

Weed Control

The use of herbicides to control weeds is often important in determining the success or failure of a crop. However, many other practices can be implemented before and after a herbicide application to help reduce weed competition. The use of these practices is termed Integrated Weed Management.

Integrated Weed Management

A farming system that uses an array of inter-dependent cultural, biological, mechanical and herbicidal weed control practices is implementing Integrated Weed Management (IWM). It is essential that IWM involve a variety of tools including the rotation and/or mixes of available herbicide groups, ensuring that weeds are exposed to a diverse range of control mechanisms. The goal of IWM is to improve the health and vigour of crops so that they may out-compete weeds emerging in the stand. This helps to reduce selection for resistance to any single control agent and to delay or prevent the development of herbicide resistant weeds.

Practicing IWM does not mean abandoning chemical weed control, just relying on it less exclusively. For example:

- You may decide to choose a taller wheat variety or a tall, viny pea variety for a certain field. These crop selections will compete strongly with weeds, possibly allowing you to skip a spray operation in more competitive crops.
- You could insert a short-term forage crop into your crop rotation. Studies show that short-term (3 year) alfalfa stands can reduce wild oat and green foxtail populations by up to 80 percent the year after breaking.
- Early sown barley may give you enough of a “jump” on the weeds that you can avoid herbicide applications.
- Use of vigorous, high-quality seed, sown shallow, can give you better crop competition than poor-quality or deeply sown crop seed.
- Banding nitrogen near the seed can give your crop an advantage over weeds.

For more information, refer to “Integrated Weed Management: Making it Work on Your Farm” factsheet, available from both Manitoba Agriculture and Saskatchewan Ministry of Agriculture.

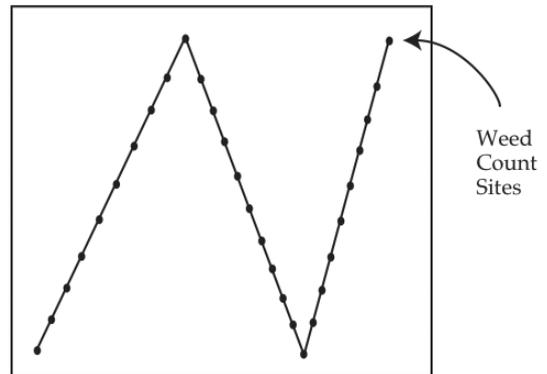
Making Spray Decisions

Field Scouting

Field scouting is an important tool for making informed spray decisions. Accurately assessing the type and number of weeds in the field will help you determine if a spray operation is necessary. The scouting pattern diagram on this page provides a guideline for scouting a field. The entire field should be walked to get a feel for the distribution and species of the weeds present. A minimum of 20 weed counts should be taken across the field. A smaller number may be used, but be aware that accuracy decreases as the number of counts gets smaller. Count the number of weeds in a 1 m² or a

0.25 m² area and divide the total number of weeds by the number of counts taken to obtain an average for the field. If using 0.25 m² samples, make sure to multiply by four so your average is for a 1 m² area.

Some weeds are not distributed uniformly and may be found in patches (for example, Canada thistle) or in low spots. As well, the type and number of weeds found along the field edges may be very different from those found inside the field. These areas should be considered separate from the rest of the field. If possible, patches, low spots, and field borders should be treated separately, as field-wide spraying may not be required. Look out for new invading weeds and patches of herbicide-resistant weeds. Herbicide-resistant weeds and new invaders should be removed (manually if necessary), regardless of their number, to prevent them from spreading and becoming a serious control problem. Mapping your field’s weed problems will allow you to monitor the spread of weed patches over time and help you assess the effectiveness of your control program.



Yield Losses Caused by Weeds

Knowing the amount of crop yield loss caused by a given weed density will help you decide if a spray operation is required. The tables on the following pages give an indication of the yield loss caused by some of the important grassy weeds.

THESE TABLES SHOULD BE USED ONLY AS A GUIDE.

The figures are based on Western Canadian research trials and will not be accurate all of the time. The yield loss values apply only to healthy, well fertilized crops with good stand establishment. Crops that are diseased or emerged unevenly will not compete well with weeds and will suffer larger yield losses than indicated in these tables. The yield loss figures are based on competition from a single weed species only. Other weeds, such as wild mustard or Canada thistle, must be controlled if the figures are to be accurate. As well, the tables are based on competition from normal height crops. Semi-dwarf or hybrid varieties may not compete as well with weeds and the figures may not be accurate in these cases.

Table 1. Yield Losses (Percent) in Wheat Caused by Wild Oats.

	Wild Oat Density – Number Per Square Metre																
	1	2	4	6	8	10	12	14	16	18	20	25	30	35	40	45	50
Wild Oats are 1 Leaf Stage Ahead of the Crop	1	2	4	6	8	10	12	14	15	17	19	22	26	29	32	34	37
Wild Oats are the Same Leaf Stage as the Crop	1	1	2	4	5	6	7	8	9	10	11	14	16	18	20	22	24
Wild Oats are 1 Leaf Stage Behind the Crop	0	1	1	2	3	3	4	5	5	6	7	8	10	11	13	14	15

Source: O'Donovan, Alberta Environmental Centre (Vegreville, Alberta)

Figure 1. Spray Decision Guideline for Wild Oats in Wheat.

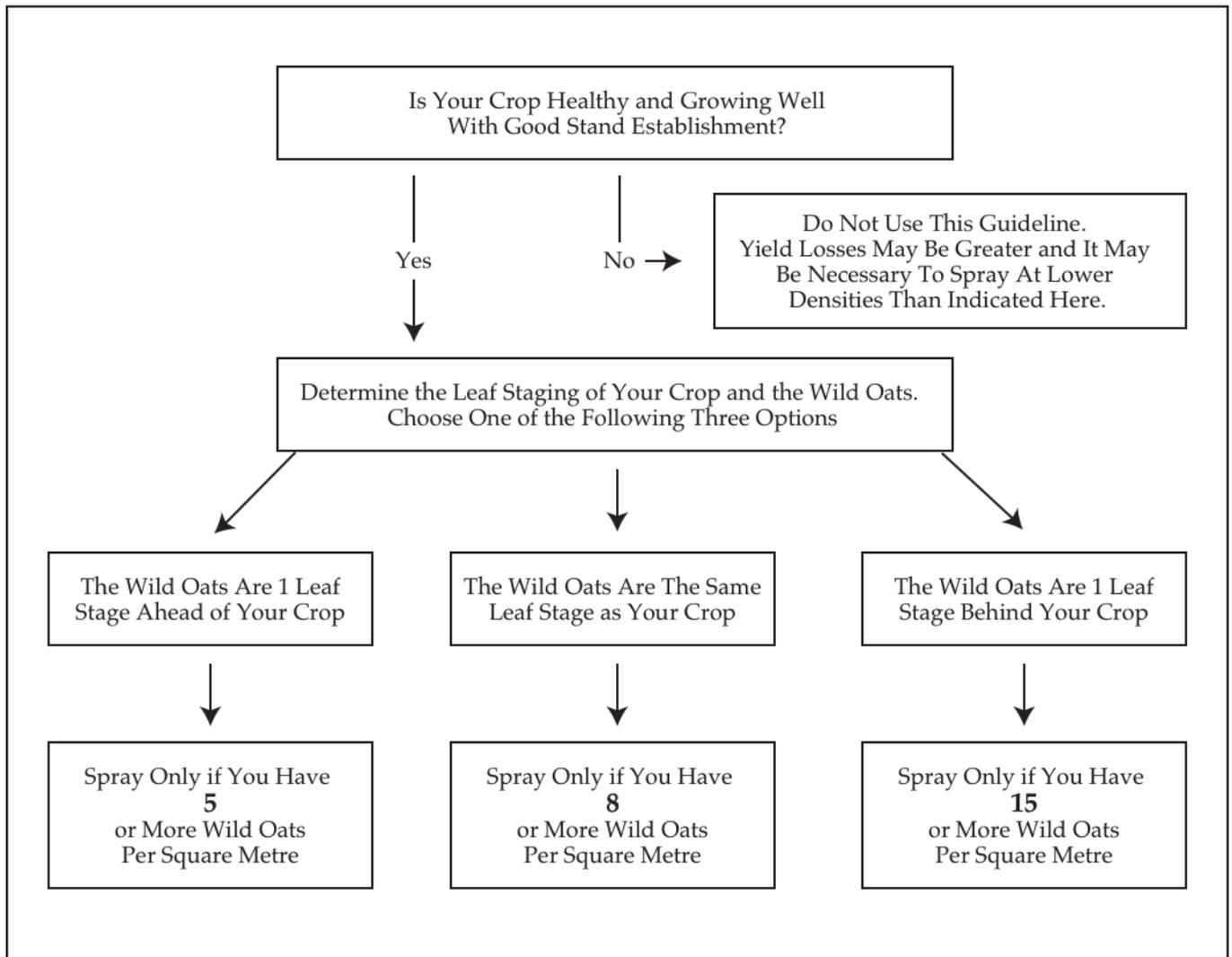
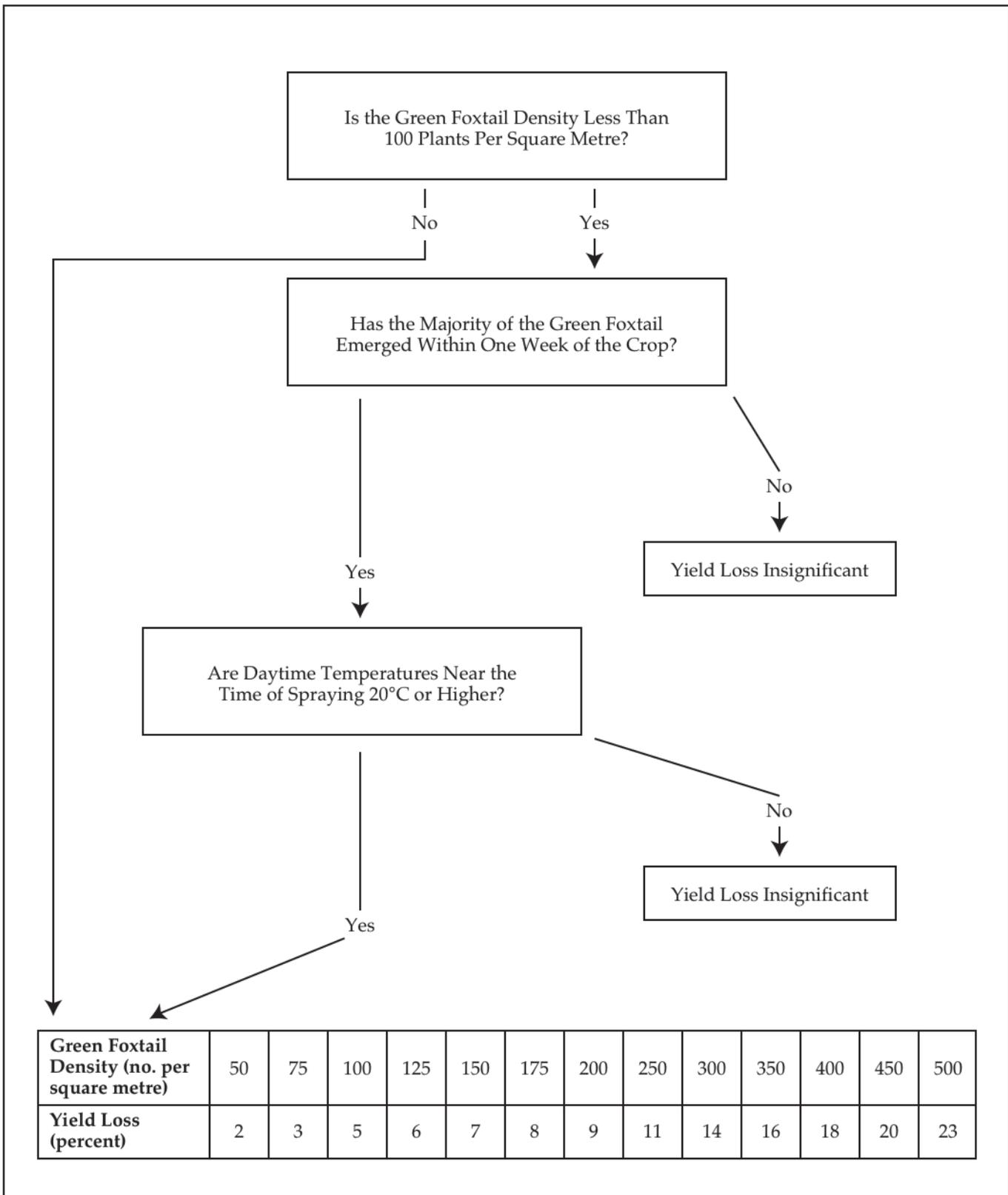


Table 2. Yield Losses (Percent) in Wheat Caused by Green Foxtail (Wild Millet).

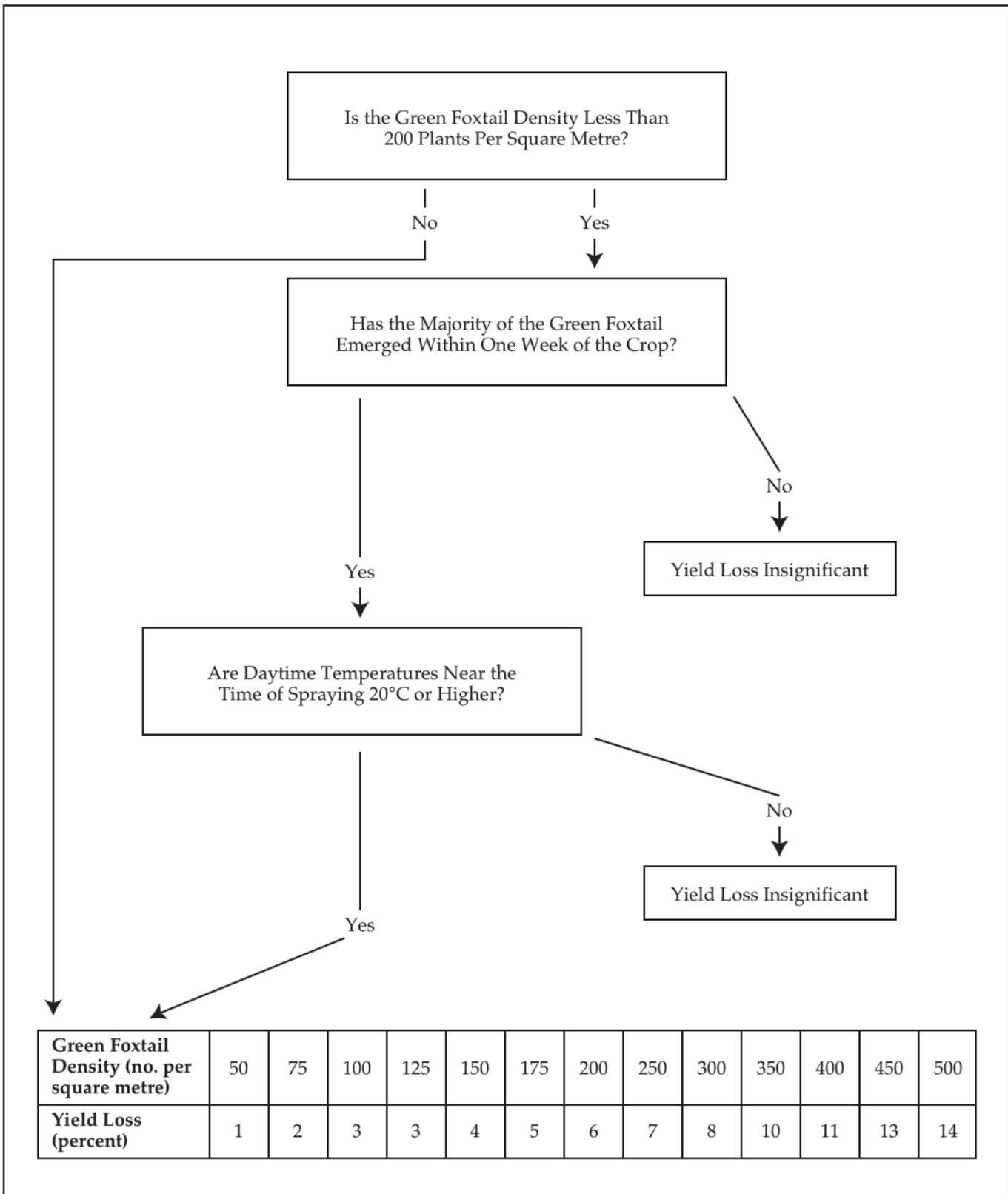


Source: O'Donovan, Alberta Environmental Centre (Vegreville, Alberta)

Table 3. Yield Losses (Percent) in Barley Caused by Wild Oats.

Crop Density (plants/m ²)	Relative Emergence	Wild Oat Density (plants/m ²)											
		1	5	10	15	20	25	30	40	50	70	100	150
300	Wild Oats are 1 Leaf Stage Ahead of the Crop	0.3	1.4	2.8	4.1	5.4	6.7	8.0	10.3	12.6	16.8	22.4	30.2
	Wild Oats are the Same Leaf Stage as the Crop	0.3	1.3	2.5	3.7	4.8	6.0	7.1	9.2	11.3	15.1	20.3	27.6
	Wild Oats are 1 Leaf Stage Behind the Crop	0.2	0.9	1.7	2.6	3.4	4.2	5.0	6.6	8.1	11.0	15.0	20.9
225	Wild Oats are 1 Leaf Stage Ahead of the Crop	0.4	1.9	3.6	5.4	7.0	8.6	10.2	13.1	15.9	20.9	27.4	36.2
	Wild Oats are the Same Leaf Stage as the Crop	0.3	1.6	3.1	4.6	6.1	7.5	8.8	11.4	13.9	18.4	24.4	32.6
	Wild Oats are 1 Leaf Stage Behind the Crop	0.2	1.0	2.0	3.0	4.0	4.9	5.8	7.6	9.3	12.6	17.1	23.6
175	Wild Oats are 1 Leaf Stage Ahead of the Crop	0.5	2.3	4.6	6.7	8.7	10.7	12.5	16.1	19.3	25.1	32.3	41.8
	Wild Oats are the Same Leaf Stage as the Crop	0.4	1.9	3.8	5.6	7.3	8.9	10.5	13.6	16.4	21.6	28.2	37.1
	Wild Oats are 1 Leaf Stage Behind the Crop	0.2	1.1	2.3	3.4	4.4	5.5	6.5	8.5	10.4	14.0	18.9	25.9

Table 4. Yield Losses (Percent) in Barley Caused by Green Foxtail (Wild Millet).



Source: O'Donovan, Alberta Environmental Centre (Vegreville, Alberta)

Table 5. Yield Losses (Percent) in Canola Caused by Wild Oats and Volunteer Cereals.

	Weed Density – Number Per Square Metre												
	1	2	4	6	8	10	12	14	16	18	20	25	30
Wild Oats	3	5	6	8	9	10	11	12	13	14	15	16	18
Volunteer Wheat	1	3	6	8	10	11	12	14	15	16	17	19	21
Volunteer Barley	3	5	8	10	12	14	15	17	18	19	20	23	25

Sources: Dew and Keys, Agriculture Canada (Lacombe, Alberta); and O'Donovan, Alberta Environmental Centre (Vegreville, Alberta)

Figure 2. Spray Decision Guideline for Wild Oats and Volunteer Cereals in Canola.

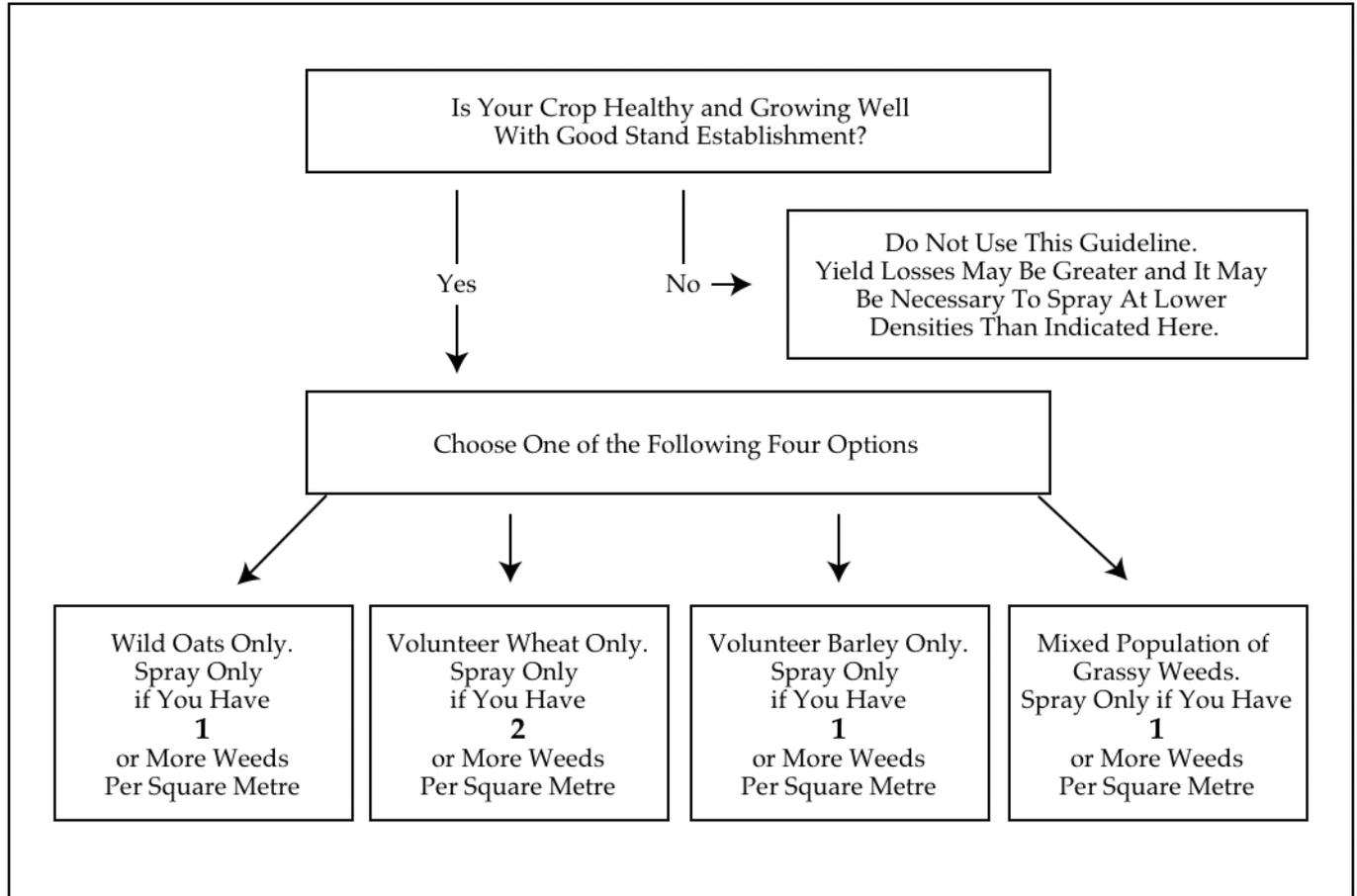
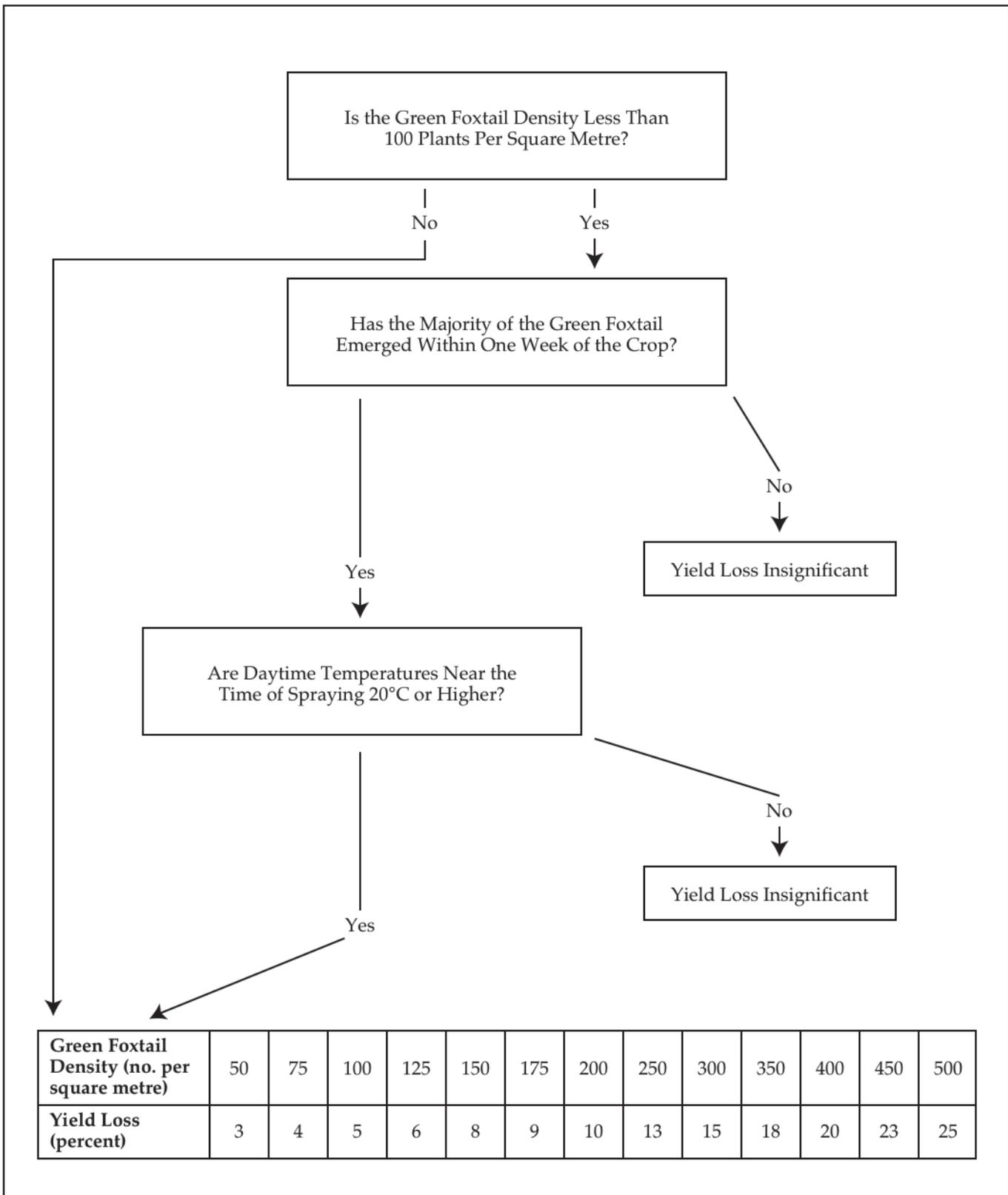


Table 6. Yield Losses (Percent) in Canola Caused by Green Foxtail (Wild Millet)



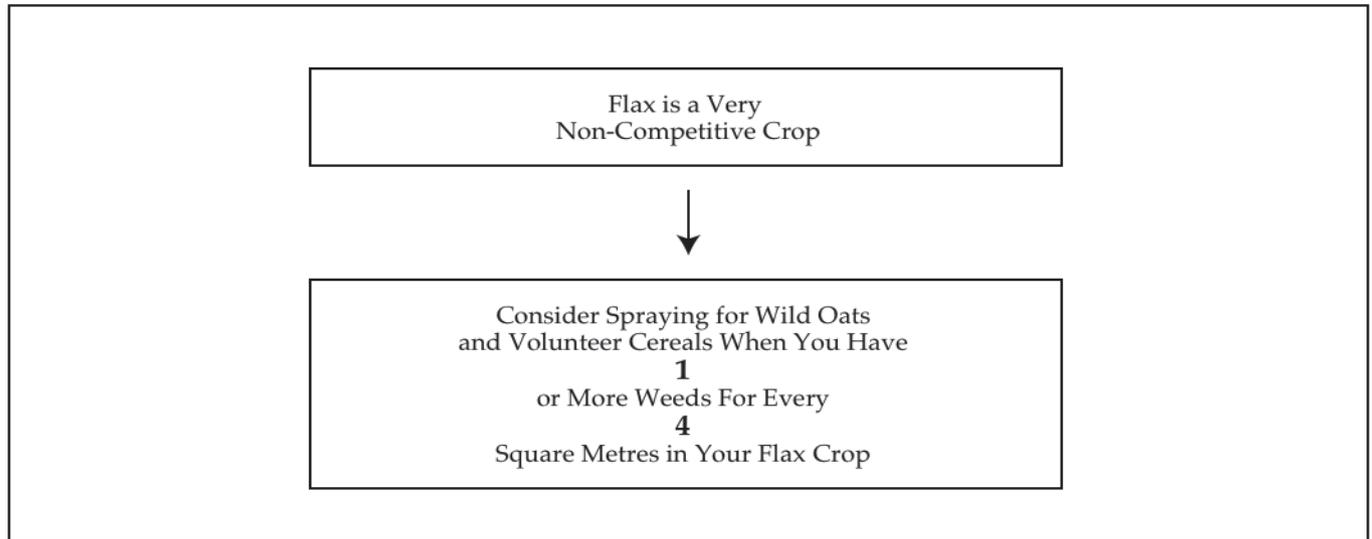
Source: O'Donovan, Alberta Environmental Centre (Vegreville, Alberta)

Table 7. Yield Losses (Percent) in Flax Caused by Wild Oats and Volunteer Cereals.

	Weed Density – Number Per Square Metre									
	1	2	3	4	5	6	7	8	9	10
Wild Oat	6	8	10	12	13	15	16	17	18	19
Volunteer Wheat	6	11	15	18	22	24	27	29	31	33
Volunteer Barley	6	12	16	21	24	28	31	34	36	39

Sources: Dew and Keys, Agriculture Canada (Lacombe, Alberta); and Friesen et al., University of Manitoba (Winnipeg, Manitoba)

Figure 3. Spray Decision Guideline for Wild Oats and Volunteer Cereals in Flax.



Deciding to Spray – Economic Thresholds and Herbicide Resistance

An economic threshold is the level of infestation at which lost yield exceeds the cost of the chemical and its application. Determining the economic threshold will help you decide if a spray operation is necessary.

The following example outlines how to determine an economic threshold:

You have a wild oat problem in your wheat. After a thorough field scouting, you have determined that your field has an average density of 35 wild oats per square metre. You know that the crop and weeds are at the same leaf stage. Using Table 1, choose the “Same Leaf Stage” row and read across to 35 wild oats per square metre. You will find that your yield loss will be about 18 percent.

You think it could be a 60 bushel per acre wheat crop, and expect to get \$6 per bushel for it. Therefore:

- 60 bushels x 0.18 (percent of expected yield loss) = 10.8 bushels per acre of lost yield
- 10.8 bushels x \$6 per bushel = \$64.80 per acre of lost income

Now find out the price of your herbicide. Most wild oat herbicides for wheat cost between \$10 to \$25 per acre. In this case, lost income exceeds the cost of the herbicide and application, so spraying would be justified.

Alternatively, you may want to use the figures provided with some of the yield loss tables. These figures provide flowcharts to assist you in making spray decisions. In some cases the flowcharts may indicate to spray when you do not have an economic threshold weed density, but most times they will prevent you from spraying unnecessarily.

Another factor to consider when deciding whether to spray is your herbicide rotation. A one in three rotation of herbicide groups is currently recommended to delay the development of herbicide resistance for weeds such as wild oats and green foxtail. Skipping a spray operation will give you an extra year of flexibility in your herbicide rotation. This means that you have one extra herbicide group to choose from the year after you skipped the spray operation. When making spray decisions, the ability to rotate herbicides should be considered in addition to the economics of spraying.

Making the Spray Decision

Remember that economic thresholds should be used only as guides when making a spray decision. Lost income caused by dockage or downgrading must also be considered. **FIELDS THAT ARE NOT SPRAYED THIS YEAR HAVE A HIGHER POTENTIAL FOR PROBLEMS THE FOLLOWING YEAR BECAUSE OF WEED SEED RETURN.** A farmer’s experience and common sense play an important role when deciding to spray. Used properly, however, the economic threshold can be an important tool in making spray decisions.

Weed Resistance to Herbicides

In recent years, the number of herbicide-resistant weeds and the areas they infest have increased.

Most herbicide-resistant weed infestations have developed following repeated use of the same herbicide (or herbicide group) for a number of years on the same field. Growers who have developed weed resistance on their farms will typically see a weed, which is normally controlled by a herbicide, escape uncontrolled after a number of years of use of the same product or product group. Individual plants may be resistant to 1.5 up to 10 or more times the normal field rate.

Herbicide Groups

To help you plan your herbicide program, the following table lists "herbicide groups." To slow down the process of developing weed resistance, tank mix products from different groups to control the same key weeds and/or use products from different groups from year to year on your fields.

Table 8. Herbicide Site of Action and Chemical Family for Resistant Weed Management

Site of Action (Group)	Common Name	Herbicide Tradename	Premix or Co-pack [†] Tradenames*
ACC-ase Inhibitor (1) Aryloxyphenoxy propionic acid "Fop"	clodinafop	<i>Horizon NG=Foothills NG=Nextstep NG, Cadillac One=Ladder All In, Aurora=Cadillac=Foax=Ladder=Signal=Slam'-R</i>	<i>Signal FSU*[†], Traxos, TraxosTwo*[†]</i>
	fenoxaprop	<i>Puma Advance =Wildcat Enhanced, Bengal WB= Cordon=MPower HellCat=Vigil WB</i>	<i>Tundra</i>
	quizalofop	<i>Assure II=Yuma GL</i>	-
Cyclohexanedione "Dim"	clethodim	<i>Select=Centurion=Antler=Arrow=Clethodim 250=MPower Independence=Shadow RTM=Patron =Statue, Arrow-All-In</i>	-
	sethoxydim	<i>Poast Ultra</i>	<i>Odyssey Ultra/Odyssey Ultra NXT*[†], Solo Ultra*[†]</i>
	tralkoxydim	<i>Achieve=Bison=Marengo=Nufarm Tralkoxydim</i>	-
Phenylpyrazolin "Den"	pinoxaden	<i>Axial</i>	<i>Axial iPak*[†], Axial Xtreme*, BroadBand*, Rezuvant[†]*, Traxos, TraxosTwo*[†]</i>
ALS Enzyme Inhibitor (2) Imidazolinone "Imi"	imazamethabenz	<i>Assert=Avert</i>	-
	imazamox	<i>Solo/Solo ADV, Mizuna, Davai 80SL</i>	<i>Altitude FX2*, Ares, Odyssey=Duet=MPower Ninja, Odyssey NXT, Odyssey Ultra/Odyssey Ultra NXT*[†], Salute*[†], Solo Ultra*[†], Tensile*[†], Viper ADV</i>
	imazapyr	-	<i>Ares, Salute*[†]</i>
	imazethapyr	<i>Pursuit=Gladiator=MPower Kamikaze=MultiStar=Phantom</i>	<i>Odyssey=Duet, Odyssey NXT, Odyssey Ultra/Odyssey Ultra NXT*[†]</i>
Sulfonylurea "SU"	ethametsulfuron	<i>Muster</i>	-
	foramsulfuron	<i>Option 2.25 OD</i>	-
	halosulfuron	<i>Permit WG</i>	-
	metsulfuron	<i>Ally, Escort</i>	<i>Express Pro, MPower X-Pro[†], Navius*, Reclaim*[†], Reclaim II*[†], Travallas*</i>
	nicosulfuron	<i>Accent /Accent Grande</i>	<i>Ultim</i>
	rimsulfuron	<i>Prism, Sortan IS</i>	<i>Ultim</i>
	thifensulfuron	<i>Pinnacle</i>	<i>Barricade II*[†], Broadside*[†]=Refine M*[†], Enforcer MSU*[†], Predicade*[†], Refine SG=Nimble=Deploy=MPower R, Retain SG*[†], Signal FSU*[†], Travallas*, Triton C*, Triton K*[†]</i>

Table 8. Herbicide Site of Action and Chemical Family for Resistant Weed Management, *continued*

Site of Action (Group)	Common Name	Herbicide Tradename	Premix or Co-pack [†] Tradenames*
Sulfonylurea "SU" <i>continued</i>	tribenuron	<i>Express SG=Spike=MPower Extra</i> <i>=Inferno WDG</i>	<i>Barricade II*[†], Broadside*[†]=Refine M*[†], Express FX*[†], Express Pro, Enforcer MSU*[†], Inferno Duo, Ko-Act*[†]=MPower X-Ko, Luxxur[†], MPower X-Pro[†], Predicade*[†], Refine SG=Nimble=Deploy=MPower R =Boost=Draft, Retain SG*[†], Signal FSU*[†], Travallas, Triton C*[†], Triton K*[†]</i>
Triazolopyrimidine "TZP"	florasulam	<i>PrePass Flex=Priority=MPower</i> <i>Battlefront=Blitz=FirstPass</i>	<i>Broadband*, Cirpreme XC*[†], MPower</i> <i>Battlefront M[†]*=Frontline XL*[†]= Topline*[†], MPower Battlefront+2,4-D[†]*=Frontline</i> <i>2,4-D*[†], HotShot*[†], Korrex II*[†], Paradigm[†], MPower Kickoff*[†]=PrePass XC*[†], MPower Battlefront CM[†]*=Spectrum*[†], Stellar*[†]=Outshine*[†], Stellar XL*</i>
	pyroxulam	<i>Simplicity</i>	<i>Rexade*[†], Tandem*[†]</i>
Sulfonylamino- carbonyltriazolinone "SACT"	flucarbazone	<i>Everest/Sierra 2.0, Everest/Sierra 3.0</i>	<i>Inferno Duo</i>
	propoxycarbazone- sodium	<i>Olympus</i>	-
	thiencarbazone	<i>Varro</i>	<i>Luxxur[†], Predicade*, Velocity m3*</i>
Mitotic Inhibitor (3) Dinitroaniline (DNA)	ethalfuralin	<i>Edge</i>	-
	trifluralin	<i>Treflan=Bonanza=Rival</i>	<i>Fortress MicroActiv*</i>
Benzamide	propyzamide	<i>Kerb (SC, 50WP)</i>	-
Growth Regulators (4) Phenoxy	2,4-D amine	<i>2,4-D, others</i>	<i>Dyvel DSp, Restore II</i>
	2,4-D ester	<i>2,4-D Ester, Salvo</i>	<i>Approve*=Leader*=Thrasher*=Thumper*, Blackhawk*([†] old form), Turboprop, Estaprop XT=Dichlorprop DX, Enforcer D*, Frontline 2,4-D*[†], Flurox- 24[†]=Rush 24[†]= MPower Foxy Pro[†],=Attain XC[†], Ko-Act*[†], Octtain XL, Reclaim*[†], Reclaim II*[†], Rexade*[†], Retain SG*, TraxosTwo*[†], Triton K*[†]</i>
	2,4-D choline	-	<i>Grazon XC</i>
	2,4-DB	<i>Embutox, Cobutox, Caliber</i>	-
	Dichlorprop (2,4-DP)	-	<i>Turboprop, Estaprop XT=Dichlorprop DX, Optica Trio</i>
	MCPA amine	<i>MCPA Amine</i>	<i>Dyvel, Optica Trio, Sword, Target, Tracker XP</i>
	MCPA ester	<i>MCPA LV ester</i>	<i>Buctril M*=Badge II*=Logic M*=Mextrol 450* =MPower Buck M, Curtail M, Enforcer M*= ForceFighter*[†], Enforcer MSU*[†], Frontline XL*, Goldwing*, Pixarro[†], Predicade*[†], MPower Foxy CM[†]=Prestige XC[†], Prestige XL, Spectrum[†]*= MPower Battlefront CM[†]*[†], Stellar*[†]= Outshine*[†], Stellar XL*, MPower Battlefront M[†]*=Topline*[†], Trophy[†]=MPower Foxy M[†]=Rush M[†]</i>
	MCPA K+	<i>Various</i>	<i>Clovitox Plus, DyVel, Topside, Tropotox Plus</i>
	MCPA Na (sodium)	-	-
	MCPB	-	<i>Clovitox Plus, Topside, Tropotox Plus</i>
	Mecoprop-p (MCBP)	<i>Mecoprop-P</i>	<i>Dyvel DSp, Optica Trio, Sword, Target, Tracker XP</i>

Table 8. Herbicide Site of Action and Chemical Family for Resistant Weed Management, *continued*

Site of Action (Group)	Common Name	Herbicide Tradename	Premix or Co-pack [†] Tradenames*
Benzoic acids	dicamba	<i>Engenia</i>	-
	• bapma salt		
	• Dimethylamine salt	<i>Oracle, Dicamba L</i>	<i>DyVel, DyVel DSp, Express FX*, Korrex II*†, Sword, Tracker XP, Triton K*</i>
	• Digycolamine salt	<i>Banvel II, Banvel VM, FeXapan=XtendiMax</i>	<i>Pulsar, Target, Roundup Xtend</i>
	• Sodium (Na) salt	-	<i>Distinct=Overdrive</i>
	• Isopropylamine	-	<i>Glykamba*</i>
Pyridine	aminopyralid	-	<i>Restore II, Reclaim*†, Reclaim II*†</i>
	aminocyclopyrachlor	-	<i>Navius*</i>
	clopyralid	<i>Lontrel=Pyralid=MPower Clobber</i>	<i>Cirpreme*†, Curtail M=MPower Clobber M, MPower Clobber G*†=Eclipse*†, Momentum, MPower Foxy CM†=Prestige XC†, Prestige XL, Salute*†, MPower Battlefront CM= Spectrum*†, Tensile*†</i>
	fluroxypyr	<i>Ikwin, MPower Foxy</i>	<i>Altitude FX2*†, Attain XC†=Flurox-24†= MPower Foxy Pro†= Rush 24†, Axial Xtreme*, Barricade II*†, Cirpreme XC*†, EnforcerD*, Enforcer M*=ForceFighter*†, Enforcer MSU*†, Infinity FX*†, Momentum, OcTTain XL, Pixarro†, Predicade*†, MPower Foxy CM†= Prestige XC†, Prestige XL, Pulsar, Retain SG*†, Rezuvant*†, Signal FSU*†, Stellar*†=Outshine*†, Stellar XL*, Tandem*†, Travallas*, TraxosTwo*†, Trophy†= MPower Foxy M†=Rush M†</i>
	halauxifen	-	<i>Paradigm*†, Pixarro*†, Rexade*†, Rezuvant*†</i>
	picloram	<i>Tordon 22K</i>	<i>Grazon XC</i>
Quinoline	quinclorac (dicots)	<i>Clever=Ingenious=MasterLine Quinclorac, Facet L</i>	<i>Triton C*</i>
Photosystem II Inhibitor (5) Triazine	atrazine	<i>Aatrex</i>	<i>Primextra II Magnum*</i>
	simazine	<i>Princep Nine-T=Simazine 480</i>	-
Triazinone	hexazinone	<i>Velpar DF CU</i>	-
	metribuzin	<i>Sencor=TriCor=Squadron=Buzzin, Metrix SC</i>	-
Photosystem II Inhibitor (6)	bentazon	<i>Basagran=Benta Super=MPower Boa, Basagran Forté</i>	<i>Viper ADV*</i>
	bromoxynil	<i>Pardner=Brotex=Bromotril II=Koril 235; Brotex 480=Loveland Bromax= MPower Bromoxynil</i>	<i>Approve*=Leader*=Thrasher*=Thumper*, Axial iPak*, Bucril M*= Badge*=Logic M*= Mextrol 450*, Conquer*†, Enforcer D*, Enforcer M*= ForceFighter*†, Enforcer MSU*†, HotShot*†, Infinity*, Infinity FX*†, Tundra*, Velocity m3*</i>
Photosystem II Inhibitor (7)	linuron	<i>Lorox=Linuron 400</i>	-
Lipid Synthesis Inhibition (8) Thiocarbamate	EPTC	<i>Eptam</i>	-
	triallate	<i>Avadex Brands</i>	<i>Fortress MicroActive*</i>

Table 8. Herbicide Site of Action and Chemical Family for Resistant Weed Management, *continued*

Site of Action (Group)	Common Name	Herbicide Tradename	Premix or Co-pack [†] Tradenames*
EPSP Synthase Inhibitor (9)	glyphosate-IPA, K, DMA	<i>several - see page 233</i>	<i>CleanStart^{††}, EclipseIII^{††}=MPowerClobberG^{††}, Flexstar GT[*], Glykamba[*], MPower Kickoff^{††}=PrePass XC^{††}, Roundup Xtend</i>
Glutamine Synthetase Inhibitor (10)	glufosinate	<i>Good Harvest, Liberty 150=MPower Vigor, Liberty 200</i>	-
Bleaching: DOXP Synthase Inhib. (13)	clomazone	<i>Command</i>	-
PPO (Protox) Inhibitor (14) Diphenyletherimine	acifluorfen	<i>Ultra Blazer</i>	-
	fomesafen	<i>Reflex</i>	<i>Flexstar GT[*]</i>
N-phenylphthalimide	flumioxazin	<i>Chateau=Valtera</i>	-
Phenylpyrazole	pyraflufen	-	<i>BlackHawk (with pyraflufen)[*], Goldwing[*]</i>
Pyrimidinedione	saflufenacil	<i>Heat LQ</i>	<i>Heat Complete^{†*}</i>
Triazolinone	carfentrazone	<i>Aim</i>	<i>Authority Charge[†], Blackhawk (with carfentrazone)^{††}, CleanStart^{††}, Conquer^{††}, Focus[*] († old form)</i>
	sulfentrazone	<i>Authority</i>	<i>Authority Charge[†], Authority Supreme^{††}</i>
Very Long Chain Fatty Acid Inhibitor (15) Acetamide	dimethenamid-P	<i>Frontier Max=Outlook</i>	-
Chloroacetamide	S-metolachlor+ safener	<i>Dual II Magnum</i>	<i>Primextra II Magnum[*]</i>
	pyroxasulfone	-	<i>Authority Supreme^{††}, Fierce[*], Focus[*] († old form), Heat Complete^{†*}</i>
Auxin Inhibitor (19)	diflufenzopyr	-	<i>Distinct[*]=Overdrive[*]</i>
Photosystem I Inhibitor (22)	diquat	<i>Reglone=Armory=Bolster=Craven=Desica=Diquat 240=Drifast=Guardsmen Diquat=MasterLine Diquat=Stage, Reglone Ion, Reward</i>	-
	paraquat	<i>Gramoxone</i>	-
Unknown (26)	quinclorac (grass)	<i>Clever=Ingenious=MasterLine Quinclorac; Facet L</i>	-
Bleaching: HPPD Inhibition(27)	pyrasulfotole	-	<i>Axial iPak^{††}, Infinity[*], Infinity FX^{††}, Tundra[*], Velocity m3[*]</i>
Pyrazolone	tolpyralate	<i>Shieldex</i>	-
	topramezone	<i>Impact=Armezon</i>	-

Adapted from WSSA Herbicide Classification System For Resistant Weed Management. Weed Technol. 17:606-608 and the NDSU Weed Control Guide.

Contact herbicides = Groups 5, 6, 7, 10, 14, and 22.

* Products contain more than one active ingredient and appear in more than one group. In some instances, both active ingredients act to kill the same weed using different modes of action. Using these products or tank mixes of products from different groups that control the same high risk weed (see the Herbicide Resistant Weeds in Western Canada chart on page 51) will slow down the process of developing weed resistance.

New herbicides do not necessarily have a unique mode of action and may fall within the groups listed in the charts.

Herbicides that have the same mode of action may not control the same weed spectrum or have the same crop safety. For example, *Assert* and *Ally* have the same mode of action; however, *Assert* controls wild oats while *Ally* does not.

† Products are packaged with multiple components in one package. Each component may also have multiple active ingredients.

How Do Herbicides Work?

There are several ways to define how herbicide work:

- **Timing (may apply to crop and/or weed and may be one timing for the crop and another for the weed):**
 - **PPI (Pre-Plant Incorporated):** the product is applied to the soil and worked in with a tillage implement prior to seeding. The product remains effective in the soil for one to several weeks, preventing weeds from emerging within the crop.
 - **PRE (Pre-Emergent Surface):** the product is applied to the soil surface and relies on rainfall to move it into the emergence zone of target weeds in the soil. The product remains effective in the soil for one to several weeks, preventing weeds from emerging within the crop. Products may allow application in the fall or in the spring prior to seeding or following seeding up until the emergence of the crop and target weeds.
 - **POST (post-emergent foliar):** the product is applied at the seedling stage of the weed and/or the crop. Early applications are usually the most beneficial to crop yield because of the removal of competition by the target weed at the crop's most vulnerable stage.
 - **Pre-harvest:** applied prior to the harvest of the crop to address weeds growing in mature.
- **Target:**
 - **Cell membrane disruptor:** causes the plant cells to produce compounds that attack the integrity of the cell membrane. Result is the spilling of cell contents into the environment and rapid drying of affected tissues.
 - **Inhibitor of essential growth component (amino acids, lipids):** blocks the production of essential building blocks for plant growth and maintenance. Target weeds stop growing and display a loss of green colour, typically in new growth first and then in older tissues as plants need to repair their tissues after environmental damage.
 - **Pigment inhibitor:** new tissues produced after exposure to the herbicide develop without colour (white). Some tissues may display red or purple tinges as a result of the presence of stress compounds called anthocyanins.
 - **Plant hormone mimic/Hormone transport inhibitor:** the herbicide produces the same response in plants as the natural hormone but susceptible plants are unable to break down these compounds as they would natural hormones. Results in unregulated growth of the plant cells causing distorted growth and a proliferation of non-functional tissue in the stem/root, blocking water flow to plant shoots. Transport inhibitors concentrate both natural and synthetic hormones in the tissues where they were produced, causing distorted growth.
 - **Seedling Root inhibitor:** stops roots growth of susceptible weeds. Susceptible weeds fail to emerge from treated soil.
 - **Seedling Shoot inhibitor:** stops shoot growth in susceptible weeds. Susceptible weeds fail to emerge from treated soil.
 - **Unknown:** the target of the herbicide is not known.
- **Movement:**
 - **Little to no plant movement:** typically soil active products. Does not move from the point where it enters the plant, or only by diffusion.
 - **Apoplastic Movement:** xylem-mobile; moves passively within free space and cell walls, upward through the transpiration stream (with water). Foliar applied products are relatively immobile. Soil active products are taken up by the root and transported to the upper portions of the plant.
 - **Symplastic Movement:** phloem-mobile – enters the cell where it is actively moved within the plant to areas of rapid growth along with other nutrients and sugars.
- **Spectrum:**
 - **Non-selective:** controls or injures most plants, except for those crops that have been bred to tolerate the herbicide.
 - **Selective:** controls weeds within a crop. Specific herbicides may be specific to control of the following weed types
 - Broadleaf
 - Grass
- **Biochemistry:**
 - The "Group" numbering system, developed by Weed Science Society of America (WSSA), and was adopted by the Pest Management Regulatory Agency of Health Canada for use on Canadian labels.
 - This system uses the herbicide's chemistry to summarize their general Mode of Action on weeds. There are also sub-divisions within these Groups (see Table 8 on page 45) that may have differing resistance patterns.
 - All herbicides within a Group share a common mode of action and resistance mechanism.
 - Herbicides within a Group may have different basic chemical structures. The difference in these basic structures are captured by the sub-group.
 - In general, weeds resistant to one herbicide within a Group (or sub-group where they are available) will be resistant to all herbicides within the Group/sub-group. There are exceptions to this rule. Cross resistant between sub-groups within a Group is common.
 - Resistance management strategies are required wherever resistance is known or there is a risk of resistance development.
 - Heavy reliance on herbicides without the integration of other non-herbicide management practices raises the risk of resistance evolution greatly.

After applying a herbicide, fields can be scouted to determine the effectiveness of the treatment. The symptoms of different herbicide groups, and the approximate time it takes to develop these symptoms, are listed in the following table. Weed patches that are not affected should be noted and checked, as they may be herbicide resistant. Note that symptoms may take longer to develop when conditions are not conducive to rapid plant growth.

The following table gives a brief description of symptoms that may be exhibited if plants are injured by a herbicide. The symptoms of each group are addressed for both foliar and soil exposures.

Table 9. The Mode of Action, Site of Uptake and Symptoms of Different Herbicide Groups

Herbicide Group	Mode of Action	Site of Uptake	Weed symptoms/timing	
			Grass weeds	Broadleaf weeds
1	Systemic	Foliar	Reduced growth, yellowing of growing point in 1 to 3 weeks. Newest leaf of affected plant pulls out easily in 3 to 5 days.	Tolerant
2	Systemic	Foliar/Soil	Newest leaves yellowed in 3 to 10 days, dead in 1 to 3 weeks.	Newest growth discolored (red/yellow/purple) and/or miniaturized; the whole plant is involved in 1 to 3 weeks.
3	Systemic	Soil	Reduced emergence, poor root development of emerged plants. Roots often swollen/stunted and root tips darkened.	Reduced emergence, poor root development of emerged plants.
4	Systemic	Foliar	Tolerant to moderate rates. High rates cause symptoms similar to drought. Improper timing may cause kernel abortion in cereal crops.	Abnormal growth (twisted stems, cupped leaves) in 2 to 10 days.
5	Systemic	Soil	Wilted and yellowed oldest leaves beginning at leaf margins, death in 7 to 10 days.	
	Contact	Foliar	Yellowed oldest leaves, death within days.	Yellowed/bleached oldest leaves where spray contacts, death within days.
6	Contact	Foliar	Some leaf tip burn or white tissues possible.	Yellowed leaves in 2 to 4 days, death in 1 to 2 weeks.
7	Systemic	Soil	Yellowed and stunted plants, death in 10 to 14 days.	
	Contact	Foliar	Interveinal yellowing of oldest leaves, death within days.	
8	Contact	Foliar	Yellowed leaves in 3 to 7 days, stunted plants.	Tolerant
	Systemic	Soil	Reduced emergence, emerged leaves dark green/blue.	
9	Systemic	Foliar	Wilted, yellowed leaves in 7 to 10 days. Newest growth is impacted first followed by the rest of the plant.	
10	Contact	Foliar	Wilted, bleached leaves in 3 to 5 days, death in 1 to 2 weeks.	
11	Systemic	Foliar	Plants wilted in 2 to 3 days, bleached and purpling leaves in 1 to 2 weeks.	Plants wilted in 2 to 3 days, bleached leaves in 1 to 2 weeks. Perennial plants die slowly.
13	Systemic	Soil	Bleached leaves, susceptible seedlings die shortly after emergence.	
14	Contact	Foliar	Some leaf burn at contact points or leaf edges.	Leaves yellowed and desiccated in 1 to 3 days. (Post-emergence applications)
	Systemic	Soil	Bleaching and yellowing, death prior to or shortly following emergence	
15	Systemic	Soil	Reduced emergence, emerged plants stunted.	
19	Systemic	Foliar	Twisting of older leaves, new leaves fail to expand, plant death in 2 to 4 weeks.	
22	Contact	Foliar	Leaves wilted within hours, desiccated in 1 to 3 days.	Leaves wilted in 1 to 3 days, desiccated and dead in 3 to 7 days.
26 (grass weeds only)	Systemic	Foliar	Immediate cessation of growth, rapid desiccation of new leaves and purpling and yellowing of older tissues.	See Group 4.
27	Systemic	Foliar	Some bleaching and whitening of leaves.	Leaves bleached and whitened in 2 to 10 days and death in 7 to 10 days.

How to Identify Weed Resistance

It is important to avoid confusing herbicide failure caused by resistance with herbicide failure caused by various other factors (such as weather or application errors). When a herbicide fails to control weeds because of weather or application factors, that herbicide may work in the field the next season. But when herbicides fail because of the development of resistance, they will fail in subsequent years, regardless of weather or application procedures.

Herbicide resistance should be suspected under the following conditions:

- A weed species that the herbicide controlled in previous seasons now escapes the treatment, while other weeds that appear on the label continue to be controlled in the field.
- The escapes cannot be attributed to adverse weather or emergence after application (if a post-emergence product is in question).
- Irregular-shaped patches of a weed develop where the herbicide gives little or no control.
- Records of the past history of the field show repeated use of the same herbicide, or combinations of herbicides, that kill the weed in question in the same way.

Table 10. Herbicide-Resistant Weeds in Western Canada

Weed	Herbicide Group	Locations Confirmed
Barnyard grass	Group 2	MB
Canada Fleabane	Group 9	Occurs in several US states
	Multiple Resistant: Groups 2 & 9	Occurs in Ontario
Cleavers	Group 2	AB, MB, SK
	Group 4	AB
	Multiple combinations of: Groups 2 & 4	AB
Chickweed	Group 2	AB, MB, SK
Cow Cockle	Group 2	AB
Downy Brome	Group 2	Occurs in Montana
Foxtail, green	Group 1	AB, MB, SK
	Group 2	MB, SK
	Group 3	AB, MB, SK
	Multiple combinations of: Groups 1 & 3	MB, SK
Foxtail, yellow	Group 1 + 2	MB
Hemp-nettle	Group 2	AB, MB
	Group 4	AB
	Multiple combinations of: Groups 2 & 4	AB
Kochia	Group 2	AB, MB, SK (overwhelming majority)
	Group 4 (dicamba and fluroxypyr)	SK
	Group 5	Occurs in North Dakota and Montana
	Group 9 (glyphosate)	AB, MB, SK
	Multiple Resistant: Groups 2 & 9	AB, MB, SK
	Multiple Resistant: Groups 2 & 4	SK
	Multiple Resistant: Groups 2, 4 (dicamba) & 9	AB
Multiple Resistant: Groups 2, 4 & 9	AB	
Lamb's-quarters	Group 2	SK
	Group 5	Occurs in Ontario
Marshelder (false ragweed)	Group 2	Occurs in North Dakota
Mustard, Ball	Group 2	AB
Mustard, Wild	Group 2	AB, MB, SK
	Group 4	MB
	Group 5	MB

Table 10. Herbicide-Resistant Weeds in Western Canada, *continued*

Weed	Herbicide Group	Locations Confirmed
Narrow-leaved hawk's-beard	Group 2	AB
Persian Darnel	Group 1	AB, SK
Ragweed, giant	Group 2 & 9	Occurs in Ontario, Minnesota
Redroot pigweed	Group 2	MB, SK
	Group 5	Occurs in Ontario
Russian thistle	Group 2	AB, SK
	Group 9	Occurs in Montana
Shepherd's-purse	Group 2	AB, MB, SK
Smartweed, pale	Group 2	MB
Spiny Annual Sow-thistle	Group 2	AB, MB
Stinkweed	Group 2	AB, MB, SK
Waterhemp	Group 2 & 9	Occurs in North Dakota, Ontario
	Group 2, 5, 9 & 14	Ontario
Wild buckwheat	Group 2	AB
Wild oat	Group 1	AB, MB, SK
	Group 2	AB, MB, SK
	Group 8	AB, MB, SK
	Multiple combinations of: Groups 1 & 2, Groups 1 & 8, Groups 2 & 8, Groups 1, 2 & 8, Groups 1, 2, 8 & 25, Groups 1, 2, 8, 14, 15 (MB)	AB, MB, SK

See Table 8 on page 45 for a complete list of products in each Herbicide Resistance Group.

If Weed Resistance Develops on Your Farm

It is important to identify weed resistance before it spreads across your farm. Plan on conducting a "patch watch" scouting program this summer to identify suspicious patches before they become difficult to manage. Resistant weed patches have been identified on fields where producers were unaware of their existence.

Your patch watch program should begin shortly after spraying and continue through July after the crop has headed out and most weeds are visible from a distance. If you find suspicious looking patches, contact your local agricultural office or crop protection company representative to assist you in confirming weed resistance. If resistance is suspected:

1. Map the location of the patches and mark them with stakes so you will remember their location.
2. Mow, cultivate or spot spray the patches. Resistant patches should not be allowed to produce seed.
3. Patchy areas should NOT be harvested with the rest of the field. Harvest these areas separately, and make sure to clean all harvesting equipment before leaving the area to prevent the spread of seeds across the field or a neighbouring field.
4. Check patches each year to monitor their spread. Keeping your resistant weeds isolated to a manageable patch is easier than dealing with an entire field of resistant weeds.

Adjuvants and Your Herbicide

Adjuvants are important ingredients in chemical weed control. Many herbicides must be applied with an adjuvant. If it is forgotten, the level of weed control can vary widely, and re-spraying may be necessary.

Many products have adjuvants built into the formulation. Others require adjuvant addition (e.g. *Refine SG*). Some adjuvants were developed specifically for one herbicide, and these are either pre-packaged with the herbicide, or are identified by name on the label (e.g. *Turbocharge* for *Achieve*, *Amigo* for *Select/Centurion*). Consult a company representative to determine the support for pesticide adjuvant combinations not listed on the product label.

With some products, adjuvants need to be added only under certain conditions. For example, glyphosate products have built-in adjuvants, but require additional adjuvant when low rates (pre-seeding or chem-fallow), high water volumes, or certain tank mixes are used.

Adjuvants should be added only when required. If one is not required, addition can reduce weed control or injure crops. Product labels will describe when an adjuvant is required, and what type should be used.

There are two main classes of adjuvants: “activators or spray modifiers” (including surfactants and crop oils), and “utility modifiers” (including pH adjusters, water conditioners, low-drift adjuvants, and anti-foaming agents). The most important class of adjuvants is the activators. Surfactants, the main group within the activators, are “surface active agents.” These chemicals produce effects at points where two substances touch, such as between two liquids (herbicide and water) or between a solid and a liquid (herbicide and leaf surface). Some surfactants act as dispersing agents, helping to keep a pesticide suspended in water. Others work on the plant, improving the wetting, sticking and penetrating characteristics of the herbicide droplets. Oil-based adjuvants contain petroleum or vegetable oil and an emulsifier that suspends

the oil in tiny droplets within the spray solution. Oil-based adjuvants typically assist in herbicide penetration into the leaf.

There are two basic types of surfactants (ionic and non-ionic), of which the non-ionic are most common. The following table lists the surfactants registered for use with herbicides in Western Canada.

Adjuvants and Registered Pesticides:

Note – some products are specific about the concentration of active ingredient in the surfactant for product performance. Check with the product page in this guide or the product label.

Trade Name	Composition	Registered Pesticides (Adjuvant label only)
<i>Addit Adjuvant</i> (PCP#29263)	37% surfactant blend	<i>Bison</i>
<i>Adigor Adjuvant</i> (PCP#28151)	48.8% methylated rape seed oil 28.2% ethoxylated alcohols	<i>Broadband</i>
<i>Agral 90</i> (PCP#24725),	90% nonylphenoxy polyethoxy ethanol	<i>Accent, Altitude FX, Battalion</i> , diquat, <i>Escort</i> , flucarbazone, glyphosate, <i>Muster, Pinnacle, Prism</i> , imazethapyr, metsulfuron, thifensulfuron/tribenuron, <i>Reflex, Reward, Triton K, Ultim</i> (Not all adjuvants may be used with all herbicides listed)
<i>Agral 90</i> (PCP#11809), <i>IPCO Agsurf Original</i> (PCP#15881)	92% nonylphenoxy polyethoxy ethanol	
<i>Agsurf II</i> (PCP#30071)	92% Alcohol ethoxylate	
<i>Amigo Adjuvant</i> (PCP#22644), <i>X-Act</i> (PCP#28225), <i>Patron Adjuvant</i> (PCP#32496), <i>MPower Tonto</i> (PCP#32615), <i>Surf-Act</i> (PCP#32313)	30% phosphate ester surfactant	clethodim ^{†*}
<i>Assist Oil Concentrate</i> (PCP#16937), <i>CropOil 83/17 Adjuvant</i> (PCP#30978), <i>XA Oil Concentrate</i> (PCP#11769), <i>Score Adjuvant Liquid</i> (PCP#12200)	83% paraffin based mineral oil 17% surfactant blend	<i>AAtrex, Basagran</i> (all crops), <i>Ultra Blazer</i> , clodinafop ^{†*} , clodinafop + bromoxynil/ MCPA ester ^{†*} , <i>Impact</i> , quizalofop (<i>Contender, Yuma GL</i>), <i>Simplicity</i> (Not all adjuvants may be used with all herbicides listed)
<i>Citowett Plus Adjuvant</i> (PCP#12766), <i>Super Spreader</i> (PCP#17402)	50% octylphenoxypolyethoxy ethanol	<i>Accent, AAtrex, Basagran</i> (peas), <i>Escort</i> , flucarbazone, metsulfuron, <i>Muster, Pinnacle, Prism</i> , thifensulfuron/tribenuron, <i>Triton K, Ultim</i>
<i>Companion Adjuvant</i> (PCP#15882)	70% octylphenoxypolyethoxy-(9)- ethanol	Glyphosate, metsulfuron, <i>Muster</i>
<i>Enhance</i> (PCP#29270), <i>Nufarm Enhance</i> (PCP#29952), <i>ADAMA Adjuvant 80</i> (PCP#30419)	80% triglyceride ethoxylate 10 POE	<i>Accent</i> , diquat, <i>Escort, Folicur 432</i> , glyphosate, <i>Gramoxone, Lontrel, Muster, Pinnacle, Prism</i> , imazethapyr, metsulfuron, thifensulfuron/tribenuron, <i>Signal, Signal FSU, Reflex, Reglone, Reward, Ultim, Valtera</i>
<i>Hasten Spray Adjuvant</i> (PCP#27420)	73.3% methyl and ethyl oleate (esterified vegetable oil)	<i>Impact</i>
<i>HiActivate Non-Ionic Liquid Spreader Activator</i> (PCP#31817)	900 g/L alkylaryl polyoxyethylene glycols, free fatty acids & isopropyl alcohol	<i>Accent, Assure, Ally, Pursuit, Ultim</i>
<i>Intake Adjuvant</i> (PCP#31243)	586 g/L paraffinic oil 242 g/L alkoxyated alcohol non-ionic surfactants	<i>Tralkoxydim (Liquid Achieve, Marengo)</i> , <i>Simplicity, Tandem, Refine SG, Ally, Reclaim II, Escort</i>
<i>LI 700</i> (PCP#23026)	80% surfactant blend	Diquat, flucarbazone, glyphosate, <i>Fulfill</i> insecticide, quizalofop (<i>Assure II</i>)

Trade Name	Composition	Registered Pesticides (Adjuvant label only)
<i>Liberate Adjuvant</i> (PCP#29491)	100% lecithin, methyl esters of fatty acids and alcohol ethoxylate	Flucarbazone, <i>Pursuit</i> , <i>Reflex</i> , <i>Odyssey</i> , quizalofop (<i>Assure II</i>), thifensulfuron/tribenuron, tribenuron, metsulfuron (<i>Accurate</i>)
<i>Merge Adjuvant</i> (PCP#24702)	50% surfactant blend 50% solvent (petroleum hydrocarbons)	<i>Ares*</i> , <i>Heat WG</i> , <i>Heat LQ*</i> , quinclorac, <i>Odyssey</i> , <i>Odyssey Ultra*</i> , <i>Poast Ultra</i> , quizalofop, <i>Solo</i> , <i>Tensile</i> , <i>Triton C</i>
<i>MSO Concentrate with Leci-Tech</i> (PCP#28385), <i>IPCO Contender MSO Adjuvant with Leci-Tech</i> (PCP#32198)	70% methylated seed oil of soybean	imazethapyr, <i>Odyssey</i> , <i>Poast Ultra</i> , quizalofop (<i>Contender</i>)
<i>Sure-Mix Surfactant</i> (PCP#25467)	60% paraffinic petroleum oil 40% surfactant blend	quizalofop
<i>Turbocharge Adjuvant</i> (PCP#23135) <i>Adjuvant for Nufarm Tralkoxydim</i> (PCP#30828) <i>Carrier</i> (PCP#30639)	50% mineral oil 39.5% surfactant blend	<i>Paradigm</i> , tralkoxydim ^{†*} , clethodim (<i>Statue</i> only)*

* The adjuvant is packaged with the product.

† Note: All products may not be registered with all adjuvants. See product page in the following sections to determine which adjuvants are registered for each herbicide.

Crop and Herbicide Recommendation Tables

The following charts give general weed control comparisons based on rates, timing and other application instructions and precautions as outlined in this Guide.

A dot (•) will indicate if the weed is listed on a product label. Where rate ranges are listed for controlling a given weed, ratings are based on results achieved with the higher rate unless noted otherwise. 'S' indicates weed suppression.

Weed Control Tables

Table 1. Weed Control in Barley

HERBICIDE	Page	Barley Grass	Foxtail, Green and Yellow	Volunteer Corn	Wild Oats	Buckwheat, Wild	Catchfly, Night-flowering	Chickweed	Cleavers	Cocklebur	Dandelion	Flixweed	Hemp-nettle	Kochia	Lambs-quarters	Mallow, Round-leaved	Mustard, Wild	Pigweed, Redroot	Russian Thistle	Shepherd's-purse	Smartweed, Annual Species	Sow-thistle (Perennial)	Stinkweed	Thistle, Canada	Volunteer Flax	Volunteer Mustard, Canola	Volunteer Sunflowers
2,4-D	83						*		*	*	⁵	*	*	*	*	*	*	*	*	*	TG	*	TG		*	S	
Avadex	106				*																						
Axial	109	*	*		*																						
Axial iPak	111	*	*		*	*		*	*		⁴	*	*	*	*	S	*	*	*	*	*	S	*	S		*	
Axial Xtreme	112	*	*		*	S		*	*				*	*													
Barricade II	114				*	*	*	*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Broadband	124	*	*		*	*		*	*				S					S				S			*	*	
Bromoxynil	126				*	*		*	*					*	*	⁷	⁷	*	*	*	*		⁷		*	*	
Bromoxynil/2,4-D	130				*	*		*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Bromoxynil/MCPA	132				*	*		*	*			*	*	*	*	*	*	*	*	*	*	TG	*	TG	*	*	
Bromoxynil+MCPA+Fluroxypyr	136				⁷	*	⁷	⁷	⁷	⁷	⁷	⁷	⁷	*	*	*	S	⁷	⁷	⁷	⁷	⁷	TG	⁷	*	⁷	
Cirpreme/MCPA	140				*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Clopyralid	151				*	*		*	*													TG	*		*	*	
Clopyralid/MCPA	154				*	*		*	*	³	*		S	*	*	*	⁷		⁷	⁷	⁷	TG	*	*	⁷	*	
Clopyralid/MCPA+fluroxypyr	156				*	*		S	*	³	*	S	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Dicamba + MCPA/2,4-D	163				*	*		*	*			¹	*	*	*	*	*	*	*	*	*	TG	*	TG	*	*	
Dicamba/Mecoprop/MCPA	168				*	*		*	*			*	*	*	*	*	*	*	*	*	*	*	*	TG	*	*	
Dichlorprop/2,4-D	170				*	³		*	*		S	*	*	*	*	*	*	*	*	*	*	*	*	TG	*	*	
DyVel	179				*	*		S	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
DyVel DSp	181				*	*		S	*			*	*	*	S	*	*	*	*	*	*	*	*	TG	*	*	
Enforcer D	186				⁷	*		*	*		TG	*	*	*	⁷	*	⁷	⁷	⁷	*	*	*	*	S	⁷	*	
Enforcer MSU	188				*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	TG	*	*	*
Fenoxaprop	195	*	*		*	*		*	*																		
Florasulam	203				*	*		*	*				S	*	*	*	S	*	*	*	*	S	*		*	*	
Florasulam + Clopyralid/MCPA	207				*	*		*	*		³	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Florasulam + MCPA	210				*	*		*	*		⁵	*	*	*	*	*	*	*	*	*	*	TG	*	TG	*	*	
Florasulam/fluroxypyr + MCPA	212				*	*		*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Fluroxypyr	217				S	*	*	*	*			S	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Fluroxypyr + 2,4-D, OcTtain XL	220/ 305				*	*		S	*		³	*	S	*	*	*	*	*	*	*	*	S	*	S	*	*	
Fluroxypyr + MCPA	222				S	*	*	*	*			³	*	*	*	*	*	*	*	*	S	*	*	*	*	*	
Fortress MicroActiv	226	*	*		* S	*		*	*				S	S			S	S	*	*	*	*	*	*	*	*	
Imazamethabenz	257				* S	*		*	*														*	*	*	*	
Infinity	269				*	*		*	*		⁴	*	*	*	*	S	*	*	*	*	*	S	*	S	*	*	
Linuron + MCPA amine	279		S		*	*		*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
MCPA	284				*	*		*	*		⁸	S	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
MCPA K	284				*	*		*	*			S	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Mecoprop-p	290				*	*		*	*															TG	*	*	
Metribuzin	291				*	*		*	*				⁷	*	*	*	*	*	*	*	*	*	*	*	*	*	
Metsulfuron	295				*	*		*	*			*	*	*	*	*	*	*	*	*	*	³	*	*	*	*	
Momentum	297				*	*		*	*				*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Optica Trio	311				*	*		*	*				*	*	*	*	*	*	*	*	*	*	*	TG	*	*	
Paradigm	318				*	*		*	*				S	S	*	*	*	*	*	*	*	S	*	S	*	*	
Pixxaro	325				*	*		*	*			*	*	*	*	*	*	*	*	*	*	*	*	S	*	*	
Pulsar	335				*	*		*	*				*	S			S	*	*	*	*	*	*	*	*	*	
Quinclorac	337	*	*		*	*		*	*			*	*	*	*	*	*	*	*	*	*	S	*	*	*	*	
Retain	350				*	*		*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	²	*
Rezuvant	354	*	*		*	*		*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Thifensulfuron/tribenuron	373				*	*		*	S			*	*	*	S	*	*	*	*	*	*	S	*	S	²	*	
Thifensulfuron/tribenuron + MCPA	377				*	*		*	S		⁶	³	*	*	*	S	*	*	*	*	*	S	*	S	*	*	
Tralkoxydim	382	*	*		*	*		*	*																		
Travallas	385				*	*		*	*			⁴	*	*	*	*	*	*	*	*	*	*	*	TG	*	²	*
Tribenuron + 2,4-D	393				*	*		*	*			⁵	*	*	*	*	*	*	*	*	*	*	*	TG	*	*	
Trifluralin (green foxtail control)	396		*		*	*		*	*																		
Trifluralin (grassy and broadleaf)	396	*	*		*	*		*	*																		
Triton C	401				*	*		*	*			*	*	*	*	*	*	*	*	*	*	S	*	S	S	²	*
Triton K	403				*	*		*	*			⁶	*	*	*	*	*	*	*	*	*	*	*	TG	*	*	*
Tundra	405	*	*		*	*		*	*			⁴	*	*	*	S	*	*	*	*	*	S	*	S	*	*	*

* Control. S – Suppression. TG – Top growth control.

¹ MCPA K mixes only. ² Will not control CLEARFIELD canola varieties. ³ Spring seedlings only. ⁴ Up to 25 cm diameter. ⁵ Seedlings and overwintered rosettes.⁶ Less than 15 cm diameter. ⁷ Controlled at higher rates. ⁸ Fall application.

Table 2. Weed Control in Oats

HERBICIDE	Page	Barnyard Grass	Foxtail, Green and Yellow	Wild Oats	Buckwheat, Wild	Catchfly, Night-flowering	Chickweed	Cleavers	Cocklebur	Dandelion	Flixweed	Hemp-nettle	Kochia	Lamb's-quarters	Mallow, Round-leaved	Mustard, Wild	Pigweed, Redroot	Russian Thistle	Shepherd's-purse	Smartweed, Annual Species	Sow-thistle (Perennial)	Stinkweed	Thistle, Canada	Volunteer Flax	Volunteer Mustard, Canola	Volunteer Sunflowers
2,4-DB	86				• ⁵					TG				•	•	•			• ⁵	TG ³	•	TG ³				
Bromoxynil	126				•				•					•	• ⁵	• ⁵	• ³			•		• ⁵				
Bromoxynil/MCPA	132				•	•			•					•	•	•	•			•	TG	•	TG		•	•
Clopyralid	151				• ⁵																TG	•				
Clopyralid/MCPA	154				•				•	• ³	•		S	•		• ⁵				• ⁵	TG	•	•		• ⁵	•
Dicamba + MCPA	163				•			•	•			S	•	•		•	•	•		•	TG	•	TG		•	
Dicamba/Mecoprop/MCPA	168				•	•		•	•			•	•	•		•	•	•		•	•	•	TG		•	•
DyVel	179				•			S	•			•	•	•		•	•	•		•	TG	•	TG	•	•	•
Florasulam + Clopyralid/MCPA	207				•	•		•	•	• ⁴	• ³	•	•	•		•	•	•		•	•	•	•	•	•	•
Florasulam + MCPA	210				•	•		•	•	• ⁵	•	•	•	•		•	•	•		•	TG	•	TG		•	•
Linuron + MCPA amine	279	S			•	•		•	•			•	•	•		•	•	•		•						
MCPA	284							•				S	•	•		•	•	•		•						
MCPB/MCPA	288											S	•	•		•	•	•		•		TG	•	•		•
Mecoprop-p	290						•	•						•		•	•	•		•			TG			
Optica Trio	311				•	•	•	•					•	•		•	•	•		•			•	TG		•
Prestige XC/Prestige XL (see Clopyralid/MCPA+Fluroxypyr)	156				•		S	•		• ³	•	S	•	•		•	•	•		•	•	•	•	•	•	•
Stellar/Stellar XL (see Florasulam/fluroxypyr + MCPA)	212				•	•	•	•				•	•	•		•	•	•		•				•	•	•
Thifensulfuron/tribenuron	373				•	•	S					•	•	•	S	•	•	•		•	S	•	S		• ²	•
Thifensulfuron/tribenuron + MCPA	377				•	•	S					•	•	•	S	•	•	•		•	S	•	S		•	•

• Control. S – Suppression. TG – Top growth control.

² Will not control CLEARFIELD canola varieties. ³ Spring seedlings only. ⁴ Seedlings and overwintered rosettes. ⁵ Controlled at higher rates.

Table 3. Weed Control in Rye or Triticale

HERBICIDE	Page	CROP F - Fall Rye, R - Spring Rye, T - Triticale	Barnyard Grass	Foxtail, Green and Yellow	Volunteer Corn	Wild Oats	Buckwheat, Wild	Catchfly, Night-flowering	Chickweed	Cleavers	Cocklebur	Dandelion	Flixweed	Hemp-nettle	Kochia	Lamb's-quarters	Mallow, Round-leaved	Mustard, Wild	Pigweed, Redroot	Russian Thistle	Shepherd's-purse	Smartweed, Annual Species	Sow-thistle (Perennial)	Stinkweed	Thistle, Canada	Volunteer Flax	Volunteer Mustard, Canola	Volunteer Sunflowers
2,4-D ³	83	F/R									•	• ²	•		•	•			•	•	•	•	TG	•	TG		•	S
Bromoxynil ¹	126	F					•				•				•	•		• ²	• ³	•	•	•		• ³				
Bromoxynil/MCPA ¹	132	F					•	•			•				•	•		•	•	•	•	•	TG	•	TG		•	•
Dicamba + 2,4-D ²	163	R					•	•			•				•	•		•	•	•	•	•	TG	•	TG		•	•
Infinity	269	T					•	•	•		• ¹	•	•	•	•	•	S		•	•	•	•	S	•	S		•	
MCPA ³	284	F/R									•			S	•	•		•	•	•	•	•		•				
Tralkoxydim	382	F/R/T	•	•		•																						

• Control. S – Suppression. TG – Top growth control.

¹ Up to 25 cm diameter. ² Seedling stage only. ³ Controlled at higher rates.

Table 4. Weed Control in Wheat (Spring, Durum and Winter)

HERBICIDE	Page	CROP: W - Winter, S - Spring, D - Durum	Barnyard Grass	Foxtail, Green	Foxtail, Yellow	Annual bromes	Volunteer Corn	Wild Oats	Buckwheat, Wild	Catchfly, Night-flowering	Chickweed	Cleavers	Cocklebur	Dandelion	Flixweed	Hemp-nettle	Kochia	Lamb's-quarters	Mallow, Round-leaved	Mustard, Wild	Pigweed, Redroot	Russian Thistle	Shepherd's-purse	Smartweed, Annual Species	Sow-thistle (Perennial)	Stinkweed	Thistle, Canada	Volunteer Flax	Volunteer Mustard, Canola	Volunteer Sunflowers	
2,4-D	83	W/S/D									*			*1	*		*	*			*	*	*	*	TG	*	TG		*	S	
Altitude FX2 ⁶	95	S ⁶		*	*	S ^D		*	*			*					*	*	S	*	*	S	*	*		*		*	*		
Avadex	106	S/D						*																							
Axial	109	W/S	*	*	*			*																							
Axial iPak	111	S	*	*	*			*	*		*			S	*	*	*	*	S	*	*	*	*	*	S	*	S		*		
Axial Xtreme	112	S	*	*	*			*	S		*					*	*		S	*	S	*	*	*	S	*	S		*		
Barricade II	114	W/S/D						*	*	*	*				*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Bentazon + 2,4-D	117	S											*						*	*	S	*	*	*	*	*	*	*	*	*	
Broadband	124	S	*	*	*			*	*		*					S				*	S	*	*	*	S	*	*	*	*	*	
Bromoxynil	126	W/S/D						*					*				*	*	*5	*5	*	*	*	*	*	*	*1	*	*	*	
Bromoxynil/2,4-D	130	S/D						*	*				*				*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Bromoxynil/MCPA	132	W/S/D						*	*				*				*	*	*	*	*	*	*	*	TG	*	TG	*	*	*	
Bromoxynil+MCPA+Fluroxypyr	136	W/S/D						*5	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5	S	*5	*5	*5	*5	*5	TG	*5	*5	*5	
Cirpreme/MCPA	140	W/S/D						*	*	*	*	*	*	*	*	*	S	*	*	*	*	*	*	*	*	*	*	*	*	*	
Clodinafop	148	S/D	*	*	*			*																							
Clopyralid	151	S						*																		TG	*	*	*	*	
Clopyralid/MCPA	154	S/D						*					*1	*	*		S	*	*	*	*5	*	*	*5	*	*	*	*	*	*	
Clopyralid/MCPA+Fluroxypyr	156	W/S/D						*		S	*	*	*1	*	S	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Dicamba + MCPA/2,4-D	163	W/S/D						*	*	*	*	*	*	*3	*	*	*	*	*	*	*	*	*	*	*	TG	*	TG	*	S	
Dicamba/Mecoprop/MCPA	168	W/S/D						*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	TG	*	TG	*	*	
Dichlorprop/2,4-D	170	W/S/D						*	*5				*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	TG	*	*	
DyVel	179	W/S/D						*			S	*	*	*	*	*	*	*	*	*	*	*	*	*	*	TG	*	TG	*	*	
DyVel DSp	181	W/S/D						*			S	*	*	*	*	*	*	*	S	*	*	*	*	*	*	*	*	TG	*	*	
Enforcer D	186	S/D						*5	*	*	*	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5	S	*5	*5	
Enforcer MSU	188	W/S/D						*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	TG	*	*	*
Fenoxaprop	195	S/D	*	*	*			*																							
Fierce	198	W/S		*	*	*1		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	S	
Florasulam	203	S/D						*	*	*	*	*	*	*	*	S	*	*	*	*	S	*	*	*	S	*	*	*	*	*	
Florasulam + 2,4-D	205	S/D						*	*	*	*	*	*	*2	*	S	*	*	*	*	*	*	*	*	S	*	S	*	*	*	
Florasulam + Curtail M	207	S/D						*	*	*	*	*	*	*2	*1	*	*	*	*	*	*	*	*	*	*	TG	*	*	*	*	
Florasulam + MCPA	210	S/D						*	*	*	*	*	*	*2	*	*	*	*	*	*	*	*	*	*	*	TG	*	TG	*	*	
Florasulam/fluroxypyr + MCPA	212	S						*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Flucarbazone	214	W/S/D	S	*	S		*	S ^{5,12}												*	*	*	*	*	*	*	*	*	*	*	
Fluroxypyr	217	W/S/D						S	*							S	*	*	*	*	*	*	*	*	S	*	*	*	*	*	
Fluroxypyr + 2,4-D, OcTtain XL	220	W/S/D						*		S	*	*1	*	S	*	*	*	*	*	*	*	*	*	*	S	*	S	*	*	*	
Fluroxypyr + MCPA	222	S/D						S	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	S	*	*	*	*	*	
Focus ¹⁰	224	W/S	*	*	*	*D		S	S	*	*	*	*	*	*	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	
Fortress MicroActiv	226	S/D		*	*			*									S	S			S	S									
Imazamethabenz	257	S/D						*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Infinity	269	W/S/D						*	*	*	*	*	*	S	*	*	*	*	*	S	*	*	*	*	S	*	S	*	*	*	
Linuron + MCPA amine	279	S/D						*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
MCPA	284	W/S/D						*	*	*	*	*	*	*	*	S	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Mecoprop-p	290	S/D						*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	TG	*	*	*
Metribuzin	291	S/D						*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Metsulfuron	295	S/D						*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Momentum	297	S/D						*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Olympus	309	W/S/D				*D		S																							
Optica Trio	311	W/S/D						*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	TG	*	*	*
Paradigm	318	W/S/D						*	*	*	*	*	*	*7	*	S	S	*	*	*	*	*	*	*	*	S	*	S ⁷	*	*	*
Pixxaro	325	W/S/D						*	*	*	*	*	*	S ⁷	*	*	*	*	*	*	*	*	*	*	*	*	*	S ⁷	*	*	*
Predicade	330	S/D	*	*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Pulsar	335	S						*	*	*	*	*	*	*	*	*	*	S	*	*	S	*	*	*	*	*	*	*	*	*	*

Table 4. Weed Control in Wheat (Spring and Winter) *continued*

HERBICIDE	Page	CROP: W - Winter, S - Spring, D - Durum	Barnyard Grass	Foxtail, Green	Foxtail, Yellow	Annual bromes	Volunteer Corn	Wild Oats	Buckwheat, Wild	Catchfly, Night-flowering	Chickweed	Cleavers	Cocklebur	Dandelion	Flixweed	Hemp-nettle	Kochia	Lamb's-quarters	Mallow, Round-leaved	Mustard, Wild	Pigweed, Redroot	Russian Thistle	Shepherd's-purse	Smartweed, Annual Species	Sow-thistle (Perennial)	Stinkweed	Thistle, Canada	Volunteer Flax	Volunteer Mustard, Canola	Volunteer Sunflowers
Quinclorac	337	S/D	.	.							.													S			.			
Retain	350	S						.	.		.	.			.	.		.			.	.	.	.				.		.
Rexade	352	W/S/D	.	S	.	⁴ , ^{D11}	.	.	S	.	.	.	.	.	.	S	.	.	.	.	.	.	.	.		.	S	.	.	.
Rezuvant	354	S	.	.	.			.	.		.	.			.	.	.	.	.	.	.	.	.					.		.
Signal SFU	361	S/D	.	.	.			.	.		.	.			.	.	.	.	S	.	.	.	.		S	.	S	.	.	.
Simplicity OD/Simplicity GoDRI	365	W/S	.	S	.	.		.	S		.	.		S	.	.		.	.	.	.	S	.	.	.	.	S	.	.	⁴
Tandem	371	W/S	.	S	.	.		.	S		.	.		S	.	.	.	.	.	.	.	S	.	.		.	S	.	.	⁴
Thifensulfuron/tribenuron	373	W/S						.	.		.	S		.	.	.	.	.	S	.	.	.	.	.	S	.	S	.	.	⁴
Thifensulfuron/tribenuron + MCPA	377	W/S						.	.	.	S	⁸	.	.	.	.	.	.	S	.	.	.	.	.	S	.	S	.	.	.
Tralkoxydim	382	W/S	.	.	.			.												.	.	.	.	.	.	.	S	.	.	⁴
Travallas	385	W/S/D						.	.	.	.	.	.	⁴	.	.	.	.		.	.	.	.	.	.	.	.	.	.	⁴
Traxos	387	S/D	.	.	.			.												.	.	.	.	.	.
TraxosTwo	389	S/D	.	.	.			.	.	S	.	.	.	¹	.	S	.	.	.	.	.	.	.	.	S	.	S	.	.	.
Tribenuron + 2,4-D	393	S						.					.	.	.	.	.	.	.	.	.	.	.		.	TG		.	.	.
Trifluralin (foxtail control) ¹⁰	396	S/D		.	.																									
Triton C	401	S/D						.	.		.	.						.	¹	.	.	.	.	.	S	.	S	S	⁴	.
Triton K	403	W/S/D						.	.				.	⁸	.	.	.	.	.	.	.	.	.	.		.	TG		.	.
Tundra	405	S	.	.	.			.	.		.	.		S	.	.	.	.	S	.	.	.	.	.	S	.	S		.	.
Valtera ¹⁰	411	S		S							.							.												S
Varro	414	W/S/D	.	.	S	S ^D		.	.		.				.			S	S	.	.	S	.		.					S
Velocity m3	417	W/S/D	.	.	S	S ^D		.	.		.	.		S	.	.	.	.	S	.	.	.	.	.	S	.	S		.	.

• Control. S – Suppression. TG – Top growth control.

¹ Spring seedlings only. ² Spring seedlings and overwintered rosettes. ³ MCPA K mixes only. ⁴ Will not control CLEARFIELD canola varieties.

⁵ Controlled at the higher rates. ⁶ For use on CLEARFIELD wheat varieties only. ⁷ Up to 30 cm tall or across. ⁸ Less than 15 cm diameter. ¹⁰ Weeds controlled when emerging from seed only (not controlled if emerged at application). ¹¹ Control of Japanese brome, suppression only of downy brome. ¹² Not registered for all products. See product page. ¹⁰ J = Japanese brome, D = Downy brome

Table 5. Weed Control in Corn

HERBICIDE	Page	Barnyard Grass	Volunteer Cereals	Foxtail, Green	Foxtail, Yellow	Wild Oats	Quackgrass	Buckwheat, Wild	Catchfly, Night-flowering	Chickweed	Cleavers	Cocklebur	Dandelion	Flixweed	Kochia	Lamb's-quarters	Mustard, Wild	Pigweed, Redroot	Russian Thistle	Shepherd's-purse	Smartweed Annual Species	Sow-thistle (Perennial)	Stinkweed	Sunflower, Volunteer	Thistle, Canada	Volunteer Canola	
2,4-D	83								•		•		•	•	•	•	•	•	•	•	•	TG	•	•	S	•	
2,4-DB	86						•						TG			•	•	•		•	S	TG	•	•	TG	•	
Aatrex	89					•	•									•	•	•			•						
Accent	91	•		•	S	•	•																				
Bentazon	117								•	•	•					•	•	S	S	•	•				S	•	
Bromoxynil	126						•				•				•	•	•	•	•		•					•	
Bromoxynil/MCPA	132						•	•			•			•	•	•	•	•	•	•	•	S	•	•	S	•	
Dicamba	163						•			•					•	•	•	•	•		•	S			S	•	
Dicamba + 2,4-D amine	163						•			•	•	S	•	•	•	•	•	•	•	•	•	S	•	•	S	•	
Distinct	176						•				•			•	•	•	•	•			•	S			TG	•	
Dual II Magnum ²	178	• ⁹		• ⁹	• ⁹													S ⁹									
DyVel DSp	181						•			•	•			•	•	•	•	•	•	•	•				TG	•	
Fierce	199			•			•		•	•					•	•	•				•					S	
Focus ⁸	224	• ⁹		• ⁹	• ⁹	S ⁹		S		• ⁹				S ⁹	S ⁹	S ⁹	• ⁹						• ⁹				
Frontier Max	228			•																							
Glyphosate ^{1,4}	233	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	• ⁷
Liberty 200 SN ³	277	•	•	•	•	•	S	•	•	•	•					•	•	•	•	•	•	•	•	•	S		
Linuron	279	S		S	S			•	•			• ¹¹		• ¹¹			•	•	•	•	•	• ⁹	•				
MCPA	284										•			•	•	•	•	•	•	•	•		•				
MCPB/MCPA	288															•	•	•	•	•	•	S	•		S	•	
Option 2.25 OD ⁶	312	•		•	•				•						•	•	•										
Permit WG	320								•	•						•	•	•		•	•					• ¹²	
Primextra II Magnum ⁸	331	• ⁹		• ⁹	• ⁹			• ⁹							• ⁹	• ⁹	• ⁹				• ⁹						
Shieldex	359	S		•	S						•				•	•	•	•	•	•	•						
Simazine	363	•				•	•									•	•	•			•						
Sortan IS	369	•		•	S		•	•								S	•	•								•	
Topramezone ¹⁰	378	S		S	S				S						S	•	S				S						
Topramezone + Atrazine	378	S		S	S				S						•	•	•				•						
Ultim ^{2,6}	408	•	•	•	S	•	•											•								• ¹²	

• Control. S – Suppression. TG – Top growth control.

¹ For use on glyphosate tolerant varieties only. ² See product page for registered corn varieties. ³ For use on Liberty 200 SN tolerant corn varieties only. ⁴ Not all glyphosate products are registered for use on glyphosate tolerant corn. ⁶ For use in Manitoba only. ⁷ Will not control glyphosate tolerant varieties. ⁸ Apply pre-seed or pre-emergent. ⁹ Only controlled when weeds are emerging from seed (not controlled if emerged at application). ¹⁰ Must be applied with a tank mix partner. ¹¹ Linuron 400 only.

¹² Except CLEARFIELD tolerant varieties.

Table 6. Weed Control in Soybean

HERBICIDE	Page	Herbicide Resistance Group	Barnyard Grass	Foxtail, Green	Foxtail, Yellow	Volunteer Barley	Volunteer Wheat	Wild Oat	Buckwheat, Wild	Chickweed	Cleavers	Cocklebur	Hemp-nettle	Kochia	Lamb's-quarters	Mustard, Wild	Nightshade, Hairy	Pigweed, Redroot	Russian Thistle	Shepherd's-purse	Smartweed, Annual Species	Stinkweed	Volunteer Canola	Canada Thistle	Dandelion	Perennial Sow-thistle	Quackgrass	
<i>Authority/Authority Charge</i> ⁷	103	14						*		S				*	*			*										
<i>Authority Supreme</i>	103	14&15	*	*	*		S	*	*	*				*	*			*				*						
<i>Bentazon</i>	117	6							*	*	*				*	*	*	S	S	*	*	*	*	*				
<i>Clethodim</i>	144	1	*	*	*	*	*	*																				
<i>Dicamba</i> ^{10, 11}	163	4						*	*	*					*	*		*			*			TG		TG		
<i>Dual II Magnum</i>	178	15	* ⁶	* ⁶	* ⁶				*	*			S	*	*			S ⁶			*							
<i>Edge Granular</i>	184	3	*	*	*	S	S	S	*	*	S		S	*	*		S	*	S		S							
<i>Fierce</i>	198	14&15	*	*	*			*	*					*	*	*	*	*	*	*	*	*		S	*	*	*	
<i>Flexstar GT</i> ^{1, 2}	201	9/14	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Focus</i>	224	14/15	* ⁶	* ⁶	* ⁶		S ⁶	S ⁶	* ⁶				S ⁶	S ⁶	S ⁶			* ⁶			* ⁶	* ⁶						
<i>Glyphosate</i> ^{2, 3}	233	9	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
<i>Heat Complete</i> (residual component)	253	14/15	S	S			S	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
<i>Imazamox</i> (<i>Solo ADV</i> and <i>Davai 80 SL</i> only)	260	2	*	*	*	*	*	*	S	S				S	*	*	*	*	*	*	*	*	*	*	*	*	*	
<i>Imazamox/Imazethapyr</i>	262	2	*	*	*	*	* ⁴	*	*	*	*	*	*		S	*	*	*	*	*	*	*	*	*	*	*	*	
<i>Imazethapyr</i>	265	2															*						* ⁴					
<i>Liberty 200SN</i> ⁸	277	10	*	*	*		*	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	S	*	*	S	
<i>Linuron</i>	279	7	S	S	S			*	*	*	*		S	*	*	*	*	*	*	*	*	*	*		S ¹³	S ¹³		
<i>Metribuzin + Treflan EC</i> (PPI)	291	5	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
<i>Odyssey Ultra</i>	308	1&2	*	*	*	*	*	*	S	*	*		S	*	*	*	*	*	*	*	*	*	*	* ⁴			S	
<i>Pinnacle</i>	323	2													*	*	*	*	*	*	*	*	*	*	*	*	*	
<i>Poast Ultra</i>	327	1	*	*	*	*	*	*																			*	
<i>Quizalofop</i>	340	1	*	*	*	*	*	*																			*	
<i>Reflex + Basagran</i> ¹	345	6&14										*			*	*		S		*	*	*	*	*	*	*	*	
<i>Roundup Xtend</i> ¹⁰	355	4&9	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
<i>Trifluralin</i> (broadleaf & grassy weeds)	396	3	* ⁶	* ⁶	* ⁶			* ⁶	* ⁶	* ⁶					* ⁶			* ⁶	* ⁶									
<i>Ultra Blazer</i>	410	14									*				*	*	*	*	*	*	*	*		S				
<i>Valtera</i> ⁵	411	14		S											*	*	*	*	*	*	*	*	S					
<i>Viper ADV</i>	421	2&6	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	S	*	*	*	*	*	*	*	*	*	

* Control. S – Suppression. TG – Top growth control.

¹ For use in the Red River Valley of Manitoba only. ² For use on glyphosate tolerant varieties only. ³ Not all glyphosate products are registered for use on glyphosate tolerant soybeans. ⁴ Will not control CLEARFIELD varieties. ⁵ Apply in fall or spring prior to seeding of or up to 3 days after seeding. ⁶ Control of the following weeds emerging from seed (not controlled if emerged at application). See preseed table for emerged weeds controlled by the *Aim* component. ⁷ For in season activity only. For initial burn down of other weeds see Table 14b. ⁸ For use in *Liberty* tolerant soybeans only. ⁹ Will not control glyphosate tolerant varieties. ¹⁰ For use on RR Xtend soybean varieties only. ¹¹ Not all dicamba products are registered for use on RR Xtend soybeans. ¹² Including glyphosate resistant biotypes. ¹³ Seedlings only.

Table 7. Weed Control in Pea

HERBICIDE	Page	Barnyard Grass	Foxtail, Green and Yellow	Quackgrass	Volunteer Barley	Volunteer Wheat	Wild Oats	Buckwheat, Wild	Catchfly, Night-flowering	Chickweed	Cleavers	Cocklebur	Dandelion	Flixweed	Hemp-nettle	Kochia	Lamb's-quarters	Mustard, Wild	Pigweed, Redroot	Russian Thistle	Shepherd's-purse	Smartweed, Annual Species	Sow-thistle (Perennial)	Stinkweed	Thistle, Canada	Volunteer canola
<i>Authority/Authority Charge</i> ³	101						• ⁴			S ⁴					• ⁴	• ⁴		• ⁴								
<i>Authority Supreme</i>	103	•	•				S	•		•						•	•	S	•					•		
<i>Avadex</i>	106						• ⁴																			
Bentazon	117									•	•	•							S	S	•	•		•	•	•
Clethodim	144	•	•	•	•	•	•										•	•	S	S	•	•		•	•	•
<i>Edge Granular</i>	184	• ⁴	• ⁴		S ⁴	S ⁴	S ⁴	• ⁴	• ⁴	S ⁴				S ⁴	• ⁴	• ⁴	• ⁴		• ⁴	S ⁴		S ⁴				
<i>Heat Complete</i> (residual component)	253		S				S	S		S						S	S	S	S					S		S
Imazamox (<i>Davai 80 SL</i> only)	260	•	•		•	• ²	•	S		S							•	•	•		•	•		•		•
Imazamox/Imazethapyr	262	•	• ¹		•	• ²	•	S		•	•			•	S		S	•	•	•	•	•		•		• ²
Imazethapyr	265		• ¹				S	S		•	•			•	•		•	•	•	•	•	•		•		• ²
MCPA Sodium Salt/Amine	284													•			•	•			•			•		
MCPB/MCPA	288													S			•	•	•		•		TG	•	•	•
Metribuzin	291									•							•	•				•		•		•
<i>Odyssey Ultra</i>	308	•	•	S	•	•	•	S		•	•			•	S		S	•	•	•	•	•		•		• ²
<i>Poast Ultra</i>	327	•	•	•	•	•	•	•																		
Quizalofop	340	•	•	•	•	•	•																			
Trifluralin (broadleaf & grassy weeds)	396	• ⁴	• ⁴				• ⁴	• ⁴		• ⁴							• ⁴		• ⁴	S						
<i>Valtera</i>	411		S ^{1,4}							• ⁴			• ⁴			• ⁴	• ⁴		• ⁴							•
<i>Viper ADV</i>	421	•	•		•	• ²	•	S			S					S	•	•	•	•	•	•		•		•

• Control. S – Suppression. TG – Top growth control.

¹ Green foxtail only. ² Will not control CLEARFIELD varieties. ³ For in season activity only. For initial burn down of other weeds see Table 14b. ⁴ For control of the marked weeds when emerging from seed (not controlled if emerged at application).

Table 8. Weed Control in Other Pulses

HERBICIDE	Page	CROP						ANNUAL WEEDS																PERENNIALS											
		Bean, Dry	Fababean	Lentil	Chickpea	Sweet White Lupin	Barnyard Grass	Foxtail, Green	Foxtail, Yellow	Volunteer Barley	Volunteer Wheat	Wild Oat	Buckwheat, Wild	Chickweed	Cleavers	Cocklebur	Hemp-nettle	Kochia	Lamb's-quarters	Mustard, Wild	Nightshade, Hairy	Pigweed, Redroot	Russian Thistle	Shepherd's-purse	Smartweed, Annual Species	Stinkweed	Canada Thistle	Dandelion	Perennial Sow-thistle	Quackgrass					
Ares	99			X ⁷			•	•	•	•	• ⁹	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•				
Authority/Authority Charge ¹²	101		X		X									S			• ¹¹	• ¹¹			• ¹¹														
Authority Supreme	103				X		•	•	•					•	•		•	•	S		•														
Bentazon	117	X ⁶	X											•	•	•					•	S	S	•	•	•							TG		
Clethodim	144	X	X	X	X		•	•	•	•	•	•																							
Dual II Magnum	178	X ¹				X	• ¹¹	• ¹¹	• ¹¹													S													
Edge Granular	184	X ²	X	X ⁶	X		•	•	•	S	S	S	•	•	S		S	•			•	S			S										
Eptam Liquid EC	189	X					•	•	•	•	•	•	•								•	S			S									S	
Frontier Max	228	X ²																																	
Heat Complete (residual component)	253			X				S	S			S	S				S	S	S		S						S								
Imazamox	260			X ⁷			•	•	•	•	• ⁹	•	S	S							•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Imazamox/Imazethapyr	262		X	X ⁷			•	•	•	•	• ⁹	•	• ⁸	•	•		• ⁸		S	•	•	•	• ⁸	•	•	•	•	•	•	•	•	•	•	•	•
Imazethapyr	265	X ¹																			•														
Linuron	279				X	S	S	S				•	•				•	•			•		•	•	•	•	•	•	•	•	•	•	•	•	•
Metribuzin (post-emergence)	291			X	X								S			S	S	S								S	S								
Metribuzin + Treflan (PPI)	291		X				•	•	•		•	•	•								•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Odyssey Ultra	308		X	X ⁷			•	•	•	•	•	•	S	•	•		S	S	S		•	•	•	•	•	•	•	•	•	•	•	•	•	•	S
Permit WG	320	X ⁶											•	•				•	•		•			•	•	•									
Poast Ultra	327	X	X	X	X	X	•	•	•	•	•	•	•																						•
Quizalofop	340	X ⁶	X	X	X		•	•	•	•	•	•																							•
Reflex + Basagran	345	X ⁴													•			S	•		S		•	•	•	•								TG	
Solo Ultra	368			X ⁷			•	•	•	•	•	•	S		S						•	•	•	•	•	•	•	•	•	•	•	•	•	•	S
Trifluralin (broadleaf & grassy weeds)	396	X	X	X			•	•	•			S	S	•							•		•												
Valtera	411				X			S ¹¹						• ¹¹							• ¹¹	• ¹¹	• ¹¹	• ¹¹									• ¹¹		
Viper ADV	421	X					•	•	•	•	• ⁹	•	S		S		S	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

• Control. S – Suppression. TG – Top growth control.

¹ Navy, kidney and pinto beans only. ² Navy and kidney beans only. ³ Pinto, pink and red beans only. ⁴ For use on navy beans in the Red River Valley of Manitoba. Does not include weeds controlled by Basagran Forté. ⁵ Not all dry bean types have been tested for tolerance to this herbicide. ⁶ Fall applications only. ⁷ For use ONLY on CLEARFIELD lentil varieties. ⁸ Suppression in CLEARFIELD lentils. ⁹ Not including CLEARFIELD varieties. ¹⁰ Apply prior to seeding of or up to 3 days after seeding. ¹¹ For control of the marked weeds when emerging from seed (not controlled if emerged at application). ¹² For in season activity only. For initial burn down of other weeds see Table 14b.

Table 9. Weed Control in Flax

HERBICIDE	Page	Barley Grass	Foxtail, Green	Foxtail, Yellow	Quackgrass	Volunteer Cereals	Wild Oats	Buckwheat, Wild	Catchfly, Night-flowering	Chickweed	Cleavers	Cocklebur	Dandelion	Flixweed	Hemp-nettle	Kochia	Lamb's-quarters	Mallow, Round-leaved	Mustard, Wild	Pigweed, Redroot	Russian Thistle	Shepherd's-purse	Smartweed, Annual Species	Sow-thistle (Perennial)	Stinkweed	Thistle, Canada
Authority/Authority Charge ⁵	101										S					*	*									
Avadex	106						*																			
Bentazon	117								*		*	*					*			S	S	*	*		*	*
Bromoxynil ¹	126							*				*				*	*			*	*	*	*	*	*	*
Bromoxynil/MCPA ¹	132							*	*			*		*		*	*			S	*	*	*	TG	*	TG
Clethodim ¹	144	*	*	*	*	*	*																			
Clopyralid ¹	151							*																*	*	
Clopyralid/MCPA ¹	154							*				*	* ²	*		S	*			*	*	*	TG	*	*	
Eptam Liquid EC ³	189	*	*	*	S	*	*		*								*			*	*					
Fortress MicroActiv	226		*	*			*	*									*	*		*	*					
MCPA	284											*		*		*	*					*			*	
Poast Ultra ¹	327	*	*	*	*	*	*										*	*		*	*					
Quizalofop ¹	340	*	*	*	*	*	*										*	*		*	*					
Trifluralin (broadleaf and grassy weeds) ⁴	396	*	*	*	*	*	*	*	*	*							*	*		*	*					

* Control. S – Suppression. TG – Top growth control.

¹ Registered for use on both Flax and Solin (low linolenic acid flax). ² Spring seedlings only. ³ Not recommended for use on flax in Saskatchewan. ⁴ Fall application only.

⁵ For in season activity only. For initial burn down of other weeds see Table 14b.

Table 10. Weed Control in Canola

HERBICIDE	Page	Barley Grass	Foxtail, Green	Foxtail, Yellow	Quackgrass	Volunteer Barley	Volunteer Wheat	Wild Oats	Buckwheat, Wild	Catchfly, Night-flowering	Chickweed	Cleavers	Cocklebur	Dandelion	Flixweed	Hemp-nettle	Kochia	Lamb's-quarters	Mallow, Round-leaved	Mustard, Wild	Pigweed, Redroot	Russian Thistle	Shepherd's-purse	Smartweed, Annual Species	Sow-thistle (Perennial)	Stinkweed	Thistle, Canada
Ares ²	99	*	*	*		*	* ⁶	*	*		*	*				*		*	*	*	*	*	*	*	*	*	*
Avadex	106							*																			
Clethodim	144	*	*	*	*	*	*	*																			
Clopyralid	151							*																	*	*	
Command 360ME	160											* ⁸															
Edge Granular	184	*	*	*		S	S	S	*		*	S				S	*	*		*	S		S				
Fortress MicroActiv	226		*	*				*	S								S	S		*	S	S					
Glufosinate 150 ¹	230	*	*	*	*	* ³	* ³	* ³	*	*	*	* ³	* ³	* ³	* ³	*	*	*	*	*	*	*	*	*	*	*	*
Glyphosate ^{4,5}	233	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Glyphosate+Clopyralid ⁴	242	*	*		* ⁷	*	*	*	*	*	*	*	* ⁷	*	*	*	*	*	*	*	*	*	*	*	* ⁷	* ⁷	
Imazamox ²	260	*	*	*		*	* ⁶	*	S		S						*	S	*	*	*	*	*	*	*	*	
Imazamox/imazethapyr ²	262	*	*	*		*	* ⁶	*	*	*	*	*					S	*	*	*	*	*	*	*	*	*	
Muster Toss-N-Go	301																			*	S				*	*	
Odyssey Ultra ²	308	*	*	*	S	*	*	*	*	*	*	*			*	*	S	*	*	*	*	*	*	*	*	*	
Poast Ultra	327	*	*	*	*	*	*	*												*	S						
Quinclorac	337	*	*									*													S		
Quizalofop	340	*	*	*	*	*	*	*																			
Salute ²	358	*	*	*		*	* ⁶	*	*	*	*	*			*	*		S		*	*	*	*	*	TG	*	TG
Solo Ultra ²	368	*	*	*	S	*	*	*	S		S						*	S	*	*	*	*	*	*	*	*	
Tensile ²	372	*	*	*		*	*	*			S						*	S	*	*	*	*	*	TG	*	TG	
Trifluralin (broadleaf & grassy weeds)	396	*	*	*				S	S	*							*	*		*	*						

* Control. S – Suppression. TG – Top growth control.

¹ For use only on Liberty Link canola varieties. ² For use only on CLEARFIELD canola varieties. ³ 1.35 L/acre rate of Liberty. Control may be reduced at lower rates.

⁴ For use only on glyphosate tolerant canola varieties. ⁵ Not all glyphosate products are registered for use on glyphosate tolerant canola. ⁶ Will not control CLEARFIELD wheat volunteers. ⁷ Season long control. ⁸ For control of weeds when emerging from seed (not controlled if emerged at application).

Table 11. Weed Control in Potatoes*

HERBICIDE	Page	Barnyard Grass	Foxtail, Green and Yellow	Volunteer Canola	Volunteer Corn	Volunteer Barley	Volunteer Wheat	Wild Oats	Quackgrass	Chickweed	Dandelion	Hemp-nettle	Lamb's-quarters	Mustard, Wild	Nightshade	Pigweed, Redroot	Pigweed, Prostrate	Purslane	Smartweed (Annual)	Shepherd's-purse	Stinkweed	
<i>Chateau</i> (see <i>Valtera</i>)	410												•		•	•	•					
Clethodim	144	•	•		•	•	•	•	•													
<i>Dual II Magnum</i>	178	•	•												• ¹	S						
<i>Eptam Liquid EC</i>	189	•	•		•	•	•	•	S	•			•		• ²	•	•	•				
<i>Frontier Max/Outlook</i>	228/ 314	•	•												•	•						
Linuron (pre-emergent use only)	279	S	S							•		•					• ⁴	•	•	•	•	
Metribuzin ³	291			•						•		•	•			•			•	•	•	
<i>Poast Ultra</i>	327	•	•		•	•	•	•	•													
<i>Prism</i>	333	•	•						•				S			•						

• Control. S – Suppression. TG – Top growth control.

¹ American and Eastern black nightshades. ² Hairy nightshade. ³ Consult manufacturer or seed provider for varietal tolerance to Metribuzin. ⁴ Linuron 400 only.

*Note: Before using any pesticides on potatoes, consult the list of Agricultural Pesticides Approved for Use, available from Simplot Canada and McCain Foods (Canada).

Table 12. Weed Control in Sunflowers

HERBICIDE	Page	Barnyard Grass	Foxtail, Green and Yellow	Quackgrass	Volunteer Barley	Volunteer Wheat	Wild Oats	Buckwheat, Wild	Catchfly, Night-flowering	Chickweed	Cleavers	Cocklebur	Dandelion	Flixweed	Hemp-nettle	Kochia	Lamb's-quarters	Mallow, Round-leaved	Mustard, Wild	Pigweed, Redroot	Russian Thistle	Smartweed, Annual Species	Sow-thistle (Perennial)	Stinkweed	Thistle, Canada	Volunteer Canola	
<i>Assure II</i> (see Quisqualofop)	340	•	•	• ²	•	•	•																				
<i>Authority /Authority Charge</i> ⁴	101										S					•	•										
Clethodim	144	•	•	• ²	•	•	•													•							
<i>Edge Granular</i>	184	•	•		S	S	S	•		•	S				S	•	•			•	S	S					
<i>Eptam Liquid EC</i>	189	•	•		•	•	•			•							•			•							
<i>Express SG</i> (see Tribenuron) ⁵	390							S									•									•	
Imazamethabenz	257																									•	• ¹
Imazamox ³	260	•	•		•	• ¹	•	S			S						•			•						•	• ¹
<i>Muster Toss-N-Go</i>	301														•	•											
<i>Poast Ultra</i>	327	•	•	S	•	•	•																				
<i>Solo Ultra</i> ³	368	•	•	S	•	•	•	S			S																• ¹
Trifluralin	396	•	•				S	S		•							•			•							• ¹

• Control. S – Suppression. TG – Top growth control.

¹ Will not control CLEARFIELD volunteers. ² Season-long control. ³ Apply only on CLEARFIELD sunflower varieties. ⁴ For in season soil activity only. For initial burn down of other weeds see Table 14b. ⁵ ExpressSun (tribenuron tolerant) sunflower varieties only.

Table 14a. Herbicides to Control Emerged Weeds Before Seeding or After Seeding but Prior to Crop Emergence

HERBICIDE	Page	Pre-seeding	Pre-emergent	Barley	Canaryseed	Canola	Chickpea	Corn, Field	Corn, Sweet	Dry Bean	Field Pea	Flax	Forage Grasses	Lentil	Oat	Potatoes	Rye	Soybean	Wheat
Amitrol	97	✓		✓		✓		✓		✓	✓							✓	✓
CleanStart	142	✓		✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
Glykamba	243	✓		✓				✓							✓			✓	✓
Glyphosate	233	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>The following products may or must (+) be mixed with glyphosate – for the marked crops</i>																			
+ 2,4-D (up to 294 gae/acre)	83	✓	✓	✓														✓ ³	✓
Aim EC	93	✓		✓		✓	✓	✓	✓	✓	✓	✓		✓	✓			✓	✓
Authority Charge	103	✓	✓				✓				✓	✓						✓	✓
BlackHawk (with carfentrazone)	121	✓	✓	✓														✓	✓
BlackHawk (with pyraflufen)	122	✓	✓	✓	✓			✓							✓ ⁴			✓	✓
+ Bromoxynil	126	✓	✓	✓		✓									✓				✓
+ Bromoxynil/florasulam	-	✓		✓											✓				✓
+ Bromoxynil/MCPA	132	✓		✓	✓			✓	✓			✓	✓		✓			✓	✓
Conquer	161	✓				✓													
+ Express FX	193	✓		✓			✓												✓
+ Florasulam	203	✓		✓											✓				✓
GoldWing	245	✓	✓	✓	✓			✓	✓		✓				✓			✓	✓
+ Heat LQ	249	✓	✓	✓	✓		✓	✓	✓		✓			✓	✓				✓
+ Heat Complete (burnoff component)	253	✓	✓					✓			✓			✓					✓
+ Inferno Duo	267	✓	✓																✓
Ko-Act	-	✓		✓														✓	✓
+ Korrex	274	✓	✓	✓											✓				✓
+ MCPA (up to 200 gae/acre)	284	✓		✓			✓ ^{1,2}	✓ ²	✓ ²		✓ ^{1,2}	✓ ²		✓ ^{1,2}	✓			✓	✓
+ Olympus	309	✓	✓																✓
Paradigm	317	✓		✓															✓
Quinclorac (Facet L only)	340	✓	✓																
+ tribenuron	390	✓		✓	✓ ³					✓ ³	✓ ³		✓ ³		✓ ³			✓ ³	✓
+ Tribenuron/Metsulfuron	394	✓		✓															✓

¹ Maximum of 140 gae/acre in chickpea, field pea and lentil (see glyphosate page). ² Amine formulations only. ³ Only for select products. See product page for details.

⁴ Applied a minimum of 7 days before planting.

Table 14b. Control of Emerged Weeds Before Seeding or After Seeding but Prior to Crop Emergence

HERBICIDE	Page	Brome (Downy, Japanese)	Foxtail Barley	Foxtail, Green	Quackgrass	Volunteer Cereals	Wild Oats	Buckwheat, Wild	Dandelion	Flixweed	Hemp-nettle	Kochia	Lamb's-quarters	Mustard, Wild	Narrow-leaved Hawk's-beard	Night-flowering catchfly	Russian Thistle	Shepherd's-purse	Smartweed (incl lady's-thumb)	Stinkweed	Volunteer Canola (including glyphosate tolerant varieties)	Volunteer Flax	
<i>Amitrol</i>	97								*														
<i>CleanStart</i>	142	*		*		*	*	*	* ²	*	*	*	*	*	*		*	*	*	*	*	*	*
<i>Glykamba</i>	243	*		*		*	*	*	*	*	*	*	*	*	*		*	*	*	*	*	*	*
Glyphosate (180 gae/acre) ¹	233	*	S	*	*	*	*	*	S	*	*	*	*	*	*	S	*	*	*	*	*	*	*
Glyphosate (360 gae/acre) ¹	233	*	*	*	*	*	*	*	S	*	*	*	*	*	*	*	*	*	*	*	*	*	*
The following products may or must (+) be mixed with glyphosate – weeds marked are those that the product has activity on in addition to glyphosate																							
+ 2,4-D	83									*	*	*	*	*	*		*	*	*	*	*	*	*
<i>Aim EC</i>	93						*				*	*	*	*	*		*	*	*	*	*	*	*
<i>Authority Charge</i> ³	103						*				*	*	*	*	*		*	*	*	*	*	*	*
<i>BlackHawk</i> (with carfentrazone)	121						S	* ²	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>BlackHawk</i> (with pyraflufen)	122						*	*	*	*	*	*	S	*	*	*	*	*	*	*	*	*	*
+ Bromoxynil	126						*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
+ Bromoxynil/MCPA	132						*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Conquer</i>	161										*	*	*	*	*	*	*	*	*	*	*	*	*
+ <i>Express FX</i>	193						*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
+ Florasulam	203						*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>GoldWing</i>	245						S ⁴		S ⁴	*	*	*	*	*	*	*	*	*	*	*	*	*	*
+ <i>Heat LQ</i>	249						*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
+ <i>Heat Complete</i> (burnoff component)	253						*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
+ <i>Inferno Duo</i>	267		*				*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Inferno Duo</i>	267						S		S	*	*	*	*	*	*	*	*	*	*	*	*	* ⁴	*
<i>Ko-Act</i>	-								*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
+ <i>Korrex</i>	274						*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
+ MCPA (up to 200 gae/acre)	284								*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
+ <i>Olympus</i>	309	*	*														*	*	*	*	*	*	*
<i>Paradigm</i>	317							*	*	*	*	S	*	*	*	*	*	*	*	*	*	*	*
<i>Quinclorac (Facet L only)</i>	337			*																			*
+ Tribenuron	390							*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
+ Tribenuron/Metsulfuron	394							*	*	*	*	*	*	*	*	S	*	*	*	*	*	*	*

* Control. S – Suppression.

¹ Rates of application varies among brands. Consult the product page for application rates. ² Spring seedlings only. ³ Initial burndown only. ⁴ Except Clearfield varieties. For extended in season control see *Authority Charge* in crop tables 7, 8, 9 and 12. ⁴ Control at high rate.

Table 15. Herbicides for Use as Harvest Aid or Desiccant Before Crop Harvest

HERBICIDE	Page	Alfalfa ⁷	Barley	Canola	Chickpea	Dry bean	Faba bean	Forage	Field Pea	Flax	Lentil	Oat	Potato	Soybean	Sunflower	Wheat
<i>Aim EC</i> ^{3,4}	93		✓		✓	✓	✓		✓			✓	✓	✓		✓
<i>CleanStart</i>	142		✓		✓	✓	✓		✓			✓	✓	✓		✓
<i>Diquat</i> ^{3,5}	173			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Glyphosate ^{1,2}	233		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓
<i>Heat LQ/Heat WG</i> ^{3,4}	249		✓ ⁸	✓	✓	✓			✓		✓ ⁷			✓	✓	✓ ⁸
<i>MPower Good Harvest</i>	299	✓									✓ ⁶		✓ ⁶			
<i>Valtera</i> ³	411				✓	✓			✓		✓					✓

¹ Rates of application vary among brands. Consult glyphosate page for specific application rates. ² For pre-harvest perennial weed control and may provide harvest management benefit. ³ For rapid plant tissue dry down to facilitate harvest. ⁴ May be tank mixed with glyphosate when used prior to harvest. ⁵ Refer to product page for surfactant requirements. ⁶ Not for crops grown for seed. ⁷ Red lentil only. ⁸ Heat LQ only.

Table 16. Weed Control in Fallow

HERBICIDE	Page	Brome, Downy	Foxtail Barley	Foxtail, Green	Quackgrass	Wild Oats	Volunteer Cereals	Buckwheat, Wild	Dandelion	Flixweed/Tansy/Mustard	Hemp-nettle	Kochia	Lamb's-quarters	Mustard, Wild	Narrow-leaved Hawk's-beard	Night-flowering catchfly	Pigweed, Redroot	Russian Thistle	Shepherd's-purse	Smartweed (incl. Lady's-thumb)	Sow-thistle (perennial)	Stinkweed	Thistle, Canada	Volunteer Canola (including glyphosate tolerant varieties)	Volunteer Flax
<i>Amitrol</i>	97								•			•	•				•			•					
Dicamba + 2,4-D ³	163							•		•		•	•	•			•	•		•			S		
Dicamba/Mecoprop/MCPA	168							•		•		•	•	•			•	•		•			S	•	
<i>DyVel DSP</i>	181							•		•		•	•	•			•	•		•			S		
<i>CleanStart</i>	142	•		•		•	•	•	• ⁴	•	•	•	•	•	•			•	•	•		•		•	•
Glykamba	243	•		•		•	•	•		•		•	•	•				•	•	•		•			
Glyphosate (180 gae/acre) ²	233	•	S	•	S	•	•	•	S	•	•	•	•	•	•	S	•	•	•	•	S		S	• ¹	•
Glyphosate (360 gae/acre) ²	233	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	• ¹	•
The following products may or must (+) be mixed with glyphosate – weeds marked are those that the product has activity on in addition to glyphosate																									
+ 2,4-D	83									•		•	•	•	•	•		•	•			•		•	
<i>Aim EC</i>	93							•				•	•	•								•		•	
+ <i>BlackHawk</i> (with pyraflufen)	122						S	• ⁴		•		•	•	•	•	•	•	•	•			•		•	
+ Bromoxynil	126						•					•	•	•				•	•			•		•	
+ Bromoxynil/MCPA	132									•	•	•	•	•			•	•	•	•		•		•	
+ <i>Distinct</i> (low rate)	176						•	TG				•	•	•											
<i>Distinct</i> (high rate)	176						•	TG				•	•	•						•	S	•	TG	•	
+ Florasulam	203						•	•		•	•		•	•					•	•		•		•	
+ <i>Heat LQ</i>	249						•	•		•	•	•	•	•					•	•		•		•	
+ <i>Ko-Act</i>	-							•	•	•	•	•	•	•					•	•				•	
+ <i>Korrex</i>	274							•	•	•	•	•	•	•					•	•					
+ tribenuron	390							•											•	•		•		•	
+ tribenuron/metsulfuron	394							•				•			S				•	•			S ³	•	

• Control. S – Suppression. TG – Top growth control.

¹ Not including glyphosate tolerant canola. ² Rates of application varies among brands. Consult the product page for application rates. ³ Fall rosettes and spring seedling.

⁴ Spring seedlings

Table 17. Post-harvest Weed Control in Stubble

HERBICIDE	Page	Flixweed	Narrow-leaved Hawk's-beard	Shepherd's-purse	Stinkweed	Thistle, Canada	Quackgrass	Dandelion
2,4-D	83	•		•	•	S		S
<i>Amitrol</i>	97					S		
Dicamba + Glyphosate	163	•		•	•	S	S	
<i>BlackHawk</i> (with pyraflufen)	122	•	•	•	•			
Dicamba/Mecoprop/MCPA	168	•		•	•	S		
<i>Distinct</i> (low rate)*	176		•			TG		TG
<i>Distinct</i> (high rate)	176		•			TG		•
<i>DyVel DSP</i>	181	•		•	•	S		
<i>Express Pro</i> *	393		•					•
Florasulam + glyphosate	208	•	•	•	•			•
Glykamba	243	•		•	•	S	S	
Glyphosate	233	•	•		•	•	•	•
MCPA	284	•		•	•	S		S
<i>Paradigm</i> + glyphosate	317	•	•	•	•	•	•	•

• Control. S – Suppression. Levels of suppression vary depending on the product and growing conditions in the fall. Regrowth requiring in-crop treatments can be expected. TG – Top growth control.

* To be used only in a mix with glyphosate.

Table 18. Weed Control in Grass Pastures and Hayfields

HERBICIDE	Page	Weeds																							
		Absinth	Bindweed, Field	Burdock	Thistle, Canada	Dandelion	Dock, Curled	Daisy, English	Flixweed	Foxtail Barley	Gumweed	Narrow-leaved Hawk's-beard	Knapweed	Leafy Spurge	Nodding Thistle	Poplar	Pussy Toes	Red Bartsia	Sage, Pasture	Snowberry	Sow-thistle, Perennial	Stinkweed	Tansy, Common	Wild Rose	Willow	Wormwood, Biennial
2,4-D (500 g/L)	83	S	S	•	S	S	•				•		S	S	S	S	•	S	S	S	•				•
2,4-DB	86		S		S	S	• ³				• ³										S	•			
Dicamba	163		S		S	S	S	S					S	S				S	•	S	S	S			
Dicamba + 2,4-D	163	S	S	•	S	S	S	S	•	S			S	S	S		•	S	•	S	•	S	•	S	
Escort	191				S	•									• ³						S	•	•	• ³	
Grazon	247			•	•	•	•							• ²										•	
Kerb	272								•																
MCPA (500 g/L)	284		S		S	S	S		•	S				• ³							S	•	S		•
MCPB/MCPA	288		S		S																S	•			
Navius	303				•	•			•			•	•		•				•	•	•	•	•	•	•
Overdrive	316						S						S												•
Reclaim II	343	•	S		•	•	•		•	•	•	•		•				•	•	•	•	•	•	•	•
Restore II	347	•		•	•	•	•		•	•	•	•						•	•	•	•	•	•	•	•
Tordon 22K	380		• ²		•							•	• ²					•							

• Controlled. S – Top growth suppression only.

¹Rates may vary between different brands. Check product page for specific rate for product and use.

² May require multiple applications for complete control. ³ Controlled by the highest rate within this range.

Table 19. Weed Control in Shelterbelts

HERBICIDE	Page	USE			SHELTERBELT SPECIES													WEEDS																						
		Before Planting	After Planting (New & Established)	Established	American Elm	Birch	Caragana	Crabapple	Green Ash	Juniper	Lilac	Manitoba Maple	Poplar	Scots Pine	Siberian Elm	Willow	Barnyard Grass	Foxtail, Green and Yellow	Wild Oats	Buckwheat, Wild	Chickweed	Cleavers	Cocklebur	Dandelion	Flixweed	Hemp-nettle	Kochia	Lamb's-quarters	Mustard, Wild	Pigweed, Redroot	Quackgrass	Russian Thistle	Shepherd's-purse	Smartweed, Annual Species	Sow-thistle (Perennial)	Stinkweed	Thistle, Canada			
Amitrol	97			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Casoron	139		•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Glyphosate	233	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Gramoxone	247	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Linuron	279				•	•	•	•	•	•	•	•	•	•	•	S										• ²														
Simazine	363		•	•	•	•	•	•	•	•	•	•	•	•	•	•	• ¹	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Trifluralin	396	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

• Control. S – Suppression. TG – Top growth control.

¹ Yellow foxtail only. ² Linuron 400 only.

Table 20a. Weed Control in Forage Crops - Crops

HERBICIDE	Page	GRASSES																	LEGUMES							COVER CROPS												
		Altai Wild Rye Grass	Bromegrass	Creeping Red Fescue	Crested Wheatgrass	Intermediate Wheatgrass	Kentucky Bluegrass	Meadow Fescue	Meadow Foxtail	Millets	Northern Wheatgrass	Orchardgrass	Pubescent Wheatgrass	Reed Canarygrass	Russian Wild Ryegrass	Ryegrass, Annual	Ryegrass, Perennial	Slender Wheatgrass	Streambank Wheatgrass	Tall Fescue	Tall/Wheat grass	Timothy	Western Wheatgrass	Alfalfa	Alsike Clover	Cicer Milkvetch	Red Clover	Sainfoin	Sweet Clover	Trefoil, Bird's-foot	White Dutch Clover	Barley	Flax ¹⁶	Oats	Canola	Wheat		
2,4-D ⁸	83	X	X	X	X	X	X	X	S	X	X	X	X	X	X	X	X	X	X	X	X	X																
2,4-DB ⁸	86		S ⁴	S ⁴	S ⁴	S ⁴					S ⁴							S ⁴	S ⁴	S ⁴	S ⁴		S	S		S		S	S	X		X			X			
Avadex Liquid EC ¹⁸	106																						S ¹	S ¹		S ¹		S ¹	S ¹		X	X		X	X			
Basagran ⁸	117		S ²	S ²	S ²			S ²	S	S ²											S ²		X ²	X ²		X ²	X ²	X ²				X						
Bromoxynil ⁸	126		S ²	S ²	S ²	S ²		S ²	S	S ²		S ²	S ²	S ²		S ²		S ²	S ²	S ²	S ²									X	X	X			X			
Bromoxynil / MCPA ester ⁸	130		S ²	S ²	S ²	S ²		S ²	S ²	S ²		S ²	S ²	S ²		S ²	S ²	S ²	S ²	S ²	X									X	X	X				X		
Clethodim ⁸	144																						S									X			X			
Clopyralid	151	X	X	X	X	X	X	X		X		X	X			X	X	X	X	X ⁹	X										X	X	X	X	X	X		
Curtail M	154																				E									X	X	X			X			
Dicamba + 2,4-D	163		S	X ²	S	S		S	S		S	S					S	S	S	S	S									X					X			
Dicamba / Mecoprop / MCPA ⁶	168		X ⁹	X ⁹	X ⁹	X ⁹	X ⁹	X ⁹	X ⁹		X ⁹	E ⁹				E ⁹	E ⁹	E ⁹	E ⁹	E ⁹	E ⁹										X		X			X		
Edge ¹⁸	184																						S ²													X		
Eptam Liquid EC ¹⁸	189																						S		S ²		S ²	S										
Fenoxaprop ⁸	195														S ²																							
Florasulam + Curtail M	207		X ²	X ²	X ²	X ²															X ²										X		X			X		
Florasulam + MCPA ⁶	210																				X																	
Fluroxypyr / 2,4-D	220		X ²	X ²	X ²	X ²															X ²																	
Gramoxone	247																						E ⁹						E									
Heat LQ ¹⁸	249		S ²																												X ²		X ²		X ²			
Imazamethabenz ⁸	257													X ²																								
Imazethapyr ⁸	265																								X ¹⁵											X ¹¹		
Infinity	269		E												X						X ²										X					X		
Kerb	272																						E						E									
MCPA ⁸	284		X ^{8,9}	X ^{8,9}	X ^{8,9}	X ^{8,9}	X ^{8,9}			X ^{8,9}		X ^{8,9}	X ^{8,9}	X ^{8,9}		X ^{8,9}				X ^{8,9}	X ^{8,9}		S ^{5,6}	S ⁵		S ⁵				X	X	X			X			
MCPB + MCPA ⁸	288	S ⁴	S ⁴	S ⁴	S ⁴	S ⁴			S ⁴		S ⁴	S ⁴	S ⁴		S ⁴	S ⁴	S ⁴	S ⁴	S ⁴	S ⁴	S ⁴		S ^{2,8}	S		S			X		X			X				
Metsulfuron ⁸	295			X	X	X				X																					X					X		
Odyssey	262																							X ²					X ²									
Poast Ultra	327			X ²																			X	X	X		X	X				X			X			
Prestige XC	156		X ²	X ²	X ²	X ²															X ²										X					X		
Princep Nine-T	363																						E						E									
Quizalofop ⁹	340																						X ²	X ²	S ²	X ²	S ²	S ²	S ²	S ²		X			X			
Thifensulfuron / Tribenuron ⁸	373		X	X	X	X	E			X	X	X				X	X	X	X		X										X		X			X		
Tralkoxydim ⁸	382		X ²	X ²	X ²	X ²				S ²						S ²															X					X		
Trifluralin ^{8,18}	396																						S ¹³	S ¹⁴	S ¹⁴	S ¹⁴	S ¹²	S ¹²	S ¹⁴				X ⁷			X		
Velpar DF CU	419																						E															

S – seedling only. E – Established only. X – seedling or established. ¹Underseeded only. ² For seed production only. ⁴Do not graze or harvest for livestock in the year of treatment. ⁵Use MCPA sodium salt on seedling forages only when underseeded to flax, oats, wheat or barley. Do not use on Flemish varieties of alfalfa. ⁶For use as a spot treatment only control red bartsia. ⁷Apply to fall prior to seeding. ⁸All products may not be registered for crops and weeds indicated. Check product labels. ⁹For forage production only. ¹⁰Check recommendations for varietal restrictions. ¹¹CLEARFIELD varieties only. ¹²Liquid formulations in spring only. ¹³ Bonanza 10G, Treflan EC (spring only). ¹⁴ Treflan EC in spring only. ¹⁵Apply to seedlings stands that will be in production for three years after application and establishment stands that will be in production for 2 years after application. ¹⁶May not include Solin (low linolenic acid flax). Check product label for restrictions. ¹⁷Fall application only. ¹⁸For application prior to emergence of the crop.

Special Weed Problems

This section identifies specific weeds and some herbicides recommended for control. Refer to the particular crop section or the product label for information on specific products that may be used on the crops and for application instructions.

Absinthe

2,4-D LV Ester (500 g/L) - In grass pastures with no legumes, spray 1.82 L per acre in late June, prior to flowering. Re-treat regrowth in late summer when plants have 6 to 10 inches (15 to 25 cm) of new growth. More than 1 season of treatment may be required.

Dicamba - In grass pasture and rangeland only, apply 0.5 L per acre in 20 to 30 gallons (90 to 135 L) per acre for top growth control when leaves are fully expanded.

Restore II - In grass pastures and rangeland, apply *Restore II* at 0.97 L per acre (one 10 L jug treats 10 acres) when actively growing.

Alders

2,4-D LV Ester (500 g/L) - In grass pastures and non-crop land, apply 1.78 L per acre to the foliage of actively growing brush.

Dicamba + 2,4-D amine or LV ester (500 g/L) - In grass pastures, rangeland and non-crop land, apply dicamba at 2.1 L per 1,000 L of water with 2,4-D LV ester or amine at 4.0 L per 1,000 L of water to the foliage of actively growing brush in the spring or early summer and wet the foliage until the point of runoff.

Aspen Poplar (Trembling Aspen)

Dicamba + 2,4-D amine or LV ester (500 g/L) - In grass pastures, rangeland and non-crop land, apply dicamba at 1.32 L per acre with 2,4-D LV ester or amine at 1.78 L per acre in 20 gallons per acre (90 L per acre) water to the foliage of actively growing brush in spring or early summer.

Baby's Breath (Perennial)

Dicamba - In grass pastures with no legumes, apply 3.72 L per acre in 10 to 20 gallons per acre (45 to 90 L per acre) water when actively growing.

Biennial Wormwood

2,4-D LV ester - In grass pastures and non-crop land, apply 2,4-D LV ester (500 g/L) at 1.78 L per acre to the foliage of actively growing plants.

Overdrive - In grass pastures and non-crop land, apply at 115 g per acre for control.

Restore II - In grass pastures, apply 0.97 L per acre (one 10 L jug treats 10 acres).

Black Medic

Dichlorprop/2,4-D; Mecoprop-p; dicamba/mecoprop/MCPA; 2,4-D amine or LV ester - Apply in registered crops at registered rates to black medic in the 1 to 4 leaf stage for suppression only.

Chokecherry

2,4-D LV ester - In grass pastures and non-crop land, apply 2,4-D LV ester (500 g/L) at 1.78 L per acre to the foliage of actively growing brush.

Common Tansy

Glyphosate - Apply at 1.9 to 2.8 L per acre in 10 gallons of water per acre (40 L per acre) to actively growing plants that are 8 to 10 inches (20 to 25 cm) tall (summerfallow, stubble and noncropland).

Escort - In pastures, rangeland and rough turf, apply 8 grams per acre in 10 to 20 gallons per acre (45 to 90 L per acre) of water to actively growing plants of less than 4 inches (10 cm) tall. Add non-ionic surfactant at 0.2 L per 100 L of spray solution.

Navius - In grass pastures and rangeland, apply *Navius* at 68 grams per acre for control.

Restore II - In grass pastures and rangeland, apply *Restore II* at 0.97 L per acre (one 10 L jug treats 10 acres) for suppression.

Curled Dock

Dicamba - As a patch treatment or in pasture and rangeland, apply 0.92 L per acre *Banvel III* in 10 to 20 gallons per acre (45 to 90 L per acre) water to actively growing weeds for top growth control.

Glyphosate - As a spot treatment, apply 2.83 to 4.86 L per acre (360 g/L formulations or equivalent of other formulations) in 10 gallons per acre (45 L per acre) water when most plants have reached the early bud stage. Do not disturb treated plants for at least 10 days following treatment.

MCPA amine, 2,4-D amine - Apply 0.445 to 0.69 L per acre of formulations containing 500 g/L MCPA or 2,4-D amine to give top growth control.

Dichlorprop/2,4-D - 0.71 L per acre for suppression before plants are 2 inches (5 cm) tall.

Diffuse and Spotted Knapweed

Dicamba - In grass pastures, rangeland and non-crop land, apply at 1.86 L per acre in 10 to 20 gallons per acre (45 to 90 L per acre) water to actively growing weeds.

Navius - In grass pastures and rangeland, apply *Navius* at 68 grams per acre for control.

Restore II - In grass pastures and rangeland, apply *Restore II* at 0.57 L per acre when actively growing.

Tordon 22K - In rangeland and grass pasture, apply 0.91 L per acre in 90 to 180 gallons per acre (400 to 800 L per acre) of water to actively growing weeds. **WARNING** - Picloram is a very persistent and water-soluble herbicide. Do not apply to permeable soil. Do not apply to irrigated areas. Take special precautions to prevent drift.

Downy Brome and Japanese Brome

Altitude FX /FX2 - Apply at label rates to suppress Japanese brome to the 4 leaf stage in CLEARFIELD wheat.

Ares - Apply at label rates to suppress Japanese brome to the 4 leaf stage in CLEARFIELD canola and lentils.

Authority Supreme - Apply in spring as a pre-plant or pre-emergent treatment to soybean, pea or chickpea for pre-emergent control of downy brome and Japanese brome.

Florasulam + glyphosate - Apply in spring or fall, prior to seeding cereal crops or in fallow at registered rates to control downy brome up to the 4 leaf stage.

Flucarbazone - Apply in spring at registered rates to control Japanese brome up to the 4 leaf stage.

Focus - Apply in fall or spring as a pre-plant or pre-emergent treatment to wheat, spring or winter, corn or soybeans for pre-emergent control of downy brome and Japanese brome.

Glyphosate - Prior to crop emergence, apply 0.51 to 0.77 L per acre (360 g/L formulations or equivalent of other formulations) in 5 to 10 gallons per acre (23 to 45 L per acre) water before downy brome is 6 inches (15 cm) in height.

Glykamba - Prior to crop emergence, apply 1.0 L per acre in 5 to 10 gallons per acre (23 to 45 L per acre) water between emergence and heading of downy brome.

Odyssey Ultra - control spring seedlings of Japanese brome in registered crops with *Poast Ultra* tank mix.

Quizalofop - in registered crops apply 200 mL per acre to downy and Japanese brome in the 2 to 5 leaf stage.

Simplicity - Suppression of downy brome and control of Japanese brome up to the 6 leaf stage when applied at registered rates in the fall in winter wheat. Apply in spring at registered rates to control Japanese brome up to the 6 leaf stage in winter or spring wheat (including durum).

Solo - Apply at label rates to suppress Japanese brome to the 4 leaf stage in registered crops.

Tandem - Applied at the maximum labelled rate in spring wheat (including durum) will control Japanese brome up to the 6 leaf stage.

Trifluralin - Apply at recommended rates for weed control in broadleaf crops prior to emergence.

Velocity m3 - Apply at registered rates in registered crops to suppress Japanese brome.

Viper ADV - In field peas, at registered rates to suppress Japanese brome.

Field Bindweed

Dicamba - As a patch treatment or in rangeland, apply 1.0 L per acre in 10 to 20 gallons per acre (45 to 90 L per acre) water. Apply when field bindweed is in the flowering stage and allow 3 weeks after treatment before resuming normal summerfallow tillage.

Basagran - In labelled crops, apply 0.71 L per acre followed by 0.71 L per acre 7 to 10 days later. Apply in 20 to 35 gallons per acre (90 to 160 L per acre) water before field bindweed has developed a dark green colour and before it has begun trailing. Use a recommended surfactant (see recommendations under the appropriate crop).

2,4-DB - As a spot treatment in labelled crops apply 2.83 to 4.86 L per acre in 10 gallons per acre (45 L per acre) water at the bud stage. Do not disturb plants for at least 10 days following treatment. Heavy rainfall within 2 hours of application may wash chemical off the foliage and a repeat treatment may be required.

Rainfall occurring within 6 hours after application may reduce control.

2,4-D amine - In grass pastures containing no legumes or as a spot treatment, apply 1.82 L per acre of formulations containing 500 g/L 2,4-D amine at early flowering stage.

Glyphosate - As a spot treatment, apply 2.8 to 4.9 L per acre (360 g/L formulations or equivalent of other formulations) in 10 to 30 gallons per acre (45 to 135 L per acre) at the full bloom stage or beyond. Allow 7 or more days after application before tillage.

Restore II - For season long control in grass pastures and rangeland only, apply *Restore II* at 0.97 L per acre.

Tordon 22K - In rangeland and grass pasture, apply 3.6 L per acre in 90 to 180 gallons per acre (400 to 800 L per acre) for spot treatment, using hand wand application equipment only, to a maximum of one acre of every two acre area of land. of water to actively growing weeds. **WARNING** - Picloram is a very persistent and water-soluble herbicide. Do not apply to permeable soil. Do not apply to irrigated areas. Take special precautions to prevent drift.

Field Horsetail

Amitrol 240 - Apply 5.0 to 6.7 L per acre in 10 to 30 gallons per acre (45 to 135 L per acre) water in non-cropped areas and pastures when the weed is young and actively growing.

MCPA amine, potassium and sodium salt mixtures - Apply 0.57 L per acre of formulations containing 500 g/L MCPA after the weeds have fully emerged for top growth control. May be used in wheat, oats, barley, flax and rye.

Foxtail Barley

Focus - Apply in fall or spring as a pre-plant or pre-emergent treatment to wheat, spring or winter, corn or soybeans for pre-emergent suppression of downy brome and Japanese brome. For best results use in a program with glyphosate.

Glyphosate - Prior to crop emergence, apply 1 to 2 L per acre (360 g/L formulations or equivalent of other formulations) in 5 to 10 gallons per acre (23 to 45 L per acre) water to foxtail barley at the seedling to heading stage. Late fall applications may provide better control of established plants than spring applications.

Glyphosate - In glyphosate tolerant canola, apply 2 applications, each at 0.5 L per acre (360 g/L formulations or equivalent of other formulations), for season long control.

Glykamba - Prior to crop emergence, apply 1.26 L per acre in 5 to 10 gallons per acre (23 to 45 L per acre) water to foxtail barley before initiation of the seed head for suppression only.

Gramoxone - Apply 2.23 L per acre in 98 gallons per acre (445 L per acre) water or 75 mL in 2.2 gallons (10 L) water per 1076 square feet (100 sq. m) for top growth control only.

Inferno Duo - Prior to crop emergence apply 12.75 grams per acre of *Inferno Duo* with 180 to 360 gae per acre of glyphosate.

Kerb - Apply registered rates in 20 gallons per acre (90 L per acre) water between October 1 and freeze-up. Use the lower rate on grey-wooded soils or where perennial bluegrass or fescues are the predominant pasture species. Do not use *Kerb* for foxtail barley removal in seed grass stands or desired foliage stands of timothy or fescue grass species. At recommended rates, pasture stands

of perennial bluegrass and fescue may be reduced by 10 to 15 percent. Where perennial bluegrass and fescues are the dominant pasture species, use the lower rate of *Kerb*. Spray overlaps may seriously harm desirable pasture grass species. Where the grass stand comprises mostly foxtail barley and reseeded to a desirable grass species is required, delay seeding into the *Kerb*-treated soil until the end of June. Do not harvest or graze within 60 days of application with *Kerb*. Avoid using *Kerb* on soils having more than 6 percent organic matter.

Quizalofop - In registered crops apply 200 mL per acre to foxtail barley in the maximum 3-4 leaf + 3 tiller stage.

Goat's-Beard

2,4-D amine - Apply 0.91 L per acre of formulations containing 500 g/L in early fall or early spring.

Dicamba - In grass pasture and rangeland only, apply 1.86 L per acre in 20 to 30 gallons (90 to 135 L) per acre when leaves are fully expanded.

Dichlorprop + 2,4-D - Apply 1.62 L per acre in early spring or fall.

Gumweed

2,4-D LV ester - In grass pastures and non-crop land, apply 2,4-D LV ester (500 g/L) at 0.89 L per acre to the foliage of actively growing plants.

Hemp Dogbane

2,4-D amine or LV ester - Apply 1.38 to 1.82 L per acre of formulations containing 500 g/L 2,4-D in fall before frost and while plant leaves are green.

Glyphosate - Apply 2.83 to 4.86 L per acre (360 formulations – see glyphosate page for other rates) when hemp dogbane is in the early bud stage. Apply in 10 gallons per acre (45 L per acre) water. Do not disturb treated plants for at least 7 days after application.

Hoary Cress

Amitrol 240 - For non-selective patch treatment in pastures and non-crop land, apply 8.9 to 13.8 L per acre.

Glyphosate - As a spot treatment in labelled crops, apply 2.83 to 4.86 L per acre (360 g/L formulations or equivalent of other formulations) in 10 to 30 gallons per acre (45 to 135 L per acre) water when most plants have reached the early bud stage. Do not disturb treated plants for at least 10 days following treatment.

Leafy Spurge

Amitrol 240 - Apply 15.2 to 18.5 L per acre in 10 to 30 gallons per acre (45 to 135 L per acre) water in non-cropped areas and pastures when the weed is between the late stages of flowering and early seed development.

Dicamba - Apply 0.84 L per acre in 10 to 20 gallons per acre (45 to 90 L per acre) water for top growth control when the weed is actively growing. Patch treatment or pasture.

2,4-D amine - Apply 1.82 L per acre of formulations containing 500 g/L 2,4-D at early flowering stage. Repeat at least once to new growth later in the season. Control of established plants and new seedlings will require continued applications for a period of at least 4 to 5 years.

Navius - In grass pastures and rangeland, apply *Navius* at 68 grams per acre for control.

Tordon 22K - In rangeland and grass pasture, apply 3.6 L per acre in 90 to 180 gallons per acre (400 to 800 L per acre) of water to actively growing weeds. **WARNING** - Picloram is a very persistent and water-soluble herbicide. Do not apply to permeable soil. Do not apply to irrigated areas. Take special precautions to prevent drift.

Overdrive - In grass pastures and non-crop land, apply at 115 g per acre for top-growth control.

Locoweeds, Lupines, and Milk-vetches

2,4-D LV ester - In grass pastures and non-crop land, apply 2,4-D LV ester (500 g/L) at 1.78 to 2.75 L per acre at the full bloom stage.

Milkweed

Amitrol 240 - Apply 7.6 to 11.3 L per acre in 10 to 30 gallons per acre (45 to 135 L per acre) water in non-cropped areas and pastures in the early summer when all the shoots have emerged.

Glyphosate - When making Preharvest applications, use 1.0 L per acre (360 g/L formulations or equivalent of other formulations). For patch treatments, apply 4.86 L per acre (360 g/L formulations or equivalent of other formulations) in 10 gallons per acre (45 L per acre) water. Apply when most plants have reached the bud to bloom stage. Reduced results may occur on plants treated after full bloom as not all milkweed plants reach the required stage of growth at the same time. Repeat treatments may be required. Do not disturb plants for 10 days following treatment. Do not apply to plants covered with dust.

Narrow-leaved Hawk's-beard

2,4-DB - Apply to forage legume crops at recommended rates at the 2 to 4 leaf stage of narrow-leaf hawk's-beard, after legume growth in the fall has stopped.

2,4-D LV ester (600 g/L) - In fall stubble, apply 0.57 to 0.90 L per acre to fall rosettes. Apply to fall seedlings or spring seedling to the 2 leaf stage at 0.22 to 0.38 L per acre or 0.4 to 0.6 L per acre in spring prior to bolting to control.

Barricade, thifensulfuron/tribenuron, Triton C, Triton K - Up to 4 inches tall in registered crops.

Blackhawk - Apply post-harvest or in-fallow to actively growing narrow-leaved hawk's-beard. Apply *BlackHawk* at 300 mL per acre in a mix with glyphosate at 180 to 360 gae/acre. For control in spring, apply prior to the 2 leaf stage.

Distinct - Apply in fallow or post-harvest at 58 grams per acre (with 180 to 360 g ae per acre glyphosate) or 115 g per acre.

Express SG - For season long control in range and pasture at the early bud-pre-bloom stage.

Florasulam + glyphosate - up to 8 cm tall prior to seeding registered crops.

Florasulam + 2,4-D - Up to 2 leaf stage in registered crops.

Inferno Duo - Prior to crop emergence apply 12.75 grams per acre of *Inferno Duo*.

Glyphosate - Prior to crop emergence, apply 0.51 to 0.77 L per acre (360 g/L formulations or equivalent of other formulations) in 5 to 10 gallons per acre (23 to 45 L per acre) water. Use the high rate if narrow-leaf hawk's-beard is between 3 and 6 inches (8 to 15 cm) in height.

Glyphosate - In glyphosate tolerant crops, apply 0.5 L per acre (360 g/L formulations or equivalent of other formulations) at the 1 to 6 leaf stage. Not all products are registered. Check glyphosate pages.

Heat LQ - Apply in a mix with glyphosate for rapid burndown prior to seeding.

Paradigm - As a pre-seed burn down with glyphosate at 7.5 to 10 grams per acre or in crop at 10 grams per acre as an in-crop application up to bolting and 30 cm in height.

Travallas - In registered crops apply to narrow-leaf hawk's-beard up to 10 cm tall or across.

Tribenuron - Apply 4 g per acre of 75% WG formulations or 6 g per acre of 50% SG formulations in a mix with glyphosate prior to seeding.

Tribenuron/metsulfuron - Up to 3 inches tall with residual activity, prior to the seeding of registered crops.

Velpar - Apply in late fall or early spring for control in established alfalfa in forage and seed production.

Pasture Sage

2,4-D LV ester - In grass pastures and non-crop land, apply 2,4-D LV ester (500 g/L) at 1.2 L per acre to the foliage of actively growing plants.

Dicamba - In grass pastures, rangeland and non-crop land, apply dicamba at 1.86 L per acre in 10 to 20 gallons per acre (45 to 90 L per acre) water to actively growing weeds.

Reclaim II - In grass pastures and non-crop land, apply *Reclaim II A* at 69 g per acre plus *Reclaim II B* at 0.69 L per acre for 2 years of control.

Tordon 22K - In rangeland and grass pasture, apply 1.82 L per acre in 90 to 180 gallons per acre (400 to 800 L per acre) of water to actively growing weeds. **WARNING** - Picloram is a very persistent and water-soluble herbicide. Do not apply to permeable soil. Do not apply to irrigated areas. Take special precautions to prevent drift.

Perennial Smartweed

Glyphosate - Apply 2.0 L per acre (360 g/L formulations or equivalent of other formulations) in 10 gallons per acre water. Apply when vines are a minimum of 8 inches (20 cm) tall, but before flowering.

Poplar

Dicamba + 2,4-D - In grass pasture and rangeland only, apply dicamba at 2.1 L plus 2,4-D 500 amine at 4 L or 2,4-D 600 ester at 3.3 L per 220 gallons (1000 L) of water and apply by wand to the point of runoff when leaves are fully expanded.

Glyphosate - As a non-selective spot treatment, apply 1.21 to 2.43 L per acre (360 g/L formulations or equivalent of other formulations) in 10 to 30 gallons per acre (45 to 135 L per acre) water in the summer through early fall when brush is actively growing.

Navius - In grass pastures and rangeland, apply *Navius* at 135 grams per acre for control of black and balsam poplar as well as plains cottonwood and trembling aspen.

Poverty Weed

Dicamba - As a spot treatment or in grass pasture or rangeland apply 1.86 L per acre in 10 to 20 gallons per acre (45 to 90 L per acre) water when weed is actively growing. Dicamba at 0.61 L per acre will provide only top growth control.

Restore II - For season long control in grass pastures and rangeland, apply *Restore II* at 0.97 L per acre (on 10 L container treats 10 acres).

Tordon 22K - In rangeland and grass pasture, apply 1.82 L per acre in 90 to 180 gallons per acre (400 to 800 L per acre) of water to actively growing weeds. **WARNING** - Picloram is a very persistent and water-soluble herbicide. Do not apply to permeable soil. Do not apply to irrigated areas. Take special precautions to prevent drift.

Prairie Everlasting, Prairie Sage

2,4-D LV ester - In grass pastures and non-crop land, apply 2,4-D LV ester (500 g/L) at 1.78 L per acre to the foliage of actively growing plants in the early fall, and repeat in the spring.

Purple Loosestrife

(dryland situations only)

Glyphosate - Apply 2.43 L per acre (360 g/L formulations or equivalent of other formulations) in 30 to 60 gallons per acre (135 to 270 L per acre) water when purple loosestrife is actively growing and at or beyond the bloom stage. If using hand held equipment, apply a 1 to 2 percent solution until plants are wet. Use a 33 percent product solution if using a wiper applicator. Do not treat plants over open water. If possible, remove and destroy the flower heads before treatment to ensure prevention of seed set. For large monocultures of purple loosestrife, gradually work from the periphery inward over a number of years to allow competing vegetation to invade the treated area. Sprayed areas should be monitored for new seedlings to prevent re-infestation of purple loosestrife.

Red Bartsia

2,4-D amine or LV ester - Apply 0.57 L per acre of formulations containing 500 g/L 2,4-D in 10 gallons per acre (45 L per acre) water. On hayland, treat within 10 days after first cutting. Roadsides and pastures should be sprayed as soon as the red bartsia appears, usually in early July. Repeat treatment if necessary for later germination.

Roses

Dicamba + 2,4-D amine or LV ester (500 g/L) - In grass pastures, rangeland and non-crop land, apply dicamba at 1.48 L per acre with 2,4-D LV ester or amine at 1.78 L per acre to the foliage of actively growing brush in the spring or early summer.

Escort - In pasture and rangeland, apply *Escort* at 12 g per acre with non-ionic surfactant at 0.2 L per 100 L spray solution in 10 to 20 gallons per acre (45 to 90 L per acre) water. Apply between mid-June and mid-August after the brush has leafed out, but before the leaves begin to turn their fall colours.

Navius - In grass pastures and rangeland, apply *Navius* at 68 grams per acre for control of wild rose.

Reclaim II - In grass pastures and non-crop land, apply *Reclaim II A* at 81 g per acre plus *Reclaim II B* at 0.69 L per acre for 2 years of control.

Russian Knapweed

Dicamba - In grass pasture and rangeland only, apply 3.72 L per acre in 20 to 30 gallons (90 to 135 L) per acre when leaves are fully expanded.

Restore II - In grass pastures and rangeland, apply *Restore II* 0.97 L per acre (one 10 L jug treats 10 acres) when actively growing for suppression.

Tordon 22K - In rangeland and grass pasture, apply 1.82 L per acre in 90 to 180 gallons per acre (400 to 800 L per acre) of water to actively growing weeds. **WARNING** - Picloram is a very persistent and water-soluble herbicide. Do not apply to permeable soil. Do not apply to irrigated areas. Take special precautions to prevent drift.

Saskatoon

2,4-D LV ester - In grass pastures and non-crop land, apply 2,4-D LV ester (500 g/L) at 1.78 L per acre to the foliage of actively growing brush.

Scentless Chamomile

Barricade II + MCPA Ester (190 mL per acre) - In registered crops apply to scentless chamomile in the 1 to 6 leaf stage.

Bromoxynil/MCPA ester - Apply in registered crops at label rates when scentless chamomile is in the 2 to 4 leaf stage.

Curtail M - In registered crops, apply 0.81 L per acre in 10 gallons per acre (45 L per acre) water when scentless chamomile is actively growing and in the 2 to 4 leaf stage.

Clopyralid - In registered crops, apply 0.23 L per acre in 10 gallons per acre (45 L per acre) water when scentless chamomile is actively growing and in the 2 to 4 leaf stage.

Dicamba - Apply 0.51 L per acre in 10 to 20 gallons per acre (45 to 90 L per acre) water to actively growing weeds for top growth control.

Escort - In pastures, rangeland and rough turf, apply 8 grams per acre in 10 to 20 gallons per acre (45 to 90 L per acre) of water to actively growing plants of less than 4 inches (10 cm) tall. Add non-ionic surfactant at 0.2 L per 100 L of spray solution.

Express SG - Apply in a mix with glyphosate prior to seeding registered follow crops.

Liberty - In registered crops, apply 1.1 L per acre to plants up to 4 inches (10 cm) in height.

Metsulfuron plus 2,4-D - Apply 3 grams per acre metsulfuron plus 0.34 to 0.45 L per acre 2,4-D LV ester or amine (500 g/L formulations) in 10 gallons per acre (45 L per acre) water for control

of scentless chamomile up to the 4 leaf stage in wheat, barley, and creeping red fescue. Add non-ionic surfactant at 0.2 L per 100 L of spray solution.

Navius - In grass pastures and rangeland, apply *Navius* at 68 grams per acre for control.

Restore II - In grass pastures and rangeland, apply *Restore II* at 0.86 L per acre (one 10 L container treats 11.6 acres) when actively growing.

Thifensulfuron/tribenuron - Apply 8 grams per acre of DG formulations or 12 grams per acre of *Refine SG* in 10 gallons per acre (45 L per acre) water to actively growing seedlings for suppression. Add non-ionic surfactant at 0.2 L per 100 L of spray solution.

Tordon 22K - In rangeland and grass pasture, apply 0.445 L per acre in 90 to 180 gallons per acre (400 to 800 L per acre) of water to actively growing weeds. **WARNING** - Picloram is a very persistent and water-soluble herbicide. Do not apply to permeable soil. Do not apply to irrigated areas. Take special precautions to prevent drift.

Triton C - Apply at label rates to suppress scentless chamomile up to 10 cm across or high.

Stinging Nettle

2,4-D amine - Apply 0.91 to 1.82 L per acre of formulations containing 500 g/L 2,4-D amine.

Stork's Bill

Altitude FX2, Ares, Everest GBX, florasulam + MCPA, Prestige XC, Pulsar, Stellar, Tandem, thifensulfuron/tribenuron, Trophy - Apply at label rates to provide suppression in registered crops. See product pages for Crops, Rates and Staging.

Barricade II - In registered crops apply to stork's-bill in the 1 to 6 leaf stage

Basagran - In registered crops apply 0.91 L per acre at the 2 to 6 leaf stage.

Dichlorprop/2,4-D - Apply at 0.71 L per acre to registered crops when stork's-bill is in the 2 to 4 leaf stage.

Fluroxypyr + 2,4-D, OcTTain - Apply at the maximum labelled rate to registered crops when stork's-bill is in the 1 to 8 leaf stage.

Glyphosate - In glyphosate tolerant crops, apply 0.5 L per acre (360 g/L formulations or equivalent of other formulations) from emergence to the 6 leaf stage.

Liberty - In registered crops apply 1.35 L per acre to plants in 1 to 3 leaf stage.

Linuron - Apply with MCPA amine in registered crops at registered rates to stork's-bill in the 2 to 4 leaf stage.

Metsulfuron - Apply with 2,4-D or MCPA amine or LV ester in registered crops at registered rates to stork's-bill in the 2 to 4 leaf stage.

Navius - In grass pastures and rangeland, apply *Navius* at 68 grams per acre for control.

Odyssey - In registered crops, apply 17 grams per acre plus adjuvant.

Spectrum - In registered crops apply at 20 acres per case to control from the 2 to 4 leaf stage.

Travallas - In registered crops apply at 200 mL per acre up to 10 cm tall or wide.

Toadflax (Yellow)

Amitrol 240 - Apply 7.6 to 11.3 L per acre in 10 to 30 gallons per acre (45 to 135 L per acre) water in non-cropped areas and pastures when the weed is in the advanced rosette to prebud stage.

Dichlorprop/2,4-D - Apply 0.71 L per acre in 10 to 18 gallons per acre (45 to 80 L per acre) water in wheat or barley for toadflax suppression. Apply when majority of toadflax is no taller than 6 inches (15 cm). The use of Dichlorprop/2,4-D for suppression of toadflax in wheat or barley should be part of a long-term planned approach for toadflax control, which includes spring and fall tillage, fall patch spraying, fallow.

Glyphosate - Apply 2.83 to 4.86 L per acre (360 g/L formulations or equivalent of other formulations) when most plants have reached the early bud stage of growth. Allow 7 more days after application before tillage. A rate of 1.0 L per acre may be used with Preharvest applications or when controlling in summerfallow situations.

Metsulfuron plus 2,4-D - Apply 2 to 3 grams per acre *Ally* plus 0.34 to 0.45 L per acre 2,4-D LV ester or amine (500 g/L formulations) in 10 gallons per acre (45 L per acre) water for toadflax suppression in wheat, barley, and creeping red fescue. Add non-ionic surfactant at 0.2 L per 100 L of spray solution.

Navius - In grass pastures and rangeland, apply *Navius* at 68 grams per acre for suppression.

Thifensulfuron/tribenuron - In registered crops, apply 8 grams per acre of DG formulations or 12 grams per acre of *Refine SG* in 10 gallons per acre (45 L per acre) water for suppression of toadflax. Apply when toadflax is less than 15 cm (6 inches) in height. Add non-ionic surfactant at 0.2 L per 100 L spray solution.

Tordon 22K - In rangeland and grass pasture, apply 3.6 L per acre in 90 to 180 gallons per acre (400 to 800 L per acre) of water to actively growing weeds. **WARNING** - Picloram is a very persistent and water-soluble herbicide. Do not apply to permeable soil. Do not apply to irrigated areas. Take special precautions to prevent drift.

Western Snowberry (Buckbrush)

2,4-D amine or LV ester (500 g/L) - Apply 1.82 L per acre 2,4-D amine or LV ester in a minimum of 20 gallons per acre (90 L per acre) water in spring or early summer. Retreatment may be necessary the following year.

Dicamba plus 2,4-D LV ester (500 g/L) - Apply 1.48 L per acre dicamba tank mixed with 1.82 L per acre 2,4-D LV Ester in 20 gallons per acre (90 L per acre) water in spring or early summer after the leaves are fully expanded.

Escort - Apply 10 grams per acre in 10 to 20 gallons per acre (45 to 90 L per acre) water between mid-June and mid-August after the brush has leafed out, but before the leaves turn their fall colours.

Navius - In grass pastures and rangeland, apply *Navius* at 68 grams per acre for control.

Reclaim II - In grass pastures and non-crop land, apply *Reclaim II A* at 81 g per acre plus *Reclaim II B* at 0.69 L per acre for 2 years of control.

White Cockle

2,4-DB - Apply Embutox 625 at 1.1 L per acre or Caliber 400 at 1.7 L per acre or Cobutox 600 at 1.1 L per acre for top growth control to registered crops only.

Barricade II + MCPA Ester (190 mL per acre) - In registered crops apply to white cockle up to 10 cm in height.

Express SG - Apply in a mix with glyphosate prior to seeding registered follow crops to control spring rosettes.

Mecoprop - Apply 2.2 L per acre in 18 gallons per acre (*80 L per acre) of water for top growth control of established plants. Will also control seedlings. Apply to registered crops only.

Navius - In grass pastures and rangeland, apply *Navius* at 68 grams per acre for control.

Travallas - In registered crops apply to white cockle up to 10 cm tall or across.

Wolf Willow (Silverwillow)

Dicamba + 2,4-D amine or LV ester (500 g/L) - In grass pastures with no legumes, apply dicamba at 2.1 L per 1000 L of water with 2,4-D LV ester or amine at 4.0 L per 1000 L of water to the foliage of actively growing brush in the spring or early summer and wet the foliage until the point of runoff.

Reclaim II - In grass pastures and non-crop land, apply *Reclaim II A* at 81 g per acre plus *Reclaim II B* at 0.69 L per acre for 2 years of control.

Wild Tomato

2,4-D or MCPA amine or ester (500 g/L) - Apply 0.34 to 0.45 L per acre to registered crops up to the 8 leaf stage of wild tomato.

Bromoxynil-MCPA ester - Apply 0.40 L per acre to registered crops from the 1 to 6 leaf stage of wild tomato.

Willow

2,4-D LV ester - In grass pastures and non-crop land, apply 2,4-D LV ester (500 g/L) at 1.78 L per acre to the foliage of actively growing brush.

Dicamba + 2,4-D - In grass pasture and rangeland only, apply dicamba at 1.7 L plus 2,4-D 500 amine at 3.24 L per acre in 20 to 30 gallons (90 to 135 L) of water per acre when leaves are fully expanded.

Glyphosate - As a non-selective spot treatment, apply 1.21 to 2.43 L per acre (360 g/L formulations or equivalent of other formulations) in 10 to 30 gallons per acre (45 to 135 L per acre) water in the summer through early fall when brush is actively growing.

Navius - In grass pastures and rangeland, apply *Navius* at 135 grams per acre for control.

Soil Residual Herbicides

When applied at recommended rates in a crop, most herbicide residues will disappear within a few weeks after application and impose no restriction on cropping options the next year. However, some herbicide residues do not degrade quickly, and can persist in the soil for months or years following application, thereby restricting the crops that can be grown in rotation. Herbicide residues in the soil are deactivated in various ways including:

- Break down by chemical reactions,
- Break down by soil microbes,
- Escape to the atmosphere as a gas (volatilization),
- Break down by light (photodegradation),
- Leaching,
- Binding to soil particles.

Herbicides often disappear from the environment by more than one of these mechanisms. Many herbicides considered to be non-residual are bound temporarily to soil particles while they are broken down gradually by either soil microbes or chemical reactions. The binding action insures that the herbicide is not available to the crop in quantities that will cause damage.

As a general rule, breakdown processes are favoured by warm, moist soil conditions. During the winter, when the ground is frozen, and in the summer when the soil is dry, herbicide degradation is reduced. The residual activity of certain herbicides is also affected by soil organic matter and soil pH. These soil factors are seldom uniform across a field.

Herbicide carryover is aggravated by low levels of organic matter and is more likely to occur on eroded hilltops than in other parts of a field. The risk of herbicide carryover will also be greater in sprayer overlaps which are most common around headlands and slough margins.

Growers should be aware of the residual properties before applying any herbicide if they are to avoid cropping restrictions in following years. Knowledge of the limitations associated with herbicides that leave a soil residue, along with an accurate record of application (i.e. rates, locations) will serve to minimize rotational problems. Each herbicide used in mixes should be considered separately.

Soil tests using chemical extraction cannot always give a good indication of the potential injury risk from herbicide residue because of the influence of organic matter, clay and pH. Because of this, a field bioassay or laboratory bioassay, where plants are grown directly in the treated soil are best for detecting the potential for injury. These tests are not intended to be used to shortcut restrictions on the label, but provide information on rotational crops where none is available.

Injury symptoms from other causes can resemble herbicide carryover injury (i.e. cold weather, flooding, drought, insects, diseases, etc.). Consult with your local agronomist on potential causes before spending money on testing.

Herbicides that leave a soil residue and are of particular concern in Western Canada are found in the following chart.

Re-cropping Restrictions for Residual Herbicides:

Figures listed are the number of cropping seasons before each crop can be grown ("1" means that the crop can be grown the year following application). For plant-back restrictions less than one season; the delay is indicated with a "d" for number of days or with "mths" for the number of months. A blank space means that there are no recommendations given on the product label and a field bioassay is recommended by many product manufacturers to determine if these crops are safe to plant. A field bioassay is a strip of a test crop that covers an area of the field that is representative of the field variation and should include an untreated area.

PRODUCT	Alfalfa	Barley	Canaryseed	Clearfield canola	Non-Clearfield canola	Fababeans	Field corn	Dry beans	Field Peas	Flax	Forage grasses	Lentils	Mustard ¹	Oats	Potatoes	Rye	Soybeans	Sunflowers	Wheat (durum)	Wheat (spring)	Wheat (winter)
2,4-D*	1	1	1	1	1		1	1	1	1	1	1		1		1			1	1	1
Accent	10 mths	10 mths		10 mths	10 mths		10 mths										10 mths			1	4 mths
Altitude FX2		1		1	1				1	1		1	2	1				1		1	3 mths
Amitrol 240		1d	1	1d	1d		10d*	10d*	5d*	1		1	1	1			6d	1	1d	1d	1d
AAtrex, Primextra II Magnum						1*	1		1*	1*											
Ares		1	1	1	2		1		1	2		1		1					2	2	1
Authority / Authority Charge	1	1		1	1	0	1		0	0		2	0				0	0	1	1	1
Authority Supreme							1		0								0	1	1	1	1
Avadex	0	0	0	0	0	1	1	1	0	0		1	0	2		1	1	1	1	0	0
Barricade II, Predicade, Retain, Signal FSU, TraxosTwo	2	1	2	1	1	2	2	2	1	1	1	1	1	1	2	1	2	2	2	1	1
Command 360 ME	2	2	2	1	1	2	1	1	2	2	2	2	2	2	1	2	1	2	2	2	16 mths
Curtail M, Prestige XC	2	1	2	1	1	2	1	2	1*	1	1	2	1	1		1	2	2	1	1	1
Dicamba*		1		1*	1*		1	1*						1			1		0*	0*	1
Dual II Magnum							1								1		1				4.5 mths
Eclipse III, Clopyralid		1		1	1				10 mths*	1	1		1	1		1				1	1
Edge	0		2	0	0	0		0	0		2	0	0	2			0	0	1*	1*	
Fierce							7 days										0			7 days	
Flexstar GT							10 mths	10 mths									10 mths			10 mths	4 mths
Florasulam/fluroxypyr + MCPA		1		1	1				1					1						1	1
Florasulam + glyphosate (prior to Aug 1)		0d		1	1				1					0d					0d	0d	0d
Flucarbazone, Everest GBX (Brown soils)																				1	
Flucarbazone, Everest GBX (Dark Brown soils)		1*		1*	1*				1*	1*							1	1	1	1	
Flucarbazone, Everest GBX (Black soils)		1*		1*	1*			1 ⁺⁺⁺	1*	1*							1	1	1	1	
Flucarbazone, Everest GBX (Grey-Wooded soils)		1*		1*	1*				1*											1	
Focus, Heat Complete							1										1			1	4 mths
Fortress MicroActiv		0	2	0	0				0	0		0	0	2		1	1	1	1	0	0
Frontier Max, Outlook							0*	0*													1
Florasulam + MCPA, florasulam + 2,4-D, florasulam + Curtail M***	1		1	1		1	1	1*	1		1	1	1	1		1	1	1	1	1	

PRODUCT	Alfalfa	Barley	Canaryseed	Clearfield canola	Non-Clearfield canola	Fababeans	Field corn	Dry beans	Field peas	Flax	Forage grasses	Lentils	Mustard [†]	Oats	Potatoes	Rye	Soybeans	Sunflowers	Wheat (durum)	Wheat (spring)	Wheat (winter)
Imazamethabenz (Black and Grey Wooded soils)		1	2	1	1				1	1				2				1	1	1	
Imazamethabenz (Brown and Dark Brown soils)		1	2	1	2				2	2				2				1	1	1	
Imazethapyr	1	1		0					0			1								1	
<i>Infinity / Tundra / Velocity m3</i>	1	1	1	1	1		1		1	1		2		1			1		1	1	
<i>Kerb</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
<i>Korrex</i>		0		1	1		1	1	1	1		1	1	0	1		1	1	0	0	0
Metribuzin				2	2	0			0						0*		0*	2			
Metsulfuron (pH less than 7, Brown and Dark Brown)		1	4		2					2		3	4	1					1	1	
Metsulfuron (pH less than 7, other soils)		1	4		1					1		3	4	1					1	1	
Metsulfuron (pH 7 to 7.9, Brown and Dark Brown soils)		1	4		3					3		4	4	2					1	1	
Metsulfuron (pH 7 to 7.9, other soils)		1	4		2					3		4	4	1					1	1	
<i>Muster</i>	2	1	2		2	2		2	2	1	2*	2	2	1					1	1	1
<i>Odyssey/Odyssey NXT*, Duet*, Odyssey Ultra/Ultra NXT*</i>	1	1	1	1	2		1		1	2		1		1				2	1	1	
<i>Option</i>	1	1		1	1		1	1	1					1	1		1			1	1
<i>Paradigm</i>		1		1	1				1	1		2	1				1			1	
<i>Permit WG</i>		2 mths		2	2		1 mths	0	1					2 mths	1		1	2	2 mths	2 mths	2 mths
<i>Pixxaro</i>		1		1	1		1		1	1		2	1	1			1	1		1	
<i>Prism, Sortan IS</i>		1		1	1	1	0	1	1	1		1		1	1		1	1	1	1	4 mths
<i>Pulsar</i>	mths	1	2	1	1	2	2	2	1	1	1	1	1	2	2	1	2	2	1	1	1
Quinclorac		0		1	1				1	2		2						1	0	0	
<i>Reflex*</i>							1	0									1		1	0	
<i>Rexade</i>		1		1	1				1	1		2	1	1			1	1		1	
<i>Salute</i>		1		1	1				10 mths	1	1		1	1		1			1	1	
<i>Signal FSU</i>		1		1	1				1	1	1	1	1	1		1			1	1	
<i>Simplicity</i>		1		1	1				1	1		1	1	1			1			1	
<i>Solo, Viper ADV</i>		1	1	1	1				1	1		1	2	1					1	1	
<i>Tandem</i>		1		1	1				1	1		1	1	1						1	
<i>Travallas</i>		10 mths		10 mths	10 mths				10 mths	10 mths		22 mths		10 mths					10 mths	10 mths	
Tribenuron/Metsulfuron		1d		10 mths	10 mths				10 mths			22 mths		11					1d	1d	1d
Trifluralin	0	1*	2	0	0	0	1*	0	0	1*	2	0	0	2		0	0	0	1*	0*	1*
<i>Triton C*</i>		0		1	1				1	2*		2*						1	0	0	
<i>Ultim</i>		1					1														1
<i>Valtera (Crop uses)</i>	11 mths	11 mths	1	11 mths	11 mths	1	1	9 mths	0	1	1	1	1	1	1	1	0	9 mths	1	0	4 mths
<i>Varro</i>	1	1	1	1	1		1	1	1	1		1		1			1	1	1	1	10 mths

* The minimum re-cropping intervals are listed. These intervals may be longer than those listed depending on the use rates, region, province, soil types, environment, time of application and crop variety. Refer to product page for more information.

** Drought restrictions apply to drought conditions (80% of normal June to September rainfall) for high pH soils (greater than pH 7.5) and severe drought (less than 65% of normal June to Sept. rainfall) for all soils.

*** May not be supported for all products; see product page for details.

† May not be valid for all varieties or crop types. See product page for details.

†† DO NOT grow dry beans the year following Everest GBX application.

0 - May be seeded or reseeded the year of application. No re-cropping restrictions. 1 - Next cropping season after application. 2 - Two cropping seasons after application.

NR - Not recommended.

Note: The re-cropping intervals listed may not be sufficient to prevent crop injury during periods of below average rainfall.

Effect of Rainfall on Herbicide Efficacy

Required Interval	Product
15 minutes	Diquat
30 minutes	clodinafop
1 hour	<i>Axial, Axial Xtreme, Barricade II, Broadband, Bromoxynil, Bromoxynil/MCPA ester, Bromoxynil/MCPA+fluroxypyr, clethodim, Enforcer D, Everest GBX, fenoxaprop, flucarbazone, fluroxypyr, Gramoxone, Infinity, Paradigm, Pixxaro, Poast Ultra, Predicade, Pulsar, quizalofop, Refine SG, tralkoxydim, Traxos, Tundra, Varro, Velocity m3</i>
2 hours	2,4-D LV Ester, <i>Aatrex</i> (post-emergent application), <i>Ares</i> , metsulfuron+2,4-D LV Ester, fluroxypyr + 2,4-D ester, MCPA Ester, <i>Simplicity, Travallas</i>
3 hours	<i>Altitude FX2</i> , dicamba/mecoprop-p/MCPA, imazamox, imazamox/imazethapyr, <i>Odyssey Ultra, Solo Ultra</i>
4 hours	<i>Accent</i> , metsulfuron + 2,4-D Amine, 2,4-D Amine, <i>Cirpreme, Distinct</i> (post-emergent application), <i>Enforcer MSU, Liberty</i> (both), <i>Manipulator 620</i> , MCPA Amine, <i>Overdrive, Permit WG</i> (post-emergent applications), <i>Prism, Reflex, Rexade, Signal FSU, Tandem</i> , thifensulfuron/tribenuron 75% WDG, <i>Ultim</i>
6 hours	<i>Curtail M, Glykamba</i> , imazamethabenz, MCPA-K, MCPA Sodium Salt, metribuzin, <i>Muster, Option, Prestige XC, quinclorac, Tordon 22K, Tribenuron, Triton C, Triton K, Ultra Blazer</i>
8 hours	<i>Basagran, CleanStart</i>
No specific recommendation*	2,4-DB, <i>Aim, Amitrol 240</i> , Bromoxynil/2,4-D ester, clopyralid, dicamba, dichlorprop/2,4-D, <i>DyVel, DyVel DSp, Enforcer D, Escort, Express FX</i> , florasulam/fluroxypyr + MCPA, florasulam + 2,4-D, florasulam + <i>Curtail M</i> , florasulam + glyphosate, florasulam + MCPA, fluroxypyr+MCPA, fluroxypyr+MCPA+bromoxynil, glyphosate, <i>Grazon</i> , imazethapyr, <i>Korrex</i> , Linuron, MCPB/MCPA, mecoprop-p, <i>Momentum, Optica Trio, Pinnacle, Pulsar, Reclaim, Restore II, Salute, Tensile</i> , topamazone, tribenuron/metsulfuron, <i>Viper ADV</i>

* The products listed make no specific time recommendation on the label. The required rainfree period could be up to 8 hours. See the product page in the guide or consult the product label.

Note: The term "Rainfastness" refers to the time needed between application and rainfall to avoid significant reduction in efficacy. Rainfall shortly after application of most post-emergent herbicides may reduce weed control. Effect will vary with product, the interval between spraying and rainfall and the intensity and duration of the rainfall. These guidelines are based on label information. Use the longest time interval on the component products when considering tank mixes.



Products Available as Prepackaged Tank Mixes

Product Name (Manufacturer)	Component 1 or A	Component 2 or B	Component 3 or C	Crops	Weeds Controlled	Area Treated per Package	
						Acres	Ha
<i>Authority Charge</i> (FMC)	<i>Aim</i>	<i>Authority</i>		Chickpea, field pea, flax, soybean, sunflower, fababean	See component products	80 to 64	32 to 26
<i>Axial iPak</i> (Syngenta) (Nufarm)	<i>Axial</i>	<i>Infinity</i>		Spring wheat (NOT including durum), barley	See component products	40	16
<i>Black Hawk</i> - carfentrazone (Nufarm)	<i>Aim</i>	2,4-D 700 ester		Prior to seeding: Wheat (spring, durum, winter), barley, rye	See component products	80	32
<i>Cirpene</i> (XC) (Corteva)	<i>Paradigm</i>	<i>Lontrel 360</i> (XC) (see Clopyralid)	Must be mixed with MCPA purchased separately	Wheat (including durum) and barley	See component products includes Canada thistle, cleavers and dandelion	40	16
<i>Conquer</i> (Nufarm)	<i>Aim</i>	Bromoxynil (<i>Koril</i>)		Prior to seeding canola	Weeds controlled by component products plus: Volunteer canola	80	32
Glyphosate + clopyralid (Corteva, Agracity)	clopyralid (<i>Lontrel</i> = <i>Eclipse A</i>) (<i>Clobber</i>)	glyphosate (<i>VP480</i> = <i>Eclipse III B</i>) (<i>Disruptor 360</i>)		Glyphosate tolerant canola varieties	See component products	40	16
<i>Enforcer MSU</i> (Nufarm)	<i>Enforcer M</i>	Thifensulfuron/tribenuron (<i>Boost</i>)		Barley, Wheat (spring, durum)	Weed controlled by component products plus suppression of narrow-leaved hawk's-beard	40	16
<i>Express FX</i> (FMC)	Tribenuron (<i>Express SG</i>)	Dicamba 480 (<i>Dicamba L</i>)	Must be mixed with glyphosate – (purchased separately)	Prior to seeding	Weeds controlled by <i>Express SG</i> plus glyphosate plus Group 2 & 9 resistant kochia	80	32
<i>Ko-Act</i> (Nufarm) <i>MPower X-KO</i> (Agracity)	tribenuron	2,4-D 700 ester		Wheat, barley, rye	See component products	80	32
<i>Luxxur</i> (Bayer CropScience)	Tribenuron (<i>Express SG</i>)	<i>Varro</i>		Wheat (spring, winter durum)	Weeds controlled by <i>Varro</i> plus Canada thistle, Cow cockle, dandelion, Narrow-leaved hawk's-beard, perennial sow-thistle, scentless chamomile	80	32
<i>Odyssey Ultra/ Odyssey Ultra NXT</i> (BASF)	<i>Odyssey/Odyssey/NXT</i>	<i>Poast Ultra</i>	<i>Merge</i> (adjuvant)	Field peas, CLEARFIELD lentil	See component products	40	16
<i>Predicade</i> (FMC)	<i>Barricade II</i> (Predicade Broadleaf)	<i>Varro</i> (Predicade Grass)	MCPA 600 Ester	Wheat (spring, durum, winter)	See component products	40	16
<i>Refine M</i> (FMC), <i>Broadside</i> (Loveland)	thifensulfuron/tribenuron (<i>Refine SG</i>)	MCPA Ester		Wheat (durum, spring, winter), barley, oat	See component products	80	32
<i>Retain SG</i> (Loveland)	thifensulfuron/tribenuron (<i>Refine SG</i>)	Fluroxypyr + 2,4-D		Wheat (spring, durum) barley	Weeds Controlled by <i>Refine SG</i> plus non-Group 2 resistant cleavers	40	16
<i>Salute</i> (Dow)	<i>Ares</i>	<i>Lontrel Dry</i>		CLEARFIELD canola	Weeds controlled by <i>Ares</i> plus Canada thistle, Sow-thistle (annual, perennial)	40	16
<i>Solo Ultra</i> (BASF)	<i>Solo ADV</i>	<i>Poast Ultra</i>		CLEARFIELD lentil, CLEARFIELD canola	See component products	40	16
<i>Tensile</i> (BASF)	<i>Solo</i>	<i>Lontrel Dry</i>		CLEARFIELD canola	See component products	40	16
<i>TraxosTwo</i> (Syngenta)	<i>Traxos</i>	<i>OcTain</i> (fluroxypyr+ 2,4-D)		Wheat (spring, durum)	See component products	20	8
<i>Triton K</i> (FMC)	Tribenuron (<i>Express SG</i>)	2,4-D LV Ester	<i>Dicamba</i> (<i>Banvel II</i>)	Spring wheat, barley	See component products	40	16

Note: See the component products listed for information concerning staging, application information, safety precautions, the effect of weather and grazing, re-cropping, harvest interval and storage precautions. The more stringent recommendation of the two products should be followed. Mix products in the order listed.

Product Pages

2,4-D

Herbicide Group

4 - 2,4-D

(Refer to page 45)

Company and Formulation:

	PCP # (Product Name)	
	600 Amine*	700 Ester**
ADAMA Canada		31698
AgraCity	31332	30460 (MPower 2,4-D)
Albaugh		29979 (Agri Star 2,4-D)
Federated Cooperatives Ltd.		32882
IPCO	17511	27819
Loveland Products Canada	5931	27818 (<i>Salvo</i>)
Nufarm Agriculture	14726	27820

* formulated as a solution.

** formulated as an emulsifiable concentrate.

- **600 Amine:** 564 g ae per L present as dimethylamine salt and formulated as a solution.
- **700 Ester:** 660 g ae per L present as 2-ethylhexyl ester and formulated as an emulsifiable concentrate.
 - Container size - various

Crops, Rates and Staging:

Application rates for individual products may vary from those listed. Refer to the label for product specific use rates. Rates greater than those listed may cause crop injury.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Post-emergent:

Crop	Maximum Safe Rate (g ae per acre)	Stage
Wheat, barley, spring rye	227 to 283** (Esters) 227 (Amines)	4 leaf to early flag leaf.
Fall rye, winter wheat*	213 (Esters) 205 (Amines)	In spring, apply after winter cereals begin to grow but before emergence of the flag leaf. From full tillering to prior to flag leaf stage.
Corn*	227 (Amines) 213 (Esters)	Apply as an overall spray before corn is 6 inches (15 cm) tall and before the 6 leaf stage. After 6 inches (15 cm) use a directed spray. Avoid making applications under hot/humid conditions onto corn.
Seedling and established grasses for forage and seed production*	213 (Esters and Amines)	Apply from the 3 leaf stage to emergence of the flag leaf of seedling grasses. For established grasses for seed production, apply in spring up to emergence of the flag leaf.
Established forage grass (not for seed production)*	426 (Esters and Amines)	Apply in spring up to emergence of the flag leaf of established grasses, or in the fall after harvest.
Established grass pastures	907 (Esters and Amines)	No restrictions, apply when weeds are actively growing. For control of brush species, apply at time of rapid growth (usually May to mid-June, and September prior to colour change).

* Note: Registered for use only with certain brands of 2,4-D; use of non-registered products is at the risk of the user.

** Note: Rates above 227 g ae per acre can result in crop injury. This injury is typically offset by the benefits of improved weed control.

Pre-plant or Pre-emergent:

- **Barley, rye, wheat (spring, winter):** Apply 134 to 213 g ea per acre (weeds less than 8 cm) to a maximum of 294 g ae per acre (weeds greater than 8 cm) of *Nufarm 2,4-D Ester 700* or *ADAMA 2,4-D Ester 700 Liquid Herbicide* only prior to seeding or after seeding but prior to emergence of the crop.
- **Soybean:** Apply from 134 to 213 g ae per acre of 2,4-D 700 Ester (*Nufarm 2,4-D Ester 700*, *ADAMA 2,4-D Ester 700 Liquid Herbicide* and *Loveland Salvo* only) 7 days prior to seeding.

Rate Per Acre*		Formulation	
(g ae)	(oz. ae)	600 g/L	700 g/L
113	4	201 mL	172 mL
125	4.4	222 mL	189 mL
134	4.75	225 mL	202 mL
170	6	301 mL	258 mL
205	7.25	364 mL	311 mL
213	7.5	377 mL	322 mL
227	8	402 mL	344 mL
283	10	503 mL	430 mL
340	12	603 mL	515 mL
483	17	854 mL	730 mL
510	18	905 mL	773 mL
907	32	1608 mL	1374 mL

* Actual product rates vary somewhat between products for similar uses. Check the product labels for the specific use rate for the product selected.

Weeds, Rates and Staging:

Apply at lower rates when weeds are small (2 to 4 leaf stage) and actively growing. Higher rates are needed when weeds are larger, in heavy populations, or growing under stressful conditions (excessively cold, hot, dry or wet).

For pre-seed or pre-emergent application of *NuFarm 2,4-D 700 Ester* or *ADAMA 2,4-D Ester 700 Liquid Herbicide* only, apply 134 to 213 g ae per acre to control weeds less than 8 cm tall or 294 g ae per acre before the emergence of cereals to control weeds greater than 8 cm tall or harder to control weeds.

Note: The rates listed differ slightly from product to product. Check individual product labels for exact use rates.

Susceptible Weeds:

125 to 227 g ae per acre

- Bluebur
- Burdock
- Cocklebur
- False flax
- Flixweed (late fall application or spring seedlings)
- Goat's-beard
- Kochia
- Lamb's-quarters
- Mustards (except dog and tansy mustard)
- Narrow-leaved hawk's-beard (fall application to seedlings or spring application at 1 to 2 leaf stage)
- Plantain
- Prickly lettuce
- Ragweed (common, false and giant)
- Russian pigweed
- Russian thistle
- Shepherd's-purse**
- Stinging nettle
- Stinkweed**
- Sweet clover
- Thyme-leaved spurge
- Volunteer canola (including all herbicide tolerant varieties)
- Wild radish
- Wild sunflower

Harder to control weeds:

227 to 340 g ae per acre

- Annual sow-thistle
- Blue lettuce*
- Burdock (top growth only of bolting plants)
- Canada thistle***
- Common chickweed
- Common groundsel**
- Common peppergrass
- Dandelion*
- Flixweed (spring prior to bolting)
- Knotweed
- Lady's-thumb
- Leafy spurge*
- Mustard (dog & tansy)
- Narrow-leaved hawk's-beard (spring prior to bolting)
- Oak-leaved goosefoot
- Pineappleweed
- Prostrate pigweed
- Purslane
- Redroot pigweed
- Russian thistle
- Sheep sorrel
- Tumble pigweed

Top growth control only (at rates for harder to control weeds):

- Biennial wormwood
- Bull thistle
- Buttercup
- Curled dock
- Field bindweed
- Gumweed
- Hedge bindweed
- Hoary cress
- Horsetail
- Mouse-eared chickweed
- Perennial sow-thistle
- Russian knapweed
- Tartary buckwheat
- Volunteer sunflower

* Control of seedlings at rates given above and top growth control only of established plants.

** Spring seedlings. Winter annual weeds - apply in late fall or early spring prior to bolting.

*** Suppression only - Apply when Canada thistle plants are actively growing and have 6 to 8 inches (15 to 20 cm) of new growth.

Regrowth will be present the following spring and in-crop treatments will be required.

Formulation Characteristics:

Formulation	Risk of Vapour Drift	Activity on Weeds	Risk of Crop Injury
LV Ester	Medium	Fast	Medium
Amine	Very Low	Medium	Low

Application Information:

- **Water Volume:** Minimum 20 L per acre - ground application. Water rates depend on product and use. Consult label for details. Higher application volumes (40 L/acre or greater) reduce the risk of crop injury.
- **Nozzles and Pressure:** 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressures designed to deliver proper coverage with *ASABE coarse* droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
2,4-D	POST (foliar)	Synthetic auxin	Moves throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

Best weed control occurs when temperatures are above 21°C (daytime) or 10°C (nighttime) and humidity is above 70 percent. DO NOT apply if temperature exceeds 27°C.

Tank Mixes:

None listed on 2,4-D label.

Restrictions:

- **Rainfall:**
 - *2,4-D amine:* within 4 hours will reduce control.
 - *2,4-D LV ester:* within 2 hours will reduce control.
- **Re-entry:** DO NOT enter treated fields for at least 12 hours
- **Grazing:** DO NOT permit lactating dairy animals to graze fields within 7 days of application. DO NOT harvest forage or cut for hay within 30 days of application. Withdraw meat animals from treated fields at least 3 days before slaughter.

- **Re-cropping:** No recropping guidelines are provided on the labels. As a general guideline, there should be no cropping restrictions the year following an in-crop treatment.
- **Aerial Application:** Some formulations may be applied by air. Check the label for detailed instructions.
- **Storage:** 2,4-D LV ester may be frozen. 2,4-D amine requires heated storage.
- **Buffer Zones:**
Hand-held or backpack sprayers, inter-row hooded sprayers and spot treatments are exempt from buffer zone requirements.

Crop	Application method	Buffer Zones (metres [†]) Required for the Protection of:		
		Aquatic Habitats of Depths		Terrestrial habitat
		Less than 1 m	Greater than 1 m	
Field Crops	Ground*	1	1	1
	Fixed wing aircraft	10	0	45
	Helicopter	10	0	40
Fallow, pastures, rangeland	Ground*	1	1	2
	Fixed wing aircraft	15	0	60
	Helicopter	15	0	50

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to pages 12 and 13.

Hazard Rating:

Amine 600 formulations:



Warning – Poison

Ester 700 formulations:



Danger – Poison



Warning – Skin Irritant

Potential skin sensitizer

For an explanation of the symbols used here see pages 7 and 8.

2,4-DB

Herbicide Group

4 - 2,4-DB

(Refer to page 45)

Company:

IPCO (*Cobutox 625* – PCP#27911)

Nufarm Agriculture (*Embutox* – PCP#27912)

Loveland Products Canada (*Caliber 625* – PCP#27910)

Formulation:

625 g/L 2,4-DB formulated as an emulsifiable concentrate.

- Container size - 10 L

Crops and Staging:

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Crop	Stage
Seedling alfalfa, bird's-foot trefoil*	1 to 4 trifoliolate leaf stage
Clover (alsike**, red**, white, Dutch but NOT sweet clover)*	As soon as possible after emergence of the 1 st trifoliolate leaf
Wheat, barley or oats	5 leaf to emergence of the flag leaf
Field corn	15 inches (40 cm) to prior to tasseling using drop nozzles.
Pastures containing forage legumes	After cutting or grazing and regrowth less than 3 inches (7.5 cm)

* With or without a cereal cover crop.

** Alsike and red clovers may be damaged by 2,4-DB applications.

Seedling Forage Grasses*:

Apply from 2 to 4 leaf stage of:

- Bromegrass (smooth)
- Fescue (creeping red, meadow, tall)
- Orchard grass
- Timothy
- Wheatgrass (crested, intermediate, streambank, tall)

* Not for seed production. Not for feeding in the establishment year.

Weeds and Staging:

Weeds controlled at the 0.71 L per acre rate from the 2 to 4 leaf stage:

- Lamb's-quarters
- Mustard (ball, wild, wormseed)
- Ragweed
- Redroot pigweed
- Shepherd's-purse
- Stinkweed

Weeds controlled at higher recommended rates (0.91 to 1.1 L per acre):

Weed	Stage
Bull thistle	Rosette to early bud stage
Canada thistle*	6 in. (15 cm) to early bud
Chicory	Rosette
Curled dock**	Young and actively growing
Dandelion*	Prior to bud
Field bindweed*	Late summer
Horsetail*	4 to 5 inches (10 to 13 cm)
Narrow-leaved hawk's-beard	Apply at rosette stage after alfalfa has gone dormant
Oak-leaved goosefoot	Up to 2 leaf stage
Perennial sow-thistle*	Rosette
Plantain	Prior to flowering
Smartweed (green, lady's-thumb)**	Seedlings
Wild buckwheat	Up to 2 leaf stage
Wild radish	Up to 2 leaf stage
Yellow rocket	Late September to mid-October

* Top growth control

** Suppression

Refer to individual product labels for details on application rates to use for different weed species.

Rates:

Crop	Rate (L per acre)	Acres Treated Per Container
Cereals, seedling forage legumes and grasses	0.71 to 0.91	14.1 to 11.0
Corn and pastures containing forage legumes	0.71 to 1.11	14.1 to 9.0

Application Information:

- **Water Volume:** 61 to 81 L per acre.
- **Nozzles and Pressure:** 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressures designed to deliver proper coverage with a minimum of fine droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
2,4-DB	POST (foliar)	Synthetic auxin	Moves throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

Severe damage to legumes can occur if high temperatures (more than 27°C) or high humidity prevail at the time of application. DO NOT apply under dry soil/drought conditions.

Tank Mixes:

Herbicides:

Underseeded Legumes:

- MCPA amine (35 g ae per acre*)
* **500 g/L formulation**
- This tank mix may increase crop damage (stunting).
- Follow all precautions and restrictions on both product labels.

Fertilizers: None registered.

Insecticides: None registered.

Fungicides: None registered.

Note: The above mixes are those listed on 2,4-DB labels only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Not specified on the label. A period of up to 8 hours may be required. Contact the manufacturer for more details.
- **Grazing Restrictions:** DO NOT graze or cut treated crops or forage until 30 days after application.
- **Re-cropping Interval:** No restrictions the year after application.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** May be frozen.

Sprayer Cleaning:

Refer to page 12.

Hazard Rating:



Caution – Poison

For an explanation of the symbols used here see pages 7 and 8.

AAtrex Liquid

Herbicide Group

5 - atrazine

(Refer to page 45)

Company:

Syngenta Canada (PCP#18450)

Formulations:

480 g/L atrazine formulated as a liquid suspension.

- Container size - 2 x 10 L

Crops, Rates and Staging:

Corn (silage, field, sweet): 0.85 to 1.25 L per acre* using the following application methods;

- **Pre-plant incorporated (PPI).**
- **Pre-emergent surface (after planting but before emergence of weeds and crop):** Recommended only on irrigated fields. Inconsistent weed control will occur if 0.5 inches (1.25 cm) of water/precipitation does not occur within 7 days of application.
- **Post-emergence:** 1 to 6 leaf stage and when corn is less than 12 inches (30 cm) tall. Add 1.11 to 2.23 L per acre of oil concentrate or 6.88 L per acre crop oil. Crop injury may occur when AAtrex and oil is applied post-emergence during cold weather.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

* Use the low rate on crops grown on sandy soils, and where weed infestations are light.

It is recommended that any products containing atrazine not be used in areas treated with this product during the previous season.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Weeds and Staging:

For pre-plant incorporated, pre-emergent and post-emergent (when weeds are less than 4 inches or 10 cm tall) control of the following weeds:

- Lamb's-quarters
- Mustard (wild, wormseed)
- Purslane
- Ragweed
- Redroot pigweed
- Smartweed (including lady's-thumb)
- Volunteer clover
- Wild buckwheat
- Wild oats

Application Information:

- **Water Volume:** Minimum 61 L per acre.
- **Nozzles and Pressure:** 30 to 45 psi (200 to 300 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage and a minimum of fine droplets that are prone to drift.
- **Screens:** Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
atrazine	PPI (soil active) POST (foliar)	PSII Inhibitor/ Membrane disruptor	Little foliar; upward soil applied (Apoplast)	Broadleaf & grass	5

Effects of Growing Conditions:

Post-emergent applications made during periods of cold weather may cause crop lightening. Hot, dry weather preceding post-emergent applications may result in reduced weed control. AAtrex will move with soil if eroded.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

- **Pre-Emergent and Pre Plant Incorporated:**
 - *Dual II Magnum*
 - Glyphosate
 - **Post-Emergent*:**
 - Dicamba (*Banvel II* only - 0.24 L per acre)[†]
 - *Dual II Magnum*
 - Bromoxynil/MCPA (*Buctril M* only)**
 - Bromoxynil (*Pardner* only)
- [†] **DO NOT use in sweet corn.**
 * **DO NOT use oils or adjuvants with post-emergent tank mixes.**
 ** **DO NOT treat after the 6 leaf stage, crop injury may occur.**

Fertilizers: For pre-emergent applications, nitrogen solutions or complete liquid fertilizers may replace all or part of the water as a carrier. *AAtrex* may be impregnated onto dry granular fertilizers. DO NOT impregnate onto nitrate, super- phosphate or limestone.

DO NOT apply *AAtrex* with nitrogen fertilizer after corn has emerged, as crop injury will occur.

Insecticides: None registered.

Fungicides: None registered.

Note: The above mixes are those listed on the *AAtrex* label only.

Syngenta also supports the following mixes that are not on the *AAtrex* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Glyphosate (glyphosate tolerant corn varieties only)*

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. See the general guidelines for mixing pesticides for more information.

Restrictions:

- **Rainfall:** Within 2 hours of post-emergence applications may result in reduced weed control.
- **Grazing Restrictions:** DO NOT graze or cut for feed before ear emergence.
- **Pre-harvest Interval:** Leave at least 45 days from application to harvest for sweet corn and 60 days for field corn.
- **Re-cropping Interval:** All crops, except corn and triazine-tolerant canola, may be affected the year following the use of atrazine. Flax, peas and faba beans have some tolerance to atrazine residues and are usually not affected by rates of up to 0.9 L per acre applied the previous year. Other more sensitive crops may be affected 2 or more growing seasons after application.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** DO NOT freeze.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:	
	Aquatic Habitats	Terrestrial habitat
Ground only*	10	10

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

- DO NOT mix or load within 30 m of any wells, lakes, streams, ponds, dugouts or sinkholes.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13. Let solution stand for several hours. Scrub inside surfaces but do not enter tank. Flush sprayer system with water.

DO NOT clean equipment upslope of water bodies or ditches, near cropland or shelterbelts. Clean your sprayer away from areas where family members or others are likely to frequent or walk.

Hazard Rating:

 Caution – Eye Irritant

KEEP OUT OF REACH OF CHILDREN.

Harmful if swallowed.

For an explanation of the symbols used here see pages 7 and 8.

Accent 75DF/Accent Grande*

Herbicide Group
2 - nicosulfuron
(Refer to page 45)

Company:

Corteva Agriscience (PCP#25116)

Formulation:

75% nicosulfuron formulated as a water dispersible granule.

- Container size - 133.6 g (4 x 33.4 g water soluble bags per pouch).

Crops and Staging:*

Field Corn: 1 to 8 leaf stage (six visible collars), coleoptile (short, blunt leaf) is counted as the first leaf.

Sweet corn **: 1 to 6 leaf stage (4 visible collars).

*** NOTE -** *Since applications to field and sweet corn in western Canada has been registered under the User Requested Minor Use program, the manufacturer assumes no responsibility for herbicide performance. Application to corn is at the risk of the user.*

**** Note that Accent is registered for use on all sweet corn varieties but tolerance may vary depending on variety.**

Krispy King, Jubilee and Jubilee Supersweet are the only varieties that have been tested for tolerance in western Canada. Test on small areas planted to other varieties for tolerance prior to widespread use.

Weeds and Staging:

Weeds	Staging
Barnyard grass, foxtail (green, yellow*), witchgrass	1 to 6 leaves (up to 2 tillers)
Quackgrass	3 to 6 leaves (with extended leaf 4 to 8 inches (10 to 20 cm) long)
Wild oats	3 to 6 leaves

*** Suppression only**

The best control and yield response is achieved by applying at the earlier end of the leaf stage ranges.

Rates:

13.5 g per acre. Add a non-ionic surfactant (*Citowett Plus, Agsurf or Agral 90*) at 0.2 L per 100 L of spray solution. One water soluble bag will treat 2.5 acres (1 ha). One pouch will treat 10 acres (4 ha).

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:** Minimum 40 L per acre; optimum 56 to 77 L per acre.
- **Nozzles and Pressure:** 25 to 40 psi (175 to 275 kPa) when using conventional flat fan nozzles tilted forward at a 45° angle. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressures designed to deliver proper coverage with *ASABE medium* droplets.
- **Screens:** Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
nicosulfuron	POST (foliar)	ALS Amino Acid synthesis Inhibitor	Toward growth areas (Symplast)	Grasses	2

Effects of Growing Conditions:

Poor weed control or crop injury may result if at the time of application, plants are under stress from disease, insect or nematode injury, carryover of herbicide from a previous years application, abnormally hot or cold weather, drought, water-soaked soils, hail damage or frost. Delay application until stress passes and both corn and weeds have resumed growth. When corn is injured by frost, wait 48 to 72 hours after normal growing conditions have resumed before applying *Accent*. Stress conditions after application may also result in injury or poor weed control.

Tank Mixes:

Herbicides:

- *Banvel II* (0.24 L per acre) plus surfactant.
- *Pardner* (0.4 L per acre) plus surfactant.

Fertilizers: DO NOT mix with fertilizers.

Insecticides: None registered. *Accent* should not be applied to corn that has been treated with organophosphate insecticides. Leave 7 days between the application of *Accent* and that of a foliar organophosphate insecticide.

Fungicides: None registered.

Note: The above mixes are those listed on the *Accent* label only.

Restrictions:

- **Rainfall:** Within 2 to 4 hours of application may result in reduced weed control.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Grazing Restrictions:** DO NOT graze or feed treated corn forage, silage, fodder or grain for at least 30 days.
- **Pre-harvest Interval:** Leave at least 30 days in field corn and 40 days in sweet corn from application to harvest.
- **Re-cropping Interval:** Spring cereals, canola, field pea, flax, corn, potato, dry beans[†], sunflower, alfalfa may be seeded 10 months from application. For all other crops a field bioassay is recommended before planting.
- [†] Since not all dry bean varieties have been tested for rotational crop tolerance, the first planting of each variety to previously treated fields should be limited to a small area to confirm tolerance prior to widespread recropping.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store product in original container in a secure, dry area away from other pesticides, food or feed.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of Terrestrial habitat
Ground only*	2

See page 36 for an explanation of the different habitats.

*Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†]Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Leave a 5 m buffer between the last spray path and woodlots or shelterbelts. Leave a 22 m buffer before wetland areas or water bodies.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:



Caution – Eye Irritant

KEEP OUT OF REACH OF CHILDREN.

Avoid breathing spray mist.

Avoid contact with skin, eyes and clothing.

For an explanation of the symbols used here see pages 7 and 8.

Aim EC

Herbicide Group
14 - carfentrazone
(Refer to page 45)

Company:

FMC Corporation (PCP#28573)

Formulations:

240 g/L carfentrazone formulated as an emulsifiable concentrate.

- Container size - 1.2 L, 2 L, 4.8 L

Crops, Rates and Staging:

Pre-Seeding:

From 14.8 to 29.5 mL per acre prior to the seeding of:

- Sorghum

From 14.6 to 47.3 mL per acre prior to the seeding of:

- | | | |
|--------------------------|----------------------------|--|
| ◦ Barley | ◦ Field pea | ◦ Rye |
| ◦ Buckwheat | ◦ Flax | ◦ Safflower |
| ◦ Canola (rapeseed) | ◦ Lentil | ◦ Soybean |
| ◦ Chickpea | ◦ Millet (pearl and proso) | ◦ Sunflower |
| ◦ Corn (field and sweet) | ◦ Mustard | ◦ Triticale |
| ◦ Dry bean | ◦ Oats | ◦ Wheat (including spring, winter and durum) |
| ◦ Faba bean | ◦ Potatoes | |

Use *Agral 90* or *Ag-Surf* at 0.25 L per 100 L of spray solution or use *Merge* at 1 L per 100 L of spray solution when used alone.

Harvest aid treatment*:

Note: As of January 1, 2019 www.keepingitclean.ca indicates that grain from crops treated with this product prior to harvest may have market access concerns. Please see page 10 for more information AND consult potential grain buyers before using this product.

Crop	Rate (mL per acre)
Barley, oats, wheat, millet, dry bean, chickpea, faba bean, field pea, soybean, triticale	29.5 to 47.3
Sorghum	29.5
Potato**	94 to 142

Use *Agral 90* or *Ag-Surf* at 0.25 L per 100 L of spray solution or use *Merge* at 1 L per 100 L of spray solution when used alone.

* DO NOT apply as a tankmix with glyphosate to crops if grown for seed purpose.

** A second application of 94 to 142 mL per acre may be applied in potato.

Weeds, Rates and Staging:

Apply to listed weeds up to 10 cm in height unless otherwise indicated:

Weeds	Rate (mL per acre)
Eastern black nightshade (up to 5 cm), Lamb's-quarters (up to 7.5 cm), Redroot pigweed, Tall waterhemp (up to 5 cm), Velvetleaf	14.8
<i>Above weeds plus:</i> Flixweed, Hairy nightshade, Lamb's-quarters, Pigweed (prostrate, smooth, tumble), Pennsylvania smartweed (seedling), Purslane, Round-leaved mallow, Stinkweed, Tansy mustard, Waterhemp (common, tall)	23.5
<i>Above weeds plus:</i> Carpetweed, Cleavers, Cocklebur, Eastern black nightshade, Kochia, Jimsonweed, Russian thistle (up to 5 cm), Shepherd's-purse, Volunteer canola (all varieties)	29.5

Weeds	Rate (mL per acre)
<i>Above weeds plus:</i> Burclover, Corn spurry, Prickly lettuce, Venice mallow (up to 5 cm)	47.3

Application Information:

- **Water Volume:** Use a minimum of 40 L per acre. Higher spray volumes is required for dense weed stands. Weed control improves with the amount of coverage.
- **Nozzles and Pressure:** Maximum 35 psi (210 kPa) if using conventional nozzles. Low drift nozzles may require higher pressure for proper performance. Use nozzles and pressure designed to deliver proper coverage with *ASABE medium* droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
carfentrazone	POST (foliar)	PPO Inhibitor/ Membrane disruptor	Little movement due to rapid cell leakage (Symplast)	Non-selective Broadleaf	14

Effects of Growing Conditions:

Extremes in environmental conditions such as temperature, moisture, soil conditions, and cultural practices may affect activity. Under warm moist conditions, herbicide symptoms may be accelerated. While under very dry conditions, the expression of herbicide symptoms may be reduced as weeds hardened off by drought are less susceptible.

Tank Mixes:

Herbicides:

- Glyphosate* (180 to 360 g ae per acre)
- 2,4-D Ester (227 g ae per acre) (fallow only)
- Bromoxynil (57 g active ingredient per acre – canola, wheat, barley, oats)
- Bromoxynil + glyphosate (rates and crops above)

Harvest aid treatment:

- **Barley, chickpea, dry beans, faba bean, field pea, millet, oats, sorghum, and wheat:**
 - Glyphosate* (360 g ae per acre)
- **Potato only:** Reglone** (0.51 to 0.9 L per acre)
* IPA or K salt only.
** For potato desiccation – should a second desiccation application be required after a first application of *Aim EC plus Reglone* tank mix, use *Aim EC* at 94.3 to 142 mL/acre alone or as a tank mix with *Reglone* at 0.51 L/acre.

Note: The above mixes are those listed on the *Aim EC* label only.

FMC Corporation supports the following tank mixes that are not on the *Aim EC* label. Apply mixes according to the most restrictive use limitations for either product. See tank mix partner page for supported crops:

Herbicides:

- MCPA Amine/Ester (114 g ae per acre prior to the seeding of wheat, barley, oats, rye, flax and field pea), 2,4-D (134 g ae per acre preseed only – see 2,4-D page for crop options)

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Rainfall within 1 hour after application may reduce activity. Heavy rainfall shortly after application may reduce activity.
- **Re-entry Interval:** DO NOT enter treated fields for 12 hours.
- **Pre-harvest Interval:** Leave 7 days between application and harvest for potatoes and 3 days for all other registered crops for harvest aid uses.
- **Grazing Restrictions:** No information is provided on the label.
- **Re-cropping Interval:** There are no rotational restrictions on crops registered for pre-seed use. All other crops may be planted 12 months after application.
- **Aerial Application:** DO NOT apply by air.

- **Storage:** Store in a cool, dry place and avoid excess heat.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of Terrestrial Habitat
Ground only*	5

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches above the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat. DO NOT apply in areas where surface water from the treated area can run off into aquatic habitats.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:



Caution – Eye and skin irritant

For an explanation of the symbols used here see pages 7 and 8.

Altitude FX2

Herbicide Group
2 - imazamox
4 - fluroxypyr
(Refer to page 45)

Company:

BASF Canada

Formulations:

Altitude FX2 contains 2 separate components. Each case contains:

AC 299,263 120 AS (PCP#26705): 120 g/L imazamox formulated as a solution.

- Container size - 2.68 L

Starane (PCP#24815): 180 g/L of fluroxypyr formulated as an emulsifiable concentrate.

- Container size - 9.6 L

MCPA, 2,4-D, or *Curtail M* must be added and are purchased separately.

Crops and Staging:

CLEARFIELD wheat varieties: 3 leaf (after appearance of first tiller) to 6 leaf stage to ensure optimal crop tolerance. Apply only to CLEARFIELD wheat varieties; application to any other variety of wheat or any other crop will result in crop death.

Weeds and Staging:

Grasses:

Apply from 1 to 4 leaf stage to a maximum of two tillers.

- Barnyard grass
- Foxtail (green, yellow)
- Japanese brome*
- Persian darnel
- Volunteer cereals (barley, canary seed, oat, non-CLEARFIELD spring wheat, durum)
- Wild oat

Broadleaves:

Apply up to 4 leaf stage unless otherwise indicated.

- Cleavers (1 to 4 whorls)
- Cow cockle
- Green smartweed
- Kochia
- Lamb's-quarters
- Redroot pigweed
- Round-leaved mallow*
- Russian thistle*
- Shepherd's-purse
- Stinkweed
- Stork's-bill (1 to 8 leaf)*
- Volunteer canola (except Clearfield varieties)
- Volunteer flax (1 to 12 cm)
- Wild buckwheat
- Wild mustard

* **Suppression**

Rates:

Altitude FX2 (1 case treats 40 acres)

AC 299,263 120 AS: 67 mL per acre.

Starane: 0.24 L per acre.

Altitude FX2 must be tank mixed with one of the registered tank mix options found under the "tank mix" section below. Add a non-ionic surfactant (such as *Agral 90* or *Ag-Surf II*) at 0.25 L per 100 L of spray solution. Surfactant not included.

DO NOT apply *Altitude FX2* or other products containing imazamox, or fluroxypyr more than once per season.

Refer to the product label for complete mixing instructions for this product and its mixes. A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:** 20 to 40 L per acre.
- **Nozzles and Pressure:** Maximum 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of *ASABE coarse* droplets.
- **Screens:** Use 50 mesh or coarser on both nozzle and primary plumbing screens.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
imazamox	POST (foliar)	ALS Amino Acid inhibitor	Toward regions of growth (Symplast)	Broadleaf & grass	2
fluroxypyr	POST (foliar)	Synthetic Auxin	Toward regions of growth (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

Initial crop injury may be observed after application but this is outgrown and should not affect yield. Severe crop injury will occur as a result of spray overlap. AVOID SPRAYER OVERLAP.

DO NOT spray if temperatures of +5°C are forecast within 3 days of application. Treat crops during warm weather when weeds are actively growing and soil moisture is adequate for rapid growth. Under cool or dry conditions, control of some weeds may be severely reduced.

Tank Mixes:

Herbicides:

- ***Altitude FX2* must be mixed with one of the following:**
 - 2,4-D Ester (213 g ae per acre)
 - *Curtail M* (0.61 to 0.81 L per acre)

Restrictions:

- **Rainfall:** Rainfall within 3 hours after application may reduce activity.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Grazing Restrictions:** DO NOT graze the treated crop within 14 days of application or cut for hay within 42 days of application.
- **Pre-harvest Interval:** DO NOT apply within 79 days of harvest.
- **Re-cropping Interval:** Winter wheat may be seeded 3 months after application. Barley, canola (all varieties), field peas, flax, lentils, oats, and spring wheat may be grown safely the year following application. Condiment mustard may be grown the second season following *Altitude FX2* application. Conduct a field bioassay the year before growing any other crop than those listed above.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** DO NOT freeze. Store in a cool, dry place above 5°C. Combustible – DO NOT store near heat or open flame.

• **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	15	15	15

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method C' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:

Starane:

 Danger – Poison

 Warning – Eye Irritant

 Caution – Skin Irritant

For an explanation of the symbols used here see pages 7 and 8.

Amitrol 240*

* Note: This product is no longer manufactured but inventories still remain in distribution.
This product may be removed from future editions.

Herbicide Group
11 - amitrole
(Refer to page 45)

Company:

Nufarm Agriculture (PCP#25684)

Formulation:

231 g/L amitrole formulated as a liquid.

- Container size - 10 L, 450 L

Crops, Rates and Staging:

Fall Stubble: Perennial weed control prior to spring seeding. No planting restrictions for barley, canola, field corn, field pea, soybean, wheat, or navy bean, but leave 8 months between application and the seeding of any other crops.

Alfalfa stand renovation/removal: 4 to 6 inches (10 to 15 cm) high.

Pastures (spot treatment only): For non-selective patch treatment of dandelion, Canada thistle, perennial sow-thistle, hoary cress, milkweed, poison ivy and toadflax apply 165 mL in 25 L of water to treat a 10 m x 10 m area. For treatment of leafy spurge and horsetail, apply 460 mL in 25 L of water to treat a 10 m x 10 m area. DO NOT mow treated plants for 3 weeks after application.

Established shelterbelts: up to 11.3 L per acre - Keep spray away from tree foliage or trunks.

Pre-seeding:

Crop	Rate (L per acre)	Delay seeding after application
Barley, wheat, canola	1.7	0 to 1 days
Field pea	1.7	5 to 7 days
Soybean (low rate)	1.7	6 days
Soybean (high rates)	5.1 to 6.7	10 to 14 days
Field corn, navy bean, soybean	3.3 to 6.7	10 to 14 days

- Adhere to the maximum pre-seeding rates and delays between application and seeding indicated above to avoid the risk of damage to the emerging crop or excess residues in the grain.
- Avoid using rates higher than 6.7 L per acre for pre-plant applications prior to soybeans, dry beans and corn on very light textured soils with low organic matter, as crop damage can occur.

Fallow areas: Apply according to weed stage and rates in the next section.

Weeds, Rates and Staging:

Fall stubble: Canada thistle, perennial sow-thistle - Spray when thistle has 4 to 6 inches (10 to 15 cm) of new growth. DO NOT cultivate for 2 weeks after application. DO NOT apply after October 1. DO NOT replant crops in treated areas within 8 months of application except those registered for pre-seeding uses.

Pre-seeding: Dandelion and annual weeds - Apply 1.7 L per acre to actively growing weeds less than 10 cm tall or across. DO NOT cultivate for 10 to 14 days after treatment.

Fallow, Pastures and Shelterbelts:

Weed	Rate (L per acre)	Weed Stage
Canada thistle	5.1 to 6.7	Early bud to bloom stage.
Cattails	15.2 to 18.5	After seed heads have formed.
Dandelion	1.7 to 5.1	Young and actively growing plants.
Hoary cress	7.6 to 11.3	Advanced rosette and bud stage.
Horsetail	5.0 to 6.7	Actively growing plants.
Leafy spurge	15.2 to 18.5	Advanced flowering to early seed set.
Milkweed	7.6 to 11.3	Early summer after majority of shoot emergence.
Perennial sow-thistle	5.1 to 6.7	Early bud to bloom stage.
Poison ivy	3.7	Fully developed green foliage.
Quackgrass	5.1 to 6.7	When plants are 4 to 6 inches (10 to 15 cm) high and actively growing.
Toadflax	7.6 to 11.3	Advanced rosette to prebud.

Application Information:

- **Water Volume:**
 - **Fall stubble:** 20 to 81 L per acre.
 - **Pastures, shelterbelts:** 40 to 121 L per acre. For poison ivy, apply 202 to 405 L per acre.
 - **Pre-seeding:** 20 to 81 L per acre.
- **Nozzles and Pressure:** Maximum 45 psi (less than 300 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressures designed to deliver proper coverage with **ASABE coarse** droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
amitrole	POST (foliar) with slight soil activity	Pigment inhibitor (unknown mechanism)	Moves throughout the plant (Apoplast & Symplast)	Broadleaf & grass	11

Effects of Growing Conditions:

Less than acceptable results may occur in dry weather.

Tank Mixes:

Nufarm supports the following mixes that are not on the *Amitrol 240* label. Mixes must be applied according to the most restrictive use limitations for either product:

Herbicides: glyphosate

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.
- **Re-entry Interval:** DO NOT re-enter treated areas for 12 hours.
- **Grazing Restrictions:** DO NOT graze treated crops or weeds or use for hay or feed.
- **Re-cropping Interval:** DO NOT plant any crop for 8 months following application except those registered for pre-seeding uses.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** DO NOT store where temperatures may exceed 50°C or near open flames. DO NOT store below 4°C.
- **Buffer Zones:** DO NOT contaminate any body of water. Use cautions to prevent spray, spray mist, or vapours from drifting off target. Spray drift may cause damage to crops or vegetation.

Sprayer Cleaning:

Refer to 'Method C' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:



Caution – Poison



Warning – Eye Irritant

For an explanation of the symbols used here see pages 7 and 8.

Ares

Herbicide Group
2 - imazamox & imazapyr
(Refer to page 45)

Company:

BASF Canada (PCP#30188)

Formulation:

33 g/L imazamox and 15 g/L imazapyr formulated as a solution.

- Container size - 1 x 9.8 L jug, Merge 8.1 L jug

Crops and Staging:

CLEARFIELD canola: 2 to 7 leaf stage.

CLEARFIELD lentil: 1 to 9 node stage.

CLEARFIELD oilseed mustard (*Brassica juncea*): 2 to 7 leaf stage.

Weeds, Rates and Staging:

Merge adjuvant must be used at a rate of 0.5 L per 100 L of spray solution.

At 244 mL per acre (40 acres per case), Ares will control:

- **Grasses** - From 1 to 6 true leaf stage with up to 2 tillers:
 - Barnyard grass
 - Foxtail (green and yellow)
 - Japanese brome*
 - Persian darnel
 - Volunteer cereals (barley, canaryseed, durum, oats and wheat - NOT including CLEARFIELD varieties)
 - Wild oats
- * Spring germinating Japanese brome maximum 4 leaf stage.

- **Broadleaf Weeds** - up to 4 leaf stage unless otherwise indicated:
 - Chickweed
 - Cleavers (up to 4 whorls)***
 - Cow cockle
 - Green smartweed
 - Hemp-nettle
 - Lamb's-quarters **
 - Redroot pigweed
 - Round-leaved mallow
 - Russian thistle
 - Shepherd's-purse
 - Stinkweed
 - Stork's bill
 - Volunteer canola (not CLEARFIELD varieties)
 - Volunteer tame mustard (not CLEARFIELD oilseed varieties - *B. juncea*)
 - Wild buckwheat**
 - Wild mustard***
- ** up to 6 leaf stage
 *** NOT Group 2 resistant biotypes.

DO NOT apply *Ares* more than once per year or follow *Ares* with other products containing the active ingredient imazamox (e.g. *Solo*, *Odyssey*) or imazapyr (*Salute*) in the same year.

Refer to the product label for complete mixing instructions for this product and its mixes. A general mixing guide can be found on page 11.

Application Information:

- **Water Volume:** 20 to 40 L per acre.
- **Nozzles and Pressure:** Maximum 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE medium* droplets.
- **Screens:** Use 50 mesh or coarser filter screens for both nozzles and in-line screens.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
imazamox	POST (foliar)	ALS Amino Acid inhibitor	Toward regions of growth (Symplast)	Broadleaf & grass	2
imazapyr	POST (foliar)	ALS Amino Acid inhibitor	Toward regions of growth (Symplast)	Broadleaf only	2

Effects of Growing Conditions:

DO NOT spray if temperatures of +5°C are forecast within 3 days of application. Treat crops during warm weather when weeds are actively growing and soil moisture is adequate for rapid growth. Under cool or dry conditions, control of some weeds may be severely reduced.

Tank Mixes:

Herbicides:

- **In CLEARFIELD canola only. DO NOT apply to CLEARFIELD oilseed mustard or CLEARFIELD lentils:**
 - *Lontrel 360* (84 mL per acre)

Fungicides: None registered.

Insecticides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Ares* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Rainfall within 2 hours after application may reduce activity.
- **Re-entry Interval:** DO NOT re-enter treated fields for 12 hours.
- **Pre-harvest Interval:** DO NOT apply within 60 days of harvest of registered crops.
- **Grazing Restrictions:** No information is provided on the label. DO NOT feed treated crops to livestock prior to crop maturity.
- **Re-cropping Interval:** Barley, canaryseed, chickpea, CLEARFIELD canola/oilseed *B. juncea*, field corn, field pea, lentil, oat, and spring wheat may be seeded the first full season after application. Non-Clearfield canola, durum, flax and sunflower may be seeded the second full season after application. The company recommends that a field bio-assay (a test strip grown to maturity) be conducted the year before growing any crops other than those listed above.

- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a cool, dry place.
- **Buffer Zones:** Avoid drift. Leave at least 11 m between the downwind edge of the boom and sensitive areas such as shelterbelts, hedgerows, wetlands, woodlots, vegetated ditch banks, ponds, streams, and sloughs.

Sprayer Cleaning:

Refer to 'Method C' in the general sprayer cleaning section on pages 12 and 13.

Hazard Rating:

No specific hazards.

Authority 480

Herbicide Group
14 - sulfentrazone
(Refer to page 45)

Weed Control

Company:

FMC Corporation (PCP#29012)

Formulation:

480 g/L sulfentrazone formulated as a suspension concentrate.

- Container size - 4 x 3.79 L

Crops, Rates and Staging:

Pre-plant surface: Apply to the soil surface prior to seeding the crop.

Pre-emergent surface: Apply to the soil surface up to 3 days after seeding. Crops emerging or near emerging at application may be injured.

At 88 mL per acre:

- Mustard

From 88 to 118 mL per acre:

- | | | |
|-------------|-------------|-------------|
| ◦ Chickpea | ◦ Field pea | ◦ Soybean |
| ◦ Faba bean | ◦ Flax | ◦ Sunflower |

All applications require rainfall for proper activation. (See "Effects of Growing Conditions")

Note: The use of this chemical may result in contamination of groundwater particularly in areas where soils are permeable (e.g. sand, loamy sand or sandy loam) and/or the depth to the water table is shallow.

Weeds, Rates and Staging:

Controls the following weeds when applied to the soil prior to emergence:

At 88 mL per acre (43 acres per jug):

- Kochia

At 118 mL per acre (32 acres per jug):

- **Above weeds plus:**

◦ Cleavers (suppression)	◦ Lamb's-quarters	◦ Waterhemp (common)
◦ Common groundsel	◦ Purslane	◦ Wild buckwheat
◦ Eastern black nightshade	◦ Pigweed (green, redroot)	◦ Yellow woodsorrel

Use the higher rates within the rate range for soils with pH less than 7.0 and organic matter greater than 3%.

DO NOT APPLY Authority 480 to:

- coarse-textured (sand, loamy sand, sandy loam) soils,
- fine textured soils with less than 1.5% organic matter,
- soils with organic matter content greater than 6%,
- soils with a pH of 7.8 or greater.

DO NOT apply Authority 480 to fields treated with Authority 480 (or other products containing sulfentrazone) in the previous year.

Application Information:

- **Water Volume:** Minimum 40 L per acre. Use as high water volume as practical to achieve even distribution over the soil surface.
- **Nozzles and Pressure:** Maximum 30 psi (175 kPa) if using conventional nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressure designed to deliver proper coverage with *ASABE medium* droplets or larger.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
sulfentrazone	PRE (residual soil activity)	PPO Inhibitor/ Membrane disruptor	Little movement (Symplast)	Broadleaf	14

Effects of Growing Conditions:

All applications require rainfall for proper activation. If weed growth begins before activation occurs, poor control may result on larger weeds. A moderate rainfall (10 to 20 mm) or equivalent irrigation is required within 10 to 14 days to activate pre-emergent surface treatments. Dry conditions that persist after any application may reduce weed control. On sandy soils, heavy rainfall following application may cause leaching of *Authority 480*, resulting in reduced weed control.

Tank Mixes:

Herbicides:

- **Field Peas only:** Imazethapyr (28.3 mL per acre) – black and grey wooded soils only.

FMC Corporation supports the following tank mixes that are not on the *Authority 480* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides:

- **Pre-seed to all crops:** *Aim EC*; glyphosate (180 to 360 g ae per acre)
- **Pre-seed (flax only):** MCPA Amine + *Aim EC* + glyphosate

Restrictions:

- **Rainfall:** Rainfall following application is required for adequate weed control.
- **Grazing Restrictions:** No information is provided on the label.
- **Pre-harvest Interval:** Leave 60 days between application and harvest.
- **Re-entry Interval:** DO NOT re-enter treated area within 12 hours.
- **Re-cropping Interval:**
 - Registered crops may be planted anytime after application.
 - Winter wheat may be seeded 4 months after application.
 - Alfalfa, barley, canola, field corn, and spring and durum wheat may be seeded the season following application (after one winter).
 - Sweet corn, lentils and sorghum may be seeded the second season (two winters) after application.
 - For all other crops three winters must pass following application and a successful bioassay indicating adequate tolerance before planting. For each year of drought experienced, add one year to the intervals above and conduct a bioassay to confirm tolerance of the rotational crop. Longer re-cropping intervals should be used under dry conditions.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store above 5°C to keep from freezing. If frozen, and solid crystals are observed, warm to above 15°C and shake or roll container periodically to dissolve solids.
- **Buffer Zones:** DO NOT fill mix or clean sprayer within 15 metres of any water source, unless the well is properly capped or activities take place on impervious pads or properly diked mixing/loading areas. Leave a 1 meter buffer between the last spray path and water or wetland habitats and 10 metres to sensitive plants and upland habitats when applying by ground. Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13. Leaving cleaning solution in the sprayer tank and plumbing for an extended period will improve cleaning effectiveness.

Hazard Rating:



Caution – Poison.

For an explanation of the symbols used here see pages 7 and 8.

Authority Charge

This product is a co-pack of Aim EC (page 93) and Authority 480 (page 101). Information is restricted to Crop, Weeds, Rates and Tank Mixes. For other detailed information on the component products see the product pages listed above. Note: this product is based on an unlabeled tank mix supported by the manufacturer.

Herbicide Group
14 - carfentrazone
& sulfentrazone
(Refer to page 45)

Company:

FMC Corporation

Formulation:

Aim EC (PCP#28573): 240 g/L carfentrazone formulated as an emulsifiable concentrate.

- Container size – 1 x 1.2 L

Authority 480 (PCP#29012): 480 g/L sulfentrazone formulated as a suspension concentrate.

- Container size – 2 x 3.79 L

Crops and Staging:

Note: The use of this chemical may result in contamination of groundwater particularly in areas where soils are permeable (e.g. sand, loamy sand or sandy loam) and/or the depth to the water table is shallow.

Pre-plant surface: Apply to the soil surface prior to seeding chickpea, faba bean, field pea, flax, soybean and sunflower.

Soil applied in the spring only, tank mixed with glyphosate.

Weeds and Staging:

Weeds controlled by component products.

Rates

Aim: 15 to 18.75 mL per acre.

Authority: 88 to 118 mL per acre.

(One case treats 86 to 64 acres at the respective rates above)

Tank Mixes:

Authority Charge should be tank mixed with glyphosate at 180 to 360 g ae per acre (See glyphosate page for equivalent product rates) based on the *Aim EC* component label only.

See component products for more information on restrictions application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

Authority Supreme

Herbicide Group
14 - sulfentrazone
15 - pyroxasulfone
(Refer to page 45)

Company:

FMC Corporation (PCP#32562)

Formulation:

250 g/L pyroxasulfone and 250 g/L sulfentrazone formulated as a suspension concentrate.

- Container size – 2 x 8 L

Crops, Rates and Staging:

Apply prior to seeding of or up to 3 days after seeding chickpea, field pea, or soybean:

Note: Maximum ONE APPLICATION of products containing pyroxasulfone per season.

Maximum of ONE APPLICATION of Authority Supreme or other products containing sulfentrazone over TWO SEASONS. In case of extremely low rainfall in any of those years, a subsequent application of herbicides containing sulfentrazone should be further delayed by the equivalent number of years in which extremely low rainfall occurred.

Note: The use of this chemical may result in contamination of groundwater particularly in areas where soils are permeable (e.g. sand, loamy sand or sandy loam) and/or the depth to the water table is shallow.

Treatment	Rate (per acre)		Acres Treated per Jug	
	Soil Type		Soil Type	
	Coarse to Medium Texture (1 to 4% O.M.)*	Medium to Fine Texture (4 to 7% O.M.)*	Coarse to Medium Texture (1 to 4% O.M.)*	Medium to Fine Texture (4 to 7% O.M.)*
Setup Treatment	162 mL		50	
Residual Treatment	202 mL	243 mL	40	33

* O.M. = organic matter content

Coarse to Medium soils	Medium-Fine to Fine soils
Sand, Loamy sand, Sandy loam, Loam, Silt loam, Silt	Sandy clay loam, Sandy clay, Silty clay loam, Silty clay, Clay loam, Clay

Refer to the product label for complete mixing instructions for this product and its mixes. A general guide to mixing can be found on page 11.

DO NOT apply Authority Supreme to:

- soils with 7% or more organic matter content.
- coarse soils classified as sand with less than 1% organic matter content.

Weeds and Staging:

Control of the following weeds emerging from seed (not controlled if emerged at application):

- Barnyard grass
- Brome (downy, Japanese)
- Cleavers
- Cow cockle
- Foxtail (green, yellow)
- Kochia
- Lamb's-quarters
- Pigweed (green, redroot)
- Ragweed, common*
- Stinkweed
- Waterhemp (common)
- Wild buckwheat
- Wild mustard*
- Wild oats*
- Witchgrass

* Suppression only.

Application Information:

- **Water Volume:** Minimum of 40 L per acre
- **Nozzles and Pressure:** Maximum 30-40 psi (200-275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ASABE medium droplets

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
sulfentrazone	PRE (surface) with residual soil activity	PPO Inhibitor/ Membrane disruptor	Little movement (Symplast)	Broadleaf	14
pyroxasulfone	PRE (surface) with residual soil activity	Long-chain Fatty Acid Inhibitor	Little movement (Symplast)	Broadleaf & grass	15

Effects of Growing Conditions:

Moisture is necessary to activate both the pyoxasulfone and sulfentrazone components in soil for effective weed control. Moderate rainfall will improve weed control activity. A minimum of 12.5 mm (0.5 inches), or more, of rainfall or irrigation is required to activate the product. Dry weather following applications may reduce effectiveness. Heavy rainfall shortly after application may reduce weed control and increase the risk of injury. Extremes in environmental conditions such as temperature, moisture, soil conditions, and cultural practices may affect activity.

Tank Mixes:

Herbicides:

Prior to All Crops:

- Glyphosate (180 to 360 g ae per acre)

Note: The above mixes are those listed on the *Authority Supreme* label only.

FMC also supports the following mixes that are not on the *Authority Supreme* label. Apply mixes according to the most restrictive use limitations for either label.

- Pre-seed to all registered crops: *Aim EC*

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Avoid application when heavy rain is forecast. A minimum of 12.5 mm (0.5 inches), or more, of rainfall or irrigation is required after application to activate the product.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Grazing Restrictions:** No information is provided on the label.
- **Pre-harvest Interval:** Not applicable.
- **Re-cropping Interval:** Registered crops may be seeded any time after treatment. Winter wheat may be seeded 4 months after application. Field corn, sunflower, or wheat (spring and durum) may be seeded the season following application (after one winter). All other crops require 36 months (three winters) from application to seeding. **Note:** *Moisture is required for breakdown; therefore, for each year where in-season rainfall is extremely low, the recropping interval must be extend by a year and a field bioassay (conducted under normal moisture conditions) must indicate it is safe to plant a sensitive crop.*
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a cool, dry place over 5°C in original container. DO NOT freeze, but if frozen raise product temperature to 15°C and shake or roll to dissolve crystals.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	5	3	10

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer 'Method A' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:

 Warning – Contains the allergen sulfites.

For an explanation of the symbols used here see pages 7 and 8.

Avadex Brands

Herbicide Group

8 - triallate

(Refer to page 45)

Company:

Gowan Canada

Formulation:

Avadex Liquid EC (PCP#16759): 480 g/L triallate formulated as an emulsifiable concentrate.

- Container size - 2 x 10 L, 115 L, 946 L

Avadex MicroActiv (PCP#25112): 10% triallate formulated as a granular.

- Container size - 22.7 kg, 451.3 kg

Crops, Rates and Application Timing:

Avadex Liquid EC Rates – Spring Treatment

Crop	Application Timing	Rate (L per acre)		Acres Treated per 115 L Container	
		Organic Matter		Organic Matter	
		4% or less	Greater than 4%	4% or less	Greater than 4%
Spring and durum wheat	Before Seeding*	1.0	1.2	115	98
	After Seeding	1.2	1.4	98	82
Barley	Before and After Seeding	1.2	1.4	98	82
Canola, flax [†] , mustard	Before Seeding	1.4	1.9	82	62
Field pea	Before Seeding	1.4	1.4	82	82

* DO NOT apply this product before seeding wheat in soils with 4% or less organic matter (brown, dark brown or grey wooded soils) where discers are to be used for seeding. If an air seeder is to be used, it must be equipped with a depth control device to ensure accurate seed placement, otherwise crop injury may occur.

[†] Excluding Solin (low linolenic acid flax).

Avadex MicroActiv Rates – Fall Treatment

Crop	Rate (Kg per acre)			Acres Treated per 451.3 Kg		
	Organic Matter			Organic Matter		
	Less than 2%*	2 to 4%	Greater than 4%	Less than 2%*	2 to 4%	Greater than 4%
Spring and durum wheat	4.5	5.7	6.9	101	80	66
Barley, canaryseed	4.5	5.7	6.9	101	80	66
Canola, flax [†] , mustard, field pea	5.7	6.9	8.9	80	66	51

* Fall treatments conducted under minimum tillage are not recommended on soils with less than 2% organic matter.

[†] Excluding Solin (low linolenic acid flax).

Avadex MicroActiv Rates – Spring Treatment

Crop	Application Timing**	Rate (Kg per acre)		Acres Treated per 451.3 Kg Container	
		Organic Matter		Organic Matter	
		4% or less*	Greater than 4%	4% or less*	Greater than 4%
Spring and durum wheat	Before seeding***	4.5	5.7	101	80
	After seeding	5.7	6.9	80	66
Barley, canaryseed	Before and after seeding (barley only)	5.7	6.9	80	66
Canola, flax [†] , mustard, field pea	Before seeding	6.9	8.9	66	51

* Minimum tillage treatments must be applied to fields with at least 2% organic matter.

** Minimum tillage treatments must be applied 10 to 14 days before seeding or incorporating. For minimum tillage treatments on spring and durum wheat, apply 5.7 kg per acre on soils with 4% organic matter or less and 6.9 kg per acre on soils with greater than 4% organic matter.

*** DO NOT apply this product before seeding wheat in soils with 4% or less organic matter (brown, dark brown or grey wooded soils) where discers are to be used for seeding. If an air seeder is to be used, it must be equipped with a depth control device to ensure accurate seed placement, otherwise crop injury may occur.

[†] Excluding Solin (low linolenic acid flax).

Seedling Forage Legumes (under-seeded only):

Apply recommended rates for the companion crop.

- Alfalfa
- Bird's-foot trefoil
- Clover (alsike, red, sweet)

Weeds and Staging:

For control of wild oats prior to their emergence (pre-emergent).

Application Information:

- **Water Volume (Avadex Liquid EC only):** 45 L per acre.
- **Nozzles and Pressure (Avadex Liquid EC only):** maximum 30 psi (200 kPa) when using conventional flat fan nozzles. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of *ASABE medium* droplets
- **Direct Seeding Systems (minimum tillage systems)**
 - *Avadex MicroActiv* herbicide may be applied in the fall or spring into standing stubble. If excessive crop residue exists at the time of application, a vigorous harrowing prior to application can be used to ensure that the herbicide granules make adequate contact with the soil. Under zero-till conditions it is recommended incorporation be conducted with suitable implement such as heavy harrow that allows for shallow incorporation while maintaining a uniform concentrated layer that provides adequate wild oat control.
 - Low disturbance seeding systems will not disturb the soil enough to control emerged weeds; therefore, a pre-seeding burnoff treatment using a herbicide such as glyphosate may be necessary. Ensure that cereals are seeded at least 1.25 cm (1/2 inch) below the treated layer.
 - **Fall Application:**
 - Applications of *Avadex MicroActiv* granules should be made to standing stubble. DO NOT apply to smooth, hard packed soils that may allow granules to drift. If excessive crop residue exists at the time of application, a vigorous harrowing prior to application should be conducted to ensure the granules are in good contact with the soil. Apply after October 1 when the soil begins to cool (less than 4°C) and 3 weeks prior to soil freeze-up. Incorporation using harrow operation following application in the fall is recommended but can be performed in the spring before seeding.
 - **Spring Application:**
 - Applications of *Avadex MicroActiv* granules should be applied and incorporated using harrow operation in spring 10 to 14 days before seeding.
- **Conventional Tillage Systems**
 - **Fall Application:**
 - Apply *Avadex Microactiv* granules to fields that are in good working condition, without excessive crop residue. Heavy crop residue or lumpy, wet fields may require tillage prior to application. Apply after September 15 until soil freeze-up. Incorporation using a harrow operation following application in the fall is recommended. Only one incorporation is required in the fall. The second incorporation may be done in the fall (before soil freeze-up) or in the spring.

- **Spring Application**

- Apply *Avadex* to fields that are in good working condition, without excessive crop residue. Heavy crop residue or lumpy, wet fields may require tillage prior to application. *Avadex* applications require two incorporations, with the second incorporation at right angles to the first. Incorporation using a harrow operation following application is recommended. Using a seeder that provides soil disturbance equivalent to a cultivator may replace one of the incorporations. The first incorporation should be completed within 48 hours of application and the second incorporation should be delayed an additional 48 hours or more.
- The liquid formulation must be incorporated into soil that is free of lumps or crop residue. Liquid formulations should be applied to fields with 30 percent or less residue cover. Heavy crop residue or lumpy, wet fields may require tillage prior to application. The liquid formulation is recommended for spring use because soils are left in an erosion prone state if the liquid is fall- applied. The first incorporation of the liquid formulation should be completed as soon as possible after spraying, while the second incorporation may be done any time prior to crop emergence. Incorporation using a harrow operation following application is recommended.
- Ensure that cereals are seeded at least 1.25 cm (1/2 inch) below the treated layer.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
trilallate	PPI (soil active)	Lipid Synthesis Inhibitor (Non-ACCase)	Little movement in plant (Apoplast)	Wild oat	8

Effects of Growing Conditions:

Reduced control may result if prolonged cool conditions or dry soil conditions prevail at the time weeds are emerging. If conditions are dry or wild oats germinate from below the treated zone, the weeds may emerge, but will usually be controlled. Thinning of wheat can occur under conditions of heavy rainfall or if cold soil conditions persist as the crop emerges.

DO NOT apply to fields where crop residue has been burned in the previous 12 months. Efficacy will be reduced.

Tank Mixes:

Herbicides: *Avadex* liquid may be tank mixed with liquid formulations of trifluralin for control of wild oats, green and yellow foxtail in wheat and barley. Apply after seeding but prior to crop emergence. Consult the recommendations for trifluralin for rates in different soil types.

Insecticides: None registered.

Fertilizer: *Avadex Liquid EC* alone, or tank mixed with liquid formulations of trifluralin, may be tank mixed with liquid fertilizer. Compatibility of the herbicide and liquid fertilizer should be checked. Follow the instructions on the herbicide label prior to adding the herbicide to the spray tank.

- *Avadex Liquid EC* may be sprayed on dry urea fertilizer. A minimum of 60 kg per acre (150 kg/ha) of dry urea fertilizer must be used. Only commercial blending is recommended.

Note: The above mixes are those listed on the *Avadex* labels only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** At least 0.5 inches (1.5 cm) within 2 weeks of application is required for activation.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Grazing Restrictions:** DO NOT graze the treated crop or use as hay or feed prior to crop maturity or in year of treatment.
- **Re-cropping Interval:** DO NOT seed tame oats the year after treatment.
- **Aerial Application:**
 - *Avadex Liquid EC:* DO NOT apply by air
 - *Avadex MicroActiv:* Granular formulations may be applied by air with attachments designed for applying low volumes of granules.
- **Storage:** DO NOT freeze liquid formulations. Store granular formulations in a cool, dry place.

- **Buffer Zones:** (Liquid formulations only)

Application method	Buffer Zones (metres [†]) Required for the Protection of:			
	Aquatic Habitats of Depths			Terrestrial habitat
	Less than 1 m	1 to 3 m	Greater than 3 m	
Ground only*	5	2	1	5

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Refer to 'Method C' on pages 12 and 13 for *Avadex Liquid EC*.

Hazard Rating:



Warning – Poison (Liquid formulation)



Warning – Contains the allergen soy (Liquid and Granular) Skin and Eye Irritant (Granular formulation)

For an explanation of the symbols used here see pages 7 and 8.

Axial

Herbicide Group
1 - pinoxaden
(Refer to page 45)

Company:

Syngenta Canada (PCP#30431)

Formulation:

50 g/L pinoxaden formulated as an emulsifiable concentrate.

- Container size - 2 x10 L, 80 L, 400 L

Crops and Staging:

Spring wheat (NOT including durum), winter wheat and barley: Up to the emergence of the flag leaf.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates, and Staging:

Apply from the 1 to 6 leaf up to the emergence of the 4th tiller. Apply at the 2 to 3 leaf stage for optimum control.

***Axial* at 0.5 L per acre (no adjuvant required)* (one case treats 40 acres):**

- Barnyard grass
- Foxtail (green, yellow)
- Proso millet
- Volunteer oat
- Volunteer canary seed
- Wild oat

* **DO NOT mix with any other adjuvant other than what is provided in the package.**

Maximum ONE APPLICATION per year of this or other products containing the active ingredient pinoxaden.

Application Information:

- **Water Volume:**
 - **Ground:** 20 to 40 L per acre
 - **Aerial:** 12 L per acre
- **Nozzles and Pressure:** 40 to 45 psi (275 to 310 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of **ASABE medium** droplets.
- **Screens:** Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
pinoxaden	POST (foliar)	ACCCase Lipid synthesis inhibitor	Toward growth areas (Symplast)	Grasses only	1

Effects of Growing Conditions:

DO NOT apply to crops that are stressed (frost, low fertility, drought or flooding, disease or insect damage) as crop injury may result.

Weed control may be reduced if *Axial* is applied under stress conditions such as drought, heat, insufficient fertility, flooding or prolonged cool temperatures.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

- Bromoxynil/MCPA (*Buctril M* and *Mextrol 450* only)[†]
 - Florasulam + *Curtail M* (*Spectrum* only)^{***†}
 - Florasulam + MCPA (*Frontline XL* only)
 - Fluroxypyr + MCPA (*Trophy* only)[†]
 - *Infinity*
 - MCPA ester[†] (0.34 to 0.45 L per acre - 500 g/L form)
 - *Refine SG* + MCPA ester^{***†} (12 g per acre + 0.23 to 0.28 L per acre)
 - Thifensulfuron/tribenuron (*Refine SG* only)^{**}
- * Always consult the label of the broadleaf herbicide prior to use.
 ** Addition of surfactants other than those included in *Axial* are not required.
 *** Suppression only of green foxtail.
 † A reduction in barnyard grass control may be observed.

Insecticides: None registered.

Fungicides:

- Propiconazole (*Tilt* only).

Fertilizers: None registered.

Note: The above mixes are those listed on the *Axial* label only.

Syngenta also supports the following mixes that are not on the *Axial* label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:** *Barricade II*; *Broadside*; *Cirpreme* + MCPA Ester 600 (189 mL per acre)^{††}, *Enforcer M*; florasulam/fluroxypyr + MCPA (*Stellar* only); *Infinity FX*, *Momentum* + MCPA ester; *Paradigm*; *Paradigm* + MCPA Ester 600 (189 mL per acre)^{††}, *Pixxaro*; *Prestige XC*; *Pulsar*; *Pulsar* (low rate) + MCPA ester, *Stellar XL*, *Travallas* (no MCPA Ester).
^{††} Only wild oat is controlled with this mix.
- **Fungicides:** Propiconazole (*Propel* only), *Quilt*, *Trivapro*.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 1 hour of treatment may reduce control.
- **Re-entry Interval:** DO NOT enter treated fields for 12 hours.
- **Pre-harvest Interval:** Leave at least 60 days between treatment and harvest of grain and straw.
- **Grazing Restrictions:** DO NOT graze livestock within 7 days or cut for hay within 30 days of application.
- **Re-cropping Interval:** No restrictions the year following treatment. DO NOT seed any crops in the year of treatment following application (emergency re-crop).
- **Aerial Application:** May be applied by air.
- **Storage:** Store in a cool, dry place. May be frozen.

- **Buffer Zones:** Buffers are not required for hand-held and backpack applications.

Application method	Buffer Zones (metres [†]) Required for the Protection of Terrestrial habitat
Ground only*	1
Aerial by airplane or helicopter	25

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method B' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:



Caution – Poison



Warning – Eye and skin irritant

For an explanation of the symbols used here see pages 7 and 8.

Axial iPak*

This product is a prepackaged tank mix of Axial (page 109) and Infinity (page 269). Information listed is restricted to Crop, Weeds and Rates. For other detailed information on the component products see the product pages listed above.

**Note: The Axial iPak co-pack is no longer manufactured but inventories still remain in distribution. This product may be removed from future editions.*

Herbicide Group
1 - pinoxaden
6 - bromoxynil
27 - pyrasulfotole
(Refer to page 45)

Company:

Syngenta Canada

Formulation:

The *Axial iPak* package contains the following:

Axial (PCP#30431): 50 g/L pinoxaden formulated as an emulsifiable concentrate.

- Container Size - 1 x 10 L, 80 L

Infinity (PCP#28738): 37.5 g/L pyrasulfotole and 210 g/L bromoxynil formulated as an emulsifiable concentrate.

- Container size - 1 x 6.7 L, 53.6 L

Crops and Staging:

Spring wheat (NOT including durum) and barley: up to the emergence of the flag leaf.

Weeds and Staging:

Weeds controlled by the component products.

Rates:

Axial: 0.5 L per acre (no adjuvant required)

Infinity: 0.33 L per acre.

(One case treats 20 acres)

Note: Ammonium sulphate is required to be added at 202 g per acre (99% dry) or 0.4 L per acre (49% solution) at 4 to 6 whorls for certain weeds controlled by *Infinity*.

Maximum ONE APPLICATION of this or other products containing the active ingredients pinoxaden, pyrasulfotole or bromoxynil per year.

See component products for more information on restrictions application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

Axial Xtreme

Herbicide Group

1 - pinoxaden

4 - fluroxypyr

(Refer to page 45)

Company:

Syngenta Canada (PCP#30391)

Formulation:

50 g/L pinoxaden and 87.5 g/L fluroxypyr formulated as an emulsifiable concentrate.

- Container size - 2 x 10 L, 80 L, 400 L

Crops and Staging:

Spring wheat (NOT including durum) and barley:

1 to 6 leaf stage prior to the emergence of the 4th tiller and before the first node can be felt in the stem.

Weeds, Rates and Staging:

Apply *Axial Xtreme* at 0.5 L per acre (no adjuvant required)

Grasses - 1 to 6 leaf prior to the emergence of the 4th tiller

- Barnyard grass
- Foxtail (green, yellow)
- Proso millet
- Volunteer oat
- Volunteer canary seed
- Wild oat

Broadleaf Weeds - stages indicated below:

- Cleavers (up to 4 whorls)
- Kochia (2 to 8 leaf)
- Stork's bill (up to 6 leaf)*
- Wild buckwheat (up to 4 leaf)*

* **Suppression.**

Maximum ONE APPLICATION per year of this or other products containing pinoxaden or fluroxypyr.

Application Information:

- **Water Volume:** 20 to 40 L per acre.
- **Nozzles and Pressure:** Maximum 40 to 45 psi (275 to 310 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE coarse* classification droplets.
- **Screens:** Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
pinoxaden	POST (foliar)	ACCCase Lipid synthesis inhibitor	Toward growth areas (Symplast)	Grasses only	1
fluroxypyr	POST (foliar)	Synthetic Auxin	Moves throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

Tolerance and efficacy is best when applied during warm weather when weeds are actively growing and soil moisture is adequate for rapid growth. Under prolonged stress caused by excessive cool or heat, flooding or drought, or poor fertility, control of some weeds may be reduced and or crops may be injured.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

- Bromoxynil/MCPA[†]
- *Curtail M*[†]
- Florasulam + MCPA (*Frontline XL* only)^{††}
- *Infinity*^{††}
- MCPA ester (0.28 to 0.37 L per acre – 600 g/L form)[†]
- Thifensulfuron/tribenuron (*Refine SG* only)
- Thifensulfuron/tribenuron (*Refine SG* only) + MCPA ester (rates above)[†]

[†] A reduction in barnyard grass control may be observed with this mix.

^{††} A reduction in green foxtail control may be observed with this mix.

Fungicides:

- Propiconazole (*Tilt* only at 101 to 202 mL per acre)

Insecticides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Axial Xtreme* label only.

Syngenta also supports the following mixes that are not on the *Axial Xtreme* label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicide:** *Broadside*, *Cirpreme* + MCPA Ester 600 (189 mL per acre)^{††}, *Paradigm* + MCPA Ester 600 (189 mL per acre)^{††}
- **Fungicide:** *Quilt*, *Trivapro*

^{††} A reduction in green foxtail control may be observed with this mix.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 1 hour of application may reduce control.
- **Re-entry Interval:** DO NOT re-enter treated fields for 12 hours.
- **Pre-harvest Interval:** DO NOT apply within 60 days of harvest.
- **Grazing Restrictions:** Must not be grazed within 7 days or cut for livestock feed within 30 days of treatment.
- **Re-cropping Interval:** Barley, canola, flax, forage grasses, lentils, mustard, oats, peas, rye or wheat may be seeded the first full season after application or fields can be fallowed.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a cool, dry place. DO NOT freeze.
- **Buffer Zones:** Avoid drift. Leave at least 15 metres between the downwind edge of the boom and sensitive areas such as shelterbelts, hedgerows, wetlands, woodlots, vegetated ditch banks, ponds, streams, and sloughs. Buffer zones can be reduced by 70% when using shrouds or by 30% when using cones mounted less than 12 inches from the crop canopy.

Sprayer Cleaning:

Refer to 'Method B' on pages 12 and 13. Use 500 g or mL per 100 L of rinsate for alkali detergents or 250 g or mL per 100 L of rinsate for concentrated laundry detergents. DO NOT use chlorine based cleaners.

Hazard Rating:

Warning – Eye and skin irritant

Potential skin sensitizer.

For an explanation of the symbols used here see pages 7 and 8.

Axial Xtreme iPak

This product is a prepackaged tank mix of Axial Xtreme (page 112) and Infinity (page 269). Information listed is restricted to Crop, Weeds and Rates. For other detailed information on the component products see the product pages listed above.

Herbicide Group

1 - pinoxaden

4 - fluroxypyr

6 - bromoxynil

27 - pyrasulfotole

(Refer to page 45)

Company:

Syngenta Canada

Formulation:

The *Axial Xtreme iPak* package contains the following:

Axial Xtreme (PCP#30391): 50 g/L pinoxaden and 87.5 g/L fluroxypyr formulated as an emulsifiable concentrate.

- Container Size - 1 x 10 L, 80 L

Infinity (PCP#28738): 37.5 g/L pyrasulfotole and 210 g/L bromoxynil formulated as an emulsifiable concentrate.

- Container size - 1 x 6.7 L, 53.6 L

Crops and Staging:

Spring wheat (NOT including durum) and barley: 1 to 6 leaf stage prior to the emergence of the 4th tiller and before the first node can be felt in the stem.

Weeds and Staging:

Weeds controlled by the component products.

Rates:

Axial Xtreme: 0.5 L per acre (no adjuvant required)

Infinity: 0.33 L per acre

(One case treats 20 acres)

Maximum ONE APPLICATION of this or other products containing the active ingredients pinoxaden, pyrasulfotole or bromoxynil per year.

See component products for more information on restrictions application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

Barricade II

Herbicide Group

2 - thifensulfuron & tribenuron

4 - fluroxypyr

(Refer to page 45)

Company:

FMC Corporation

Formulation:

The *Barricade II* package contains two components:

Barricade SG (PCP#29544): 25% thifensulfuron methyl plus 25% tribenuron methyl formulated as a water soluble granule.

- Container size - 486 g

Perimeter II (PCP#30094): 333 g ae/L fluroxypyr formulated as an emulsifiable concentrate.

- Container size - 3.4 L

Crops and Staging:

Barley and spring wheat (including durum) only: 2 leaf until first node can be felt at the base of the stem.

Winter wheat: In the spring from the 3 tiller stage until the emergence of the flag leaf.

Weeds and Staging:

Unless otherwise noted below, apply to young and actively growing weeds that are less than 4 inches (10 cm) in height or width.

Weeds Controlled:

- Annual smartweed (green, lady's-thumb)
- Canada thistle (less than 6 inches (15 cm) tall or across and prior to budding)*
- Cleavers (1 to 6 whorls)
- Common chickweed (1 to 6 leaf)
- Cow cockle
- Flixweed
- Kochia (seedling to 8 leaf)
- Hemp-nettle
- Lamb's-quarters
- Narrow-leaved hawk's-beard
- Night-flowering catchfly
- Redroot pigweed
- Round-leaved mallow (1 to 5 leaf)
- Russian thistle
- Shepherd's-purse (up to 20 cm)
- Sow-thistle (perennial)
- Stinkweed
- Stork's-bill (1 to 6 leaf)
- Volunteer canola (not CLEARFIELD varieties)
- Wild buckwheat (1 to 8 leaf)
- Wild mustard
- Volunteer flax (up to 12 cm)

***Suppression only.**

Rate:

Barricade SG: 12 g per acre.

Perimeter II: 85 mL per acre.

(One package treats 40 acres)

Add *Agral 90*, *Agsurf II*, *Citowett Plus*, *Enhance*, *HiActivate*, *Liberate* or *Super Spreader* at 0.2 L per 100 L of spray solution.

Barricade SG may degrade if left in the sprayer for an extended period. Apply within 24 hours of mixing.

Maximum of ONE APPLICATION per year of this or other products containing thifensulfuron/tribenuron or fluroxypyr.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:**
 - **Ground:** Minimum 40 L per acre.
 - **Aerial:** 12 to 20 L per acre
- **Nozzles and Pressure:** Flat fan nozzles are recommended. Sprayers without drift reduction nozzles should use between 30 to 40 psi (210 to 275 kPa). Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with **ASABE medium** droplets by ground or **ASABE coarse** droplets by air.
- **Screens:** Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
thifensulfuron, tribenuron	POST (foliar)	ALS Amino Acid synthesis Inhibitor	Toward growth areas (Symplast)	Broadleaf only	2
fluroxypyr	POST (foliar)	Synthetic Auxin	Moves throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

DO NOT apply to registered crops that are stressed by severe weather conditions (frost, drought or water saturated soil) as crop injury may result. Reduced activity will occur when temperatures are below 8°C or above 27°C. Frost 3 days before or after application may reduce weed control and crop tolerance. Under certain conditions (heavy rainfall, prolonged cool weather, frost conditions, and wide fluctuations in day/night temperatures), lightening in crop colour and reduction in crop height may occur.

Tank Mixes:

Herbicides:

Tank mix partners are applied at all label rates and include recommended adjuvants unless otherwise noted.

- **All crops:**
 - MCPA Ester* (190 mL/acre)
 - **Spring wheat including Durum:**
 - Horizon NG
 - Simplicity OD
 - Simplicity OD + MCPA
 - Traxos + MCPA Ester* (190 mL/acre)
- * Rate for MCPA Ester 600.

Fertilizers: None registered.

FMC Corporation supports the following mixes that are not on the *Barricade II* label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:** *Axial, Assert, Clodinafop, Flucarbazone 3.0, Flucarbazone 2.0, Flucarbazone 2.0 + 2,4-D Ester, Puma Advance, Simplicity GoDRI, Varro.*
- **Fungicides:** *Acapela.*

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Rainfall within 1 hour of application may reduce efficacy.
- **Re-entry Interval:** DO NOT re-enter treated fields for 12 hours.
- **Pre-harvest Interval:** Leave 60 days between application and harvest.
- **Grazing Restrictions:** MUST NOT be grazed or fed to livestock for 7 days after treatment.
- **Re-cropping Interval:** Alfalfa, barley, corn, canola, dry beans, flax, forage grasses, lentils, mustard, oats, peas, potatoes, rye, soybeans, sugar beets, sunflowers, wheat or fields can be fallowed the year after treatment.
- **Aerial Application:** May be applied by aircraft.
- **Storage:** Store in a cool, dry place. Avoid freezing. If frozen, bring to room temperature and agitate before use. DO NOT store near heat or open flame.
- **Buffer Zones:**

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground*	1	0	15
Fixed wing aircraft	5	0	125
Helicopter	3	0	100

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Follow the sprayer cleaning instructions on the thifensulfuron/tribenuron page. The addition of a wetting agent (detergent) will also aid the cleaning process. Refer to pages 12 and 13 for additional information.

Hazard Rating:



Danger – Poison



Warning – Contains the allergens milk and sulfites

For an explanation of the symbols used here see pages 7 and 8.

Basagran Brands (this referring text to be removed in the 2021 edition)

See Bentazon on page (117).

Bentazon

Herbicide Group

6 - bentazon

(Refer to page 45)

Company:

BASF Canada (*Basagran* - PCP#12221, *Basagran Forté* - PCP#22006)

AgraCity (*MPower Boa* – PCP#33011)

Sharda CropChem Canada (*Benta Super* - PCP#32827)

Formulation:

480 g/L bentazon formulated as a solution in both products. *Basagran Forté* has a built-in adjuvant. Other products require the addition of an adjuvant.

- Container size
 - *Basagran, Benta Super*: 2 x 9 L
 - *MPower Boa*: 2 x 7.25 L
 - *Basagran Forté*: 2 x 10 L

Crops and Staging:

Basagran, Basagran Forté, MPower Boa and Benta Super:

Crop	Stage
Soybean	No restrictions
Dry bean ***	After the first trifoliolate leaf
Corn	No restrictions
Pea	After 3 leaf pairs but prior to flowering
Faba bean	After 2 to 3 leaf stage or at least 4 inches (10 cm) tall
Flax	After 2 inches (5 cm) in height

Basagran Forté only:

Crop	Stage
Forage millet and forage sorghum (forage and seed production)*	3 to 10 inches (7.5 to 25 cm) prior to canopy closure
Established clover (alsike, red) for seed production only*	3 to 10 inches (7.5 to 25 cm) prior to canopy closure

Basagran, MPower Boa and Benta Super only:

Crop	Stage
Spring wheat (excluding durum)**	No restrictions (limited to the 4 leaf to flag leaf by 2,4-D staging)
Solin (low linolenic acid flax)	After 2 inches (5 cm) in height
Forage grasses for seed production*: Bromegrass, creeping red fescue, crested wheatgrass, meadow foxtail, orchardgrass, timothy.	1 to 7 leaf stage
Forage legumes (seedlings) for seed production*: Alfalfa, alsike clover, red clover, sainfoin.	After the third trifoliolate leaf
Established alfalfa for seed production.*	Prior to flowering

Crop	Stage
Established clover (Sweet, or Red) and sainfoin for seed production.*	3 to 10 inches (7.5 to 25 cm) prior to canopy closure

* One application per season.

** *Basagran, Benta Super and MPower Boa* only at 0.4 L per acre. Must be tank mixed with 2,4-D (no adjuvant required).

*** Test a small area of a new variety for tolerance before widespread use. Refer to product labels for a list of dry bean types registered for *Basagran, Benta Super and MPower Boa*. *Basagran Forté* registered for all dry bean types but not tested for tolerance on all types.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

Basagran Liquid, MPower Boa and Benta Super only: Add *Assist* or *XA Oil Concentrate* at 0.4 to 0.8 L per acre. Use the low rate of *Assist* or *XA Oil Concentrate* only if hot, humid conditions (above 28°C and 80% relative humidity) prevail. *Citowett Plus* may be used on peas at 0.25 L per 100 L spray mixture. Ammonium sulphate can be added for applications to soybean and dry beans.

Benta Super can also be applied with *Citowett Plus* at 0.25L per 100L of spray solution.

Basagran Forté only: *Basagran Forté* does not require the addition of *Assist* or *XA oil concentrate*. Ammonium sulphate can be added for applications to soybean only.

Apply the rate listed when weeds in the table are within the recommended height:

Annual Weeds	0.71 L per acre		0.91 L per acre	
	Inches	Maximum Leaf Stage	Inches	Maximum Leaf Stage
Buttercup			2 to 4	6*
Cleavers			1 to 3 whorl stage	
Cocklebur	3 to 7	6*	7 to 12	10*
Common chickweed			1 to 3 weeks after emergence	
Common groundsel			2 to 4	
Common ragweed			1 to 2	6
Corn spurry			1 to 4	
Flower-of-an-hour	1 to 2	6*	2 to 4	10*
Giant ragweed			2 to 6	4
Hairy galinsoga			2 to 3	6*
Hairy nightshade			0.2 to 0.8	6
Jimsonweed			2 to 6	10
Lady's-thumb (smartweed)	1 to 3	6*	3 to 8	10
Lamb's-quarters			0.5 to 1.0	8
Purslane			1 to 2	6
Redroot pigweed (suppression only)			0.5 to 1.5	4
Russian thistle (suppression only*)			1 to 3	4*
Shepherd's-purse	Rosette to 4	6*	4 to 10	6
Stinkweed	Rosette to 2	6*	2 to 6	6
Stork's-bill			1.5 to 4	2 to 6 leaf stage
Volunteer canola	0.75 to 6	8**	0.75 to 6	8
Wild mustard	1 to 5	6*	5 to 10	10
Wild radish			1 to 2	6
Canada thistle	6 to 8			
Field bindweed	1 to 2.5			
Yellow nutsedge	6 to 8			

* *Basagran Forté* only.

** *Basagran, MPower Boa and Benta Super* only.

Basagran, *MPower Boa* and *Benta Super* may be applied in spring wheat (except durum) at 0.4 L per acre when tank mixed with 2,4-D amine or ester at 143 to 190 g ae per acre to control the weeds controlled by 2,4-D plus lady's-thumb, redroot pigweed and daisy fleabane. No adjuvant is required for this mix.

Refer to the product label for complete mixing instructions for this product and its mixes. A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:**
 - **Ground:** 40 to 160 L per acre. A minimum of 80 L per acre is recommended for optimum control.*
 - **Aerial:** 23 to 45 L per acre.
- **Nozzles and Pressure:** Maintain 40 to 60 psi (275 to 425 kPa)* when using conventional flat fan nozzles capable of delivering high water volumes with *ASABE medium* droplets. Low drift nozzles may require higher pressures for proper performance. Contact the herbicide manufacturer regarding the suitability of low drift nozzles for use with this product. Direct nozzles 45° forward to improve contact with vertical targets.
 - * **Higher water volumes and pressures should be used when the weeds are at the upper end of their recommended treatment stage.**

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
bentazon	POST (foliar)	PSII Inhibitor/Membrane disrupter	Little (Apoplast)	Broadleaf only	6

Effects of Growing Conditions:

Poor results will occur if temperatures are cool. Optimum results are achieved when applied at daytime temperatures between 20 and 28°C. Applications at temperatures greater than 28°C may result in crop injury. May result in crop injury when applied to crops that are stressed due to severe weather conditions such as frost, drought or water saturated soil.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

- **In soybean:**
 - *Pinnacle* (2.2 to 3.2 g per acre)
- **In dry bean*:**
 - *Basagran*, *MPower Boa* and *Benta Super* only (0.71 L per acre) plus *Reflex** plus *Agral 90*.
- **In spring wheat (not including durum):**
 - *Basagran*, *MPower Boa* and *Benta Super* only (0.4 L per acre) must be tank mixed with 2,4-D amine or ester at 143 to 190 g ae per acre. This tank mix DOES NOT need any adjuvant.
 - * **For use in the Red River Valley of Manitoba only.**

Fungicides: None registered.

Insecticides: None registered

Fertilizers:

- **In soybean:**
 - *Basagran* or *Basagran Forté* plus UAN (4 L per acre)
- DO NOT add fertilizer with *Assist* or *XA Oil Concentrate* when tank mixing with *Pinnacle*. The risk of crop injury increases with the use of fertilizer mixes under hot, humid conditions.
- Use of fertilizer mixes is not recommended for use under western Canadian environmental conditions for other crops.

When mixing Bentazon refer to the tank mix partner label for any additional restrictions and precautions.

Allow 4 days between application of Bentazon and other herbicides, fertilizers or insecticides.

Note: The above mixes are those listed on the Bentazon labels only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 6 to 8 hours will reduce control.
- **Re-entry Interval:** DO NOT enter treated field for 12 hours.
- **Grazing Restrictions:** Allow 30 days between treatment with *Basagran Forté* and harvest of forage sorghum and millet for hay. Otherwise DO NOT graze treated crops or cut for feed prior to crop maturity.
- **Pre-harvest Interval:** 50 days for Bentazon + 2,4-D in wheat, 84 days for Bentazon + *Reflex* in dry beans in Manitoba. Other uses are restricted only by appropriate staging.
- **Re-cropping Interval:** No restrictions the year after application.
- **Aerial Application:** May be applied by air for weed control in dry beans or soybeans only. *Assist* or *XA Oil Concentrate* at 0.05 to 0.1 L per acre must be added. DO NOT use *Assist* or *XA Oil Concentrate* in excess of 0.1 L per acre as substantial crop injury could occur. DO NOT apply fertilizer mixes in soybean or 2,4-D tank mix in wheat by air. Crop canopy should NOT cover the weeds.
- **Storage:** May be frozen.
- **Buffer Zones:**

Application method	Crop	Buffer Zones (metres ^{††}) Required for the Protection of: Terrestrial habitat
Ground [†]	Sorghum**, Forage millet**, Forage grasses and legumes, Peas*	1
	Corn, Dry bean, Faba bean, Flax, Pea**, Soybean, Spring wheat*	2
Fixed wing airplane***	Dry bean	20
	Soybean	35
Helicopter***	Dry bean	20
	Soybean	30

See page 36 for an explanation of the different habitats.

* *Basagran*, *MPower Boa* and *Benta Super* only

** *Basagran Forté* only

*** *Basagran* only

[†] Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

^{††} Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method B' in the general sprayer cleaning section on pages 12 and 13.

Hazard Rating:

Basagran, *MPower Boa*, *Benta Super*:



Caution – Poison

Basagran Forté:



Warning – Poison



Danger – Corrosive to Eyes



Warning – contains the allergen soy.

For an explanation of the symbols used here see pages 7 and 8.

BlackHawk* (with carfentrazone)

Herbicide Group
4 - 2,4-D

14 - carfentrazone
(Refer to page 45)

This product is a prepackaged tank mix of Aim EC (page 93) and 2,4-D (page 83). Information listed is restricted to Crop, Weeds, Rates and Tank mixes. For other detailed restrictions and other general information on the component products see the product pages listed above.

** Note: The BlackHawk co-pack is no longer manufactured but inventories still remain in distribution. This product may be removed from future editions.*

Company:

Nufarm Agriculture

Formulation:

The *BlackHawk* co-package contains the following components:

Aim EC (PCP#28573): carfentrazone-ethyl 240 g/L as an emulsifiable concentrate.

- Container size - 2 x 600 mL

2,4-D 700 ester (PCP#27820): 2,4-D 660g/L as an emulsifiable concentrate.

- Container size - 2 x 8.69 L

Crops and Staging:

Pre-seed burndown prior to seeding the following crops:

- Spring wheat
- Durum wheat
- Winter wheat
- Barley
- Rye
- Chemfallow

Soybean - 7 days prior to seeding.

Weeds and Staging:

Emerged weeds controlled by the component products up to 10 cm or 3 leaf rosette stage plus:

- Kochia*
- Volunteer canola*

* All biotypes.

Rates:

Aim EC: 15 mL per acre

2,4-D 700 ester: 212 mL per acre

(One case treats 80 acres)

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Tank Mixes:

Herbicides:

- Glyphosate (180 to 360 g ae per acre)

See component products for more information on restrictions application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

BlackHawk (with pyraflufen-ethyl)

Herbicide Group

4 - 2,4-D

14 - pyraflufen-ethyl

(Refer to page 45)

Company:

Nufarm Agriculture (PCP#32111)

Formulation:

473 g/L 2,4-D ester and 6.1 g/L pyraflufen-ethyl formulated as an emulsifiable concentrate.

- Container size - 2 x 9 L, 96 L

Crops and Staging:

Apply pre-seeding or up to 3 days after seeding the following crops:

- Wheat (spring, durum, winter)
- Barley
- Corn (field)
- Canary seed
- Rye (spring, fall)
- Soybean
- Triticale
- Chemfallow

Oat - 7 days prior to seeding.

Post-harvest: Apply in the fall (up until soil freeze). Crops not listed above can be planted one month after application.

Weeds, Rates and Staging:

Apply 300 mL per acre (one 9 L container treats 30 acres) to young, actively growing weeds that are less than 5 cm in height or width, unless indicated otherwise.

- Annual sow-thistle
- Bluebur (up to 4 leaf)
- Burdock (up to 4 leaf)
- Cleavers
- Cocklebur
- Dandelion (spring seedlings)
- Cow cockle*
- False flax
- Fleabane (Canada*, daisy)
- Flixweed
- Goat's-beard
- Kochia (including glyphosate resistant)
- Lamb's-quarters
- Mallow
- Mustards (except dog and tansy)
- Narrow-leaved hawk's-beard**
- Plantain
- Pigweed (redroot, Russian)
- Prickly lettuce
- Ragweed (common, false, giant)
- Shepherd's-purse
- Stinging nettle
- Stinkweed
- Sweet clover (seedling)
- Thyme-leaved spurge
- Volunteer canola (all varieties)
- Wild buckwheat*
- Wild mustard*
- Wild sunflower

* Suppression

** Up to 5 cm in the fall, up to 2 leaf in spring

† *Blackhawk* applied alone requires the addition of a non-ionic surfactant (*Nufarm Enhance, Agral 90*) at 0.25 L per 100 L of spray solution.Maximum TWO APPLICATIONS of this product or *Goldwing* at the rates listed in this Guide WITHIN A TWO YEAR TIME SPAN.*Blackhawk* may degrade if left in the sprayer for an extended period under alkaline conditions. Apply within 24 hours of mixing.

Application Information:

- **Water Volume:** Minimum 20 L per acre up to 40 L per acre (recommended).
- **Nozzles and Pressure:** Flat fan nozzles operated at a pressure of 30 to 40psi (210 to 275 kPa) are recommended. Use nozzles and pressure designed to deliver thorough, even coverage with *ASABE medium* droplets. Boom height must be 60 cm or less above the crop or ground.
- **Screens:** Use 50 mesh or coarser on both nozzle and primary plumbing screens.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
2,4-D	POST (foliar)	Synthetic Auxin	Moves throughout the plant (Symplast)	Broadleaf only	4

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
pyraflufen	POST (foliar), with slight soil activity	PPO Inhibitor/ Membrane disruptor	Little movement due to rapid cell leakage (Symplast)	Non-selective Broadleaf	14

Effects of Growing Conditions:

Control may be reduced if weeds are under stress (e.g. drought, heat or cold stress). Weeds hardened off by cold weather or drought may not be adequately controlled or suppressed.

Tank Mixes:

Herbicides:

Pre-seed and Pre-emergent:

- Glyphosate (180 to 360 g ae per acre) (no surfactant required)

Note: The above mixes are those listed on the *Blackhawk* label only. Nufarm Agriculture also supports the following mixes that are not on the *Blackhawk* label.

- **Herbicides:**
 - **In fall:** *Valtera* (spring seeded chickpea, field pea, lentil, soybean, spring wheat)
 - **In spring:** *Valtera* (soybean only)

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** No rainfast period is specified on the label. Consult the manufacturer.
- **Re-entry Interval:** DO NOT enter treated fields for 12 hours.
- **Pre-harvest Interval:** DO NOT harvest for feed or forage for 30 days.
- **Grazing Restrictions:** DO NOT graze the treated crop or cut for hay for 30 days after application. DO NOT allow lactating dairy cows to graze for 7 days after application. Animals intended for meat should be withdrawn from treated fields 3 days before slaughter.
- **Storage:** Store in a cool, dry place away from direct sunlight. May be frozen. If frozen, allow to warm to 10 to 20°C and shake thoroughly before use.
- **Buffer Zones:**

Application method	Buffer Zones (metres †) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground*	1	1	2

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:

 Danger – Poison

 Warning – contains the allergen soy. Skin and eye irritant. Potential skin sensitizer.

For an explanation of the symbols used here see pages 7 and 8.

Broadband

Herbicide Group

1- pinoxaden

2- florasulam

(Refer to page 45)

Company:

Syngenta Canada

Formulation:

Broadband (PCP#29138): 92.7 g/L pinoxaden and 7.7 g/L florasulam formulated as an emulsifiable concentrate.

- Container size - 10.5 L, 84.2 L

Adigor Adjuvant (PCP#28151): 11.3 L, 90.4 L

Crops and Staging:

Barley, spring wheat (NOT including durum): up to the emergence of the flag leaf.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

Apply *Broadband* at 263 mL per acre and *Adigor* adjuvant at 280 mL per acre (package sizes listed above will treat 40 or 320 acres)

Grass weeds - 1 to 6 leaves and prior to the emergence of the 4th tiller:

- Barnyard grass
- Proso millet
- Volunteer canary seed
- Foxtail (green, yellow)
- Volunteer oat
- Wild oat

Broadleaf weeds - 1 to 6 leaf stage:

- Annual smartweed (including lady's-thumb)
- Hemp-nettle[†]
- Stinkweed
- Common chickweed
- Pigweed, redroot[†]
- Volunteer canola*
- Cleavers
- Shepherd's-purse
- Wild buckwheat
- Sow-thistle (annual, perennial^{**})[†]
- Wild mustard

[†] **Suppression only.**

* **Not Clearfield varieties.**

** **Applications made at advanced leaf stages will reduce product effectiveness.**

Maximum ONE APPLICATION per year of this or other products containing the active ingredient pinoxaden.

Maximum ONE APPLICATION of this or other products containing florasulam over a TWO YEAR TIME SPAN.

Application Information:

- **Water Volume:** 20 to 40 L per acre.
- **Nozzles and Pressure:** Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE medium* droplets. Low drift nozzles may require higher pressures for proper performance.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
pinoxaden	POST (foliar)	ACCCase Lipid synthesis inhibitor	Toward growth areas (Symplast)	Grasses only	1
florasulam	POST	ALS Amino Acid synthesis Inhibitor	Toward growth areas (Symplast)	Broadleaf	2

Effects of Growing Conditions:

DO NOT apply to crops or weeds that are stressed (frost, low fertility, drought or flooding, disease or insect damage) as crop injury or reduced weed control may result.

Temporary crop injury may occur with tank-mixes under extreme weather conditions or when the crop is suffering from stress due to inadequate or abnormally high moisture levels or extreme temperatures.

Tank Mixes:

Herbicides:

- *Curtail M* (0.6 L per acre)
- MCPA LV500 ester (0.28 L per acre)

Fungicides:

- Propiconazole (*Tilt* only at label rates)

Fertilizers: None registered

Note: The above mixes are those listed on the *Broadband* label only.

Syngenta also supports the following mixes that are not on the *Broadband* label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:** Fluroxypyr+MCPA (*Trophy* only); *Infinity*; *Prestige XC* (low rate).
- **Fungicides:** Propiconazole (*Propel*, *Tilt* 80 acres/8L jug); *Quilt*; *Trivapro*.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 1 hour of application may reduce control.
- **Re-entry Interval:** DO NOT re-enter treated fields within 12 hours.
- **Pre-harvest Interval:** Leave 60 days between treatment and harvest.
- **Grazing Restrictions:** DO NOT cut for livestock feed within 30 days or grazed by livestock within 7 days of treating the crop.
- **Re-cropping Interval:** No restrictions the year following treatment.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in dry, heated storage.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:	
	Aquatic Habitats	Terrestrial habitat
Ground only*	5	30

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:

 Warning – Eye Irritant

For an explanation of the symbols used here see pages 7 and 8.

Bromoxynil

Herbicide Group

6 - bromoxynil

(Refer to page 45)

Company:

Bayer (*Pardner*)IPCO (*Brotex 240, Brotex 480*)Nufarm Agriculture (*Koril 235*)ADAMA Canada (*Bromotril II*)AgraCity (*MPower Bromoxynil*)Loveland Products Canada (*Loveland Bromax*)

Formulation:

Pardner (PCP#18001): 280 g/L bromoxynil formulated as an emulsifiable concentrate.

- Container size - 2 x 8 L

Koril 235 (PCP#25341): 235 g/L bromoxynil formulated as an emulsifiable concentrate.

- Container size - 2 x 9.71 L

Bromotril II (PCP#30371), MPower Bromoxynil (PCP#32911) & Brotex 240 (PCP#28519): 240 g/L bromoxynil formulated as an emulsifiable concentrate.

- Container size - 2 x 9.7 L, 115 L (*Brotex 240* only), 116.4 L (*Bromotril II* only).

Brotex 480 (PCP#31348) & Loveland Bromax (PCP#31431): 480 g/L bromoxynil formulated as an emulsifiable concentrate.

- Container size - 2 x 9.7 L

Crops, Staging and Rates:

Pardner: At 0.40 to 0.48 L per acre one 8 L jug treats 20 to 16.5 acres.

Koril, MPower Bromoxynil, Brotex 240 & Bromotril II: At 0.49 to 0.57 L per acre one 9.71 L jug treats 20 to 17 acres.

Brotex 480 & Loveland Bromax: At 0.24 to 0.28 L per acre one 9.7 jug treats 40 to 34 acres. See the following chart for registered crops and specific rates and stages. NR = Not Registered.

Crop	Stage	Rate (L per acre)				
		<i>Pardner</i>	<i>Koril</i>	<i>Bromotril II</i>	<i>Brotex 240/ MPower Bromoxynil</i>	<i>Brotex 480/ Bromax</i>
Barley, oats, triticale, wheat (spring and durum**)	2 leaf stage to early flag	0.40 to 0.48	0.49 to 0.57	0.49 to 0.57	0.49 to 0.57	0.24 to 0.28
Winter wheat	2 to 4 leaf stage (fall application) First growth to early flag leaf (spring application)	0.40 to 0.48	0.49 to 0.57	0.49 to 0.57	0.49 to 0.57	0.24 to 0.28
Corn (field or sweet)	4 to 8 leaf	0.40 to 0.48	0.49 to 0.57	0.49 to 0.57	0.49 to 0.57	0.24 to 0.28
Corn (field or sweet) with drop pipes	Beyond 8 leaf	0.40 to 0.48	0.49 to 0.57	0.49 to 0.57	0.49 to 0.57	0.24 to 0.28
Canaryseed (seed production only)	3 to 5 leaf	0.40	0.49	0.49	0.49	0.24
Seedling alfalfa	2 to 6 trifoliate leaf stage	0.40	0.49	0.49	0.49	0.24

Crop	Stage	Rate (L per acre)				
		<i>Pardner</i>	<i>Koril</i>	<i>Bromotril II</i>	<i>Brotex 240/MPower Bromoxynil</i>	<i>Brotex 480/Bromax</i>
Established alfalfa (seed production only)	Up to 10 inches (25 cm). Apply no more than twice in one growing season.	0.40 to 0.48	0.49 to 0.57	0.49 to 0.57	0.49 to 0.57	0.24 to 0.28
Fall rye	First growth to early flag leaf (spring application only)	0.40 to 0.48	0.49 to 0.57	0.49 to 0.57	0.49 to 0.57	0.24 to 0.28
Flax and Solin (low linolenic acid flax)	2 to 4 inches (5 to 10 cm)	0.40	0.49	0.49	0.49	0.24
Forage millet and sorghum	4 leaf to 8 inches (20 cm)	0.40	NR	NR	0.49	0.24
Seedling grasses (seed production only): Bromegrass, Fescue (creeping red, meadow), Orchard grass, Reed canary grass, Russian wildrye, Timothy, Wheatgrass (crested, intermediate, slender, tall)	2 to 4 leaf (Establishment year only)	0.40 to 0.48	NR	NR	0.49 to 0.57	0.24 to 0.28
Pearl millet and sorghum (grain)*	4 leaf to 8 inches (20 cm)	0.40	NR	NR	0.49 [†]	NR
Prior to direct-seeding cereal crops (mixed with glyphosate only)	Apply according to weed stage.	0.40	0.49	NR	0.49	0.24
Pre-seed/pre-plant prior to seeding canola (mixed with glyphosate only)	Apply according to weed stage	0.40 to 0.51	0.61	NR	NR	0.29***

* NOTE: Since application to grain pearl millet and sorghum is registered under User Requested Minor Use Label Expansion program, the manufacturer assumes no responsibility for herbicide performance. Users of this on product grain pearl millet and sorghum do so at their own risk.

** *Pardner* only.

*** *Brotex 480* only.

[†] *MPower Bromoxynil* only.

Weeds and Staging:

Weeds controlled at the 1 to 4 leaf stage:

- American nightshade
- Annual smartweed (green, pale, lady's-thumb)
- Bluebur
- Cocklebur
- Common ragweed
- Cow cockle*
- Kochia**
- Pigweed*[†]
- Russian thistle**
- Stinkweed*
- Volunteer Canola*
- Wild mustard*

Weeds controlled at the 1 to 8 leaf stage:

- Buckwheat (tame, Tartary, wild)
- Common groundsel
- Lamb's-quarters

* Controlled with high rate only.

** Apply before plants are 2 inches high.

[†] Not controlled in seedling alfalfa.

Application Information:

- **Water Volume:**
 - **Ground:**
 - *Corn, Millet & Sorghum*: 80 to 120 L per acre.
 - *Seedling grasses*: 60 L per acre.
 - *Other crops*: 40 L per acre.
 - **Aerial (*wheat and barley only*)**: 8 to 16 L per acre.
- **Nozzles and Pressure:** Maximum 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver **ASABE medium** droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
bromoxynil	POST (foliar)	PSII Inhibitor/Membrane disrupter	Little (Apoplast)	Broadleaf only	6

Effects of Growing Conditions:

Avoid spraying if temperatures are greater than 25°C. Leaf scorching may occur in corn and flax if applied during or after adverse growing conditions, such as cool and wet or hot (greater than 27°C) and humid weather.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Crop	Tank Mixes
Spring wheat	2,4-D [†] , <i>Achieve Liquid</i> , MCPA
Winter wheat	2,4-D, <i>Achieve Liquid</i> , MCPA
Barley	2,4-D [†] , <i>Achieve Liquid</i> , MCPA [†]
Oats	MCPA
Fall rye, canaryseed	MCPA*
Flax	MCPA (amine, ester or K salt)
Seedling forage grasses***	MCPA
Corn	<i>Accent*</i> + surfactant (field corn only), <i>AAtrex**</i> (0.4 L per acre), <i>Banvel II</i> (field corn only)**
Prior to seeding: Cereals, Canola ^{††}	Glyphosate
Prior to seeding (<i>Koril</i> only)	<i>Aim</i> , <i>CleanStart</i>

* The ester formulations are preferred but other formulations can be used.

** DO NOT add oil or surfactant to this mix. DO NOT use atrazine formulations that contain oil.

*** *Bromax*, *Brotex 240*, *Brotex 480*, *MPower Bromoxynil* and *Pardner* only.

† May be applied by air.

†† *Bromax 480*, *Koril 235* and *Pardner* only. Not all glyphosate products/formulations are registered for this use. Refer to individual product labels.

♦ *Since the use of this tank mix on corn is registered under the User Requested Minor Use program, the manufacturer assumes no responsibility for herbicide performance. Users of this tank mix on corn do so at their own risk.*

Fertilizers: None registered.

Insecticides: None registered.

Fungicides: None registered.

Note: The above mixes are those listed on the bromoxynil labels only.

Bromoxynil manufacturers may also support mixes with pesticides that are not on the bromoxynil labels. Check with each manufacturer for the products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 1 hour of application will reduce control.
- **Re-entry Interval:** DO NOT enter treated fields for 24 hours.
- **Grazing Restrictions:** DO NOT graze treated wheat, barley, oats, forage millet, sorghum or seedling alfalfa crops or cut for feed within 30 days of application. DO NOT graze other treated crops or cut for hay prior to crop maturity.
- **Re-cropping Interval:** No restrictions.
- **Aerial Application:** Registered for aerial application on wheat and barley. The use of low water volumes, 8 to 16 L per acre may result in less effective weed control than seen with ground application.
- **Storage:** *IPCO Brotex 480* and *Loveland Bromax* must be stored at temperatures of 7°C or higher. Others may be stored at freezing temperatures and they will return to original state by warming to room temperature (20 to 22°C) and shaking thoroughly.
- **Buffer Zones:**

Application method	Buffer Zones (metres †) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	1	1	1
Fixed wing aircraft**	20	5	55
Helicopter**	20	3	45

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy

** Wheat and barley crops only.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Refer to pages 12 and 13.

Hazard Rating:

All:



Warning – Poison

Brotex 240, Bromotril II, MPower Bromoxynil:



Warning – Eye and Skin Irritant

Koril 235:



Danger – Eye and Skin Irritant

Potential Skin Sensitizer

For an explanation of the symbols used here see pages 7 and 8.

Bromoxynil/2,4-D Ester

Herbicide Group

4 - 2,4-D

6 - bromoxynil

(Refer to page 45)

Company:

Bayer (*Thumper*)ADAMA Canada (*Thrasher II*)Nufarm Agriculture (*Approve*)IPCO (*Leader*)

Formulation:

Thumper (PCP#22659): 280 g/L bromoxynil and 280 g/L 2,4-D ester formulated as an emulsifiable concentrate.

- Container size - 8 L

Approve (PCP#28123), Leader (PCP#28853) & Thrasher II (PCP#30372): 225 g/L bromoxynil and 225 g/L 2,4-D ester formulated as an emulsifiable concentrate.

- Container size - 10 L, 100 L*, 115 L**, 120 L***, 500 L*

* *Approve only*** *Leader only**** *Thrasher II only*

Crops and Staging:

Spring wheat (including durum) and barley at the 4 leaf to early flag leaf stage.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds and Staging:

Weeds controlled at the 1 to 4 leaf stage:

- | | | |
|-----------------------|----------------------------|---|
| ◦ American nightshade | ◦ Cow cockle | ◦ Shepherd's-purse |
| ◦ Ball mustard | ◦ Flixweed | ◦ Smartweed (green, lady's-thumb, pale) |
| ◦ Bluebur | ◦ Jimsonweed | ◦ Volunteer canola |
| ◦ Cocklebur | ◦ Night-flowering catchfly | ◦ Volunteer sunflower |
| ◦ Common ragweed | ◦ Redroot pigweed | |

Weeds controlled at the 1 to 8 leaf stage:

- | | | |
|------------------------------------|-------------------|----------------|
| ◦ Buckwheat (tame*, Tartary, wild) | ◦ Lamb's-quarters | ◦ Wild mustard |
| ◦ Common groundsel | ◦ Stinkweed | |
- * up to 4 leaf stage with *Approve*

Weeds Controlled from 1 to 12 leaf (max. 2 inches tall):

- | | |
|----------|-------------------|
| ◦ Kochia | ◦ Russian thistle |
|----------|-------------------|

Rates:

Thumper: 0.4 L per acre (one 8 L container treats 20 acres).

Approve, Leader or Thrasher II: 0.5 L per acre (One 10 L container treats 20 acres).

Application Information:

- **Water Volume:**
 - **Ground:** 20 to 40 L per acre.
 - **Aerial:** 12 to 16 L per acre. Use the higher volume when there is a heavy crop canopy, or when the majority of weeds are cow cockle, smartweed, or pigweed.
- **Nozzles and Pressure:** Use 40 psi (275 kPa) when using conventional 80° or 110° flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with **ASABE coarse** droplets.
- **Screens:** All strainer and nozzle screens must be 50 mesh or coarser.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
bromoxynil	POST (foliar)	PSII Inhibitor/Membrane disrupter	Little (Apoplast)	Broadleaf only	6
2,4-D	POST (foliar)	Synthetic Auxin	Symplast	Broadleaf only	4

Effects of Growing Conditions:

Less than acceptable weed control may be expected if weeds are under stress because of excessive moisture, drought, or cool weather.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

- **In wheat (spring, durum) and barley:**
 - *Liquid Achieve*
- In wheat (spring, durum, winter):
 - *Varro**
- **In wheat (spring, durum) only:**
 - *Clodinafop 240EC*^Δ
 - * **Thumper** only.
 - ^Δ **Manufacturers may only support specific mixes. Contact the manufacturer for more information.**

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the Bromoxynil/2,4-D Ester labels only.

Bromoxynil/2,4-D ester manufacturers may also support mixes with pesticides that are not on the Bromoxynil/2,4-D ester labels. Check with each manufacturer for the products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.
- **Re-entry Interval:** DO NOT enter treated fields for at least 24 hours.
- **Grazing Restrictions:** DO NOT graze or cut for livestock feed within 30 days of application. Withdraw meat animals 3 days before slaughter.
- **Pre-harvest Interval:** DO NOT harvest within 30 days of application.
- **Re-cropping Interval:** No restrictions the year after application.
- **Aerial Application:** May be applied by air.
- **Storage:** May be frozen. Shake well before using after being frozen.

- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	1	1	1
Fixed wing aircraft	20	5	55
Helicopter	20	3	45

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy. Hand-held or backpack sprayers, inter-row hooded sprayers and spot treatments are exempt from buffer zone requirements.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method C' on pages 12 and 13.

Hazard Rating:

All Products:

 Warning – Poison

Thumper and Approve:

 Caution – Skin and Eye Irritant

Leader and Thrasher II:

 Warning – Skin and Eye Irritant

 Potential Skin Sensitizer

For an explanation of the symbols used here see pages 7 and 8.

Bromoxynil/MCPA ester

Herbicide Group
4 - MCPA
6 - bromoxynil
(Refer to page 45)

Company:

Bayer (*Buctril M*)

Nufarm Agriculture (*Mextrol 450*)

ADAMA Canada (*Badge II*)

AgraCity (*MPower Buck M*)

IPCO (*Logic M*)

Formulation:

***Buctril M* (PCP#18022):** 280 g/L bromoxynil and 280 g/L of MCPA ester formulated as an emulsifiable concentrate.

- Container size - 8 L

***Mextrol 450* (PCP#26999), *Badge II* (PCP#30370), *Logic M* (PCP#28109) & *MPower Buck M* (PCP#32685):** 225 g/L bromoxynil and 225 g/L of MCPA ester formulated as an emulsifiable concentrate.

- Container sizes:
 - *Logic M* - 10 L, 115 L
 - *Badge II* - 120 L
 - *Mextrol* - 100 L, 500 L
 - *Buck M* - 2x10 L, 115 L

Crops and Staging:

Field Crops:

- **All Products:**

Crop	Stage
Barley, oats, spring wheat (including durum)	2 leaf to early flag
Winter wheat	2 to 4 leaf stage in the fall or after growth resumes up to early flag leaf.
Fall rye	When growth commences in spring to early flag leaf
Canaryseed	3 to 5 leaf stage
Flax and Solin (low linolenic acid flax)	2 inches (5 cm) to early bud stage. Best tolerance occurs when flax is 2 to 4 inches (5 to 10 cm) tall.
Corn	4 to 6 leaf stage

Seedling forage grasses[†]: 2 to 4 leaf stage[†].

- **All Products:**

- Bromegrass
- Fescue (creeping red, meadow)
- Reed canarygrass
- Russian wild-rye
- Timothy
- Wheatgrass (crested, intermediate, slender, tall)

- **Buctril M, Logic M and Badge only:**

- Fescue (tall)
- Meadow bromegrass
- Meadow foxtail
- Orchard grass
- Wheatgrass (streambank)

Established Forage Grasses:

- Timothy (seed[†] or hay^{††})^{**} - prior to emergence of the flag leaf.

[†] Maximum of two treatments per year at least 21 days apart.

^{††} Maximum of two treatments per year at least 90 days apart.

Perennial Cereal Rye* (*Buctril M* only):

- **Established stands:** 2 leaf up to early flag leaf stage.
 - **Establishment year:** 2 to 4 leaf stage in the fall, or from the time growth commences to early flag leaf stage in the spring.
- * *Since the use of this tank mix on perennial cereal rye is registered under the User Requested Minor Use Label Expansion program, the manufacturer assumes no responsibility for herbicide performance. Users of this tank mix on perennial cereal rye do so at their own risk.*
- ** Applications onto timothy for hay production registered with *Buctril M*, *Logic M*, and *Mextrol 450* only.

Weeds and Staging:

Weeds up to 4 leaf stage:

- American nightshade
- Annual smartweeds (green, lady's-thumb, pale)
- Bluebur
- Ball mustard
- Cocklebur
- Cow cockle
- Flixweed
- Jimsonweed
- Kochia^{**}
- Night-flowering catchfly
- Redroot pigweed*
- Russian thistle^{**}
- Scentless chamomile^{***}
- Shepherd's-purse
- Volunteer canola
- Volunteer sunflower

* May not be controlled in flax.

** Control before plants are 2 inches tall.

*** Spring seedlings only.

Weeds up to 6 leaf stage:

- Wild tomato (*Buctril M*, *Logic M* & *Badge II* only)

Weeds up to 8 leaf stage:

- Buckwheat (tame, tartary, wild)
- Common ragweed
- Mustard (wild, wormseed)
- Common groundsel
- Lamb's-quarters
- Stinkweed

Weeds suppressed in winter wheat from the 2 to 12 leaf stage:

- Prickly lettuce (All except *Logic M* and *Buck M*)

Weeds where top growth is controlled:

- Canada thistle
- Perennial sow-thistle

Rate:

Buctril M: 0.4 L per acre. (One 8 L jug treats 20 acres).

Mextrol 450, Badge II & Logic M: 0.5 L per acre. (One 10 L jug treats 20 acres).

Application Information:

- **Water Volume:**
 - **Corn:** 80 to 120 L per acre.
 - **Flax, Solin:** 20 to 40 L per acre.
 - **Cereals:** 20 to 40 L per acre.
 - **Seedling forage grasses:** 60 L per acre.
 - **Established timothy:** 60 L per acre.
 - **Perennial Cereal Rye:** Not less than 20 L per acre.
 - **Aerial:** 8 to 16 L per acre.
- **Nozzles and Pressure:** Use 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with **ASABE coarse** droplets

Refer to specific labels for recommended water volumes.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
bromoxynil	POST (foliar)	PSII inhibitor/Membrane disrupter	Little (Apoplast)	Broadleaf only	6
MCPA	POST (foliar)	Synthetic Auxin	Symplast	Broadleaf only	4

Effects of Growing Conditions:

Best weed control when humidity is high at the time of spraying and for the following day or two. Prolonged cool conditions may result in reduced weed control. Spraying during early morning may increase the risk of flax injury.

Avoid spraying in temperatures greater than 25°C.

DO NOT apply to flax, canaryseed or corn if daytime temperatures exceed 27°C within 48 hours before or after application.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicide Tank Mix Table:

Crop & Tank Mixes	<i>Badge</i>	<i>Buctril M</i>	<i>Logic M</i>	<i>Mextrol 450</i>	<i>Buck M</i>
Flax (including Solin):					
<i>Poast Ultra + Merge</i> adjuvant	✓	✓	✓	✓	✓
Clethodim + adjuvant	✓*	✓**	✓	✓*	✓
Spring wheat (including durum) and Barley:					
<i>Liquid Achieve</i>	✓	✓	✓	✓	✓
<i>Ally</i>	✓	✓	✓	✓	✓
MCPA (amine, ester & K)	✓	✓	✓	✓	✓
<i>Refine SG</i> (4 g per acre) #		✓	✓		✓
<i>Cordon</i>				✓	
<i>Puma Advance</i>		✓			
<i>Puma Advance + Refine SG</i> (rates above)		✓			

Crop & Tank Mixes	Badge	Buctril M	Logic M	Mextrol 450	Buck M
Spring wheat (including durum):					
<i>Everest 2.0</i>		✓			
<i>Varro</i>		✓			
Spring wheat only (NOT including durum):					
<i>Axial</i>	✓	✓			
Spring wheat only (NOT including durum) and Barley:					
<i>Axial</i>		✓			
Winter Wheat:					
<i>Refine SG (4 g per acre)#</i>			✓		✓
Oats:					
MCPA (amine, ester & K)	✓	✓	✓	✓	✓
Corn:					
<i>AAtrex</i>	✓	✓	✓	✓	✓

* *Select* only

** *Select* and *Centurion* only.

*** *Buctril M* only

Requires the addition of a surfactant as per *Refine SG*.

Fertilizers: None registered.

Insecticides: None registered.

Fungicides: None registered.

Note: The above mixes are those listed on the bromoxynil/MCPA ester labels only.

Bromoxynil/MCPA manufacturers may also support mixes with pesticides that are not on the bromoxynil/MCPA labels. Check with each manufacturer for the products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Rainfall within 1 hour of application may reduce weed control.
- **Re-entry Interval:** DO NOT enter treated fields for at least 24 hours, or 15 days for corn to be harvested by hand.
- **Grazing Restrictions:** DO NOT graze treated grain or established timothy crops or cut for feed within 30 days of application. DO NOT graze meadow foxtail in the year of treatment. DO NOT graze other treated forage grasses within 56 days of treatment.
- **Pre-harvest Interval:** DO NOT harvest perennial cereal rye within 30 days of application, or flax or solin within 60 days of application.
- **Re-cropping Interval:** No re-cropping restrictions the year after treatment.
- **Aerial Application:** May be applied by air to wheat, barley, and oats only. Use higher water volume (see 'Application Information') when the majority of weeds are cow cockle, smartweed, hemp-nettle, pigweed, and Canada thistle.
- **Storage:** May be frozen. Shake the container well when thawed to reconstitute components before use.

• **Buffer Zones:**

Application method	Crop	Buffer Zones (metres [†]) Required for the Protection of:		
		Aquatic Habitats of Depths		Terrestrial habitat
		Less than 1 m	Greater than 1 m	
Ground only*	All	1	1	4
Fixed wing aircraft	Oats	15	2	60
	Barley & wheat	20	5	60
	Rye	1	0	60
Helicopter	Oats	15	1	50
	Barley & wheat	20	3	50
	Rye	1	0	50

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Refer to pages 12 and 13.

Hazard Rating:

Badge II, Buctril M, Logic M:

 Warning

Mextrol 450:

 Danger – Poison

 Warning – Skin Irritant. Potential Skin sensitizer

 Caution – Eye irritant

For an explanation of the symbols used here see pages 7 and 8.

Bromoxynil + MCPA+Fluroxypyr

Herbicide Group
4 - fluroxypyr & MCPA
6 - bromoxynil
(Refer to page 45)

Company:

Nufarm Agriculture (*Enforcer M*)

ADAMA Canada (*ForceFighter M*)

Formulation:

Enforcer M (PCP#30691): 80 g/L fluroxypyr, 200 g/L bromoxynil and 200 g/L MCPA ester co-formulated as an emulsifiable concentrate.

- Container size – 2 x 10 L, 120 L or 480 L

-or-

ForceFighter M package contains two components:

Badge II (PCP#30370): 225 g/L bromoxynil and 225 g/L MCPA ester formulated as an emulsifiable concentrate.

- Container size – 2 x 10 L, 2 x 120 L

Fluroxypyr 180 EC (PCP#30815): 180 g/L fluroxypyr formulated as an emulsifiable concentrate.

- Container size – 9.6 L, 115.2 L

Crops and Staging:

Wheat (durum, spring) and barley: 2 leaf stage until the flag leaf is fully emerged.

Winter wheat*: in spring once tillered until the flag leaf is fully emerged.

Canaryseed*: from the 3 to 5 leaf stage.

* *Enforcer M* only.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

Apply to emerged weeds up to the 6 leaf stage unless otherwise indicated.

Enforcer M only applied at the 0.25 L per acre rate will control the following weeds (see "Rates:" below):

- Kochia (up to 5 cm tall)
- Wild buckwheat*
- Wild mustard
- Lamb's-quarters

Enforcer M (high rate) or *ForceFighter M* will control the following weeds (see "Rates:" below):

Weeds listed prior plus:

- American nightshade[†]
- Bluebur[†]
- Buckwheat (tame, Tartary, wild)
- Canada thistle (top growth control only)
- Chickweed
- Cleavers (up to 6 whorls)
- Cocklebur[†]
- Common groundsel
- Common ragweed
- Cow cockle[†]
- Flixweed[†]
- Hemp-nettle
- Mustard (ball[†], wild, wormseed)
- Night-flowering catchfly[†]
- Perennial sow-thistle (top growth control only)
- Redroot pigweed*
- Russian thistle (< 5 cm tall)[†]
- Scentless chamomile[†]
- Shepherd's-purse[†]
- Smartweed[†] (green, lady's-thumb, pale)
- Stinkweed
- Stork's-bill*
- Velvetleaf[†]
- Volunteer canola/rapeseed[†]
- Volunteer flax
- Volunteer sunflower[†]

* **Suppression only.**

[†] **Up to 4 leaf stage only.**

Rates

Enforcer M: 0.25 to 0.51 L per acre

-or-

ForceFighter M:

- *Badge II:* 0.5 L per acre
- *Fluroxypyr 180 EC:* 0.24 L per acre

Application Information:

- **Water Volume:**
 - *Enforcer M:* minimum 20 to 40 L per acre; Use the higher volume when there is a heavy crop canopy or weeds are at an advanced stage.
 - *ForceFighter M:* minimum 40 L per acre.
- **Nozzles and Pressure:** Use 40 psi (275 kPa) if applying without drift reduction nozzles. Drift reduction nozzles may require higher pressures for proper performance. Select the nozzle and pressure combination that produces of *ASABE coarse* droplets while maintaining good coverage of foliage.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
MCPA, fluroxypyr	POST (foliar)	Synthetic auxin	Moves throughout the plant (Symplast)	Broadleaf only	4
bromoxynil	POST (foliar)	PSII Inhibitor/ Membrane disrupter	Little (Apoplast)	Broadleaf only	6

Effects of Growing Conditions:

Optimum activity is experienced between 12 to 24°C when weeds are actively growing. Weeds may not be actively growing and as a result reduced activity will occur when temperatures are below 8°C or above 27°C. Frost 3 days before or after an application may reduce crop tolerance and weed control efficacy.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

- **In wheat (*durum*, *spring*, *winter*) and barley:**
 - Tralkoxydim (*Liquid Achieve* and *Nufarm Tralkoxydim* only)
- **In wheat (*spring and durum* only) and barley:**
 - Fenoxaprop (*Cordon* or *Puma Advance* only)
- **In spring wheat (including *durum*) only:**
 - Clodinafop 240 EC (*Signal* only)
 - Flucarbazone (*Everest 2.0* only)
 - *Simplicity*
 - *Varro*

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Enforcer M* label only. Bromoxynil+MCPA+Fluroxypyr manufacturers may also support mixes with pesticides that are not on the *Enforcer M* or *ForceFighter M* labels. Check with each manufacturer for the products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.

- **Herbicides:** *Axial*, *Traxos*

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.
- **Re-Entry Interval:** DO NOT enter treated fields for 24 hours.
- **Grazing Restrictions:** DO NOT graze or cut for livestock feed within 30 days of application. Withdraw meat animals from treated feed 3 days before slaughter.
- **Pre-harvest Interval:** DO NOT harvest within 60 days of application.
- **Re-cropping Interval:** Barley, canola, flax, forage grasses, lentil, mustard, oat, pea, rye and wheat can be seeded the following year or fields can be fallowed.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a ventilated room above freezing. If frozen, allow container to warm and shake well before using.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	1

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

- Spray when winds are under 16 km/hr, but not dead calm.

Sprayer Cleaning:

The manufacturer provides no recommendations on how to clean equipment used to apply this product. As a petroleum based emulsifiable concentrate, 'Method B' in the general section on sprayer cleaning on pages 12 and 13 may be the most effective.

Hazard Rating:
 Warning – Poison

 Caution – Skin and Eye Irritant. Potential skin sensitizer.

For an explanation of the symbols used here see pages 7 and 8.

Casoron

Herbicide Group
20 - dichlobenil
(Refer to page 45)

Company:

Arysta LifeScience Canada (PCP#12533)

Formulation:

4% dichlobenil formulated as a granular.

- Container size - 22.7 kg

Crops:**Poplar plantations****Shelterbelts consisting of the following species:**

- | | | |
|------------------------------|---------------------------|---------------|
| ◦ Ash | ◦ Euonymus (Burning bush) | ◦ Maple |
| ◦ Barberry | ◦ Forsythia | ◦ Mock orange |
| ◦ Birch (cutleaf-weeping) | ◦ Honeysuckle | ◦ Poplar |
| ◦ Boxwood Caragana | ◦ Juniper | ◦ Rose |
| ◦ Cedar (White, Eastern Red) | ◦ Lilac | ◦ Spirea |
| ◦ Crabapple | ◦ Linden | ◦ Willow |
| ◦ Elm | ◦ Locust | |

NOTE: DO NOT apply to shelterbelts with mugo pine, firs, hemlock, holly, spruce or other shallow rooted species or injury may result. DO NOT apply in or around greenhouses. DO NOT use on light sandy soils.

Weeds and Staging:

Apply in early spring or late fall prior to annual weed emergence, or after cultivation has removed existing weeds.

- | | | |
|---|-------------------|--------------------|
| ◦ Annual blugrass | ◦ Horsetail | ◦ Purslane |
| ◦ Artemisia (absinthe,* wormwood, sage) | ◦ Knotweed | ◦ Quack grass* |
| ◦ Bindweed* | ◦ Kochia | ◦ Sheep sorrel* |
| ◦ Canada thistle* | ◦ Lamb's-quarters | ◦ Shepherd's-purse |
| ◦ Chickweed | ◦ Loosestrife | ◦ Smartweed |
| ◦ Dandelion* | ◦ Mustard | ◦ Sow-thistle |
| ◦ Foxtail (green and yellow) | ◦ Nutsedge* | ◦ Spurge |
| ◦ Groundsel | ◦ Pigweed | ◦ Vetch* |
| | ◦ Plantain | ◦ Wild buckwheat* |

* Controlled with fall applications at the higher rates.

Rates:

45 to 70 kg per acre.

At the low rate, a 15 kg bag will treat a 4 yd by 407 yd (4 m by 340 m) strip of shelterbelt. At the high rate, a 15 kg bag will treat a 4 yd by 256 yd (4 m by 214 m) strip of shelterbelt. If application is followed by 0.5 to 1.0 inches (1.3 to 2.5 cm) of irrigation, the lower rates are recommended.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
dichobencil	PRE (soil active)	Cellulose synthesis inhibitor	Upward (Apoplast)	Broadleaf & grass	20

Effects of Growing Conditions:

DO NOT apply during periods of high soil temperatures (more than 15°C).

Tank Mixes:

None registered.

Restrictions:

- **Rainfall:** Does not reduce activity.
- **Re-entry Interval:** DO NOT enter treated areas for at least 24 hours.
- **Grazing Restrictions:** DO NOT graze in treated area.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a cool, dry place. DO NOT freeze.
- **Buffer Zones:** Site characteristics and conditions that may lead to runoff include, but are not limited to, heavy rainfall, moderate to steep slope, bare soil, poorly draining soil (e.g., soils that are compacted, fine textured or low in organic matter). Avoid application of this product when heavy rain is forecast.

Equipment Cleaning:

Refer to pages 12 and 13.

Hazard Rating:

No specific rating. Keep out of reach of children. Harmful if swallowed.

Avoid skin or eye contact.

Cirpreme/Cirpreme XC

This product is a co-pack of Paradigm (page 317) and Lontrel 360 or Lontrel XC (page 151). Information is restricted to Crop, Weeds, Rates and Tank Mixes. For other detailed information on the component products see the product pages listed above.

Herbicide Group
2 - florasulam
4 - halauxifen & clopyralid
(Refer to page 45)

Company:

Corteva Agriscience

Formulation:

The *Cirpreme* package contains two components:

Paradigm (PCP#31304): 20% halauxifen and 20% florasulam formulated as a water dispersible granule

- Container size – 1 X 800 gm

Lontrel 360 (PCP#23545): 360 g/L clopyralid formulated as a solution.

- Container size – 1 X 6.7 L

The *Cirpreme XC* package contains:

Paradigm (PCP#31304): 20% halauxifen and 20% florasulam formulated as a water dispersible granule

- Container size – 1 X 800 gm

Lontrel XC (PCP#23545): 600 g/L clopyralid formulated as a solution.

- Container size – 1 X 4.1 L

Crops and Staging:

Spring wheat (including durum), Winter wheat and barley:

3 leaf to just prior to emergence of the flag leaf

Weeds and Staging:

Apply to emerged, young and actively growing weeds that are less than 8 leaf stage unless otherwise stated.

The use of MCPA 600 Ester is recommended at 189 to 280 mL per acre.

Weeds Controlled - *Cirpreme* + MCPA 600 Ester at 280 mL per acre:

Weeds listed as controlled or suppressed by *Paradigm* in-crop (page 318) plus:

- American dragonhead (up to bud stage or 15 cm)
- Burdock
- Cocklebur
- Cow cockle
- Dandelion (seedlings, overwintered rosettes & mature plants)
- Field horsetail (top growth)
- Hemp-nettle
- Henbit (up to 8 leaf or 15 cm)
- Mustard, ball*
- Night-flowering catchfly (up to bolting, 15 cm in height)
- Plantain (top growth)
- Prickly lettuce
- Radish, wild
- Redroot pigweed
- Scentless chamomile (suppression only up to the bud stage)
- Sow-thistle, perennial (up to the bolting stage & 20 cm in height)
- Sunflower (annual wild, volunteer)
- Thistle, Canada (up to the bud stage)
- Vetch

* Best results are obtained when applied to actively growing weeds in the 1 to 4 leaf (seedling) stage

Rate:

Paradigm: 10 g per acre.

-plus-

Lontrel 360: 84 mL per acre.

-or-

Lontrel XC: 52 mL per acre.

(One package treats 80 acres)

It is recommended that *Cirpreme/Cirpreme XC* be mixed with MCPA ester 600 at 280 mL per acre (not supplied).

Add *Agral 90*, *Agsurf II*, or *Citowett Plus* at 0.2 L per 100 L of spray solution; *Intake Adjuvant* at 0.5 to 1.0 L per 100 L of spray solution or *Merge* at 0.5 L per 100 L of solution.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

- **All Registered Crops:**
 - MCPA 600 Ester at 189 to 280 mL per acre.
 - *Axial*
- **Wheat (Spring, durum, winter) only:**
 - *Simplicity OD*
 - *Simplicity GoDRI*
- **Wheat (spring and durum only):**
 - Flucarbazone 2.0

Fungicides: None registered.

Insecticides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Cirpreme/Cirpreme XC* labels only.

Corteva Agriscience also support the following mixes with pesticides that are not on the *Cirpreme/Cirpreme XC* labels.

- **Herbicides:** *Axial Xtreme* (barley and spring wheat, not durum)

Adding ingredients in the correct order is critical for optimum performance. Add water dispersible granule *Paradigm* first, followed by the grass tank-mix then add the *Lontrel* component, add MCPA ester and recommended surfactant as required.

General guidelines can be found on page 11.

See component products for more information on restrictions application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

CleanStart

Herbicide Group
9 - glyphosate
14 - carfentrazone
(Refer to page 45)

Company:

Nufarm Agriculture

Formulation:

One case of *CleanStart* contains 2 components:

Credit (PCP#25866): 356 g/L glyphosate formulated as a solution.

- Container size - 2 x 10, 450 L

Aim EC (PCP#28573): 240 g/L carfentrazone formulated as an emulsifiable concentrate.

- Container size - 1 x 600 mL, 4 x 3.38 L

Crops and Staging:

Prior to the seeding of most crops* including the following:

- Barley
- Beans, dry
- Buckwheat
- Canola
- Chickpea
- Corn
- Faba bean
- Flax
- Lentil
- Millet (pearl and proso)
- Mustard
- Oats
- Peas, field
- Potato*
- Rye
- Safflower
- Sorghum
- Soybean
- Sunflower
- Triticale
- Wheat

* Note – before using any pesticide on potatoes, consult the list of “Agricultural Pesticides Approved for Use”, available from Simplot Canada and McCain Foods (Canada).

Harvest Aid Treatment:

Note: As of January 1, 2019 www.keepingitclean.ca indicates that grain from crops treated with this product prior to harvest may have market access concerns. Please see page 10 for more information AND consult potential grain buyers before using this product.

CleanStart may be applied to the following crops when seed is at less than 30% moisture to speed the rate of dry-down of the following crops and green weedy material. See glyphosate preharvest uses for additional staging information.

Crop*	Rate		
	Credit (glyphosate) (g ae per acre) [†]	Aim (mL per acre)	Acres per case
Barley, chickpea, dry bean, field pea, oats, wheat	360 ^{†**}	30	20

* DO NOT apply to crops if grown for seed purpose.

[†] See the glyphosate page for equivalent product rates.

Weeds, Rates and Staging (Pre-seeding):

Credit at 0.5 to 1.0 L per acre plus *Aim EC* at 15 to 30 mL per acre (40 to 20 acres per case or 900 to 450 acre bulk):

Weeds controlled by glyphosate at the above rates plus rapid burnoff of:

- Chickweed
- Dandelion (spring seedlings only)
- Shepherd's-purse
- Kochia (including glyphosate resistant biotypes^{**})
- Tansy mustard
- Volunteer canola (including all herbicide tolerant varieties)*

Apply to actively growing weeds up to 10 cm in height.

* 1 to 3 leaf stage for glyphosate tolerant volunteer canola

** Use highest registered rate to control glyphosate resistant kochia.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:** Minimum 40 L per acre. Higher water volumes will give better performance from the carfentrazone active. Use higher volumes when weed populations are dense.
- **Nozzles & Pressure:** Sprayers without drift reduction nozzles should use maximum pressure of 30 psi (210 kPa). Low drift nozzles may require higher pressures for proper performance. Apply using nozzle and pressure combination that deliver an even spray pattern with good coverage with *ASABE medium* droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
glyphosate	POST (foliar weeds)	EPSP Amino Acid Synthesis Inhibitor	Toward growth areas (Symplast)	Non-selective broadleaf & grass except HT crops	9
carfentrazone	POST (foliar weeds)	PPO Inhibitor/ Membrane disruptor	Little movement due to rapid cell leakage (Symplast)	Broadleaf	14

Effects of Growing Conditions:

Most effective control is achieved when grasses are actively growing. Weeds stressed by drought, flooding, hot or prolonged cool temperatures (<15°C) and poor fertility are more difficult to control. Symptoms of carfentrazone activity on weeds may be accelerated by warm moist conditions. Weeds hardened off by drought may be more difficult to control.

Tank Mixes:

Herbicides:

- *Aim EC* (17 mL per acre)

Fungicides: None registered.

Insecticides: None registered

Fertilizers: None registered.

DO NOT use with additives that are used to modify spray pH.

Restrictions:

- **Rainfall:** Rainfall within 6 to 8 hours after application may reduce activity. Avoid application when heavy rainfall is forecast.
- **Re-entry Interval:** DO NOT re-enter treated fields for at least 12 hours.
- **Pre-harvest Interval:** Leave a minimum of 3 days between harvest aid treatment and harvest.
- **Grazing Restrictions:** DO NOT graze the treated crop or cut for feed.
- **Re-cropping Interval:** *CleanStart* may be applied as a preseed burnoff prior to the seeding of most crops. Check the product label for a complete list. There are no rotational restrictions 12 months after application.
- **Aerial Application:** DO NOT apply by air
- **Storage:** Store in a cool dry location.
- **Buffer Zones:** Leave a buffer of 3 metres from the downwind edge of the boom to sensitive upland habitats. Apply near wetlands only when wind is blowing away from wetlands. Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:

 Caution – Skin and Eye Irritant

For an explanation of the symbols used here see pages 7 and 8.

Clethodim

Herbicide Group

1 - clethodim

(Refer to page 45)

Company:

Arysta LifeScience Canada (*Select* - PCP#22625; *Amigo* - PCP#22644)

ADAMA Canada (*Arrow* - PCP#28224; *X-ACT Adjuvant* - PCP#28225; *Arrow-All-In* - PCP#33225; built in adjuvant)

AgraCity (*Mpower Independence* - PCP#32851; *Mpower Tonto* - PCP#32615)

Agri-Star (*Clethodim 250* - PCP#32334; *Surf-Act* - PCP#32313)

BASF Canada (*Centurion* - PCP#27598; *Amigo* - PCP#22644)

Federated Cooperatives Ltd. (*Patron 240 EC* - PCP#32495; *Patron Adjuvant* - PCP#32496)

Loveland Products Canada (*Shadow RTM* - PCP#29277; *Amigo* - PCP#22644)

Nufarm Agriculture (*Statue* - PCP#32885; *Nufarm Carrier* - PCP#30639)

Winfield United (*Antler* - PCP#32880; *X-ACT Adjuvant* - PCP#28225)

Formulation:

Clethodim 250: 252 g/L clethodim formulated as an emulsifiable concentrate.

- Container size - 3 L clethodim + 9 L adjuvant

Arrow-All-In: 120 g/L clethodim formulated as an emulsifiable concentrate.

- Container size - 2 x 6 L

Other products: 240 g/L clethodim formulated as an emulsifiable concentrate.

- Container size - 3 L clethodim + 9 L adjuvant

Crops, Rates and Staging:

Crops are tolerant at all growth stages at maximum rates, but "Pre-harvest Intervals" must be observed to prevent excess residue in the grain (see "Restrictions:" section below).

To a maximum rate of 150 mL per acre for *Arrow-All-In* and 75 mL per acre for other formulations:

- Chickpea*
- Dry bean[#] (black, great northern, navy, pink, pinto, red)
- Prairie Carnation**†

To a maximum rate of 310 mL per acre for *Arrow-All-In* and 150 mL per acre for other formulations:

- Alfalfa (seedling only)
- Canola
- Caraway^{Δ†}
- Carinata^{ΔΔ}
- Coriander^{**†}
- Dill (seed production)^{***ΔΔ†}
- Faba bean^{ΔΔ†}
- Fenugreek^{***†}
- Field pea
- Flax (including Solin)
- Hops^{ΔΔ†}
- Lentil
- Mustard, condiment (brown, oriental, yellow)
- Mustard, oilseed types (*B. juncea*)^Δ
- Potato
- Safflower (6 to 8 leaf)^{Δ†}
- Soybean
- Sunflower

* Apply up to the 9 node stage (7 inches or 18 cm maximum height)

** Apply in the 2 to 5 leaf stage, one application per year.

*** Apply in the 3 to 5 leaf stage, one application per year.

[#] *Select*, *Centurion*, *Statue* and *Mpower Independence* are registered for all *Phaseolus vulgaris* varieties. Since not all varieties of dry beans have been tested for tolerance to clethodim, first use of clethodim should be limited to a small area of each variety to confirm tolerance. *Antler*, *Arrow-All-In*, *Clethodim 250*, *Patron* and *Shadow RTM* are registered for use on black, great northern, navy, pink, pinto, and red dry bean types only.

^Δ *Select*, *Centurion*, *Shadow RTM*, *Statue* and *Mpower Independence* only.

^{ΔΔ} *Select*, *Centurion* and *Shadow RTM* only.

[†] NOTE: Since these uses are registered under the User Requested Minor Use Label Expansion (URMULE) program, the manufacturer assumes no responsibility for herbicide performance. Those who apply these uses do so at their own risk.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

DO NOT apply more than a combined total rate of 37.5 g clethodim active ingredient (310 mL/acre *Arrow-All-In* or 150 mL per acre of other clethodim products), or other products containing clethodim, to the same field per season.

Adjuvants: Clethodim products must be applied with 0.5 L of *Amigo* adjuvant (*Centurion*, *Shadow RTM* or *Select*), *Mpower Tonto* (*Mpower Independence*), *Nufarm Carrier* adjuvant (*Statue*), *X-ACT* (*Antler*, *Arrow*), *Surf-Act* (*Clethodim 250*) or *Patron* adjuvant (*Patron 240 EC*) per 100 L of spray solution (unless otherwise indicated on the label). For spray water sources high in bicarbonate ions (CO₃) see 'Effects of Growing Conditions' section following.

Arrow-All-In does not require the addition of an adjuvant since it is built into the formulation.

Weed	Rate (mL/ Acre)	Arrow-All-In (mL/acre)	Stage
Barnyard grass, foxtail (green, yellow)*†, proso millet, volunteer cereals (barley*†, canary seed, corn, oat*†, wheat*†), wild oat†	50**	100**	Apply at 2 to 6 leaf stage. † Apply at the 2 to 4 leaf stage when treated with the lowest rate.
Moderate to heavy infestations of the above grasses, plus Persian darnel	75	150	For best results in either case, apply at the 2 to 3 leaf stage
Quackgrass (suppression only)	75	150	2 to 6 leaf stage when 3 to 6 inches (6 to 15 cm) tall. For best results, apply at the 3 to 5 leaf stage
Quackgrass (season long control)	150***	310	

* Apply to light infestations of these weeds only for the lowest rate. The manufacturers do not provide guidelines for weed densities under light infestations. When in doubt as to the level of weed infestation, use the higher rate or contact the manufacturer.

** At this rate, clethodim should NOT be tank mixed with any other pesticide and should only be applied under the following growing conditions: good crop stand, within the recommended leaf staging (2 to 3 leaf is optimum timing) prior to tillering, light weed infestations, adequate moisture and fertility, absence of stress, and good growing conditions.

*** Apply with 1 L of adjuvant per 100 L of spray solution.

Refer to the product labels for complete mixing instructions. A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:**
 - **Ground:** 20 to 40 L per acre. Use 40 L per acre under dense weed infestations or dense crop canopies.
 - **Aerial:** Minimum of 11.3 L per acre.
- **Nozzles and Pressure:** Use 40 psi (275 kPa) when using conventional 80° flat fan nozzles tilted forward at a 45° angle. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressure designed to deliver proper coverage with *ASABE medium* droplets or larger.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
clethodim	POST (foliar)	ACCCase Lipid synthesis inhibitor	Toward regions of growth (Symplast)	Grasses only	1

Effects of Growing Conditions:

Clethodim will be less effective when plants are stressed by lack of moisture, excessive moisture, low temperature and/or very low relative humidity. Re-growth of tillers may occur if application is made under any of the above stress conditions.

Clethodim activity is reduced by levels of bicarbonate ions in spray water equal to or greater than 500 ppm. The addition of ammonium sulphate at 1.6 L per acre (490 g/L liquid) or 0.8 kg per acre (99% dry), or the addition of 28-0-0 liquid fertilizer at 0.5 L per acre to the tank prior to the addition of clethodim has been shown to restore control.

Tank Mixes:

Clethodim may be tank mixed with other pesticides at the all but the lowest rates. Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Add the recommended amount of adjuvant with all tank mixes unless otherwise indicated.

Herbicides:

- **In flax (not including solin):**
 - Bromoxynil/MCPA ester (label rates)^Δ
 - *Curtail M*[†]
 - MCPA ester (rates for flax)
 - *Lontrel* at 0.23 to 0.34 L per acre[†]
- **In Solin (low linolenic flax):**
 - Bromoxynil/MCPA ester (label rates)^Δ
 - *Curtail M*[†]
 - *Lontrel* at 0.23 to 0.34 L per acre[†]
- **In canola:**
 - *Lontrel*[†]
 - *Muster*[†] (redroot pigweed is controlled at the 8 g per acre rate of *Muster* in this tank mix).
- **In Clearfield canola only:**
 - *Pursuit* at 42 to 85 mL per acre[†]
- **In field peas:**
 - *Pursuit*[†]
- **In Glyphosate tolerant soybean:**
 - Glyphosate (360 to 720 g ae per acre)^{†*}

[†] Apply with the 150 mL per acre rate of *Arrow-All-In* or the 75 mL per acre rate of other clethodim formulations only.

^Δ Manufacturers may only support specific mixes. Contact the manufacturer for more information.

* *Antler*, *Arrow*, *Arrow-All-In* and *Patron 240 EC* only.

Allow 4 days between application of clethodim and any other chemical not recommended as a tank mix combination on the label.

Fertilizer: None registered.

Insecticide: None registered.

Fungicides: None registered.

Note: The above mixes are those listed on the clethodim labels only.

Clethodim manufacturers also support mixes with pesticides that are not on the clethodim labels.

Herbicides: *Liberty 150* (100 to 150 mL per acre of *Arrow-All-In* or 50 to 75 mL per acre for other clethodim formulations) When mixing add adjuvant to the water first, then *Liberty*, then clethodim. Consult labels for detailed mixing instructions.

Check with each manufacturer for other products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 1 hour may reduce control.
- **Re-entry Interval:** DO NOT enter treated fields for 12 hours.
- **Grazing Restrictions:** DO NOT graze or cut treated crops for forage until 60 days after application of clethodim to annual crops, and 30 days after application to seedling alfalfa.
- **Pre-harvest Interval:**

Pre-harvest Interval (days)	Crops
30	Alfalfa, fenugreek
40	Dill seed
60	Canola, chickpeas (Desi and Kabuli) coriander, dry beans, faba bean, flax (including Solin), lentils, or mustard (brown, yellow, oriental), potatoes
70	Safflower
72	Sunflower
75	field peas, soybeans

- **Aerial Application:** Only *Centurion*, *Shadow RTM* and *Select* may be applied by air in canola, chickpea, dry bean, faba bean, flax, field pea, lentil, mustard, potato, soybean, sunflower only.
- **Storage:** May be stored at any temperature. Shake well before use.

- **Buffer Zones:**

- **Antler, Arrow, Patron:** Leave a 15 meter buffer between the edge of sensitive habitats and the closest spray pass.
- **Select, Centurion, Arrow-All-In (ground only), MPower Independence, Statue:**

Application method	Crop	Buffer Zones (metres [†]) Required for the Protection of:		
		Aquatic Habitats of Depths		Terrestrial habitat
		Less than 1 m	Greater than 1 m	
Ground only*	All	1	1	1
Fixed wing aircraft	Desi and Kabuli chickpeas, dry common beans, faba bean	1	1	20
	Other registered crops	5	5	40
Helicopter	Desi and Kabuli chickpeas, dry common beans, faba bean	1	1	20

- **Shadow RTM:**

Application Method	Crops	Buffer Zones (metres [†]) Required for the Protection of:
		Terrestrial habitat
Ground	All Crops	15
Aerial	Desi and Kabuli chickpeas, dry common beans	15
	Other Registered Crops	20

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method B' in the general Sprayer Cleaning section on pages 12 and 13.

Hazard Rating:

Select, Shadow, MPower Independence, Statue and Centurion:



Warning – Skin and Eye Irritant

Antler, Arrow, Arrow-All-In and Patron:



Caution – Skin and Eye Irritant

For an explanation of the symbols used here see pages 7 and 8.

Clodinafop

Herbicide Group

1 - clodinafop*(Refer to page 45)*

Company:

Syngenta Canada (*Horizon NG* - PCP#29089; built in adjuvant)

ADAMA Canada (*Ladder 240 EC* - PCP#29495; *ADAMA Adjuvant 80* - PCP#30419; *Ladder All In* - PCP#32497; built in adjuvant)

AgriStar (*Slam'R Herbicide* - PCP#31053; *Slam'R COC Adjuvant* - PCP#30138)

AgraCity (*Mpower Aurora* - PCP#29711; *Chem Spray COC Adjuvant* - PCP#29712)

Great Northern Growers (*Foax* - PCP#31261; *CropOil 83/17 Adjuvant* - PCP#30978)

Loveland Products Canada (*Foothills NG* - PCP#30341; built in adjuvant)

Nufarm Agriculture (*Signal* - PCP#29172; *Nufarm Enhance* - PCP#29952)

Winfield United (*Cadillac* - PCP#30428; *ADAMA Adjuvant 80* - PCP#30419; *Cadillac One* - PCP#32539; built in adjuvant)

Formulation:

Horizon NG*, Foothills NG*: 60 g/L clodinafop-propargyl formulated as an emulsifiable concentrate.

- Container size** - 2 x 7.57 L, 121.1 L

Cadillac One*, Ladder All In*: 80 g/L clodinafop-propargyl formulated as an emulsifiable concentrate.

- Container size** - 2 x 5.66 L, 90.6 L

Cadillac, Foax, Ladder 240 EC, Mpower Aurora, Signal, Slam'R Herbicide: 240 g/L clodinafop-propargyl formulated as an emulsifiable concentrate.

- Container size** - 3.68 L, 11 L, 14.72 L, 18.4 L, 2 x 11.04 L, 58.9 L, 115 L
 - **CropOil 83/17, and Slam'R COC**: 2 x 6.4 L
 - **Nufarm Enhance**: 4 L, 16 L, 64 L
 - **ADAMA Adjuvant 80**: 4 L, 12 L

*These products have a built in adjuvant system and do not require the addition of an adjuvant.

** Package size availability varies by company. Not all sizes may be available from each company.

Crops and Staging:

Spring wheat (including durum) - prior to the emergence of the 4th tiller.

When tank mixing, check broadleaf product description for additional restrictions.

Weeds, Rates and Staging:

NG Formulations: 376 mL per acre, no additional adjuvant required (packages listed above treats 40, 322 or 1129 acres).

-or-

Cadillac One, Ladder All In: 283 mL per acre, no additional adjuvant required (packages listed above treats 40, 320 acres).

-or-

240 EC Formulations: 93 mL per acre plus recommended adjuvant at 0.8 L per 100 L spray solution. For *Signal* only add *Nufarm Enhance* adjuvant, for *Ladder 240EC* only add *ADAMA Adjuvant 80* at 0.25 L per 100L spray solution.

For control of:

Weed	Stage
Barnyard grass	1 to 5 leaf prior to tillering
Foxtail (green, yellow)	1 to 5 leaf stage, prior to emergence of 3rd tiller
Volunteer canaryseed, wild oats	1 to 6 leaf, maximum 3 tillers
Volunteer oats	3 to 6 leaf, maximum 3 tillers

NG Formulations: 474 mL per acre, no additional adjuvant required (package sizes above treats 32, 258 or 903 acres);

-or-

Cadillac One, Ladder All In: 356 mL per acre, no additional adjuvant required (packages listed above treats 32, 254 acres).

-or-

240 EC Formulations: 115 mL per acre plus recommended adjuvant at 1.0 L per 100 L spray solution of the recommended adjuvant. For *Signal* only add *Nufarm Enhance* adjuvant, or for *Ladder 240 EC* only add *ADAMA Adjuvant 80* at 0.32 L per 100L spray solution.

For control of:

Weed	Stage
Persian darnel	1 to 5 leaf prior to tillering

Apply at the 2 to 3 leaf stage for optimum control.

Optimum weed control and yield response occurs when weeds are controlled before tillering.

Refer to the product label for complete mixing instructions.

A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:**
 - **Ground:** 20 L to 40 L per acre.
 - **Aerial:** 12 L per acre.
- **Nozzles and Pressure:** 40 to 45 psi (275 to 310 kPa) when using conventional 80° or 110° flat fan stainless steel nozzles tilted forward at an angle of 45°. Low drift nozzles may require higher pressures for proper performance. Consult with herbicide manufacturer regarding the suitability of low drift nozzles for use with this product.

Tank Mixes:

Mixes provide control of wild oat, green foxtail, and weeds/insects controlled by the tank mix partner unless otherwise noted.

Herbicides:

	<i>Aurora</i>	<i>Cadillac</i>	<i>Cadillac One</i>	<i>Foax</i>	<i>Ladder</i>	<i>Ladder All In</i>	NG Formulations	Nufarm Clodinafop	<i>Signal</i>	<i>Slam'R</i>
2,4-D amine (160 to 212 g ae per acre) ^{††}	•	•	•	•	•	•	•	•	•	•
Bromoxynil [#]	•	•	•	•	•	•	•	•	•	•
Bromoxynil/MCPA ^{*** #}	•	•	•	•	•	•	•	•	•	•
Bromoxynil/2,4-D (label rates)	•	•	•	•	•	•	•	•	•	•
<i>Curtail M</i> (0.6 to 0.81 L per acre)	•	•	•	•	•	•	•	•	•	•
Dichlorprop/2,4-D (0.71 L per acre) ^{**}	• ^Δ	• ^Δ	• ^Δ	• ^Δ	• ^Δ	• ^Δ	• ^Δ	• ^Δ	• ^Δ	• ^Δ
<i>DyVel</i> (0.4 to 0.50 L per acre)	•	•	•	•	•	•	•	•	•	•
<i>Lontrel 360</i> (0.17 to 0.34 L per acre)		•	•		•	•	•		•	
<i>Lontrel 360</i> (0.11 to 0.17 L per acre) + MCPA ester (0.45 L per acre) ^{††}	•	•	•	•	•	•	•	•	•	•
MCPA 600 amine or 600 ester ^{††} (0.34 to 0.45 L per acre)	•	•	•	•	•	•	•	•	•	•
MCPA Sodium Salt (0.48 to 1.09 L per acre) [*]		•	•		•	•	•		•	
Mecoprop-p (2.2 to 2.8 L per acre)		•	•		•	•	•		•	
Metsulfuron (3 g per acre) ^{††† #}	•	•	•	•	•	•	•	•	•	•
<i>Pulsar</i> (80 acres / case)			•			•	•			

	Aurora	Cadillac	Cadillac One	Foax	Ladder	Ladder All In	NG Formulations	Nufarm Clodinafop	Signal	Slam'R
<i>Pulsar</i> + MCPA Ester (rates above)			•			•	•			
<i>Refine SG</i> (12 g per acre) ^{†††}			•			•	•		•	
<i>Target</i> (0.4 to 0.6 L per acre) ^{**}		•	•		•	•	•		•	
<i>Trophy</i> (20 acres per case)		•	•		•	•	•		•	

Refer to the broadleaf herbicide label for crop staging, and other information. When tank mixing *Clodinafop 240 EC*, always add the broadleaf herbicide first, followed by clodinafop, with the adjuvant added last. Reductions in green foxtail and wild oat control may be observed when tank mixed with 2,4-D amine and MCPA amine.

Insecticides:

- *Lambda-cyhalothrin*[#] (25 to 33 mL per acre)[Ⓒ]

Fungicides:

- *Propiconazole*[#] (0.1 L[#] to 0.2 L per acre)[Ⓒ]
- Clodinafop may also be mixed with *Lambda-cyhalothrin*[#] plus *propiconazole*[#] at the rates above[Ⓒ].

Fertilizers: None registered.

[#] Check product label for specific tank mix partners and appropriate rates

^Δ NOT for use with *Estaprop XT* or *Dichlorprop DX*.

* Rate above 0.81 L per acre may cause crop injury.

** Barnyard grass also controlled.

*** Barnyard grass and Persian darnel also controlled. May be applied by air.

†† See 2,4-D page for equivalent formulation rates.

††† Additional adjuvants are not required.

[Ⓒ] All products except *Aurora*.

Note: The above mixes are those listed on the clodinafop labels only.

Clodinafop manufacturers may also support mixes with pesticides that are not on the clodinafop labels. Check with each manufacturer for the products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
clodinafop	POST (foliar)	ACCCase Lipid synthesis inhibitor	Toward growth areas (Symplast)	Grasses only	1

Effects of Growing Conditions:

For optimum results, apply to actively growing weeds. DO NOT apply to crops or weeds that are stressed by hot or cool conditions, frost, drought, low fertility, water-saturated soil, disease or insect damage as crop injury and poor weed control may result.

Restrictions:

- **Rainfall:** Within 30 minutes may reduce control.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Grazing Restrictions:** DO NOT graze or harvest treated crops for forage within 3 days of application.
- **Pre-harvest Interval:** Leave at least 60 days from application to harvest.
- **Re-cropping Interval:** No restrictions in the year following treatment.
- **Storage:** May be frozen.

- **Aerial Application:** May be applied by air.
- **Buffer Zones:**

Application method	Buffer Zones (metres †) Required for the Protection of:	
	Aquatic Habitats	Terrestrial habitat
Ground *	15	0
Aerial	72	76

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method B' in the general tank cleaning section on pages 12 and 13. If mixed with other pesticides, the cleaning method above should be combined with the method recommended for the tank mix partner if different from above.

Hazard Rating:

240 EC formulations:



Caution – Poison



Warning – Eye and Skin Irritant

NG Formulations:



Caution – Skin Irritant

Cadillac One, Ladder All In:



Danger – Corrosive to Eyes

All products except *Ladder*:



Warning – contains the allergen soy.

For an explanation of the symbols used here see pages 7 and 8.

Clopyralid

Herbicide Group
4 - clopyralid
(Refer to page 45)

Company:

Corteva Agriscience (*Lontrel, Lontrel XC*)

Sharda CropChem Canada (*Pyralid*)

AgraCity (*MPower Clobber*)

Formulation:

Lontrel XC (PCP#32795): 600 g/L clopyralid formulated as a solution.

- Container size – 4 x 2.67 L

Lontrel (PCP#23545), MPower Clobber (PCP#33114): 360 g/L clopyralid formulated as a solution.

- Container size:
 - *Lontrel 360* – 4.45 L
 - *MPower Clobber* – 2 x 8.9 L

Pyralid (PCP#32265): 300 g/L clopyralid formulated as a solution.

- Container size – 4 x 4.45 L

Crops Rates and Staging:

Clopyralid Rate (g ai per acre)	Formulation (mL per acre)					
	360 g/L forms		Lontrel XC		Pyralid	
	mL per acre	mL per 1000 sq m	mL per acre	mL per 1000 sq m	mL per acre	mL per 1000 sq m
31	85	-	52	-	102	-
41	112	28	68	17	136	34
61	170	42	102	25	204	50
82	240	56	137	34	272	67
121	340	83	202	50	403	100

Note: The use of this chemical may result in contamination of groundwater particularly in areas where soils are permeable (for example, sandy soil) and/or the depth to the water table is shallow. Use should be avoided in these areas.

Barley, spring wheat (NOT including durum), oat: Apply at 41 to 61 g ai per acre from the 3 leaf to flag leaf emergence stage.

Flax and Solin (low linolenic acid flax): Apply at 82 to 121 g ai per acre from the 2 to 4 inches (5 to 10 cm) in height.

Canola: Apply at 61 to 121 g ai per acre from the 2 to 6 leaf stage. Argentine (*B. napus*) and Polish (*B. rapa*) varieties only; application to any other canola type oilseeds may cause crop injury.

Seedling forage grasses*: Apply at 61 to 121 g ai per acre from the 2 to 4 leaf stage.

Established grasses*: Apply at 61 to 121 g ai per acre at the shot blade stage, or in the fall after harvest or in early spring.

Seedling and established grasses* for forage and seed production include:

- Bromegrass (smooth)
- Orchardgrass
- Fescue (creeping red, meadow, tall)
- Reed canarygrass
- Kentucky bluegrass
- Timothy
- Meadow foxtail
- Wheatgrass (crested, intermediate, slender, streambank, tall**)
- Wildrye (Altai, Russian)

Clopyralid at 121 g ai per acre:

Fallow: Stage according to weeds.

Shelterbelts*: containing villosa lilac, acute willow, Colorado spruce, white spruce, buffaloberry and chokecherry*.

Plantation poplar (including hybrid poplar)*

* NOTE: Since these uses are registered under the User Requested Minor Use Label Expansion program, the manufacturer assumes no responsibility for herbicide performance. Users of this product for these uses do so at their own risk.

** for forage use only

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

Apply to weeds when young and actively growing.

Weeds Controlled	Rate*(g ai per acre)
Alsike clover Canada thistle (top growth only) [†]	Vetch (<i>Vicia</i> spp.) 61
Canada thistle** [†] Common groundsel Common ragweed Knapweed (spotted and diffuse) ^Δ Ox-eye daisy (suppression) Perennial sow-thistle (top growth only)	Scentless chamomile Sheep sorrel (suppression) Volunteer alfalfa - 2 to 20 inches (5 to 50 cm) tall Wild buckwheat 82
Canada thistle** [†] Ox-eye daisy	Sheep sorrel 121

^Δ Lontrel Only

[†] Canada thistle - after all thistles have emerged and when the majority are in the rosette to pre-bud stage;

* Provides season long control of Canada thistle. Not all root stalks will be killed and some regrowth may occur by the end of the growing season.

** Provides season long control of Canada thistle with suppression into the following year.

Application Information:

- **Water Volume:** 40 to 89 L per acre.
- **Nozzles and Pressure:** Maximum 30 to 40 psi (200 to 275 kPa) with conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressures designed to deliver thorough, even coverage with *ASABE coarse* droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
clopyralid	POST (foliar)	Synthetic Auxin	Moves throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

Poor control may occur under dry conditions. Injury to flax may occur when tank mixing with MCPA. To reduce the risk of crop injury, DO NOT apply tank mixes if temperature exceeds 27°C.

Tank Mixes:

Herbicides:

Clopyralid applications following applications of products containing bromoxynil (*Approve, Badge, Bromotril, Buctril M, Enforcer, Koril, Logic M, Mextrol, Pardner, Thumper*) should be delayed by 14 days to allow the Canada thistle to recover from leaf burn.

Recommended rates of clopyralid may be used for each crop unless otherwise indicated. Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides	Crop (rate g ai per acre – if different from label rates range above)				
	Canola	Flax	Barley	Spring Wheat (Not durum)	Oats
<i>Poast Ultra</i>	(61 to 121)	(61 to 121)	-	-	-
<i>Select</i>	(61 to 121)	(82 to 121)	-	-	-
Glyphosate (glyphosate tolerant canola only)	(41)	-	-	-	-
<i>Odyssey</i> (CLEARFIELD canola only)	(61 to 82)	-	-	-	-
2,4-D ester or amine (170 to 227 g ae per acre)	-	-	(41 to 61)	(41 to 61)	-
MCPA ester or amine (0.28 to 0.38 mL per acre - 600 g/L)	-	(61)	(41 to 61)	(41 to 61)	(41 to 61)
<i>Poast Ultra</i> plus MCPA (rates above)	-	(61 to 121)	-	-	-
<i>Select</i> plus MCPA (rates above)	-	(31 to 41)	-	-	-
Tralkoxydim (<i>Achieve</i> only) + MCPA ester (rates above)	-	-	(31 to 41)	(31 to 41)	-
Imazamethabenz (<i>Assert</i> only) + MCPA ester (rates above)	-	-	(31 to 41)	(31 to 41)	-
Florasulam + MCPA ester	-	-	(31)	(31)	(31)
<i>Assert</i> + Florasulam + MCPA ester	-	-	-	-	-
Fluroxypyr + MCPA ester	-	-	(31 to 41)	(31 to 41)	-
Tralkoxydim + Fluroxypyr + MCPA ester	-	-	(31 to 41)	(31 to 41)	-
<i>Assert</i> + Fluroxypyr + MCPA ester	-	-	(31 to 41)	(31 to 41)	-

Fungicides: None registered.

Insecticides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the clopyralid labels only.

Corteva Agriscience also supports the following mixes that are not on the *Lontrel* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Assure II, Muster, Muster + any of Assure II, Clethodim, Poast Ultra, Pursuit, or Solo.*

Adding ingredients in the correct order is critical for optimum performance.

Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.
- **Re-entry Interval:** DO NOT enter treated fields for 12 hours.
- **Grazing Restrictions:** Crops or areas treated with this product may be grazed immediately following treatment.
- **Re-cropping Interval:** Clopyralid residues in the soil may affect succeeding crops. The year after application, replant to wheat, barley, oats, rye, flax, forage grasses, mustard or canola. DO NOT use manure from animals fed or bedded with clopyralid-treated straw, except on fields that are to be sown to clopyralid-tolerant crops.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in heated storage. If product is frozen, bring to room temperature and agitate before use.
- **Buffer Zones:** Avoid contamination of or drift toward non-target land, water or irrigation ditches.

Sprayer Cleaning:

No detailed cleaning procedures are indicated on the label. Use a commercial all purpose spray sprayer cleaning product for adequate cleaning. Contact the manufacturer for more information.

Hazard Rating:



Caution – Poison



Danger – Eye Irritant

For an explanation of the symbols used here see pages 7 and 8.

Clopyralid/MCPA

Herbicide Group
4 - clopyralid & MCPA
(Refer to page 45)

Company:

Nufarm Agriculture (*Curtail M*)

AgraCity (*MPower Clobber M*)

Formulation:

Curtail M (PCP#30914): 50 g/L clopyralid and 280 g/L MCPA ester formulated as an emulsifiable concentrate.

- Container size - 8 L, 112 L, 960 L

The *MPower Clobber M* package contains two components:

- **MPower Clobber (PCP#33114):** 360 g/L clopyralid as a solution.
 - Container size - 2.23 L
- **MPower MCPA Ester 600 (PCP#32912):** 600 g/L MCPA ester formulated as an emulsifiable concentrate.
 - Container size - 7.5 L

Crops and Staging:

Apply at the 3 leaf to just before the flag leaf stage of the following crops:

- Barley
- Flax and Solin (low linolenic acid flax)
- Timothy (established for seed, and hay or forage production)*
- Canaryseed*
- at 2 to 6 inches (5 to 15 cm) height.
- Wheat (spring & durum)
- Oat

* **NOTE:** Since these uses are registered under the User Requested Minor Use Label Expansion (URMULE) program, the manufacturer assumes no responsibility for herbicide performance. Those who apply these uses do so at their own risk.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

The following weeds are controlled at the 1 to 4 leaf stage unless specified:

At 0.61 L per acre of *Curtail M* (8 L jug treats 13 acres):

- Burdock
- Canada thistle (low infestations)***
- Cocklebur
- Field horsetail†
- Flixweed**
- Lamb's-quarters
- Plantain†
- Prickly lettuce
- Ragweed
- Shepherd's-purse**
- Stinkweed**
- Sunflower (annual, volunteer)
- Wild mustard
- Wild radish
- Vetch

At 0.81 L per acre of *Curtail M* (8 L jug treats 10 acres) or *Mpower Clobber M* (1 case treats 20 acres) the above weeds and:

- Buckwheat (Tartary, wild)
- Canada thistle (medium to high infestations)***
- Common groundsel
- Dandelion*
- Kochia (suppression only)**
- Pigweed (redroot, Russian)
- Scentless chamomile**
- Smartweed
- Sow-thistle (annual, perennial†)
- Volunteer canola

* **Spring rosettes only.**

** **2 to 4 leaf stage, (spring seedlings only for winter annual weeds).**

*** **Season long control, some regrowth may occur in the fall. Apply from the 4 inch (10 cm) to prebud stage.**

† **Top growth control only.**

Application Information:

- **Water Volume:**
 - *Cereals and Flax*: 40 to 60 L per acre
 - *Canary seed and timothy*: 40 to 80 L per acre
- **Nozzles & Pressure:** Use 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Select the nozzle and pressure combination that produces of *ASABE coarse* droplets while maintaining good coverage of foliage. Flat fan tips tilted forward at a 45° angle are recommended in flax.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
MCPA, clopyralid	POST (foliar)	Synthetic Auxin	Moves throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

When weeds are stressed because of drought, flooding, hot or cool (less than 15°C) temperatures, weeds are not actively growing and control may be reduced. DO NOT apply to weeds stressed longer than 20 days from lack of moisture as poor control can result.

Tank Mixes:

Curtail M at 0.81 L per acre should be used in all tank mixes unless otherwise indicated. See labels for adjuvant rates.

In spring wheat (including durum) and barley:

- *Achieve Liquid* (0.20 L per acre) plus *Turbocharge* adjuvant
- *Assert* (0.52 to 0.64 L per acre) plus water pH adjuster

Check product labels for additional crop staging restrictions.

Fertilizers: None registered.

Insecticides: None registered.

Fungicides: None registered.

Note: The above mixes are those listed on the *Curtail M* label only.

Nufarm Canada supports the following mixes not found on the *Curtail M* label. Apply mixes according to the most restrictive use limitations for either product:

- **Wheat including Durum and Barley:** Assert 300SC, Achieve Liquid, Nufarm Tralkoxydim
- **Wheat (NOT Durum) and Barley:** Axial
- **Wheat (NOT Durum):** Varro, Everest 2.0, Signal, Fenoxaprop, Traxos, Simplicity
- **Flax:** Poast Ultra, clethodim (Select/Centurion only)

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 6 hours will reduce control.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Grazing Restrictions:** DO NOT graze treated fields or cut for hay within 7 days of application.
- **Pre-harvest Interval:** Leave 60 days between application and harvest.
- **Re-cropping Interval:** Wheat, barley, oats, rye, corn, flax, canola, forage grasses and mustard may be planted the year after application. DO NOT under-seed crops to forage legumes the year after treatment.
 - DO NOT seed to field peas for at least 10 months following treatment. Very dry soil conditions following application can result in a risk of injury to field peas grown in rotation. If severe drought conditions are experienced during the months of June to August inclusive in the year of application delay seeding field peas an additional 12 months (22 months following application). Contact your local Nufarm Agriculture Inc. representative or retailer for more information before seeding field peas following drought conditions in the previous year.
 - DO NOT sow any other crops until the second year after application. Apply manure bedded with straw from treated crops only to the crops listed above.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a cool (above 5°C), dry area. If product is frozen, bring to room temperature and agitate before use.
- **Buffer Zones:**

Application method	Buffer Zones (metres †) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	4

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Spray when winds are under 16 km/hr, but not dead calm.

Sprayer Cleaning:

No detailed cleaning procedures are indicated on the label. Use a commercial all purpose spray sprayer cleaning product for adequate cleaning. Contact the manufacturer for more information.

Hazard Rating:



Caution – Poison



Caution – Eye Irritant

For an explanation of the symbols used here see pages 7 and 8.

Clopyralid/MCPA + fluroxypyr

Herbicide Group
4 - fluroxypyr,
clopyralid & MCPA
(Refer to page 45)

Company:

Corteva Agriscience (*Prestige Brands*)

ADAMA (*Esteem*)

AgraCity (*MPower Foxy CM*)

Formulation:

The *Prestige XC* package has 2 components:

Prestige XC A (PCP#29462): 333 g ae/L fluroxypyr formulated as an emulsifiable concentrate.

- Container size - 3.3 L or in bulk package 4 x (2 x 9.9 L)

Prestige XC B (PCP#29465): 50 g/L clopyralid and 280 g/L MCPA ester formulated as an emulsifiable concentrates.

- Container size - 2 x 8.0 L or bulk package 4 x 96 liter

-or-

The *Esteem* or *MPower Foxy CM* package has 3 components:

ADAMA Fluroxypyr (PCP#30815); ***MPower Foxy (PCP#32952)***: 180 g/L fluroxypyr formulated as an emulsifiable concentrate.

- Container size:
 - *Esteem* – 9.6 L
 - *MPower Foxy CM* – 6.4 L

ADAMA Clopyralid 360 (PCP#32898); ***MPower Clobber (PCP#33114)***: 360 g/L clopyralid formulated as a solution.

- Container size:
 - *Esteem* – 3.34 L
 - *MPower Foxy CM* – 2.23 L

ADAMA MCPA 2 EH Ester 600 (PCP#31669); ***MPower MCPA 600 Ester (PCP#32912)***: 360 g/L MCPA ester formulated as an emulsifiable concentrate.

- Container size:
 - *Esteem* – 11 L
 - *MPower Foxy CM* – 7.5 L

-or-

Prestige XL (PCP#31428): 61.56 g/L fluroxypyr and 42.72 g/L clopyralid and 239 g/L MCPA ester formulated as an emulsifiable concentrate.

- Container size - 2 x 9.5 L per case, 113.6 L drum

Crops and Staging:

Cereals:

- ***Spring wheat (including durum), barley, oat[†] and canaryseed^{**†}***: 3-leaf to just before the emergence of flag leaf stage
- ***Winter wheat***: Apply in the spring from the 3 tiller stage to just before the emergence of flag leaf

Forage Grasses^{**†} grown for seed production:

- ***Seedling and established stands***: 4 leaf until the emergence of the flag leaf.
 - Bromegrass (meadow, smooth, hybrid)
 - Fescue (creeping red, tall)
 - Timothy
 - Wheatgrass (crested, intermediate)

*** NOTE: Since these uses are registered under the User Requested Minor Use Label Expansion (URMULE) program, the manufacturer assumes no responsibility for herbicide performance. Users of this product on forage grasses and canary seed do so at their own risk.**

† Prestige Brands only.

Weeds, Rates and Staging:

Unless otherwise stated, the following weeds will be controlled if sprayed in the 2 to 4 leaf stage.

Only ***Prestige XC A*** at 0.13 L per acre plus ***Prestige XC B*** at 0.6 L per acre or ***Prestige XL*** at 0.71 L per acre controls:

- | | | |
|---------------------------------------|------------------------------|--------------------------------|
| ◦ Burdock | ◦ Plantain ^{***} | ◦ Volunteer flax (1 to 12 cm) |
| ◦ Canada thistle (light infestations) | ◦ Prickly lettuce | ◦ Volunteer sunflower |
| ◦ Cleavers [†] | ◦ Ragweeds | ◦ Wild annual sunflower |
| ◦ Field horsetail ^{***} | ◦ Shepherd's-purse | ◦ Wild buckwheat ^{††} |
| ◦ Flixweed (spring seedlings only) | ◦ Stinkweed | ◦ Wild mustard |
| ◦ Kochia | ◦ Stork's-bill (1 to 8 leaf) | ◦ Wild radish |
| ◦ Lamb's-quarters | ◦ Vetch | |

Prestige XCA at 0.17 L per acre plus Prestige XCB at 0.8 L per acre or Esteem (ADAMA Fluroxypyr 180 at 323 mL per acre plus ADAMA Clopyralid 360 at 112 mL per acre) or MPower Foxy CM (MPower Foxy at 323 mL per acre plus MPower Clobber at 112 mL per acre) plus MPower MCPA 600 Ester at 378 mL per acre; or Prestige XL at 0.85 L per acre controls:

The weeds controlled by Prestige Brands above plus:

- Annual sow-thistle
- Canada thistle* (moderate to heavy infestations)
- Chickweed (up to 6 cm)^Δ
- Cleavers^{††}
- Common groundsel
- Dandelion^{**}
- Flixweed^{**}
- Hemp-nettle (2 to 6 leaf stage)^Δ
- Kochia
- Lamb's-quarters
- Perennial sow-thistle*
- Redroot pigweed
- Round-leaved mallow (1 to 6 leaf)
- Russian pigweed
- Scentless chamomile
- Shepherd's-purse
- Smartweed
- Stinkweed
- Stork's-bill (1 to 8 leaf)
- Tartary buckwheat
- Volunteer canola
- Volunteer flax (1 to 12 cm)
- Wild annual sunflower
- Wild buckwheat^{††}
- Wild mustard

* Spray when 4 to 6 inches (10 to 15 cm) high. Season long control, with some regrowth in the fall.

** Spring rosettes only.

*** Top growth control only.

† 1 to 4 whorls with *Esteem* and *MPower Foxy CM*; 1 to 8 whorls with *Prestige Brands*.

†† 1 to 4 leaf with *MPower Foxy CM*, 1 to 8 leaf with *Esteem* and *Prestige Brands*.

Δ Suppression only with *MPower Foxy CM*, control with *Esteem*, *Prestige Brands*.

Application Information:

- **Water Volume:**
 - **Ground:** 20 to 40 L per acre.
 - **Aerial:** 12 to 20 L per acre. Consult label for buffer zones.
- **Nozzles and Pressure:** Maximum 30 to 40 psi (200 to 275 kPa) with conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressure designed to deliver proper coverage with *ASABE S572.1 coarse* droplets. Tilt nozzles forward at a 45° angle to improve coverage of vertical targets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
fluroxypyr	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4
clopyralid	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4
MCPA	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

The activity of clopyralid/MPCPA + fluroxypyr is influenced by weather conditions. The temperature range for optimum activity is 12°C to 24°C. Reduced activity will occur when temperatures are below 8°C or above 27°C. Frost 3 days before or after application may reduce weed control and crop tolerance. Weed control may be reduced during stress conditions (drought or heat stress) or if heavy infestations exist.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

- **In spring wheat (including durum) and barley:**
 - *Liquid Achieve*
 - *Assert* (0.53 to 0.65 L per acre) plus acidifier

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the clopyralid/MPCPA + fluroxypyr labels only.

Corteva Agriscience also supports the following mixes that are not on the *Prestige XC* label. Apply mixes according to the most restrictive use limitations for either product. Contact the company for more information on use:

- **Herbicides:** *Axial*, Fenoxaprop 120 EC, Clodinafop 240 EC, *Everest 2.0*, *Simplicity OD*, *Simplicity GoDRI*.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 6 hours of post-emergent application may result in reduced weed control.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Grazing Restrictions:** DO NOT cut or graze treated fields of wheat, barley or canaryseed for 7 days after application. DO NOT cut treated forage grass fields for hay or forage. DO NOT graze treated forage grass fields.
- **Pre-harvest Interval:** DO NOT harvest crop within 60 days of application.
- **Re-cropping Interval:** Wheat, oat, barley, rye (not under-seeded to forage legumes, clover or alfalfa), flax, canola, field pea* and mustard may be seeded the season following application.
 - * **NOTE: DO NOT seed to field pea for at least 10 months following treatment. Very dry soil conditions following application can result in a risk of injury to field pea grown in rotation. If severe drought conditions are experienced during the months of June to August inclusive in the year of application delay seeding field pea an additional 12 months (22 months following application).**
 - Contact the manufacturer for more information before seeding field peas following drought conditions in the previous year.
 - DO NOT seed legume forages or crops other than those listed above until the second season following application.
- **Aerial Application:** Only *Prestige Brands* may be applied by air.
- **Storage:** Store product in original containers in a secure, dry, heated area. If the product is frozen, bring to room temperature and agitate before use.
- **Buffer Zones:**
 - *Esteem*, *MPower Foxy CM* – Leave a 15 meter buffer between aquatic or sensitive non-target terrestrial habitats and the closest spray pass.
 - *Prestige Brands*:

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	0	1
Fixed Wing aircraft**	4	0	60 (XC)/65 (XL)
Helicopter**	1	0	50 (XC)/55 (XL)

See page 36 for an explanation of the different habitats.

* Buffer zones for ground applications can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

** Only *Prestige Brands* may be applied by air.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method C' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:

 Danger – Poison.

 Warning – Eye and Skin Irritant

Potential Skin Sensitizer

For an explanation of the symbols used here see pages 7 and 8.

Command 360 ME

Herbicide Group

13 - clomazone

(Refer to page 45)

Company:

FMC Corporation (PCP#27827)

Formulation:

360 g/L clomazone formulated as a microcapsule suspension.

- Container size – 2 x 5.4 L

Crops and Staging:

Apply to soil prior to seeding to herbicide-tolerant canola (all varieties).

Weeds, Rates and Staging:

Apply *Command 360 ME* pre-emergent to weeds at 101 mL per acre for suppression (one jug treats 54 acres) or at 135 mL per acre for control (one jug treats 40 acres) of:

- Cleavers

Maximum ONE APPLICATION per year of *Command 360 ME* or other products containing the active ingredient clomazone.DO NOT APPLY *Command 360 ME* to:

- sandy soils
- soils with greater than 10% organic matter
- fields receiving applications of solid manure, unless it has been thoroughly incorporated to a depth of 10 to 15 cm

Application Information:

- **Water Volume:** minimum 40 L per acre.
- **Nozzles & Pressure:** Use 30 psi (207 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Select the nozzle and pressure combination that produces of **ASABE coarse** droplets while maintaining good coverage of foliage.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
clomazone	PRE (soil active)	DOXP Pigment synthesis inhibitor	Upward (Apoplast)	Broadleaf (& grass at higher rates)	13

Effects of Growing Conditions:

Rainfall (5 to 10 mm), or equivalent irrigation, is required within 7 to 10 days for activation. Dry conditions that persist after application may reduce weed control. Heavy rainfall after application may dilute the active layer and result in reduced weed control.

DO NOT apply when temperature exceed 25°C due to increased risk of vapour drift. Temporary whitening/yellowing of the crop may occur when emerging from treated soil. Under some conditions, temporary whitening or yellowing of leaves may occur on approved rotational crops where undesirable soil residues of *Command 360 ME* exist. Refer to the label for more details.

Tank Mixes:

None registered.

FMC Corporation supports the following tank mixes that are not on the *Command* label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:** *Aim EC*, Glyphosate (180 to 360 g ae per acre)

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Moderate rainfall after application is required for activation. Heavy rainfall shortly after application may reduce activity.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Grazing Restrictions:** DO NOT graze the treated crop or cut for hay.
- **Re-cropping Interval:** Winter wheat may be sown 4 months after application. Canola, corn (field, sweet), dry bean (kidney, navy), field pea, potatoes, soybean, lentils, barley, oats and wheat (spring or durum) may be planted the year after application. All other crops may be planted 16 months after application. Under some conditions, temporary whitening or yellowing of leaves may occur on approved rotational crops where undesirable soil residues of *Command 360 ME* exist.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store above 5°C to keep from freezing. If frozen, thaw before use. If solid crystals are observed, warm to above 15°C and shake or roll container periodically to dissolve solids. DO NOT store near heat or open flame.
- **Buffer Zones:** DO NOT apply *Command 360 ME* within 90 metres of sensitive plants and sensitive terrestrial habitats or within 370 metres of fruit, nursery and greenhouse production. A buffer zone of 370 metres should also be observed for applications adjacent to residential areas and established vegetation. DO NOT apply *Command 360 ME* directly to surface water or to areas where runoff is likely to occur.

See page 36 for an explanation of the different habitats.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

- Spray when winds are under 16 km/hr, but not dead calm.

Sprayer Cleaning:

Refer to 'Method A or B' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:



Caution – Poison

Potential skin sensitizer

For an explanation of the symbols used here see pages 7 and 8.

Conquer

Herbicide Group
6 - bromoxynil
14 - pyraflufen-ethyl
(Refer to page 45)

Company:

Nufarm Agriculture (PCP#32528)

Formulation:

15 g/L pyraflufen-ethyl and 467 g/L bromoxynil formulated as an emulsifiable concentrate.

- Container size - 2 x 9.71 L, 77.7 L

Crops and Staging:

Canola, wheat (spring, durum, winter), barley, fall rye, oats, triticale, corn, canary seed: Apply prior to seeding or post-seeding but prior to crop emergence.

Fallow: Apply to small, actively growing weeds

Weeds, Rates and Staging:

Apply *Conquer* at 122 mL per acre to control:

- | | | |
|----------------------|---|--|
| ◦ Annual Sowthistle* | ◦ Kochia – including resistant biotypes | ◦ Stinkweed* |
| ◦ Cleavers | ◦ Lamb's-quarters | ◦ Volunteer Canola (cotyledon to 4 leaf) |
| ◦ Cow Cockle* | ◦ Narrow-leaved hawk's beard* | ◦ Wild buckwheat* |
| ◦ Dandelion* | ◦ Night-flowering catchfly (Seedling) | ◦ Wild mustard* |
| ◦ Flixweed* | ◦ Redroot pigweed | |

* **Suppression only, control when mixed with the appropriate rate of glyphosate. Refer to the glyphosate label for rate recommendation.**

Apply *Conquer* at 122 mL per acre plus glyphosate** to control all weeds controlled by *Conquer* alone and glyphosate alone plus:

- Pineappleweed*
- Stinkweed
- Wild mustard*
- Shepherd's-purse
- Wild buckwheat

* Suppression only, control when mixed with the appropriate rate of glyphosate. Refer to the glyphosate label for rate recommendation.

** present as isopropylamine or potassium salt

Apply *Conquer* at up to 242 mL per acre to control volunteer canola beyond the 3 leaf stage.

Application Information:

- **Water Volume:** 20 to 40 L per acre.
- **Nozzles & Pressure:** Flat fan nozzles with a spray pressure of 30 to 40 psi (210 to 275 kPa) is recommended. DO NOT apply with spray droplets smaller than the *ASABE medium* classification.
- **Screens:** Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
bromoxynil	POST (foliar)	PSII Inhibitor/ Membrane disruptor	Little (Apoplast)	Broadleaf only	6
pyraflufen-ethyl	POST (foliar) with slight soil activity	PPO Inhibitor/ Membrane disruptor	Little movement due to rapid cell leakage (Symplast)	Non-selective Broadleaf	14

Effects of Growing Conditions:

Warm, moist growing conditions promote active weed growth and enhance the activity of *Conquer* by allowing maximum foliar uptake and contact activity. Weeds hardened off by cold weather or drought stress may not be adequately controlled or suppressed and regrowth may occur. Weed control may be reduced if the plants are beyond the recommended application growth stage, and during stress conditions, e.g. drought, heat or cold stress, or in heavy infestations where overlapping leaves prevent spray contact. For best results, ensure thorough spray coverage of target weeds.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides

- **Pre-Emergent and Pre Plant Incorporated:** Glyphosate (Follow label rates)

Fertilizers: None registered.

Insecticides: None registered.

Fungicides: None registered.

Restrictions:

- **Rainfall:** Within 1 hour of application may reduce control.
- **Re-entry Interval:** DO NOT re-enter treated fields for 24 hours.
- **Grazing Restrictions:** DO NOT use treated areas for grazing or green feed until 30 days after application.
- **Re-cropping Interval:** Registered crops can be seeded immediately after application. Any crops not listed can be seeded 30 days after an application of *Conquer*.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a cool, dry, secure place. DO NOT freeze.

- **Buffer Zones:**

Application method/rate	Buffer Zones (metres †) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground* - 112 mL/acre	1	1	1
Ground* - 242 mL/acre	1	1	2

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy

† Distance measured as metres from the downwind edge of the spray boom to sensitive areas.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12-13. Let solution stand for an extended period for better results. Flush sprayer system with water. See the label for product specific cleaning details.

Hazard Rating:



Danger – Poison



Warning – contains the allergen soy. Potential skin sensitizer.

For an explanation of the symbols used here see pages 7 and 8.

Dicamba

Herbicide Group

4 - dicamba

(Refer to page 45)

Company:

BASF Canada (*Engenia*, *Banvel II**, *Banvel VM*)

Gharda Chemicals (*Oracle* distributed by UAP)

Bayer (*Xtendimax*)

Corteva Agriscience (*FeXapan*)

Formulation:

*Banvel II** (PCP#23957), *Banvel VM* (PCP#29249): 480 g ae/L dicamba formulated as a solution of a diglycolamine salt.

Engenia (PCP#32220): 600 g ae/L dicamba formulated as a solution of N,N-Bis-(3-aminopropyl)methylamine salt.

Oracle (PCP#26722): 480 g ae/L dicamba formulated as a solution of a dimethylamine salt.

Xtendimax (PCP#31896), *FeXapan* (PCP#32188): 350 g ae/L dicamba formulated as a solution of a diglycolamine salt.

*NOTE: This product is no longer manufactured but product still remains in the distribution system. This product may be removed from future editions.

Crops, Rates and Staging:

Note: The use of these chemicals may result in contamination of groundwater, particularly in areas where soils are permeable (e.g. sand, loamy sand and sandy loam soils) and/or the depth to the water table is shallow (less than 2 m). Avoid use in these situations.

Banvel II and Oracle are registered for the all of the uses below. *Banvel VM* is only registered for pasture and rangeland uses below.

Crop	Stage	Rate (mL per acre)			
		g acid equivalent per acre	480 g/L dicamba formulations	<i>Engenia</i>	350 g/L forms
Spring wheat*	2 to 5 leaf	45 to 56	93 to 117	75 to 95	127.5 to 161
Barley*	2 to 5 leaf	45 to 56	93 to 117	75 to 95	127.5 to 161
Oats*	2 to 5 leaf	45 to 56	93 to 117	75 to 95	127.5 to 161
Canaryseed*	3 to 5 leaf	56	117	95	161
Winter wheat*	In spring 6 to 10 inches (15 to 25 cm) - prior to flag leaf	45 to 56	93 to 117	75 to 95	127.5 to 161
Spring rye*	2 to 3 leaf	45 to 56	93 to 117	75 to 95	127.5 to 161
Corn, field	Broadcast up to 8 inches (20 cm). When higher, use drop-nozzles.	117 to 242	243 to 505	200 to 400	333 to 692
Corn, field + 2,4-D	Apply no later than 2 weeks prior to tassel emergence and prior to 20 inches (50 cm).	56	117	95	161
Red fescue (for seed production)	Seedling: 2 inches (5 cm) tall. Established: up to the flag leaf stage.	117	243	200	333
Pastures	Established and actively growing	408 to 710	850 to 1,480 (0.85 to 1.48 L)	530 to 1182	1174 to 2550
<i>Seedling grasses (for seed and forage production):</i> Fescue (creeping red, meadow, tall), Meadow foxtail, Orchardgrass, Smooth brome grass, Timothy, Wheatgrass (crested, intermediate, pubescent, slender, streambank, tall)	2 to 4 leaf	45 to 56	93 to 117	75 to 95	127.5 to 161
Fall stubble	Apply according to weed stage.	480	1000 (1.0 L)	800	1376
Fall stubble + glyphosate	Apply according to weed stage.	240	500	400	692
Pre-seeding cereals	Apply according to weed stage.	61	127	100	175
Chemfallow + 2,4-D	Apply according to weed stage.	45 to 56	93 to 117	75 to 95	127.5 to 161
Chemfallow + glyphosate	Apply according to weed stage.	56 to 117	117 to 243	95 to 200	161 to 333

* Should be mixed with a tank mix partner for broad spectrum control

In Dicamba Tolerant Soybeans:

Apply to Roundup Ready 2 Xtend soybeans from prior to the emergence of the crop (Pre-plant or Pre-emergence) and/or after the emergence of the crop (Post-emergent) to the crop once or twice up to the early flower stage (R1) of the crop.

Crop	Rate (mL per acre)	
	<i>Engenia</i>	350 g/L forms
Dicamba tolerant Soybeans	200 to 400	333 to 692

Weeds, Rates and Staging:

Apply to annual broadleaf weeds at the 2 to 3 leaf stage and to winter annual rosettes up to 2 in. (5 cm) across.

Dicamba applied alone at 45 to 56 g ae per acre will control:

- Cleavers (high rate only)
- Cow cockle
- Corn spurry
- Canada thistle*
- Perennial sow-thistle*
- Smartweed (green, lady's-thumb)
- Tartary buckwheat
- Wild buckwheat

Dicamba at 117 to 242 g ae per acre will control:

- Canada thistle**
- Canada fleabane
- Field bindweed**
- Lamb's-quarters
- Mustard (hare's-ear, Indian, tumble, wild, wormseed)
- Perennial sow-thistle**
- Pigweed (redroot, Russian)
- Ragweed (common, false, giant)

Dicamba at 408 g ae per acre in rangeland or 480 g ae per acre in fallow will control:

Weeds listed above plus:

- Curled dock*
- English daisy
- Goldenrod
- Tansy ragwort

Dicamba at 892 g ae per acre will control:

Weeds listed above plus:

- Diffuse knapweed
- Goat's-beard
- Ground cherry
- Pasture sage
- Povertyweed
- Sheep sorrel
- Thyme-leaved spurge

* Top growth only.

** Three consecutive years of treatment are required for complete control.

The following chart indicates weed and brush controlled by dicamba + 2,4-D mixes at the listed rates.

Weeds	Rate (g ae per acre) [†]	
	Dicamba	2,4-D
Poison ivy	322	426
Wild carrot	408	426
Aspen poplar	634	852
Prickly rose, western snowberry ^{†††}	710	852
	Rate (L/1000 L of water) ^{††}	
Alder, aspen poplar, cherry, western snowberry, wolf willow, wild rose	408	745

[†] Applied by broadcast sprayer.

^{††} Apply to the foliage and stems to the point of run-off using high volume equipment.

^{†††} Ester formulations of 2,4-D only.

Canada thistle, Perennial sow-thistle in fallow: Apply prior to the bud stage. Must be applied to thistle plants with 6 to 10 inches (15 to 25 cm) of new growth.

Canada thistle control in fall after harvest: When thistles exhibit new growth and at least 2 weeks prior to a killing frost.

Refer to label for full lists of weeds controlled by dicamba plus tank mixes in cereals, pastures, fallow and other situations.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Brush control in pastures: When brush is actively growing and is 6 feet (2 m) in height or less (in spring or early summer). Growth greater than 2 metres may be cut and allowed to regrow prior to treatment.

Application Information:

- **Water Volume:**
 - **Preseeding burnoff:** 20 to 45 L per acre.
 - **Annual crops:** at least 45 L per acre.
 - **Pastures, fallow and stubble:** 45 to 90 L per acre.
 - **Corn:** 90 to 140 L per acre.
 - **Brush:** high volumes to the point of run-off.

- **Nozzles and Pressure:**

- **Broadcast application:**

- *Dicamba tolerant soybeans (Enginia, FeXapan and Xtendimax only):* Use nozzles that deliver **extremely coarse to ultra coarse** spray droplets (volume median diameter of **450 microns or more**) as defined by **ASABE standard S572.1** and as shown in the nozzle manufacturer's catalog.
- *Other Uses:* Maximum 40 psi (275 kPa) with conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver even coverage of **ASABE coarse** droplets.
- **Brush Control:** Use high volume spray equipment producing large droplets including, but not limited to, hand-wand, boomless nozzle and Radi-Arc technologies.

Note: Refer to product labels for detailed application information

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
dicamba	POST (foliar) PRE (soil active)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

Crop damage (stunting, reduced seed set) can occur if the chemical is applied at any time other than the recommended stage. DO NOT apply to crop under stress from adverse environmental conditions, such as excess moisture, drought and disease. Apply when air temperature is between 10 and 25°C.

DO NOT apply:

- when there is a risk of severe temperature fall in the night;
- under high humidity, temperatures above 30°C, or fog conditions, to prevent drift to sensitive crops;
- when wind is blowing toward a nearby sensitive crop;
- when winds are below 3 km/h or above 15 km/h.

Tank Mixes:

Herbicides:

	Spring wheat	Winter wheat	Barley	Oats	Seedling grasses
2,4-D Amine 160 g ae/L	✓	✓	✓		✓
MCPA Amine (0.34 L per acre)	✓	✓	✓	✓	✓
MCPA K (0.44 L per acre)	✓	✓	✓	✓	✓
<i>Sencor</i> (0.11 to 0.17 L per acre)	✓		✓		
<i>Ally</i> (2 g per acre)	✓		✓		

In Canaryseed: MCPA amine (0.34 L per acre – 500 g ai/L formulation)

In Corn, Spring rye: 2,4-D amine (160 g ae per acre)

In Corn (Banvel II only):

- *Accent* (13.5 g per acre) plus non-ionic surfactant
- *Option 2.25 OD* (0.63 L per acre) plus liquid 28-0-0 (*Banvel II* at 0.12 L per acre) (Manitoba only).

In Chemical fallow, stubble: 2,4-D, glyphosate products.

In Red fescue: 2,4-D amine (287 g ae per acre)

In Preseeding burnoff: Glyphosate (136 g ae per acre - see glyphosate page for product rates)

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the dicamba labels only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.
- **Re-entry Interval:** DO NOT enter treated fields for 12 hours.
- **Grazing and Harvest Intervals:**
 - **Canaryseed:** Use only as birdseed.
 - **Corn:** DO NOT graze cattle or harvest for silage until 7 days after treatment of dicamba alone or for at least 12 weeks following dicamba tank mixes with other herbicides.
 - **Cereals, seedling grasses, pasture:** DO NOT harvest for silage for or graze lactating dairy cattle until 7 days after treatment. If treated vegetation has been consumed by dry dairy animals or meat animals within 30 days of dicamba application, feed the animal with untreated diet for 30 days before slaughter. Meat animals or dry dairy animals may graze or feed on treated pasture 3 days after dicamba application without restrictions on slaughter. Feed untreated forage within 3 days of slaughter.
 - **Dicamba tolerant Soybeans:** Pre-harvest interval of 7 to 10 days for soybean forage and 13 to 15 days for soybean hay. A plant back interval of 120 days is required for those not on the dicamba label.
- **Re-cropping Interval:** Grow only cereals, corn, soybeans or white beans the year after treatment with the 1.0 L per acre rate. Grow only cereals, corn, field beans, soybeans or canola the year after applications of 0.5 L per acre. If applications are made after September 1, or if dry weather persists after application, crop injury may occur the following spring.
- **Aerial Application:** May be applied by air on cereals only. Use a minimum water volume of 8 L per acre.
- **Storage:** May be stored at freezing temperatures.
- **Buffer Zones:**
Buffers are not required for hand-held and backpack applications.

Application method	Crop	Buffer Zones (metres [†]) Required for the Protection of:		
		Aquatic Habitats of Depths		Terrestrial habitat
		Less than 1 m	Greater than 1 m	
Ground*	Barley, oats, rye, wheat, canary seed, seedling forage grasses	0	0	1
	Corn, established forage grasses, red fescue	1	1	4
	Dicamba tolerant soybeans (<i>Engenia</i> and <i>Xtendimax</i> only)	1	1	4
	Stubble, fallow	1	1	5
	Pasture and rangeland	1	1	10
Winged airplane	Barley, oats, rye, wheat	0	0	50
Helicopter		0	0	45

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

'Method A' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:



Caution – Poison



Warning – Eye Irritant

For an explanation of the symbols used here see pages 7 and 8.

Dicamba/Mecoprop/MCPA

Herbicide Group
4 - dicamba,
mecoprop-p & MCPA
(Refer to page 45)

Company:

Syngenta Canada (*Target* – PCP#28028)

Loveland Products Canada (*Sword* – PCP#27892)

IPCO (*Tracker XP* – PCP#27790)

Formulation:

275 g/L MCPA + 62.5 g/L mecoprop-p + 62.5 g/L dicamba formulated as a solution.

- Container size - 2x10 L and 160 L (*Target*), 500 L (*Sword*), 1000 L (*Sword*)

Crops and Staging:

All Products:

Cereals:

Crop	Stage
Barley	2 to 4 leaf (3 leaf for best crop safety)
Canaryseed, Oats, Spring wheat (including durum)	2 to 5 leaf (3 to 4 leaf for best crop safety)
Winter wheat	Spring application only; up to 12 inches (30 cm) high (top leaf extended)
Fallow	Fall stubble

Target and Sword only:

- **Seedling grasses grown for forage only (NOT for seed production)*:** Apply at the 2 to 4 leaf stage.
 - Creeping red fescue
 - Meadow foxtail
 - Smooth bromegrass
 - Wheatgrass (crested, intermediate)
 - Orchardgrass
 - Timothy
- **Established grasses for forage only (NOT for seed production)*:** Apply up to flag leaf stage.
 - Bromegrass (meadow, smooth)
 - Meadow foxtail
 - Wheatgrass (crested, intermediate, pubescent, slender, streambank, tall, western)
 - Fescue (creeping red, meadow, tall)
 - Orchardgrass
 - Kentucky bluegrass
 - Timothy

* **NOTE: Use only one application per year by ground. Since applications to forage grasses in western Canada has been registered under the User Requested Minor Use program, the manufacturer assumes no responsibility for herbicide performance. Application to forage grasses are at the risk of the user.**

Weeds and Staging:

Weeds controlled at 0.4 to 0.6 L per acre (10 L treats 25 to 16.7 acres) from the 2 to 3 leaf stage unless otherwise indicated:

- Bindweed* (field, hedge)
- Buckwheat (tame, tartary, wild)
- Canada thistle (6 to 8 inches (15 to 20 cm))*
- Cleavers (1 to 2 whorls)
- Corn spurry
- Cow cockle
- Flixweed
- Hemp-nettle (less than 2 pairs of true leaves)
- Kochia
- Lamb's-quarters
- Mustards (ball, tall, wild, wormseed, yellow)
- Night-flowering catchfly
- Pigweed (prostrate, redroot)
- Ragweed, common
- Russian thistle (less than 2 inches (5 cm))
- Shepherd's-purse
- Smartweed (green, lady's-thumb)
- Sow-thistle (annual, perennial*)
- Stinkweed
- Volunteer canola
- Volunteer sunflowers

* **Top growth control only**

Use the higher rate under adverse weather conditions, when weed density is high, for cleavers control, winter annual control and for suppression of Canada thistle and perennial sow-thistle.

Although dicamba/mecoprop-p/MCPA is registered up to the 5 leaf stage of the crop for the rates listed here, the low rate should be used when the crop is at the 5 leaf stage for optimum crop safety.

For Canada thistle, post-harvest or fallow application, use 0.81 L per acre (one 10 L container treats 12.4 acres).

Application Information:

- **Water Volume:**
 - **Ground:** Minimum 40 L per acre.
 - **Aerial:** Minimum of 12 L per acre
- **Nozzles and Pressure:** 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of **ASABE coarse** droplets.
- **Screens:** Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
dicamba, mecoprop, MCPA	POST (foliar)	Synthetic Auxin	Moves throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

Hot and dry or cold and wet weather prior to spraying may result in reduced weed control and increased crop injury. DO NOT apply within 2 weeks of a killing frost.

Tank Mixes:

Herbicides:

- **Spring wheat (including durum):**
 - *Horizon NG* *(label rates - no adjuvant required)
- **Wheat and Barley:**
 - *Sencor* or *linuron* for chickweed control.
 - * **Target only.**

Fertilizers: None registered.

Insecticides: None registered.

Fungicides: None registered.

Note: The above mixes are those listed on the dicamba/mecoprop-p/MCPA labels only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Activity may be reduced if rainfall occurs within 3 hours of application. Contact manufacturer for more information.
- **Re-entry Interval:** DO NOT enter treated fields for 12 hours.
- **Grazing Restrictions:** DO NOT graze or harvest for livestock feed within 7 days of application.
- **Pre-harvest Interval:** Leave at least 80 days from application to harvest.
- **Re-cropping Interval:** No restrictions the year after application.
- **Aerial Application:** All may be applied by air.
- **Storage:** DO NOT freeze.
- **Buffer Zones:**
Buffers are not required for hand-held and backpack applications.

Application method	Crops	Buffer Zones (metres [†]) Required for the Protection of:		
		Aquatic Habitats of Depths		Terrestrial habitat
		Less than 1 m	Greater than 1 m	
Ground *	Standing Crops	1	1	5
	Fallow and stubble	1	1	5

Application method	Crops	Buffer Zones (metres [†]) Required for the Protection of:		
		Aquatic Habitats of Depths		Terrestrial habitat
		Less than 1 m	Greater than 1 m	
Fixed wing airplane	Cereals	1	0	60
	Canaryseed	1	0	75
	Forage	1	0	75
	Fallow and stubble	5	1	100
Helicopter	Cereals	1	0	50
	Canaryseed	1	0	60
	Forage	1	0	60
	Fallow and stubble	4	1	80

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to pages 12 and 13.

Hazard Rating:



Caution – Poison



Warning – Eye Irritant. Potential Skin Sensitizer

For an explanation of the symbols used here see pages 7 and 8.

Dichlorprop/2,4-D

Herbicide Group
4 - dichlorprop & 2,4-D
(Refer to page 45)

Company/Products:

Nufarm Agriculture (*Estaprop XT*)

IPCO (*Dichlorprop-DX*)

Formulation:

Estaprop XT (PCP#29660); *Dichlorprop-DX* (PCP#29664): 210 g/L of dichlorprop-P and 400 g/L of 2,4-D ester formulated as an emulsifiable concentrate.

- Container sizes:
 - *Estaprop XT* - 2 x 9.7 L, 97.1 L
 - *Dichlorprop-DX* - 2 x 10L, 115 L

Crops and Staging:

Wheat (spring, durum) and barley - 4 leaf until the early flag leaf stage.

Winter wheat - in spring from tillering to the early flag leaf stage.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds and Staging:

Treat weeds when young and actively growing and before they are shielded by the crop. Additional stage restrictions indicated are the minimum indicated over all labels. Check individual labels for exceptions.

- Bluebur
- Burdock
- Canada thistle*
- Cocklebur
- Curled dock*
- Dandelion***
- Flixweed
- Kochia (up to 2 inches)
- Lamb's-quarters
- Mustards (ball, dog, hare's-ear, Indian, tumble, wild, wormseed)
- Night-flowering catchfly[♦]
- Oak-leaved goosefoot
- Pigweed (redroot, Russian)
- Prickly lettuce (2 to 12 leaf)[†]
- Ragweed (Common, giant^{††♦♦})
- Round-leaved mallow
- Russian thistle (up to 2 inches)
- Shepherd's-purse
- Sow-thistle (annual, perennial*)
- Spreading atriplex (cotyledon to 10 leaf)^{††}
- Stinkweed
- Stork's-bill
- Toadflax**
- Volunteer canola

Control the following weeds up to the 4 leaf stage:

- Smartweed (including lady's-thumb)
- Tartary buckwheat
- Volunteer Sunflower
- Wild buckwheat

* Top growth control only

** Suppression only. Treat before the majority reach 6 inches (15 cm).

*** Season long control in winter wheat.

[♦] Spring annuals only

^{♦♦} Treat prior to the 6 leaf stage

[†] In winter wheat only.

^{††} *Estaprop XT* in winter wheat only.

Rates:

486 mL per acre.

- (One jug treats 20 acres)

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
dichlorprop, 2,4-D	POST (foliar)	Synthetic Auxin	Moves throughout the plant (Symplast)	Broadleaf only	4

Application Information:

- **Water Volume:**
 - **Ground:** 20 to 97 L per acre*. Use a minimum of 40 L of water per acre to reduce the risk of drift.
 - **Aerial:** Minimum 12 L per acre.
- **Nozzles and Pressure:** 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressure designed to deliver proper coverage with **ASABE coarse** droplets or larger.

* May vary by product. Check label closely.

Effects of Growing Conditions:

Applications made under dry conditions may result in reduced control. Crops under stress from adverse environmental conditions, such as excess moisture, frost or drought, may be injured. Best weed control when adequate soil moisture is present and warm temperatures prevail. DO NOT apply when daytime temperatures exceed 27°C.

Tank Mixes:

Herbicides:

Tank Mix Partner (Mixed at label rates unless otherwise indicated)	Crops			
	Spring wheat	Durum	Winter wheat	Barley
Imazamethabenz ^Δ	•	•		•
Clodinafop ^Δ	•	•		
Fenoxaprop ^Δ	•	•		• [†]
Thifensulfuron/tribenuron ^{Δ††}	•	•	•	•
Tralkoxydim ^Δ	•	•	•	•

[†] *Cordon, Vigil WB and WildCat* only.

^{††} *Estaprop XT* only.

^Δ Manufacturers may only support mixes with specific products. Contact the manufacturer for more information.

Note: Always refer to the label or the page for the tank mix partner in this guide for additional restrictions on staging and varieties.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on dichlorprop-P+2,4-D labels only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.
- **Re-entry Interval:** Leave 12 hours before entering treated fields.
- **Grazing Restrictions:** DO NOT graze the treated crop or harvest for hay or feed within 40 days of application. Withdraw meat animals from treated fields at least 3 days before slaughter.
- **Pre-harvest Interval:** Leave 40 days from spraying until harvest of winter wheat and 60 days for other crops.
- **Re-cropping Interval:** No restrictions the year after application. Fields treated with *Estaprop XT* may be replanted after a minimum of 30 days.
- **Aerial Application:** May be applied by air. Refer to specific product labels for full details for application by air.
- **Storage:** May be frozen.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat ^{**}
	Less than 1 m	Greater than 1 m	
Ground	1	1	1
Fixed wing aircraft	5	1	30
Helicopter	3	1	30

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

** Handheld or backpack sprayers do not require a buffer zone.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:

 Warning – Poison

For an explanation of the symbols used here see pages 7 and 8.

Diquat

Herbicide Group

22 - diquat

(Refer to page 45)

Company:

Syngenta Canada (*Reglone, Reglone Ion, Desica*)ADAMA Canada (*Armory 240*)AgraCity (*MPower Clone*)Sharda Cropchem (*Diquat 240*)Federated Co-operatives Ltd. (*Co-op Bolster*)IPCO (*Bolster*)Loveland Products (*Stage*)Nufarm Agriculture (*Drifast*)Univar Canada Ltd (*Guardzman Diquat*)Winfield United Canada (*Craven*)

Formulation:

Armory 240 (PCP#32726); Bolster (PCP #32540); MPower Clone (PCP#32997); Co-op Bolster (PCP#33005), Craven (PCP#32231), Desica (PCP#30488); Diquat 240 (PCP#31754); Drifast (PCP#32648); Stage (PCP#31597); Guardzman Diquat (PCP#32606); Reglone (PCP#26396): 240 g/L diquat ion (present as dibromide) formulated as a solution.

- Container size - 2 x 10 L, 115 L

Reglone Ion (PCP#31058): 200 g/L diquat formulated as a solution. Comes with a built-in-adjuvant

- Container size - 2x10 L, 115 L, 450 L

Crops and Staging:

Note: As of January 1, 2019 www.keepingitclean.ca indicates that grain from crops treated with this product may have market access concerns. Please see page 10 for more information AND consult potential grain buyers before using this product.

Diquat is used to dry immature green material at top of indeterminate crops and green weeds to facilitate harvest. Diquat will not speed maturity of green crops. Treatment before the recommended stage can result in reduced yield and quality. Add 0.1 L of *Agral 90* or 0.25 L of *LI 700* per 100 L of spray solution for all applications of 240 g/L formulations. Refer to product labels for specific recommendations for adjuvant use.

Crop	Stage	Rate (L/Acre)			
		240 g/L formulations		<i>Reglone Ion</i>	
		Ground	Aerial	Ground	Aerial
Canola*†	90% or more of seed has turned brown.	0.50	0.69	0.61	0.83
Dry Beans - Red and white kidney	Crop has lost 80 to 90 percent of leaves and 80 percent of pods are yellow.	to	to	to	to
Soybeans		0.69†	0.93	0.83†	1.11†
Faba beans	Most plants are ripe and dry. Pods fully filled, bottom pods are tan or black in colour.				
Flax and Solin (low linolenic acid flax)	75 percent of bolls brown.				
Lentils	Lowest pods are light brown and rattle when shaken.				
Mustard (condiment type only)	75 percent of seed has turned brown.				
Peas	Bottom pods are ripe and dry, seeds detached from pods.				

Crop	Stage	Rate (L/Acre)			
		240 g/L formulations		<i>Reglone Ion</i>	
		Ground	Aerial	Ground	Aerial
Sunflowers	Backs of sunflower heads and bracts are turning yellow and seed moisture is 20 to 50 percent.	0.50 to 0.69 [†]	0.69 to 0.93	0.61 to 0.83 [†]	0.83 to 1.11 [†]
Chickpeas [†]	Plants yellow, pods mature, seeds changed colour and detached from pods.	0.50 to 0.69 [†]	0.69	0.61 to 0.83 [†]	0.83
Potatoes (top growth mature and few weeds)	Two weeks prior to harvest.	0.5	Requires 2 Passes Pass #1: 0.69 to 0.93 L/acre** Pass #2: (4 to 5 days later) at 0.5 L/acre	DO NOT use <i>Reglone Ion</i> on Potatoes	
Potatoes (some top growth and/or some weeds)		0.69 to 0.93 ^{**†}			
Potatoes (dense crop, heavy weed infestations)		1.42 ^{**†}			
Alfalfa, bird's-foot trefoil, red and white clover (for seed production only) ^{***}	Pods are ripe but before shattering. Harvest within 7 days.	0.69 to 1.09 [†]	0.69 to 1.09 [†]	0.83 to 1.32 [†]	0.83 to 1.32 [†]

[†] Use high rates for dense crops and/or heavy weed infestations. Use of high rates for canola and chickpea is recommended.

* This product can cause shattering losses in non-shatter resistant canola.

** DO NOT use an adjuvant on potatoes except at the 0.5 L per acre ground application rate.

*** DO NOT use on forage legumes that have been treated with a residual herbicide in the previous 12 months.

Application Information:

- Water Volumes:**

- **Ground:** 91 to 222 L per acre. Use 222 to 445 L per acre on potatoes.
- **Aerial:** 18 L per acre.

Use the highest water volumes when crop canopy is heavy or if weed growth is dense.

- Nozzles and Pressure:** 20 to 30 psi (150 to 200 kPa) when using conventional Flat fan nozzle tips are recommended for proper coverage. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE medium* droplets. Rotary atomizer nozzles and other low volume and ultra low volume application equipment are not recommended for use with diquat.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
diquat	POST (foliar)	PS I Inhibitor/Membrane disruptor	Little (Apoplast)	Non-selective	22

Effects of Growing Conditions:

Best results under cloudy conditions or in evening. Shattering losses can increase if heavy winds, rain or hail occur after the crop has dried down.

Tank Mixes:

Herbicides: None registered.

Insecticides: None registered.

Fungicides: Fungicides may be added when applying diquat to potatoes for vine killing.

Fertilizers: None registered.

Restrictions:

- **Rainfall:** Within 15 minutes may reduce effectiveness.
- **Re-entry Interval:** Leave 24 hours before entering treated fields.
- **Grazing Restrictions:** Crop residues remaining after harvest may be fed to livestock.
- **Pre-harvest Interval (note these recommended intervals may be for functional or marketability reasons):**
 - **Faba bean, Lentil:** Wait 4 to 7 days to harvest.
 - **Forage Legumes:** DO NOT exceed 7 days.
 - **Canola, Mustard:** Wait 7 to 10 days; maximum 14.
 - **Sunflowers:** Wait 15 to 20 days.
 - **Flax, Peas:** When sample tests dry.
- **Re-cropping Interval:** No restrictions the year after application.
- **Aerial Application:** May be applied by air in a minimum of 18 L per acre water volume.
- **Storage:** DO NOT freeze.
- **Buffer Zones:**

Application method	Crops	Buffer Zones (metres [†]) Required for the Protection of:		
		Aquatic Habitats of Depths		Terrestrial habitat
		Less than 1 m	Greater than 1 m	
Ground*	Potatoes	10	5	5
	Other crops under "Crops:" section	5	3	3
Winged aircraft	Potatoes	200	100	100
	Beans, Legume forage seed	150	80	90
Helicopter	Potatoes	125	65	80
	Beans, Legume forage seed	100	55	70

See page 36 for an explanation of the different habitats.

* Buffer zones for ground applications can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

When finished spraying diquat, rinse the sprayer out with clean water. Run through pump, lines and nozzles. Drain tank by spraying out on an untreated portion of a crop on which the product is registered, or by spraying on uncropped land. Refill sprayer with water and *Agral 90* at 0.6 L per 1,000 L spray solution. Run the solution through lines and boom. Spray out, then refill with clean water. Leave equipment standing overnight, then drain water out.

Refer to pages 12 and 13 for additional information.

Hazard Rating:



Warning – Poison



Caution – May cause eye damage, Potential Skin Sensitizer

For an explanation of the symbols used here see pages 7 and 8.

Distinct

Herbicide Group
4 - dicamba
19 - diflufenzopyr
(Refer to page 45)

Company:

BASF Canada (PCP#25811)

Formulation:

20% diflufenzopyr and 50% dicamba, sodium salt formulated as a water dispersible granule.

- Container size - 2 x 2.3 kg

Crops and Staging:

Fallow and Post-Harvest applications

Corn - 2 to 6 leaf stage

Note: The use of this chemical may result in contamination of groundwater, particularly in areas where soils are permeable (e.g. sand, loamy sand and sandy loam soils) and/or the depth to the water table is shallow.

Weeds, Rates and Staging:

Corn:

Distinct applied post-emergent to weeds below at 115 grams per acre plus a non-ionic surfactant (see page 43) and UAN (liquid 28-0-0) at 1.25 L per 100 L of spray solution will control:

- Biennial wormwood (2 to 8 leaf)
- Canada thistle*
- Cocklebur (6 leaf)
- Kochia (up to 15 cm)
- Lady's-thumb
- Lamb's-quarters
- Ragweed (common, giant**)
- (2 to 8 leaf)
- Redroot pigweed
- Sow-thistle, perennial**
- (2 to 10 leaf)
- Tall waterhemp
- Velvetleaf
- Volunteer canola (up to 4 leaf)
- Wild buckwheat

Fallow or post-harvest:

It is recommended that *Distinct* be tank-mixed with glyphosate and *Merge* adjuvant (200 mL per acre).

Distinct at 58 g per acre (40 acres per jug), as a tank mix with glyphosate, provides enhanced control of the following weeds:

- Dandelion*
- Kochia
- Lamb's-quarters
- Narrow-leaved hawk's-beard
- Redroot Pigweed
- Round-leaved mallow
- Sow-thistle, spiny annual
- Wild buckwheat

Distinct at 115 g per acre (20 acres per jug) controls:

- Weeds listed at 58 g per acre plus:
 - Biennial wormwood (2 to 8 leaf)
 - Canada thistle*
 - Cocklebur
 - Lady's-thumb
 - Lamb's-quarters
 - Redroot pigweed
 - Ragweed, common
 - Sow-thistle, perennial**
 - Tall waterhemp
 - Velvetleaf
 - Volunteer canola (up to 4 leaf)
 - Wild buckwheat

* Top growth control only.

** Suppression only.

A general guide to mixing can be found on page 11.

DO NOT exceed a maximum application rate of 115 g per acre of *Distinct* per season.

Application Information:

- **Water Volume:** 20 to 80 L per acre. High water volumes are required for adequate coverage, particularly when weed densities are high or weed staging is large.
- **Nozzles and Pressure:** Use 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of *ASABE coarse* droplets.
- **Screens:** Use 50 mesh or coarser on both nozzle and primary plumbing screens.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
dicamba	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4
diflufenzopyr	POST (foliar)	Auxin transport inhibitor	To growth areas of the plant (Symplast)	Broadleaf only	19

Effects of Growing Conditions:

DO NOT spray if temperatures of +5°C or less are forecast within 3 days of application or when temperatures are expected to exceed +27°C on the day of application. Under cool or dry conditions, control of some weeds may be severely reduced.

Tank Mixes:

Herbicides:

- **Fallow and Post-harvest:**
 - Glyphosate (180 to 360 g ae per acre) - recommended
- **Corn:**
 - None registered in western Canada.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Restrictions:

- **Rainfall:** Rain within 4 hours may reduce control.
- **Re-entry Interval:** Leave 12 hours before entering treated fields.
- **Grazing Restrictions:** DO NOT graze or cut as feed for 75 days.
- **Pre-harvest Interval:** DO NOT apply within 120 days of harvesting corn.
- **Re-cropping Interval:** A plant back interval of 30 days is required for the planting of rotational crops. Consult BASF for further information on rotational cropping.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a cool, dry place above 5°C.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only	15	15	10

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Distinct can cause injury to sensitive crops at very low concentrations. Sprayers used to spray this product should be flushed out immediately after use.

Use 'Method B' on pages 12 and 13 to clean sprayers after using *Distinct*.

Hazard Rating:



Caution – Poison

For an explanation of the symbols used here see pages 7 and 8.

Dual II Magnum

Herbicide Group

15 - metolachlor

(Refer to page 45)

Company:

Syngenta Canada (PCP#25729)

Formulation:

915 g/L s-metolachlor formulated as an emulsifiable concentrate.

- Container size - 2 x 10 L

Crops and Staging:

Pre-plant incorporated.

Pre-emergent: In areas with good rainfall or under irrigation, *Dual II Magnum* may be applied as a pre-emergence surface treatment. At least 0.5 inches of water (1.25 cm) is required within 10 days of application for proper activity.

Refer to product label for more specific information on timing and rates of applications for each crop type.

- Corn (field, sweet, silage)
- Potatoes
- Sweet white lupins
- Dry beans (navy, kidney, pinto)*
- Soybeans

* Beans should be planted at least 4 cm deep to avoid crop injury. Dry bean varieties vary in their tolerance to *Dual II Magnum*. Test a limited acreage on all new varieties first.

Weeds, Rates and Staging:

Pre-emergent and Pre-Plant Incorporated Treatments: Apply 0.47 to 0.7 L per acre (12 L treats 24 to 17 acres) prior to weed emergence.

- Barnyard grass
- Nightshade (American, Eastern black)
- Yellow nutsedge**
- Foxtail (green, yellow)
- Redroot pigweed*
- Witch grass

* Suppression only.

** Pre-plant incorporated treatment only.

Use higher rates on heavy textured soils or when high populations of weeds are expected.

Maximum ONE APPLICATION per year of this or other products containing the active ingredient s-metolachlor.

Application Information:

- **Water Volume:** A minimum of 60 L per acre.
- **Nozzles:** Use 30 to 45 psi (200 to 300 kPa) when using conventional flat fan nozzles.
- **Screens:** Use 50 mesh screens.
- **Incorporation:** Apply to a firm seed bed free of large clods or lumps. If using tandem disks, set disks to work the soil at a depth of 4 inches (10 cm) and operate at a speed of 6 km/hr (4 mph). If using an S-tine cultivator, set the implement to work the soil to a depth of 4 inches (10 cm) and operate at a speed of 10 km/hr (6 mph). Incorporation equipment should include rolling or western harrows.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
metolachlor	PPI, PRE (surface) with residual soil activity	Long-chain Fatty Acid Inhibitor	Little movement (Symplast)	Broadleaf & grass	15

Effects of Growing Conditions:

A moderate rainfall or equivalent irrigation (0.5 inches) is required within 10 days to activate pre-emergent surface treatments. If rain does not occur, a shallow cultivation or use of a rotary hoe is necessary. Drought conditions that persist after any application may reduce annual grass control. On sandy soils, heavy rainfall following application may cause leaching of *Dual II Magnum*, resulting in reduced weed control.

Tank Mixes:

Herbicides:

- **In Corn:** *AAtrex* and glyphosate in both PPI and pre-emergent applications.
- **In Soybeans:** *Sencor*, and glyphosate, in both PPI and pre-emergent applications.

Fertilizers: May be applied with liquid fertilizer. May be impregnated onto dry bulk fertilizers (except nitrate fertilizers, superphosphate fertilizers or limestone).

Insecticides: None registered.

Note: The above mixes are those listed on the *Dual II Magnum* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** When applying as a pre-emergent surface treatment, 0.5 inches (1.25 cm) of rain or irrigation is required after application for proper activity.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Grazing Restrictions:** DO NOT graze the treated immature crop or cut for hay. In corn, immature means before ear emergence.
- **Pre-harvest Interval:** DO NOT harvest corn within 80 days of post-emergent application.
- **Re-cropping Interval:** In the year of treatment, seed only corn, soybeans, white beans, potatoes, snap beans, lima beans, processing peas, sweet white lupins, or (a minimum of 4.5 months after application) winter cereals.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** May be frozen.
- **Buffer Zones:** Leave a buffer zone of 29 metres between last spray swath and the edge of important wildlife habitats such as wetlands, sloughs and water bodies.

Sprayer Cleaning:

No detailed cleaning procedures are indicated on the label. Use a commercial all purpose spray sprayer cleaning product for adequate cleaning. Contact the manufacturer for more information.

Hazard Rating:

 Warning – Eye Irritant

 Potential Skin Sensitizer

For an explanation of the symbols used here see pages 7 and 8.

DyVel*

* Note: This product is no longer manufactured but some still remains in the distribution system. This product will be removed from future editions when supplies are exhausted.

**Herbicide Group
4 - dicamba & MCPA**
(Refer to page 45)

Company:

BASF Canada (PCP#16545)

Formulation:

84 g/L of dicamba and 336 g/L of MCPA K+ formulated as a solution.

- Container size - 10 L, 55 L, 110 L, 1000 L

Crops and Staging:

Spring wheat (including durum), barley or oats - 2 to 5 leaf stage.

Winter wheat - apply in spring when crop is 6 to 10 inches (15 to 25 cm) tall but before shot blade stage.

Note: Crop damage can occur if applications are made at other than the recommended crop stage.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds and Staging:

Weeds controlled in the 2 to 4 leaf stage unless otherwise stated:

- Burdock
- Cleavers (suppression only)
- Cocklebur
- Corn spurry (2 to 3 leaf)
- Cow cockle (2 to 3 leaf)
- Flixweed
- Hemp-nettle (2 to 3 leaf)
- Kochia
- Lamb's-quarters
- Mustards (ball, hare's ear, Indian, tumble, wild, wormseed)
- Pigweed (prostrate, redroot, Russian)
- Ragweed (common, false, giant)
- Russian thistle
- Shepherd's-purse
- Smartweed (green, lady's-thumb)
- Stinkweed
- Tartary buckwheat
- Wild buckwheat
- Wild radish
- Volunteer canola (2 to 4 leaf)
- Volunteer sunflowers

Top growth control:

- Canada thistle
- Perennial sow-thistle

Rate:

0.51 L per acre (one 10 L jug treats 19.7 acres)

Application Information:

- **Water Volume:**
 - **Ground:** 40 L per acre.
 - **Aerial:** Minimum 8 L per acre
- **Nozzles and Pressure:** Maximum 40 to 45 psi (275 to 310 kPa) when using conventional flat fan nozzles. To reduce the risk of drift damage to sensitive non-target crops when using conventional nozzles, 20 to 30 psi (150 to 200 kPa) as well as higher water volumes are recommended. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with **ASABE coarse** droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
dicamba	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4
MCPA	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

For best weed control, apply when temperature is between 10 and 25°C. DO NOT treat crops under stress from excessive moisture or drought. To avoid crop injury, DO NOT apply when temperature is expected to exceed 30°C, or when there is a risk of a severe drop in overnight temperature.

Tank Mixes:

None registered.

Note: No mixes are listed on the DyVel label with currently marketed products.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** No rainfast period is specified on the label; required interval may be up to 8 hours. Avoid applying this product when heavy rain is forecast. Contact manufacturer for more information.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.

- **Grazing Restrictions:** DO NOT graze treated crop or cut for hay within 30 days of application.
- **Pre-harvest Interval:** Leave 60 days between application and harvest.
- **Re-cropping Interval:** No restrictions the year after treatment.
- **Aerial Application:** May be applied by air.
- **Storage:** May be frozen.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	4
Fixed wing aircraft	1	0	60
Helicopter	1	0	50

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to "Method A" in the general sprayer cleaning section on pages 12 and 13. If mixed with other pesticides, the cleaning method should be combined with the method recommended for the tank mix partner if different.

Hazard Rating:



Caution – Poison

For an explanation of the symbols used here see pages 7 and 8.

DyVel DSp*

* Note: This product is no longer manufactured but some still remains in the distribution system. This product will be removed from future editions when supplies are exhausted.

Herbicide Group
4 - dicamba,
2,4-D & mecoprop
(Refer to page 45)

Company:

BASF Canada (PCP#27856)

Formulation:

110 g/L dicamba, 295 g/L 2,4-D amine and 80 g/L mecoprop-p formulated as a solution.

- Container size - 10 L, 55 L, 100 L

Crops, Rates and Staging:

Crop	Stage	Rate	
		(L per Acre)	Acres Per 10 L Jug
Spring wheat (including durum)	3 to 5 leaf	0.34 to 0.45	29 to 22
Barley	2 to 3 leaf	0.34	29
Winter wheat	Before crop is 12 inches (30 cm) tall in spring	0.34 to 0.45	29 to 22
Corn (field)** (DO NOT apply to sweet corn)	Before corn reaches 6 inches (15 cm) in height with the top leaf extended or by directed spray with drop nozzles once over 12 inches (30 cm).	0.34 to 0.45	29 to 22
Native range and permanent grass pasture*	Established	1.3	7.7

Crop	Stage	Rate	
		(L per Acre)	Acres Per 10 L Jug
Fall stubble, fallow	Stage according to weed	0.45 to 0.71	22 to 14

* Legumes will be severely injured by this application.

** NOTE: Under environmental stress corn will become brittle for 2 weeks after application. In-field mechanical processes and strong winds may cause stalk lodging during that time.

Applications outside the recommended stage may result in crop injury.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds and Staging:

The low registered rate for each crop will control the following weeds at the 2 to 3 leaf stage unless otherwise indicated:

- Annual smartweed (including lady's-thumb)
- Annual sow-thistle
- Cocklebur
- Common ragweed
- Corn spurry
- Hedge bindweed
- Knotweed
- Kochia
- Lamb's-quarters
- Mustards (wild, ball, tall, wormseed, yellow)
- Pigweed (prostrate, redroot)
- Russian thistle
- Stinkweed*
- Volunteer canola (2 to 4 leaf, prior to bolting)
- Volunteer tame buckwheat
- Wild buckwheat

Use the high registered rate for each crop to control the following weeds:

- Canada thistle (top growth only)***
- Cleavers (1 to 2 whorls)**
- Cow cockle
- Field bindweed†
- Velvetleaf
- Flixweed*
- Jerusalem artichoke
- Round-leaved mallow**
- Shepherd's-purse*
- Tartary buckwheat

† Apply when actively flowering.

* Rosette stage in winter wheat.

** Suppression only.

*** Canada thistle should be treated when 6 to 8 inches (15 to 20 cm) of new growth is present after harvest and in the early bud stage in fallow.

Rates for Native Range and Pasture will control:

- Alder
- Bull thistle
- Chicory
- Goat's-beard
- Poison ivy
- Ragwort
- Sheep laurel
- White cockle

The high rate for each crop should be used for all weeds under adverse growing conditions, when weeds are at an advanced stage of growth or when weed densities are high. Guidelines are not provided for weed densities under light or heavy infestations. When in doubt as to the infestation level, use the high rate or contact the manufacturer.

NOTE: It is possible that poisonous plants such as ragworts, hemlocks and death camas could be more palatable to livestock after treatment with DyVel DSp. Suitable precautions should be taken to avoid livestock access when such plants are present.

Application Information:

- **Water Volume:**
 - **Cereals:** Minimum 40 L per acre.
 - **Corn:** 81 to 142 L per acre.
- **Nozzles and Pressure:** Maximum 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with **ASABE coarse** classification or larger droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
dicamba	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4
Mecoprop-p	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4
2,4-D	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

Crops under stress from excess moisture, drought or disease may suffer a setback when this herbicide is applied. DO NOT apply when temperature exceeds 27°C or when relative humidity is high. Stubble treatments for thistle control in fall should be made at least 2 weeks prior to killing frost.

DO NOT apply *DyVel DSp* at wind speed greater than 5 mph (8 km/hr).

Tank Mixes:

Herbicides:

- *AAtrex Liquid* (0.91 L per acre).

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *DyVel DSp* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information. DO NOT irrigate for 24 hours after application.
- **Re-entry Interval:** DO NOT enter fields for at least 12 hours for field corn and leave 14 days from application to hand harvest sweet corn.
- **Grazing Restrictions:** DO NOT harvest for livestock feed within 30 days of application. DO NOT permit lactating dairy animals to graze fields within 7 days of application. Withdraw meat animals from treated fields at least 3 days before slaughter.
- **Pre-harvest Interval:** Leave 30 days between application and harvest.
- **Re-cropping Interval:** No restrictions the year after treatment.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** May be frozen.
- **Buffer Zones:** If there are sensitive plants within 400 m, apply only when there is a light breeze away from the sensitive area. DO NOT contaminate wetlands or water used for domestic or livestock consumption, irrigation or natural habitat. Buffers are not required for hand-held and backpack applications.

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Cropland	1	1	5
Range and Pasture	1	1	10

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

No cleaning information provided on the label. Refer to 'Method B' in general sprayer cleaning section on pages 12 and 13.

Hazard Rating:

 Warning – Poison

 Warning – contains the allergen soy

For an explanation of the symbols used here see pages 7 and 8.

Eclipse Brands (this referring text to be removed in the 2022 edition)

See Glyphosate + Clopyralid on page 242.

Edge Granular

Herbicide Group
3 - ethalfluralin

(Refer to page 45)

Company:

Gowan Canada (PCP#20980)

Formulation:

5% ethalfluralin formulated as a granular.

- Container size - 25 kg, 544 kg

Crops and Staging:

Edge Granular can be applied prior to seeding the following crops:

- Seedling alfalfa (seed production only)
- Canola
- Caraway
- Chickpeas*
- Coriander
- Dry beans (navy, kidney)
- Industrial hemp*
- Faba beans
- Lentils (fall application only)[†]
- Mustard (yellow only)
- Peas
- Safflower
- Soybeans
- Sunflowers

[†] Registered for use on lentils for fall application only. One incorporation must be completed in the fall. Seeding depth is critical - DO NOT seed more than 1.5 inches (4 cm) deep. Avoid loose seedbeds and planting into cold soils.

* Since this use is registered under the User Requested Minor Use Label Expansion program, the manufacturers assume no responsibility for herbicide performance. Application to chickpeas and industrial hemp is at the risk of the user.

Weeds and Staging:

For pre-emergent control of the following weeds:

Grassy Weeds:

- Barnyard grass
- Foxtail (green**, yellow)
- Volunteer barley*
- Volunteer spring wheat*
- Wild oat*
- Witch grass

Broadleaf Weeds:

- Cleavers*
- Chickweed
- Corn spurry
- Cow cockle
- Hemp-nettle*
- Kochia
- Lady's-thumb*
- Lamb's-quarters
- Nightshade*
- Pigweed (prostrate, redroot)
- Purslane
- Russian thistle*
- Wild buckwheat

* Suppression only.

** Not including group 3 herbicide resistant biotypes.

Rates:

Note: Successful use of this product requires proper field preparation and product incorporation. For instructions on proper application under various situations see 'Application Information' below.

Time of Application	Rate (Kg per Acre)				
	Light Textured Soils		Medium to Heavy Textured Soils		
	2 to 6% Organic Matter Dark Brown-Black	6 to 15% Organic Matter Deep Black	2 to 4% Organic Matter Dark Brown	4 to 6% Organic Matter Black	6 to 15% Organic Matter Deep Black
Spring	6.9	8.9	6.9	8.9	8.9 to 11.3
Fall	8.9	11.3	8.9	11.3	11.3

DO NOT apply to:

- soils containing less than 2% organic matter (including eroded knolls)
- soils containing greater than 15% organic matter.
- fields that received applications of manure within the last 12 months. After this period, manure must be thoroughly incorporated to a depth of 10 to 15 cm.

To reduce the possibility of injury to the treated crop, use good quality certified seed. Seed shallow into a warm, moist, firm seedbed using recommended agronomic practices that will promote rapid and even crop germination and emergence.

Application Information:

Apply *Edge Granular* uniformly with a properly calibrated granular herbicide applicator. Avoid concentration of the herbicide in narrow bands. Calibrate the applicator according to manufacturer's directions and check frequently during application to be sure equipment is operating correctly.

Direct Seeding Systems (minimum tillage systems):

- **General:**
 - Direct-seeding is defined as seed placement into standing stubble (including chemical fallow) with minimum soil disturbance (<30%) and maximum surface residue retention. *Edge Granular* may be used on fields that have been in direct-seeding systems for at least two consecutive years. When seeding, a one pass, direct-seeding operation is recommended.
 - *Edge Granular* applied to the soil surface provides residual control of susceptible weeds within the top 2.5 cm of the soil surface but will not control weeds that germinate from deeper (>2.5 cm).
- **Land Preparation:**
 - *Crop Residue Management:* Chopping, spreading and even distribution of straw and chaff residues will prevent plugging or hairpinning during the seeding operation. Poor and uneven crop emergence, cold wet soils, soil nutrient tie-up and delayed and uneven maturity may also be a result of inadequate residue management.
 - *Pre-seeding (Burn Off) Weed Control:* *Edge Granular* will not control emerged weeds. A pre-seeding burn-off herbicide treatment is required to eliminate weed competition prior to crop emergence.
- **Instructions:**
 - Use of a single harrow operation assists in managing straw residue to ensure good herbicide soil contact. Avoid excessive soil disturbance.
 - *Seeding Instructions:* Use direct-seeding equipment with seed placement at a uniform depth to ensure seed-soil contact and rapid crop emergence. Minimum soil disturbance ensures a uniform herbicide layer at the soil surface.
 - *Fall Application:* *Edge Granular* in direct-seeding systems may be applied in the fall between October 1 and prior to soil freeze-up for weed control the following year. Apply at the fall rates in the 'Rates' section using a harrow operation to manage crop residue and ensure herbicide soil contact. DO NOT apply to snow or frozen soil.
 - *Spring Application:* *Edge Granular* in direct-seeding systems may be applied in the spring as early as field conditions permit and at least 10 days prior to seeding. Apply at the spring rates in the 'Rates' section and use a shallow harrow incorporation within 24 hours of application.

Conventional Tillage Systems:

- **General:**
 - *Edge Granular* for weed control in conventional tillage systems is intended for use on soils which have been conventionally tilled with > 30% soil disturbance within the previous two consecutive years or more.
- **Land Preparation:**
 - *Pre-seeding Weed Control:* *Edge Granular* will not control emerged weeds. If existing weed growth is too heavy to allow uniform application and incorporation, destroy established weeds by cultivation or a foliar herbicide application before application.
- **Application Instructions:**
 - Incorporate *Edge Granular* with a tandem disc, discer or field cultivator (Vibrashank type). Cultivators should have 3 to 4 rows of sweeps spaced 8 inches apart and staggered so that no soil is left unturned. Set equipment to work at a depth of 3 to 4 inches (8 to 10 cm). Operate disc implements at 7 to 10 km per hour (4 to 6 mph), and cultivators at 10 to 13 km per hour (6 to 8 mph).

- **Fall and Spring Application:** In conventional tillage systems, *Edge Granular* can be applied in the fall between September 1 and prior to freeze-up for weed control the following year, or it may be applied in the spring any time up to seeding. DO NOT apply to snow or frozen soil.
- Apply to a soil surface free of large clods and incorporate in the same operation if possible.
- Two incorporations are required at right angles for thorough mixing. *The first incorporation must be completed within 24 hours of application.* Delay the second incorporation for at least three days after the first. When applying *Edge Granular* in the fall, it is preferred that both incorporations be done in the fall. The second incorporation may be delayed until spring to conserve crop residues; however, both incorporations must be done to the same depth.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
ethalfluralin	PPI (Soil active)	Mitosis Inhibitor/cell division	Little movement in plant (Apoplast)	Broadleaf & grass	3

Effects of Growing Conditions:

Crops stressed by cold weather, excessive moisture or drought may be injured by *Edge Granular*. Dry soil conditions between application and emergence may result in decreased weed control.

Tank Mixes:

Not applicable.

Restrictions:

- **Rainfall:** No effect once incorporated.
- **Grazing Restrictions:** DO NOT graze or cut treated crops for livestock feed.
- **Re-cropping Interval:** DO NOT grow sugar beets, oats, and small-seeded annual grasses such as timothy, canaryseed and creeping red fescue in rotation following a crop treated with *Edge Granular*. DO NOT seed wheat as a rotational crop onto land that has been treated with trifluralin and/or *Edge Granular* at oilseed/special crop/barley rates for two consecutive crop years. Thinning of crop may occur in areas that have received abnormally low amounts of precipitation or in crops that are emerging slowly.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a cool, dry place. May be frozen. DO NOT expose to prolonged sunlight or heat.
- **Buffer Zones:** Toxic to fish and other aquatic organisms. DO NOT contaminate water bodies or wetland areas.

Sprayer Cleaning:

Not applicable.

Hazard Rating:



Caution – Potential skin sensitizer.

For an explanation of the symbols used here see pages 7 and 8.

Enforcer D

Herbicide Group
4 - fluroxypyr & 2,4-D
6 - bromoxynil

(Refer to page 45)

Company:

Nufarm Agriculture (PCP#30690)

Formulation:

80 g/L fluroxypyr, 190 g/L bromoxynil and 240 g/L 2,4-D ester formulated as an emulsifiable concentrate.

- Container size: 2 x 10 L, 120 L, 480 L

Crops and Staging:

Spring wheat (including durum) and barley: 4 leaf stage until the flag leaf is fully emerged.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

Apply to emerged weed seedlings up to the 5 leaf stage unless otherwise indicated.

Weeds controlled at the 0.24 L per acre rate:

- Broadleaf plantain
- Cleavers
- Common groundsel
- Kochia (up to 5 cm tall)
- Hemp-nettle
- Knotweed
- Lady's-thumb
- Lamb's-quarters
- Night-flowering catchfly
- Shepherd's-purse
- Stinkweed
- Stork's-bill
- Volunteer canola
- Wild mustard

Weeds controlled at the 0.48 L per acre rate:

- *Weeds listed above plus:*
 - Canada thistle (suppression)
 - Dandelion
 - Field horsetail
 - Redroot pigweed
 - Round-leaved mallow
 - Russian thistle
 - Volunteer flax
 - Wild buckwheat

Application Information:

- **Water Volume:** Minimum 20 to 40 L per acre. Use the higher volume when there is a heavy crop canopy or weeds are at an advanced stage.
- **Nozzles and Pressure:** Use 40 psi (275 kPa) if applying without drift reduction nozzles. Drift reduction nozzles may require higher pressures for proper performance. Select the nozzle and pressure combination that produces **ASABE coarse** droplets while maintaining good coverage of foliage.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
fluroxypyr, 2,4-D	POST (foliar)	Synthetic Auxin	Moves throughout the plant (Symplast)	Broadleaf only	4
bromoxynil	POST (foliar)	PSII Inhibitor/Membrane disrupter	Little (Apoplast)	Broadleaf only	6

Effects of Growing Conditions:

Optimum activity is experienced between 12 to 24°C when weeds are actively growing. Weeds may not be actively growing and as a result reduced activity will occur when temperatures are below 8°C or above 27°C. Frost 3 days before or after an application may reduce crop tolerance and weed control efficacy.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

- **In spring wheat (including durum) and barley:**
 - Tralkoxydim (*Nufarm Tralkoxydim* and *Liquid Achieve* only)
 - Fenoxaprop (*Cordon* or *Puma Advance* only)
 - Thifensulfuron/tribenuron (*Boost* only) - 2.7 g per acre.
- **In spring wheat (including durum) only:**
 - Clodinafop 240 EC (*Signal* only)
 - *Simplicity OD*
 - *Varro*

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Enforcer D* labels only. Nufarm Agriculture also supports the following mixes that are not on the *Enforcer D* label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:** *Everest 2.0*, *Traxos*.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.
- **Re-Entry Interval:** DO NOT enter treated fields for 24 hours.
- **Grazing Restrictions:** DO NOT graze or cut for livestock feed within 30 days of application. Withdraw meat animals from treated feed 3 days before slaughter.
- **Pre-harvest Interval:** DO NOT harvest within 60 days of application.
- **Re-cropping Interval:** Barley, canola, flax, forage grasses, lentil, mustard, oat, pea, rye and wheat can be seeded the following year or fields can be fallowed.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a ventilated room above freezing. If frozen, allow container to warm and shake well before using.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	1

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

- Spray when winds are under 16 km/hr, but not dead calm.

Sprayer Cleaning:

The manufacturer provides no recommendations on how to clean equipment used to apply this product. As a petroleum based emulsifiable concentrate, 'Method B' in the general section on sprayer cleaning on pages 12 and 13 may be the most effective.

Hazard Rating:



Caution – Poison



Caution – Skin and Eye Irritant

For an explanation of the symbols used here see pages 7 and 8.

Enforcer MSU

This product is the equivalent of a prepackaged mix of Enforcer M (bromoxynil+MCPA+fluroxypyr - page 136) and Boost (thifensulfuron/tribenuron 75WDG – see page 373). Information listed is restricted to Crops, Weeds and Rates. For other detailed information on the component products see the product pages listed for the components.

Herbicide Group
**2 - thifensulfuron/
 tribenuron**
4 - fluroxypyr & MCPA
6 - bromoxynil
(Refer to page 45)

Company:

Nufarm Agriculture

Formulation:

The *Enforcer MSU* package has two components:

Enforcer M (PCP#30691): 80 g/L fluroxypyr, 200 g/L bromoxynil and 200 g/L MCPA ester formulated as an emulsifiable concentrate.

- Container size – 2 x 7.5 L

Boost (PCP#30377): 50% thifensulfuron and 25% tribenuron formulated as a water dispersible granule.

- Container size – 108 g

Crops and Staging:

Wheat (durum, spring) and barley: 2 leaf up until the flag leaf is fully emerged.

Winter wheat: in spring from fully tillered up until the flag leaf is fully emerged.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds and Staging:

Weeds controlled by *Enforcer M* plus suppression of narrow-leaved hawk's-beard.

Rates:

Enforcer M: 375 mL per acre

Boost: 2.71 g per acre

(One case treats 40 acres)

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Tank Mixes:

None registered.

Nufarm Agriculture also supports the following mixes that are not on the *Enforcer M* and *Boost* labels. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:** *Axial*, *Cordon* (Fenoxaprop), *Everest 2.0*, *Signal* (clodinafop), *Simplicity*, *Traxos*, *Varro*.

Note: Enforcer MSU SHOULD NOT be tank-mixed with Tralkoxydim (Nufarm Tralkoxydim or Liquid Achieve) as reduced grass control may occur.

See bromoxynil+MCPA+fluroxypyr and thifensulfuron/tribenuron 75WG pages for more information on restrictions application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

Eptam Liquid EC

Herbicide Group
8 - EPTC

(Refer to page 45)

Company:

Gowan Canada (PCP#11284)

Formulation:

800 g/L of EPTC formulated as an emulsifiable concentrate.

- Container size - 10 L, 1000 L

Caution: *The level of weed control may be reduced where Eptam Liquid EC is used on soils that have been treated with Eptam Liquid EC the previous growing season. It is expected that the reduction in control will be greater where Eptam Liquid EC have been used repeatedly for 2 or more years.*

Crops, Rates and Staging:

Eptam Liquid EC is applied as a pre-plant incorporated treatment prior to seeding the following crops:

Crop	Rate (L per Acre)	Acres Treated per 10 L Container
Dry beans	1.72 to 2.23	5.8 to 4.5
Alfalfa, Bird's-foot trefoil, Cicer milk-vetch** Sweet clover** Sunflowers*	1.72	5.8
Potatoes	1.72 to 3.44	5.8 to 2.9
Flax*	1.42 to 1.72	7.0 to 5.8

* May also be applied in late fall prior to freeze-up

** Seed production only

NOTE: The use of *Eptam Liquid EC* on flax is not recommended in Saskatchewan because of the risk of crop injury.

Where a rate range appears, use the lower rate on light textured soils and the higher rate on heavy textured soils.

DO NOT apply *Eptam Liquid EC* to:

- soils with less than 3 percent organic matter
- soil with more than 15 percent organic matter

Weeds and Staging:

Must be applied prior to the emergence of the following weeds. Emerged weeds will not be controlled.

- Barnyard grass
- Chickweed*
- Corn spurry*
- Foxtail (green, yellow)
- Hairy nightshade*
- Henbit *
- Lamb's-quarters*
- Nettleleaf goosefoot*
- Pigweed (prostrate, redroot, tumble)*
- Purslane*
- Quackgrass (suppression)**
- Volunteer cereals (wheat, barley, oats)
- Wild oat
- Yellow nutsedge**

* Will be controlled only if treatment is made when conditions are favourable for germination and growth.

** Roots of perennial weeds must be thoroughly chopped prior to application.

Application Information:

- **Water Volume:** Minimum of 40 L per acre of water. May be mixed with liquid fertilizer in place of water (see label for liquid fertilizer compatibility).
- **Pressure:** 30 to 40 psi (200 to 275 kPa).
- **Equipment and Nozzles:** Since *Eptam Liquid EC* is highly volatile, the product must be incorporated immediately. This is best accomplished by mounting spraying equipment directly onto the incorporation equipment (tandem disks, field cultivators on light soil). May also be applied to cleanly cultivated soil for potatoes, by metering into the irrigation water to achieve the recommended rate per acre (“herbigation” or “chemigation”). See label for detailed instructions.
- **Incorporation:** All growth and stubble should be thoroughly worked into the soil before treatment. Apply to a dry soil surface. Incorporate immediately after application preferably during the spraying operation as *Eptam Liquid EC* is volatile. Set disc and cultivator implements to cut to a depth of 4 to 6 inches (10 to 15 cm). A second operation at a right angle to the first is required. The disc or cultivator must be followed with a harrow or other levelling device that extends beyond the width of the implement. Speeds in excess of 8 km/h (5 mph) will result in excessive pulverization and crop residue destruction leaving the field susceptible to erosion. The maximum recommended tillage depth is 4 inches (10 cm).

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
EPTC	PPI (soil active)	Lipid Synthesis Inhibitor (Non-ACCase)	Little movement in plant (Apoplast)	Broadleaf & Grass	8

Effects of Growing Conditions:

Crop injury can occur if stressful environmental conditions (cold, wet soils, drought or excessive heat) occur after seeding. To minimize crop injury, delay seeding 10 days if these conditions occur at the time of application, or select an alternative product. Very cold or dry soil conditions during weed emergence will reduce control.

Tank Mixes:

Herbicides:

- *Dry beans (navy and red kidney only):* Liquid formulations of *Treflan* and *Rival*.

Insecticides: DO NOT tank mix with insecticides.

Fungicides: None registered.

Fertilizers: May be mixed with liquid fertilizer.

- Compatibility test should be conducted according to instructions on the herbicide label.
- Dry bulk fertilizers, except nitrate fertilizers, may be impregnated or coated with *Eptam Liquid EC*. The impregnated fertilizer should be spread uniformly onto the field using a double overlap pattern immediately after impregnation. The impregnated fertilizer must be applied to the field when the soil surface is dry to at least 0.5 inch (1.5 cm) depth. The first incorporation must be done immediately after application.

Note: The above mixes are those listed on the *Eptam Liquid EC* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** No effect once incorporated. DO NOT apply prior to irrigation.
- **Re-entry Interval:** DO NOT enter treated fields for 24 hours.
- **Grazing Restrictions:** DO NOT graze or feed treated crops to livestock in the year of application.
- **Re-cropping Interval:** Will not injure crops the year after spring application.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** May be frozen.
- **Buffer Zones:** DO NOT apply within 15 m of fish bearing waters or wildlife habitat.

Sprayer Cleaning:

No detailed cleaning procedures are indicated on the label. Use a commercial all purpose spray sprayer cleaning product for adequate cleaning. Contact the manufacturer for more information.

Hazard Rating:



Caution – Poison

For an explanation of the symbols used here see pages 7 and 8.

Escort

Herbicide Group
2 - metsulfuron

(Refer to page 45)

Company:

Bayer (PCP#23005)

Formulation:

60% metsulfuron-methyl formulated as a water dispersible granule.

- Container size - 0.25 kg

Crops and Staging:

Pasture, rough turf, and rangeland - No stage restrictions.

Weeds, Rates and Staging:

For seedling weeds apply to young plants up to 4 inches (10 cm) tall or wide. For established non-woody plants (biennial or perennial) apply up to the early bud stage. For western snowberry, wild rose and other woody species, apply between mid-June and mid-August after the brush has leafed out, but before the leaves begin to turn their fall colours.

Rate	Weeds Controlled
8 g per acre	Canada thistle* Dandelion* Russian thistle Sow-thistle* Common tansy Scentless chamomile Sweet clover
10 g per acre	<i>Above weeds plus:</i> Western snowberry
12 g per acre	<i>Above weeds plus:</i> Wild rose Dandelion
40 g per acre**	Balsam poplar Willow

Rate	Weeds Controlled	
60 g per acre**	Cherry	Trembling aspen

At all rates add *Agral 90*, *Agsurf II*, or *Citowett* at 0.2 L per 100 L of spray solution.

* **Suppression only.**

** **Rangeland only. See label for detailed application instructions.**

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Application Information

- **Water Volume:** 40 to 91 L per acre for weedy growth and up to 809 L per acre applied to the point of run-off for woody species. See the label for details.
- **Nozzles and Pressure:** 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE coarse* droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
metsulfuron-methyl	POST (foliar) also has soil activity	ALS Amino Acid Inhibitor	Toward growth areas of plant (Symplast)	Broadleaf only	2

Effects of Growing Conditions:

DO NOT apply during periods of intense rainfall or to soil saturated with water. Warm, moist conditions following treatment enhance the activity of *Escort*, while cold, dry conditions may reduce or delay activity. Brush hardened off by cold weather and drought stress may not be controlled.

Tank Mixes:

Herbicides: 2,4-D amine or ester (371 g ae per acre) plus surfactant.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.
- **Re-entry Interval:** DO NOT re-enter treated fields for 12 hours.
- **Grazing Restrictions:** May be grazed by cattle on the day of treatment.
- **Storage:** Store in a cool, dry place. May be frozen.
- **Buffer Zones:**
Buffers are not required for hand-held and backpack applications.

Rate (g per acre)	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat**
	Less than 1 m	Greater than 1 m	
8 to 12	1	1	10
40	2	1	35
60	3	1	45

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

** Terrestrial buffers are not required for transport and utility rights of way

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Escort can cause severe injury to sensitive crops at very low concentrations. Use 'Method A' on pages 12 and 13 to clean sprayers immediately after using *Escort*.

Hazard Rating:

 Caution – Eye Irritant

For an explanation of the symbols used here see pages 7 and 8.

Express FX

Herbicide Group
2 - tribenuron
4 - dicamba
(Refer to page 45)

Weed Control

Company:

FMC Corporation

Formulation:

Express FX (PCP#33039): 60.87% dicamba and 6.52% tribenuron-methyl formulated as a wettable granule.

- Container size: 1.86 kg

Express FX is purchased alone, but it must be mixed with glyphosate before use.

Crops and Staging:

For application to fallow, post-harvest and 1 day prior to seeding the following crops:

- Barley
- Wheat (spring, durum and winter)
- Oats

Weeds and Staging:

Unless otherwise noted below, apply to young and actively growing weeds that are less than 15 cm (6 inches) in height or width.

- | | | |
|---|--|---|
| ◦ Annual smartweed
(green, lady's-thumb) | ◦ Hemp-nettle | ◦ Stinkweed |
| ◦ Canada fleabane (up to 8 cm) | ◦ Kochia** (up to 8 cm) | ◦ Volunteer canola
(including glyphosate tolerant) |
| ◦ Canada thistle (rosette)* | ◦ Lamb's-quarters | ◦ White cockle* |
| ◦ Common ragweed (up to 8 cm) | ◦ Narrow-leaved hawk's-beard
(up to 8 cm) | ◦ Wild buckwheat (up to 8 leaf) |
| ◦ Cow cockle (up to 3 leaf) | ◦ Redroot pigweed | ◦ Wild mustard |
| ◦ Dandelion | ◦ Russian thistle | ◦ Volunteer flax |
| ◦ Flixweed | ◦ Scentless chamomile* | |

* **Suppression only.**

** **Except biotypes multiple resistant to glyphosate, Group 2 and dicamba.**

Rates:

46.5 g per acre. One jug treats 40 acres. DO NOT apply more than 46.5 grams/acre per year.

Must be tank mixed with glyphosate

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Application Information:

- **Water Volume:** Minimum 22 L per acre.
- **Nozzles and Pressure:** DO NOT apply with spray droplets smaller than **ASABE coarse** classification. Boom height must be 60 cm or less above the crop or ground.
- **Screens:** Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
tribenuron	POST (foliar)	ALS Amino Acid Inhibitor	Toward growth areas of plant (Symplast)	Broadleaf only	2
dicamba	POST (foliar) with slight soil activity	Synthetic Auxin	Moves throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

Apply *Express FX* when air temperature is between 10 and 25°C. DO NOT apply when there is a risk of severe drop in night temperatures. Control of weeds growing in wheel tracks may be reduced if *Express FX* is applied under dry, dusty conditions.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

- Glyphosate

Restrictions:

- **Rainfall:** If rain occurs soon after application, control may be reduced.
- **Re-entry Interval:** DO NOT re-enter treated fields for 12 hours.
- **Grazing Restrictions:** MUST NOT be grazed or fed to livestock for 7 days after treatment.
- **Re-cropping:** Fields treated with *Express FX* may be seeded to wheat (spring, durum or winter), spring barley or oats a minimum of 24 hours after application. Fields treated with a chemfallow application can be seeded to any crop the following season. Fields treated with a post-harvest application in the fall may be seeded in spring to canola, corn, oats, spring barley, soybeans, wheat (spring or durum) or white beans.
- **Aerial Application:** DO NOT apply by aircraft.
- **Storage:** Store in original container only, away from fertilizer, seeds, food or feed. Not for use or storage in or around the home. Keep container closed.
- **Buffer Zones:**
Buffers are not required for hand-held and backpack applications.

Rate (g per acre)	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground*	1	1	5

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

** Terrestrial buffers are not required for transport and utility rights of way

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' found in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:

 Caution – Poison

 Warning – Eye Irritant. Potential skin sensitizer.

For an explanation of the symbols used here see pages 7 and 8.

Express FX (co-pack)*

Herbicide Group
2 - tribenuron
4 - dicamba
(Refer to page 45)

This product is a prepackaged tank mix of Express SG (see tribenuron - page 390) and the equivalent of dicamba 480 (page 163). Information listed is restricted to Crop, Weeds, Rates and Tank mixes. For other detailed restrictions and other general information on the component products see the product pages listed above.

**Note: This product is no longer manufactured but some still remains in the distribution system. This product will be removed from future editions when supplies are exhausted.*

Company:

FMC Corporation

Formulation:

The *Express FX* package contains the following components:

Express SG (PCP#28262): 50% tribenuron formulated as a soluble granule.

- Container size: 486 g

Dicamba L (PCP#31536): 480g/L dicamba dimethylamine salt formulated as a solution.

- Container size: 4.7 L

Crops and Staging:

Prior to seeding the following crops:

- Spring wheat
- Durum wheat
- Barley

Rates:

Express SG: 6 g per acre

Dicamba L: 58.7mL per acre
(One case treats 80 acres)

No adjuvant is required when mixing with glyphosate at 180 g ae per acre or more.

Weeds and Staging:

Weeds controlled by the pre-seed use of *Express SG* and dicamba when mixed with glyphosate plus:

- Kochia resistant to Group 2 herbicides and glyphosate

Tank Mixes:

Herbicides:

- Glyphosate (180 g ae per acre – see glyphosate page 231)

See component products for more information on restrictions application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

Fenoxaprop

Herbicide Group
1 - fenoxaprop
(Refer to page 45)

Company:

ADAMA Canada (*Bengal WB*)

Bayer (*Puma Advance*)

AgraCity (*MPower HellCat*)

IPCO (*Vigil WB*)

Loveland Products Canada (*WildCat⁺, WildCat Enhanced*)

Nufarm Agriculture (*Cordon*)

Formulation:

Bengal WB (PCP#30843), Cordon (PCP#29494), MPower HellCat (PCP#30055), Vigil WB (PCP#30844), WildCat[†] (PCP#29151): 120 g/L fenoxaprop-p-ethyl formulated as an emulsifiable concentrate.

- Container size* - 6.2 L, 12.4L, 18.6 L, 99.3L, 297.6, 312 L

Puma Advance (PCP#29615), WildCat Enhanced (PCP#31272): 90 g/L fenoxaprop-p-ethyl formulated as an emulsifiable concentrate.

- Container size - 8.25L, 123.75L, 412.5 L

* Check with individual suppliers for the container sizes they have available.

[†] Note: This product is no longer manufactured but some still remains in the distribution system. This product will be removed from future editions when supplies are exhausted.

Crops and Staging:

Application beyond the maximum rates provided below may result in crop injury.

Crop	Stage
Spring wheat (including durum), Barley [†]	1 to 6 leaves on the main stem plus 3 tillers
Barley ^{††}	1 to 5 leaves on the main stem plus 2 tillers
Perennial ryegrass for seed production only* (seedling or established [†])	2 to 4 leaves
Meadow bromegrass (seedling or established) (forage or seed production)**	

[†] *Puma Advance* and *WildCat Enhanced* only. Late application of other products could result in injury to barley.

^{††} *Bengal WB, Cordon, MPower HellCat, Vigil WB, or WildCat* only. Apply to barley only when tank mixed with a registered broadleaf product.

NOTE: Application of other fenoxaprop products to barley can result in crop injury.

* Perennial ryegrass with *Bengal WB, Cordon, Vigil WB* or *WildCat* by ground only.

** Meadow bromegrass with *Puma Advance* by ground only.

NOTE: Since the uses on forage grasses were registered under the User Requested Minor Use Label Expansion (URMULE) program, the manufacturer assumes no responsibility for herbicide performance. Those who apply this use do so at their own risk.

Durum wheat, forage grasses and barley may experience some initial, temporary stunting and yellowing that rarely results in yield loss. Injury is more likely under stress conditions (see "Effect of Growing Conditions" section).

Treatment at the 3 to 4 leaf stage of cereal crops and weeds will maximize crop tolerance and weed control. Temporary crop injury such as shortening or discoloration may be observed after application. Such injury is more likely to occur in barley and also when fenoxaprop is applied outside recommended stages.

Application Information:

- **Water Volume:**
 - **Ground application:** 23 to 45 L per acre. Use higher water volumes for dense canopies.
 - **Aerial Application:** A minimum of 14 L per acre.
- **Nozzles and Pressure:** Use 40 psi (275 kPa) when using conventional 80° or 110° flat fan nozzles. Angle nozzles forward at 45° to improve contact with vertical leaf surfaces. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressure designed to deliver proper coverage with **ASABE medium** droplets or larger.
 - DO NOT use flood jet nozzles, controlled droplet application equipment or Spra-foil equipment.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
Fenoxaprop-p ethyl	POST (foliar)	ACCase Lipid synthesis inhibitor	Toward regions of growth (Symplast)	Grasses only	1

Effects of Growing Conditions:

DO NOT apply fenoxaprop 2 to 3 days prior to, or following, temperatures of 3°C or lower as crop injury may occur. Under stressful conditions (hot/dry, water logging, disease or insect damage) or heavy crop canopy, early application will improve weed control.

DO NOT apply by air when both the temperature is greater than 25°C and the relative humidity is less than 30%.

Weeds, Rates and Staging:

Apply from the 1 to 6 leaf stage up to emergence of 3rd tiller of the weeds below. Apply at the 3 to 4 leaf stage for optimum control. Optimum weed control and yield response occurs when weeds are removed before tillering.

DO NOT apply fenoxaprop or products containing fenoxaprop to a crop more than once per year.

Weeds	Rate (mL per acre)		Rate (Acres per Package [†])
	<i>Puma Advance</i>	120 g/L forms	
Green foxtail only	206	156	80
Low wild oat infestations*	360	271	46
Moderate-heavy wild oat infestations, barnyard grass, green and yellow foxtail	413	312	40

[†] Based on 12.4 L for 120g/L formulations and 16.5 L for *Puma Advance* and *WildCat Enhanced*.

* Low wild oat rate for use on WHEAT AND DURUM ONLY, and when applied alone and NOT in a tank-mix. NOT for use with perennial ryegrass or meadow bromegrass.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

DO NOT apply *Bengal WB*, *Cordon*, *Vigil WB* or *WildCat* in barley without a broadleaf herbicide mix. ALWAYS tank mix with a registered broadleaf herbicide.

2,4-D Ester (170 g ae per acre[†] -
see 2,4-D page for product rates)

Ally (2 to 3 g per acre)[†]

Attain XC^{††}

Bromoxynil/2,4-D ester^Δ

Bromoxynil/MCPA ester^Δ

Curtail M

Dichlorprop/2,4-D^Δ

Estaprop XT^{†††}

Infinity (0.33 L per acre)^{ΔΔΔ}

Lontrel 360^{***} (0.17 L per acre)

Lontrel 360^{***} (0.17 L per acre) + MCPA 500

Ester (0.34 L per acre)*

Lontrel 360^{***} (0.112 L per acre) + MCPA

500 Ester (0.34 to 0.45 L/ acre)*

MCPA Amine or Ester (0.28 L per acre)

(600 g ai/L formulation)

Mecoprop-p^{***Δ*}

Prestige XC^{††}

Refine SG^{††}

Refine SG + MCPA (rates above)^{††}

Refine SG (4 g per acre)+ *Buctril M*

(0.4 L per acre)^{††}

Spectrum^{***†}

Triton C (label rate)^{ΔΔΔ}

Trophy^{**††}

[†] All products except *MPower HellCat*.

^{††} *Puma Advance* and *WildCat Enhanced* only.

^{†††} *Cordon* only.

^Δ Manufacturers may only support mixes with specific brands. Contact the manufacturers for more information.

^{ΔΔ} *Puma Advance*, *WildCat Enhanced* and *Cordon* only.

^{ΔΔΔ} *Puma Advance* and *WildCat Enhanced* only.

* Use only at the high rate of fenoxaprop.

** Use only at the green foxtail rate of fenoxaprop.

*** Use in wheat only

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the fenoxaprop labels only.

Fenoxaprop manufacturers may also support mixes with pesticides that are not on the fenoxaprop labels. Check with each manufacturer for the products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.

Leave an interval of 7 days prior to application or 4 days after application of fenoxaprop, when applying any pesticide that is not registered as a tank mix.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 1 hour may reduce control.
- **Re-entry Interval:** DO NOT re-enter treated fields for 12 hours.

- **Grazing Restrictions:** DO NOT graze or cut cereal crops or meadow bromegrass for hay, within 25 days of application. DO NOT graze or cut perennial ryegrass crop for hay within 65 days of application.
- **Pre-harvest Interval:** DO NOT harvest within 65 days of application.
- **Re-cropping Interval:** No restrictions in the year after application. Only one application may be made per year.
- **Aerial Application:** May be applied by air.
- **Storage:** DO NOT freeze.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:	
	Aquatic Habitats	Terrestrial habitat
Ground*	3	10
Aerial	3	33

See page 36 for an explanation of the different habitats.

* These distances can be reduced by 30% using cones on individual nozzles and by 70% using a full shield (shroud, curtain) that extends to the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Refer to 'Method B' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:

All:



Caution – Poison.



Warning – Contains the allergen soy

MPower HellCat and WildCat:



Warning – Eye and Skin Irritant.

Bengal WB, Puma Advanced and WildCat Enhanced:



Danger – Eye and Skin Irritant

For an explanation of the symbols used here see pages 7 and 8.

Fierce

Herbicide Group
14 - flumioxazin
15 - pyroxasulfone
(Refer to page 45)

Company:

Valent Canada, Inc. Distributed by Nufarm Agriculture (PCP#31117)

Formulation:

33.5% flumioxazin and 42.5% pyroxasulfone formulated as a wettable granule.

- Container size - 2.72 kg

Crops, Rates and Staging:

Note: The use of this chemical may result in contamination of groundwater particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

DO NOT apply more than 127.5 g per acre during a single growing season.

Pre-seed or pre-emergent:**Spring or Fall Application**

Crop	Rate (g per acre)	Acres Treated per Container
Corn*	85	128
Soybeans**	85	128
Wheat (NOT including durum)***	85	128

* Apply *Fierce* between 7 and 30 days prior to planting field corn into no-till or minimum tillage fields, unless application is made as part of fall burndown program.

** Seed soybean at least 1.5 inches (4cm) deep.

*** Seed wheat at least 1 inch (2.5cm) deep: apply *Fierce* a minimum of 7 days prior to seeding spring wheat.

If applied without glyphosate, add a non-ionic surfactant at 0.25% v/v.

DO NOT apply to snow or frozen ground.

Weeds and Staging:

Spray within 6 hours of mixing. *Fierce* will break down in the spray tank left to sit in the sprayer for an extended period.

Apply prior to crop and weed emergence. *Fierce* will not control emerged weeds. If weeds are emerged, apply *Fierce* in a mix with a foliar herbicide (see tank mix section). The duration of residual control may be reduced at lower rates.

Apply at 85 to 127.5 g per acre to provide control or suppression of the following weeds:

- Canada fleabane
- Chickweed (common)
- Dandelion
- Foxtail (green)
- Kochia**
- Lamb's-quarters
- Nightshade (Eastern black, hairy)
- Pigweed (green, Redroot)
- Ragweed (common)
- Smartweed (Pennsylvania)
- Velvetleaf
- Volunteer canola (all varieties)*
- Waterhemp
- Wild buckwheat
- Wild mustard

* Suppression only.

** Including Group 2, 4 and 9 resistant biotypes.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Application Information:

- **Water Volume:**
 - For pre-emergence application, use 40 to 120 L per acre.
 - For burndown application, prior to crop emergence, use 60 to 240 L per acre
- **Nozzles and Pressure:** Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE medium* droplets
- **Screens:** The use of 50 mesh screens is recommended.

DO NOT perform any tillage operations after application otherwise weed control will be reduced. When applied prior to seeding crops must be direct seeded with minimum disturbance systems.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
flumioxazin	PRE (surface) with soil activity	PPO Inhibitor/ Membrane disruptor	Upward to leaves. Little downward movement due to rapid cell leakage (Apoplast)	Selective Broadleaf	14
pyroxasulfone	PRE (surface) with residual soil activity	Long-chain Fatty Acid Inhibitor	Little movement (Symplast)	Broadleaf & grass	15

Effects of Growing Conditions:

Rainfall is required to activate *Fierce* in the soil. Crop injury may occur when soils are wet and cool following application or soils are poorly drained. Severe injury may occur with flooded soils. Newly emerging foliage can be temporarily injured by heavy rain splashing treated soil on leaves. Heavy crop residues may reduce weed control.

Irrigation: If rainfall is not received after application, 1.5 to 2.5 cm of irrigation may be applied to improve weed control activity. DO NOT apply irrigation to wheat between emergence and spike.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

Prior to All Crops:

- **Soybean:**
 - Glyphosate (IPA or K salts) 180 to 486 g ae per acre
 - *Liberty 200 SN*
 - *Gramoxone*
 - *Select*
 - *Sencor*
 - *Pursuit*

DO NOT apply with *Dual II Magnum* or *Frontier* or injury may occur.
- **Fallow Land:**
 - Glyphosate
- **Wheat:**
 - Glyphosate (IPA or K salts) 180 to 486 g ae per acre
- **Bare Ground on Non-crop Areas:**
 - Glyphosate, 2,4-D Ester and *Liberty 200 SN*.

Fungicides: None registered.

Insecticides: None registered.

Fertilizers: None registered.

Nufarm also supports the following mixes that are not on the *Fierce* label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:**
 - Prior to Soybeans, Spring Wheat: *BlackHawk*

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

- **Rainfall:** Rain or irrigation shortly after application is required for activation. If rainfall does not occur, irrigation with at least 1.5 cm of water is recommended before ground crack occurs.
- **Re-entry Interval:** DO NOT re-enter treated fields for 12 hours.
- **Grazing Restrictions:** DO NOT graze or cut crops for livestock feed from treated fields.
- **Re-cropping Interval:** Soybeans may be seeded immediately after treatment or in the spring following a fall application. Spring wheat may be seeded into minimum and no-till fields 7 days after a spring *Fierce* application or anytime in the spring after a fall application. All other crops require a successful soil bio-assay to be performed prior to planting.
- **Aerial Application:** DO NOT apply by aircraft.
- **Storage:** Store in a cool, dry place. May be frozen

- **Buffer Zones:** (Liquid formulations only)

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Soybeans, Spring wheat and fallow land	4	2	10
Bare ground on non-crop areas	5	3	20

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13. See product label for further information.

Hazard Rating:

 Warning – Skin and Eye Irritant

For an explanation of the symbols used here see pages 7 and 8.

Flexstar GT*

* For use only in the Red River Valley of Manitoba

Herbicide Group
9 - glyphosate
14 - fomesafen
(Refer to page 45)

Company:

Syngenta Canada (PCP#30412)

Formulation:

67 g/L fomesafen and 271 g/L glyphosate formulated as a solution.

- Container size: 2x10 L, 450 L

Crops and Staging:

Flexstar GT may be applied as a pre-seed burn down or as pre-emergent to the crop of soybeans or as early post-emergent on 1 to 2 trifoliolate leaf stage of glyphosate tolerant soybeans only.

For use in the Red River Valley of Manitoba only.

Maximum ONE APPLICATION EVERY TWO CONSECUTIVE YEARS of *Flexstar GT* or other products containing the active ingredient fomesafen.

Weeds, Rates and Staging:

Flexstar applied at 840 mL per acre control of the following weeds at the cotyledon to 3 or 4 true leaf stage. Add *Turbocharge* adjuvant at 0.25 L per 100 L spray solution only when weeds are under stress conditions and for larger weeds.

Grass Weeds:

- Barnyard grass
- Bromegrass (smooth)
- Cattail (common)
- Downy brome
- Foxtail barley
- Foxtail (green, yellow)
- Persian darnel
- Proso millet
- Quackgrass
- Rye, tame
- Volunteer barley
- Volunteer corn (except glyphosate tolerant varieties)
- Volunteer wheat
- Wild oats
- Yellow nutsedge

Broadleaf Weeds:

- Absinthe
- Canada thistle
- Chickweed, common
- Cleavers
- Clover (white)
- Cocklebur
- Cow cockle
- Curled dock
- Dandelion
- Field bindweed
- Fleabane (Canada)
- Flixweed
- Hemp-nettle
- Horsetail
- Knotweed (Japanese, prostrate)
- Kochia
- Lamb's-quarters
- Milkweed (common)
- Narrow-leaved hawk's-beard
- Night-flowering catchfly
- Nightshade (Eastern black)
- Pigweed (redroot, smooth)
- Prickly lettuce
- Ragweed (common)
- Round-leaved mallow
- Russian thistle
- Shepherd's-purse
- Smartweed (green, lady's-thumb)
- Sow-thistle (annual, perennial)
- Stinkweed
- Stork's-bill
- Volunteer alfalfa
- Volunteer canola (all varieties)
- Volunteer flax
- Wild buckwheat
- Wild mustard
- Wild tomato

A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:** Minimum of 60 to 80 L clean, clear water per acre. Higher spray volume is required for dense weed stands.
- **Pressure:** 30 psi (210 kPa). Increase pressure to 60 psi (420 kPa) for fields with heavy weed densities or with weeds at the upper limit of their recommended stage.
- **Nozzles:** Use nozzles capable of delivering appropriate pressures and volumes. DO NOT apply with spray droplets smaller than the *ASABE coarse* classification.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
fomesafen	POST (foliar) with little soil activity	PPO Inhibitor/ Membrane disruptor	Little movement due to rapid cell leakage(Symplast)	Non-selective Broadleaf	14
glyphosate	POST (foliar)	EPSP Amino Acid Synthesis Inhibitor	Toward growth areas (Symplast)	Broadleaf & grass	9

Effects of Growing Conditions:

Extremes in environmental conditions such as temperature, moisture, soil conditions, and cultural practices may affect activity.

Tank Mixes:

None registered.

Syngenta also supports the following mixes that are not on the *FlexStar GT* label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicide:** Glyphosate (not all formulations, please refer to manufacturer for recommendations).

Restrictions:

- **Rainfall:** Within 4 hours may reduce control.
- **Re-entry Interval:** DO NOT re-enter treated fields for 12 hours.
- **Pre-harvest Interval:** Leave at least 90 days from application to harvest.
- **Grazing Restrictions:** DO NOT graze treated crop or cut for hay.
- **Re-cropping Interval:** Winter wheat may be sown 4 months after application. Spring wheat, dry beans, soybeans and field corn may be grown the year following an application. These re-cropping restrictions refer only to the Red River Valley of Manitoba. Use outside this region is not registered as re-cropping options have not been determined.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store above -10°C, in a dry place in original container, away from food or feed.
- **Buffer Zones:** Leave a buffer zone of at least 15 m between the last spray swath and the edge of sensitive terrestrial areas such as shelterbelts, hedgerows and shrublands as well as aquatic areas such as ponds, streams, rivers, prairie potholes and sloughs. DO NOT apply when winds are greater than 15 km/hr.

Sprayer Cleaning:

Refer to 'Method B' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:

 Warning – Eye Irritant.

For an explanation of the symbols used here see pages 7 and 8.

Florasulam

Herbicide Group
2 - florasulam
(Refer to page 45)

Weed Control

Company:

Corteva Agriscience (*PrePass Flex*)

AgraCity (*MPower Battlefront*)

Loveland Canada (*Blitz*)

Winfield United (*FirstPass*)

Formulation:

PrePass Flex (PCP#31259)*: 25% florasulam formulated as a water dispersible granule.

- Container size - 8 x 648 g case

Priority (PCP#30831)*, Blitz (PCP#31687)*, FirstPass (PCP#31671)*, MPower Battlefront (PCP#33003)*: 50 g/L florasulam formulated as a suspension concentrate.

- Container size:
 - *Priority, Blitz, MPower Florasulam* - 2 x 6.4L
 - *FirstPass* – 3.2 L

**NOTE: PrePass Flex, Priority, Blitz and FirstPass are intended to be applied with glyphosate only. Best practice is to mix florasulam products with herbicides from other resistance groups to prevent the development of resistant weed biotypes.*

Crops and Staging:

Preseed burndow, Fallow or PostHarvest: Florasulam + glyphosate can be applied either in the fall or in the spring prior to seeding spring wheat (including durum), barley or oats or as an initial fallow treatment. *PrePass Flex* may be applied in fall prior to seeding winter wheat.

Spring wheat (including durum), barley: 2 to 6 leaf stage.

When mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds and Staging:

Broadleaf weeds controlled at the 2 to 4 leaf stage:

- Chickweed
- Cleavers
- Shepherd's-purse
- Smartweed (including lady's-thumb)
- Stinkweed
- Volunteer canola[†]
- Wild buckwheat
- Wild mustard

Broadleaf weeds suppressed:

- Annual sow-thistle
- Hemp-nettle
- Perennial sow-thistle (top growth control only)
- Redroot pigweed

* Seedlings and overwintered rosettes

[†] Not Including Clearfield canola varieties

Rates:

40 mL per acre

(One package treats 40 acres)

Refer to the product label for complete mixing instructions for this product and its mixes. A general mixing guide can be found on page 11.

Application Information:

- **Water Volume:** 40 L per acre.
- **Nozzles and Pressure:** Maximum 30 to 40 psi (200 to 275 kPa) with conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressure designed to deliver thorough, even coverage with *ASABE coarse* droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
florasulam	POST (foliar) with little soil activity	ALS Amino Acid synthesis inhibitor	Toward regions of growth (Symplast)	Broadleaf only	2

Effects of Growing Conditions:

Warm, moist growing conditions promote active weed growth and enhance activity of florasulam. Weeds hardened off by cold weather or drought stress may not be adequately controlled or suppressed and re-growth may occur. Under conditions of low crop and high weed density, control may be reduced. Extreme growing conditions such as drought or near freezing temperature prior to, at, or following time of application may reduce weed control and increase the risk of crop injury at all stages of growth.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Preseed Burndown, Fallow or Post-harvest:

- Glyphosate (180 to 360 g ae per acre)

In spring wheat (including durum):

- *Assert 300 SC* (0.65 L per acre) plus *Acidulate*
- *Everest 2.0**

* Refer to the *Everest 2.0* product label for additional information on rates. Application of this tank mix to wheat under environmental stress may result in injury.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the florasulam labels only.

Florasulam manufacturers may also support mixes with pesticides that are not on the product labels. Check with each manufacturer for the products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information. DO NOT apply excessive irrigation following application as product may leach.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Grazing Restrictions:** DO NOT allow lactating dairy animals to graze treated areas within 7 days of application. Withdraw meat animals from treated fields at least 3 days before slaughter. DO NOT harvest forage or cut hay within 30 days of application.
- **Pre-harvest Interval:** Leave 60 days between application and harvesting mature crop.
- **Re-cropping Interval:** Wheat, barley, canola, chickpea*, corn*, dry beans*, flax*, lentil*, mustard* (brown, oriental, yellow, and oilseed quality *B. juncea* types), oats, peas, potato* (except seed potato), soybean* or sunflower* may be grown the year following an application.

* *PrePass Flex* or other Corteva products only.

- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in dry, heated area. If frozen, bring to room temperature and agitate before use.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	5	5	30

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13. Check the cleanout requirements of pesticides mixed with this product. Additional cleanout measures may need to be integrated into those provided here.

Hazard Rating:

PrePass Flex:

 Warning – Irritant

Other Products:

 Caution – Poison

 May cause skin and eye irritation.

For an explanation of the symbols used here see pages 7 and 8.

Florasulam + 2,4-D

Herbicide Group
2 - florasulam
4 - 2,4-D
 (Refer to page 45)

This product is a prepackaged tank mix of Florasulam (page 203) and the equivalent of 2,4-D (page 83). Information listed is restricted to Crop, Weeds, Rates and Tank mixes. For other detailed restrictions and other general information on the component products see the product pages listed above.

Company:

Corteva Agriscience (*Frontline 2,4-D*)

AgraCity (*MPower Battlefront 2,4-D*)

Formulation:

The *Florasulam + 2,4-D* packages have 2 components:

Frontline 2,4-D XC A (PCP#30060) or MPower Battlefront (PCP#33003)*: 50 g/L florasulam formulated as a suspension concentrate

- Container sizes:
 - *Frontline 2,4-D XC A:* 1.6 L
 - *MPower Battlefront:* 2 x 6.4 L

Frontline 2,4-D XC B (PCP#30061); MPower 2,4-D Ester 700 (PCP#30460): 660 g/L 2,4-D LV ester formulated as an emulsifiable concentrate.

- Container sizes:
 - *Frontline 2,4-D XC B:* 2 x 6.8 L
 - *MPower 2,4-D Ester 700:* 115 L

Crops and Staging:

Spring wheat (including durum): 3rd leaf fully expanded to 6 leaf stage.

When mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds and Staging:

Broadleaf weeds controlled at the 2 to 4 leaf stage:

- Bluebur
- Burdock
- Buckwheat (Tartary, Wild)
- Chickweed (Common)
- Cleavers
- Cocklebur
- Cow cockle^{††}
- Dandelion*
- Flixweed
- Lamb's-quarters
- Mustard (ball, wild)
- Narrow-leaved hawk's-beard (up to 2 leaf)
- Plantain
- Prickly lettuce
- Ragweed (common)
- Redroot pigweed
- Russian thistle
- Shepherd's-purse
- Smartweed (including lady's-thumb)
- Sow-thistle (annual)
- Stinkweed
- Sunflower (annual)
- Vetch
- Volunteer canola[†]
- Wild radish

Broadleaf weeds suppressed:

- Canada thistle (top growth control only)
- Hemp-nettle
- Perennial sow-thistle (top growth control only)

* Seedlings and overwintered rosettes

[†] Including all herbicide-tolerant canola varieties

^{††} MPower Battlefront 2,4-D only

Rates:

Frontline 2,4-D XC A: 40 mL per acre.

Frontline 2,4-D XC B: 340 mL per acre.

(One package treats 40 acres)

MPower Battlefront: 40 mL per acre. (2 x 6.4 L treats 320 acres)

2,4-D Ester: 227 g ae per acre.

(One package/pallet treats 320 acres)

Refer to the product label for complete mixing instructions for this product and its mixes. A general guide to mixing can be found on page 11.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

In spring wheat (including durum):

- Assert 300 SC (0.65 L per acre) plus Acidulate
- Everest 2.0*

* Refer to the Everest 2.0 product label for additional information on rates. Application of this tank mix to wheat under environmental stress may result in injury.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

See component products for more information on restrictions application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

Florasulam + Clopyralid + MCPA

This product is a prepackaged tank mix of Florasulam (page 203) and the equivalent of Clopyralid+MCPA (page 154). Information listed is restricted to Crop, Weeds, Rates and Tank mixes. For other detailed restrictions and other general information on the component products see the product pages listed above.

Herbicide Group
2 - florasulam
4 - clopyralid & MCPA
(Refer to page 45)

Company:

Corteva Agriscience (*Spectrum*)

AgraCity (*MPower Battlefront CM*)

Formulation:

Each case of *Spectrum* contains 2 components:

Spectrum A (PCP#27031): 50 g/L florasulam formulated as a suspension concentrate.

- Container size - 0.8 L

Spectrum B (PCP#27032): 50 g/L clopyralid and 280 g/L of MCPA ester formulated as an emulsifiable concentrate.

- Container size - 12 L

-or-

Each case of *MPower Battlefront CM* contains 3 components:

MPower Battlefront (PCP#33003): 50 g/L florasulam formulated as a suspension concentrate.

- Container size - 0.8 L

MPower Clobber (PCP#27032): 360 g/L clopyralid formulated as a solution.

- Container size - 1.7 L

MPower MCPA Ester 600 (PCP#27032): 600 g/L of MCPA present as an ester salt and formulated as an emulsifiable concentrate.

- Container size - 5.7 L

Crops and Staging:

All Products:

- Spring wheat (including durum), barley and oats in the 2 to 6 leaf stage.

Spectrum only:

- **Forage Grasses* (seedling and established) grown for seed production:**

- No staging indicated for forage grasses.
- Bromegrass (meadow, smooth, hybrid)
- Fescue (chewings, creeping red, hard, tall)
- Perennial Ryegrass
- Timothy
- Wheatgrass (crested, intermediate)

*** NOTE: Since these uses are registered under the User Requested Minor Use Label Expansion (URMULE) program, the manufacturer assumes no responsibility for herbicide performance. Users of this product on forage grasses do so at their own risk.**

Weeds and Staging:

Broadleaf weeds controlled at the 2 to 4 leaf stage:

- Canada thistle
- Chickweed (common)
- Cleavers
- Cow cockle
- Dandelion**
- Flixweed*
- Hemp-nettle
- Lamb's-quarters
- Narrow-leaved hawk's-beard (*Spectrum* only – up to 20 cm tall)
- Redroot pigweed
- Shepherd's-purse
- Smartweed
- Sow-thistle (annual)
- Sow-thistle (perennial)[†]
- Stinkweed
- Stork's-bill
- Volunteer canola (all varieties)
- Wild mustard
- Wild buckwheat

* Spring seedlings only.

** Control of seedlings and overwintered rosettes < 15 cm and suppression of overwintered rosettes > 15 cm; mature plants.

[†] Top growth control only. Control not observed until a minimum of 40 days after treatment.

Rates:

Spectrum A: 40 mL per acre

Spectrum B: 600 mL per acre

(One case treats 20 acres)

-or-

MPower Battlefront: 40 mL per acre

MPower Clobber: 85 mL per acre.

MPower MCPA Ester 600: 283 mL per acre.

(One package treats 20 acres)

Refer to the product label for complete mixing instructions for this product and its mixes. A general mixing guide can be found on page 11.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

- **In spring wheat (including durum) and barley:**
 - Imazamethabenz (*Assert* – 0.65 L per acre) plus *Acidulate*
 - Flucarbazone (*Everest 2.0**) plus non-ionic surfactant
 - * Refer to the *Everest 2.0* product label for additional information on rates. Application of this tank mix to wheat under environmental stress may result in injury.
- **In spring wheat (including durum) and winter wheat:**
 - *Simplicity OD* or *Simplicity GoDRI*[†]
 - † *Simplicity GoDRI* with *Spectrum* only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

See component products for more information on restrictions application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

Florasulam + glyphosate

Herbicide Group
2 - florasulam
4 - glyphosate
(Refer to page 45)

This product is a prepackaged tank mix of Florasulam (page 203) and glyphosate (page 233). Information listed is restricted to Crop, Weeds, Rates and Tank mixes. For other detailed restrictions and other general information on the component products see the product pages listed above.

Company:

Corteva Agriscience (*PrePass XC, PrePass Flex*)

ADAMA Canada (*Priority*)

AgraCity (*MPower Kickoff*)

Loveland Products Canada (*Blitz*)

United Suppliers Canada (*FirstPass*)

Formulation:

The *PrePass XC* package contains 2 components:

PrePass XC A (PCP#29651): 50 g/L florasulam formulated as a suspension concentrate.

- Container size - 1.6 L (40 acre), 4 x 12 L (1200 acre)

PrePass XC B (PCP#29652): 480 g/L glyphosate DMA salt formulated as a solution.

- Container size - 2 x 7.5 L (40 acre); 4 x 112.5 L or 450 L (1200 acre)

-or-

The *MPower Kickoff* package contains two components:

***MPower Battlefront* (PCP#33003):** 50 g/L florasulam formulated as a suspension concentrate.

- Container size – 2 x 6.4 L (320 acre); 2 x 80 L (1280 acre)

***MPower Disruptor 360* (PCP#29290):** 360 g/L glyphosate as an isopropylamine (IPA) salt formulated as a solution.

- Container size – 8 x 6.4 L (320 acre); 640 L (1280 acre)

-or-

***PrePass Flex** (PCP#31259):** 25% florasulam formulated as a water dispersible granule.

- Container size - 8 x 0.65 kg (640 acres)

-or-

***Priority** (PCP#30831), *Blitz** (PCP#31687), *FirstPass* (PCP#31671)*:** 50 g/L florasulam formulated as a suspension concentrate.

- Container size – 2 x 6.4 L (320 acre)

* *PrePass Flex*, *Priority*, *FirstPass* and *Blitz* DO NOT come packaged with glyphosate. Glyphosate must be purchased separately.

Crops and Staging:

Florasulam + glyphosate can be applied either in the fall or in the spring prior to seeding spring wheat (including durum), barley or oats or as an initial fallow treatment.

PrePass XC or *PrePass Flex* may be applied in fall prior to seeding winter wheat.

Weeds and Staging:

Florasulam + glyphosate will control the following weeds:

Weeds controlled by glyphosate at the 180 g ae per acre rate plus enhanced control of the following weeds:

- ***Broadleaf weeds controlled at the 2 to 4 leaf stage:***

- | | | |
|---|---|--------------------------------------|
| ◦ Canada fleabane (up to 8 cm) [†] | ◦ Lamb's-quarters | ◦ Stinkweed |
| ◦ Common chickweed | ◦ Narrow-leaved hawk's-beard (up to 8 cm) ^{††} | ◦ Smartweed (including lady's-thumb) |
| ◦ Cleavers | ◦ Ragweed (common) (up to 8 cm) [†] | ◦ Volunteer canola (all varieties) |
| ◦ Cow cockle ^{††} | ◦ Redroot pigweed | ◦ Wild buckwheat (up to 5 leaf) |
| ◦ Dandelion (up to 30 cm across) | ◦ Russian thistle [†] | ◦ Wild mustard |
| ◦ Flixweed [†] | ◦ Scentless chamomile [†] | |
| ◦ Hemp-nettle | ◦ Shepherd's-purse | |
| ◦ Kochia* | | |

- ***Broadleaf weeds suppressed:***

- | | |
|----------------------|--|
| ◦ Annual sow-thistle | ◦ Perennial sow-thistle ^{***} |
|----------------------|--|

* Note: Florasulam + glyphosate will not control glyphosate resistant kochia.

** Earlier applications provide better results.

[†] *PrePass XC* and *PrePass Flex* only.

^{††} *PrePass XC*, *PrePass Flex*, *Priority* and *Blitz* only.

Rate:

See "Formulations:" section for package rates.

For *PrePass XC*:

PrePass XC A: 40 mL per acre.

PrePass XC B: 375 mL per acre.

-or-

For *MPower Kickoff*:

MPower Battlefront: 40 mL per acre.

MPower Disruptor 360: 500 mL per acre.

-or-

Prepass Flex: 8.1 g per acre.

-plus-

Glyphosate (purchased separately): At least 180 g ae per acre (see glyphosate page for product rates).

-or-

***Priority*, *Blitz* or *FirstPass*:** 40 mL per acre. (320 acre or 1280 acres)

-plus-

Glyphosate (purchased separately): 180 g ae per acre (see glyphosate page for product rates).

Tank Mixes:

Herbicides

- **PrePass XC:** *Vantage Plus Max II***.
 - **PrePass Flex:** glyphosate IPA, DMA or K+ salt at 180 to 1020 g ae per acre.
 - **Priority, FirstPass, or Blitz:** must be mixed with glyphosate IPA or DMA salt at 180 g ae per acre.
- ** NOTE: Corteva Agriscience does not support the topping up of *PrePass XC* with other salts of glyphosate as they may have a negative reaction with the florasulam component. *PrePass Flex* may be topped up with any formulation of glyphosate, as indicated above.

Note: The above mixes are those listed on the florasulam + glyphosate labels only.

Manufacturers may also support the following mixes that are not on the florasulam + glyphosate labels. Check with each manufacturer for the products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Re-cropping Interval:**
 - Applications after August 1: Spring wheat (including durum), barley and oat, may be seeded the following year, or the field may be fallowed.
 - Applications **before August 1:** Barley, canola, chickpeas*, dry beans*, field peas, flax*, lentils*, mustard* (brown, oriental, yellow and oilseed quality *B. juncea*) oat, soybeans*, sunflower* and wheat, may be grown the following year.
- * *PrePass XC*, *PrePass Flex*, and *Priority* only.

See component products for more information on restrictions application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

Florasulam + MCPA Ester

Herbicide Group

2 - florasulam

4 - MCPA

(Refer to page 45)

Company:

Corteva Agriscience (*Frontline XL*)

ADAMA Canada (*Topline*)

AgraCity (*MPower Battlefront M*)

Formulation:

Frontline XL (PCP#28804): 4 g/L florasulam and 280 g/L MCPA ester formulated as a co-formulated emulsifiable concentrate.

- Container size - 2 x 10 L or 120 L drum

-or-

The *Topline* or *MPower Battlefront M* packages contain two components:

Florasulam SC (PCP#30814); MPower Battlefront (PCP#33003): 50 g/L florasulam formulated as a suspension concentrate.

Checkmate MCPA Ester 600 (PCP#27804); MPower MCPA 600 Ester (PCP#32912): 600 g/L MCPA Ester formulated as an emulsifiable concentrate.

- Container size -
 - **Florasulam SC; MPower Battlefront:** 1.6 L
 - **MCPA Ester (both):** 9.33 L

Crops and Staging:

All Products:

- **Spring wheat (including durum), barley and oats:** 2 to 6 leaf stage.

Frontline XL only:

- **Seedling and established timothy for forage and seed production*:**
 - **Seedlings:** from the 2 leaf fully expanded stage up to the flag leaf stage.
 - **Established:** no stage restrictions.
- * **NOTE - Since applications to timothy has been registered under the User Requested Minor Use program, the manufacturer assumes no responsibility for herbicide performance. Application to timothy is at the risk of the user.**

When tank-mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds and Staging:**Broadleaf weeds controlled at the 2 to 4 leaf stage:**

- | | | |
|----------------------------|--------------------------------|------------------------|
| ◦ Ball mustard | ◦ Lamb's-quarters | ◦ Stinkweed |
| ◦ Burdock** | ◦ Prickly lettuce** | ◦ Sunflower (annual)** |
| ◦ Chickweed | ◦ Ragweed (common) | ◦ Volunteer canola* |
| ◦ Cleavers | ◦ Redroot pigweed [‡] | ◦ Wild mustard |
| ◦ Cow cockle ^{††} | ◦ Russian pigweed** | ◦ Wild buckwheat |
| ◦ Flixweed** | ◦ Shepherd's-purse | |
| ◦ Hemp-nettle [‡] | ◦ Smartweed | |

Broadleaf weeds suppressed:

- | | | |
|------------------------------|-------------------------|--|
| ◦ Canada thistle | ◦ Plantain [†] | ◦ Sow-thistle (perennial) [†] |
| ◦ Dandelion*** [‡] | ◦ Stork's-bill | |
| ◦ Narrow-leaved hawk's-beard | ◦ Sow-thistle (annual) | |

* including all herbicide-tolerant canola varieties

** up to the 4 leaf stage of development

*** seedlings and overwintered rosettes less than 15 cm (6 inches)

[‡] for improved control of this weed add an additional 47.5 mL per acre of MCPA LV600.

[†] top growth control

^{††} Frontline XL and Priority only.

Rate:

Frontline XL: 0.5 L per acre

- (40 acres per case, 240 acre per 120 liter drum)

-or-

Topline or MPower Battlefront M:

Florasulam SC or MPower Battlefront: 40 mL per acre

-plus-

MCPA 600 Ester: 0.23 L per acre

- (One case treats 40 acres.)

Refer to the product label for complete mixing instructions for this product and its mixes. A general guide to mixing can be found on page 11.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

- **In spring wheat (including durum) and barley only:**
 - Assert (0.65 L per acre) plus Acidulate.
- **In spring wheat (including durum) only:**
 - Simplicity OD (0.2 L per acre)[†]
 - Everest 2.0[†]

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

[†] Frontline XL or MPower Battlefront M only.

Note: The above mixes are those listed on the florasulam + MCPA ester labels only.

Manufacturers may also support additional mixes that are not on the Florasulam + MCPA labels. Check with the manufacturers for mixes they may support.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Re-cropping Interval:** Wheat, barley, canola, chickpea*, corn*, dry beans*, flax*, lentil*, mustard* (brown, oriental, yellow and oilseed quality *B. juncea* types), oats, field peas, potato* (except seed potato), soybean* or sunflower* may be grown the year following an application.
* *Frontline XL* only.

See component products for more information on restrictions application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

Florasulam/fluroxypyr + MCPA ester

Herbicide Group
2 - florasulam
4 - fluroxypyr, MCPA
(Refer to page 45)

Company:

ADAMA Canada (*Outshine*)

Corteva Agriscience (*Stellar* and *Stellar XL*)

Formulation:

Stellar A (PCP#29286), Outshine (PCP#31646): 2.5 g/L florasulam and 100 g/L fluroxypyr formulated as a suspension concentrate.

- Container size - 2 x 8 L

Stellar B (PCP#29165), MCPA 2 EH Ester 600 (PCP#31699): 600 g/L of MCPA ester formulated as an emulsifiable concentrate.

- Container size - 1 x 9.33 L

-or-

Stellar XL (PCP #32099): 2.5 g/L florasulam, 100 g/L fluroxypyr and 350 g/L of MCPA as a co-formulated emulsifiable concentrate.

- Container size – 2 x 8.1 L, 97.1 L, 518 L

Crops and Staging:

Barley, oat (*Stellar* or *Stellar XL* only) and spring wheat (including durum): 2 to 6 leaf stage.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds and Staging:

Apply when weeds are at the 2 to 4 leaf stage unless otherwise indicated.

- | | | |
|---------------------------|--|----------------------------|
| ◦ Burdock [†] | ◦ Plantain ^{††} | ◦ Sunflower (annual) |
| ◦ Chickweed (Common) | ◦ Prickly lettuce [†] | ◦ Vetch ^{††} |
| ◦ Cleavers ^{†††} | ◦ Ragweed | ◦ Volunteer canola |
| ◦ Cocklebur [†] | ◦ Pigweed (redroot, Russian [†]) | ◦ Volunteer flax |
| ◦ Flixweed | ◦ Shepherd's-purse | ◦ Wild buckwheat |
| ◦ Hemp-nettle | ◦ Smartweed | ◦ Wild mustard |
| ◦ Kochia | ◦ Stinkweed [†] | ◦ Wild radish [†] |
| ◦ Lamb's-quarters | ◦ Stork's-bill* | |

* **Suppression only**

[†] *Stellar/Outshine* weeds indicated on B or MCPA component only. All weeds controlled with *Stellar XL*.

^{††} *Stellar XL* only.

^{†††} 1 to 8 whorl for *Stellar XL*. No staging given for *Stellar/Outshine*.

Rates:

Stellar/Outshine A: 0.4 L per acre

Stellar/Outshine B (MCPA): 0.24 L per acre

(One case treats 40 acres)

-or-

Stellar XL: 0.4 L per acre

(One case treats 40 acres; one 97.1 L drum treats 240 acres; one 518 L tote treats 1280 acres)

Application Information:

- **Water Volume:** Minimum 40 L per acre.
- **Nozzles & Pressure:** For conventional flat fan nozzles use a pressure of 30 to 40 PSI (200 to 275 kPa). Use a combination of nozzles and pressure designed to deliver thorough, even coverage with **ASABE coarse** droplets. Low drift nozzles may require higher pressures for proper performance.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
florasulam	POST (foliar)	ALS Amino Acid Synthesis Inhibitor	Toward regions of growth (Symplast)	Broadleaf only	2
fluroxypyr	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4
MCPA	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

DO NOT apply to crops or weeds that are stressed (frost, low fertility, drought or flooding, disease or insect damage) as crop injury or reduced weed control may result.

Tank Mixes:

Herbicides:

- **Barley, spring wheat:**
 - *Axial****
- **Barley, spring wheat, and durum only:**
 - *Assert* (0.65 L per acre)*
- **Spring Wheat (including durum) only:**
 - *Everest 2.0* (19.4 to 29.1 mL per acre plus adjuvant - see flucarbazone)**
 - *Simplicity***
 - *Simplicity GoDRI****

* All products

** *Stellar* and *Stellar XL* only.

*** *Stellar XL* only

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the florasulam/fluroxypyr + MCPA labels only.

Manufacturers may also support the following mixes that are not on the florasulam/fluroxypyr + MCPA ester labels. Check with each manufacturer for the products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.

Restrictions:

- **Rainfall:** Rainfall within 2 hours of application may reduce efficacy.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Pre-harvest Interval:** Leave 60 days between treatment and harvest.
- **Grazing Restrictions:** DO NOT graze or harvest for livestock feed within 7 days of treating the crop.

- **Re-cropping Interval:** Wheat, barley, oat, canola, and pea may be grown the season following application or the field may be fallowed. The following crops may be grown the season following application: barley, canola, corn*, field beans (*Phaseolus vulgaris*)*, flax*, lentils*, mustard*, oats, peas, potato*†, soybean*, sunflower* or wheat or fields can be summerfallowed. There are no recropping restrictions the second year after application.
* *Stellar* and *Stellar XL* only.
† Except seed potatoes for *Stellar*
- **Aerial Application:** DO NOT apply by air.
- **Storage:** May be frozen. If frozen, bring to room temperature and agitate before use. This product is combustible. DO NOT store near heat or open flame.
- **Buffer Zones:** Leave 30 metres between the downwind edge of the boom and sensitive terrestrial habitats such as forested areas shelterbelts, woodlots, hedgerows, and shrub lands and 15 metres to sensitive freshwater habitats such as lakes, rivers, sloughs ponds, prairie potholes, creeks marshes streams reservoirs and wetlands.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13. If mixed with another pesticide additional clean-out measures may be necessary.

Hazard Rating:



Warning – Poison



Warning – Eye and Skin Irritant.



Potential skin sensitizer.

For an explanation of the symbols used here see pages 7 and 8.

Flucarbazone

Herbicide Group
2 - flucarbazone
(Refer to page 45)

Company:

Arysta LifeScience Canada (*Everest 2.0**, *Everest 3.0*)

Syngenta Canada (*Sierra 2.0**, *Sierra 3.0*)

Formulation:

Everest 2.0 (PCP#30342)*, Sierra 2.0 (PCP#30430)*: 397 g/L flucarbazone formulated as a suspension concentrate.

- Container size - 1.94 L

Everest 3.0 (PCP#32602), Sierra 3.0 (PCP#32941): 200 g/L formulated as a suspension concentrate.

- Container size - 3.88 L

***Note:** This product is no longer manufactured, but some may remain in the distribution system. This product may be removed in future editions of this guide.

Crops and Staging:

Spring application to wheat (spring, durum, winter): 1 leaf to a maximum of 4 main stem leaves plus 2 tillers (6 total leaves).

Note: Several of the tank mix partners have more limiting staging than flucarbazone alone. When tank mixing use the most restrictive application state or injury may result.

Weeds, Rates and Staging:

Grass weeds: Maximum of 4 main stem leaves and 2 tillers

Broadleaf weeds: 2 to 6 leaf stage

Weed	Rate	
	Everest 2.0/ Sierra 2.0	Everest 3.0/ Sierra 3.0
	mL per Acre	mL per Acre
Green foxtail*	14.6	29.1
Weeds listed above plus: Wild oat* (light infestations) (< 100 plants/m ²), volunteer oat, green smartweed, redroot pigweed*, shepherd's-purse*, volunteer canola*, wild mustard*, stinkweed* (2 to 9 leaf stage)	19.4	38.4
Weeds listed above plus: Wild oat* (heavy populations) (> 100 plants/m ² , Japanese brome up to 4 leaf stage pre-tillering, both growing under ideal growing conditions, Suppression of: Wild buckwheat (1 to 4 leaf stage), barnyard grass**, yellow foxtail**	24.3	48.2
Grass weeds listed above growing under poor growing conditions or when mixing with herbicides containing the a.i. dicamba (see pages 11 to 18)	29.1	58.2

Requires the addition of a non-ionic surfactant (*Agral 90, Agsurf II, Liberate, ProSurf, Super Spreader, LI700*) at 0.25 L per 100 L of spray solution.

* Will not control imidazolinone tolerant (CLEARFIELD) canola volunteers or Group 2 resistant weed biotypes.

** Control with a mix of *Inferno WDG*.

DO NOT apply more than the equivalent of 29.1 mL per acre flucarbazone 2.0 or 58.2 mL flucarbazone 3.0 or other source of flucarbazone (*Inferno Duo*) per growing season.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:**
 - **Ground:** 22.5 to 45 L per acre.
 - **Aerial:** 11 L per acre.
- **Nozzles and Pressure:** Use 30 to 50 psi (200 to 345 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE medium* droplets. Orienting nozzles at a 45 degree angle forward may improve coverage of vertical leaves (grasses).

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
flucarbazone	POST (foliar) with soil residual activity	ALS Amino Acid Inhibitor	Toward growth areas of plant (Symplast)	Broadleaf & grass	2

Effects of Growing Conditions:

Crop tolerance and weed control may be reduced if applications are made to plants growing under stress. Stress includes saturated or water-logged soil, drought, extreme temperatures, low fertility or visible disease symptoms at application. Adopting practices to increase crop vigour will improve crop tolerance.

Tank Mixes:

Herbicides:

Note:

- All mixes must be applied with a registered surfactant unless otherwise indicated. Only one registered surfactant is required.
- All products below may be mixed at label rates with Flucarbazone unless otherwise indicated.
- Flucarbazone at all rates may be mixed with the products listed below unless otherwise indicated.
 - **In wheat (spring and durum) only:**
 - 2,4-D Amine or Ester (rates up to 227 g ae per acre)*
 - *Enforcer D*
 - *Enforcer M*
 - Florasulam + *Curtail M* (*Spectrum* only)*
 - *Paradigm*
 - *Paradigm* + MCPA Ester
 - *Paradigm* + *Curtail M*
 - *Pixxaro*
 - *Pixxaro* + MCPA
 - *Pixxaro* + *Curtail M*
 - Tribenuron (*Inferno WDG*)

- **In wheat (spring and winter) only:**
 - 2,4-D Amine or Ester (rates up to 227 g ae per acre)
 - Bromoxynil/MCPA (*Buctril M/Logic M* only)
- **In spring wheat (NOT including durum) only:**
 - Bromoxynil (*Brotex 240/Pardner* only)
 - Bromoxynil/2,4-D (*Leader/Thumper* only)
 - *Curtail M***
 - Dicamba/mecoprop/MCPA (*Target* only)††
 - Dichorprop+2,4-D (*Estaprop/Dichlorprop-D* only)
 - *Dyvel*††
- MCPA Amine or Ester at rates up to 0.38 L per acre (600 g/L formulation)
- Florasulam + 2,4-D (*Frontline 2,4-D* only)
- Florasulam + MCPA (*Frontline XL* only)*
- Florasulam/Fluroxypyr+MCPA (*Stellar* only)**
- Fluroxypyr + 2,4-D (*Attain XC* only)**
- Fluroxypyr+MCPA (*Trophy* only)
- Thifensulfuron/tribenuron (*Refine SG/Deploy WDG* only)
- Metsulfuron (*Ally* only) + 2,4-D Amine or Ester up to rates above**
- *OcTTain XL**
- *Optica Trio*††
- *Prestige XC***
- Thifensulfuron/Tribenuron (*Refine SG/Deploy* only) plus 2,4-D Amine or Ester at rates above
- *Triton C*

*Apply in 40 L per acre of water only.

** Apply in 40 L per acre of water only with 24.3 to 29.1 mL per acre of *Flucarbazone 2.0* or 38.4 to 58.3 mL per acre of *Flucarbazone 3.0*.

† Wild oat control may be reduced with this mix.

Tank mix only with the highest rate of flucarbazone.

Fertilizers: None registered.

Insecticides: None registered.

Note: The above mixes are those listed on the flucarbazone labels only.

Both manufacturers also support the following mixes that are not on Flucarbazone labels.

- **Herbicides:**
 - *Barricade II, Enforcer MSU, Momentum* + MCPA Ester, *Retain SG, Stellar XL*. Apply mixes according to the most restrictive use limitations for either product.

Flucarbazone manufacturers may also support other mixes with pesticides that are not listed above. Check with each manufacturer for the products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Rainfall within 1 hour of application may reduce control.
- **Re-entry Interval:** DO NOT re-enter treated area within 12 hours.
- **Grazing Restrictions:** DO NOT graze treated fields. Mature grain or straw may be fed to livestock.
- **Pre-harvest Interval:** Leave at least 80 days from application to harvest
- **Re-cropping Interval:** See the following chart below:

Soil Zones and Rotational Crops			
Grey-Wooded	Black	Dark Brown	Brown
Spring Wheat Barley Canola (all varieties) Field Pea*	Spring Wheat Barley Canola (all varieties) Durum Wheat Field Pea* Flax Field Bean Soybean† Sunflower†	Spring Wheat Barley Canola (all varieties) Durum Wheat Field Pea* Flax Soybean† Sunflower†	Spring Wheat

† Not including *Sierra 3.0* at this time.

* NOTE: Field pea may be grown the year following flucarbazone application in fields where precipitation has been equal to or above the 10-year average during the growing season, and where organic matter content is above 4%, and pH is below 7.5. The company suggests a minimum of 100 mm (4 inches) of rain is needed in the 60 days following application for adequate breakdown to take place.

NOTE: Other rotational crops may also be affected if rainfall is less than the 10-year average for the area. Soils in the grey wooded, black and dark brown soil zones with a combination of low organic matter (less than 2%), light textured soils or high pH (greater than 7.5) (i.e. eroded knolls, sandy soils) may result in delayed growth and development in rotational crops.

- **Aerial Application:** May be applied by aircraft.
- **Storage:** Store in closed original container in a cool, dry area away from fertilizers, food or feed. DO NOT freeze.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:	
	Aquatic Habitat	Terrestrial habitat
Field sprayer*	5	2
Fixed wing aircraft	100	65
Helicopter	85	55

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13. When mixing with other pesticides, combine the method above with cleanout methods for the tank mix partner.

Hazard Rating:



Warning – Contains the Allergen Milk

For an explanation of the symbols used here see pages 7 and 8.

Fluroxypyr

Herbicide Group
4 - fluroxypyr
(Refer to page 45)

Company:

AgraCity (*MPower Foxy*)

Great Northern Growers and UAP (*Ikwin*)

Formulation:

MPower Foxy (PCP#32952); Ikwin (PCP#33047): 180 g ae/L fluroxypyr formulated as an emulsifiable concentrate.

- Container size – 7.28 L (*MPower Foxy*), 9.68 L (*Ikwin*)

Perimeter II (PCP#30094)*: 333 g ae/L fluroxypyr formulated as an emulsifiable concentrate.

- Container size – 3.4 L.

* *Perimeter II* is only available as a component of co-packaged products or tank mixes with FMC products.

Crops and Staging:

Spring wheat (including durum), barley: 2 leaf up to the initiation of stem elongation (nodes can be felt at the base of the stem).

Winter wheat (*Perimeter II* only): Apply to winter wheat in the spring from the 3 tiller stage to just before the flag leaf stage.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

Weeds Controlled	180 g/L		333 g/L	
	Rate (mL/acre)	Stage	Rate (mL/acre)	Stage
Cleavers	162	(1 to 4 whorls)	85	(1 to 6 whorls)
Cleavers	-	-	125	(1 to 8 whorls)
Kochia	243	(2 to 8 leaf)	125	(2 to 8 leaf)

Weeds Controlled	180 g/L		333 g/L	
	Rate (mL/acre)	Stage	Rate (mL/acre)	Stage
Round-leaved mallow	324	(1 to 6 leaf)	162	(1 to 6 leaf)
Volunteer flax	243	(1 to 12 cm)	125	(1 to 12 cm)
Chickweed ^{††}	324	(up to 8 cm)	162	(up to 8 cm)
Hemp-nettle [†]	324	(2 to 6 leaf)	162	(2 to 6 leaf)
Stork's-bill [†]	243	(1 to 8 leaf)	125	(1 to 8 leaf)
Wild buckwheat [†]	324	(1 to 4 leaf)	85	(1 to 8 leaf)

[†] Suppression only

^{††} Suppression only with 180 g/L formulations, control with 333 g/L formulations

Make only ONE APPLICATION per year of any of these products or other products containing the same active ingredients. Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:**
 - **Ground:** 20 to 40 L per acre. All other uses minimum 40 L per acre.
 - **Aerial:** *Perimeter II* only – 12 to 20 L per acre.
- **Nozzles and Pressure:** Maximum 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of **ASABE coarse** droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
fluroxypyr	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

The activity these products are influenced by weather conditions. The temperature range for optimum activity is 12°C to 24°C. Reduced activity will occur when temperatures are below 8°C or above 27°C. Frost 3 days before or after application may reduce weed control and crop tolerance. Weed control may be reduced during stress conditions (drought, heat or cold stress) or if extremely heavy infestations exist.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

The following mixes may be used with each of the products above unless noted otherwise.

- **In all labelled crops:**
 - 2,4-D ester (up to 560 g ae per acre)
 - MCPA ester (up to 560 g ae per acre)
 - *Curtail M* (0.61^{††} to 0.81 L per acre)

The following mixes may be used with fluroxypyr alone or in combination with the broadleaf tank mix partners above unless otherwise indicated.

- **In spring wheat (including durum) and barley:**
 - Imazamethabenz (*Assert* only – 0.53 to 0.65 L per acre)
 - Tralkoxydim^{†*}
- **In spring wheat (including durum) only:**
 - Clodinafop 240EC[†] (93 mL per acre)
 - Fenoxaprop[†]
 - *Simplicity OD*^{†Δ}

Insecticides: None registered.

Fungicides: None registered.

Fertilizer: None registered.

* Temporary crop injury or reduced wild oat control may occur with this tank mix.

† See product labels for specific brands registered.

†† *Perimeter II* only.

△ Only with tank mix with 2,4-D ester.

Note: The above mixes are those listed on the fluroxypyr + 2,4-D product labels only.

Manufacturers may also support mixes between their products and other pesticides that are not on their labels. Check with each manufacturer for the products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 1 hour will reduce control.
- **Re-entry Interval:** DO NOT re-enter treated area within 12 hours.
- **Grazing Restrictions:** Livestock may be grazed 3 days after application. DO NOT feed or cut forage grasses for hay.
- **Pre-harvest Interval:** Leave 60 days between application and harvest.
- **Re-cropping Interval:**
 - **All Products:** Barley, canola, flax, forage grasses, lentils, mustard, oats, peas, rye, and wheat, may be grown the year after application. There are no re-cropping restrictions the second year after application.
 - **Perimeter II only:** Alfalfa, corn, dry beans, potatoes, soybeans, and sunflowers may also be seeded the year following.
- **Aerial Application:** *Perimeter II* only may be applied by air.
- **Storage:** Avoid freezing. If frozen, bring to room temperature and agitate before use. These products are combustible. DO NOT store near heat or open flame.
- **Buffer Zones:**
 - **Ikwin, MPower Foxy:** Leave a buffer of 15 metres from water bodies, wetland areas and plants that may be injured.
 - **Perimeter II:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	3
Fixed wing aircraft	6	0	100
Helicopter	6	0	80

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:

Ikwin, MPower Foxy:

 Danger – Poison.

All products:

 Warning – Eye Irritant.

 Caution – Skin Irritant.

For an explanation of the symbols used here see pages 7 and 8.

Fluroxypyr + 2,4-D

Herbicide Group
4 - fluroxypyr & 2,4-D
(Refer to page 45)

This product is a prepackaged tank mix of Fluroxypyr (see Fluroxypyr – page 217) and 2,4-D ester (page 83). Information listed is restricted to Crop, Weeds, Rates and Tank mixes. For other detailed restrictions and other general information on the component products see the product pages listed above.

Company:

AgraCity (MPower Foxy Pro)
Corteva Agriscience (Attain XC)
Nufarm Agriculture (Flurox-24)
ADAMA Canada (Rush 24)

Formulation:

The Attain XC package has 2 components:

Attain XC A (PCP#29463): 333 g/L fluroxypyr formulated as an emusifiable concentrate.

- Container size - 5 L, 8 x 15 L

Attain XC B (PCP#29264): 660 g/L 2,4-D LV ester formulated as an emusifiable concentrate.

- Container size - 2 x 6.8 L, 4 x 82 L

-or-

The packages for Flurox-24, Rush 24 or MPower Foxy Pro have 2 components:

Nufarm Fluroxypyr (PCP#30194), Fluroxypyr 180 EC (PCP#30815), MPower Foxy (PCP#32952): 180 g/L fluroxypyr formulated as an emusifiable concentrate.

- Container size:
 - Nufarm Fluroxypyr – 7.28 L
 - Fluroxypyr 180 EC, MPower Foxy – 9.6 L

2,4-D Ester 700 (PCP#27820), Salvo 2,4-D Ester 700 (PCP#27818), MPower 2,4-D Ester (PCP#30460): 660 g/L 2,4-D LV ester formulated as an emusifiable concentrate.

- Container size -
 - Flurox-24 package – 10.3 L.
 - Salvo (Rush 24) and MPower Foxy Pro package – 9.8 L[§]

[§]NOTE: The amount of 2,4-D 700 Ester provided in the Rush 24 and MPower Foxy Pro packages is roughly 75% of the 2,4-D Ester required to achieve the rates listed below. Additional 2,4-D Ester will need to be purchased to achieve labelled use rates.

Crops and Staging:

Spring wheat (including durum), barley: 4 leaf up to the emergence of the flag leaf.

Winter wheat: Apply to winter wheat in the spring from the 3 tiller stage to just before the flag leaf stage. (Attain XC only)

Forage Grasses for seed production only*:

- Seedling and established grasses at the 4 leaf up to the emergence of the flag leaf.
 - Bromegrass (meadow, smooth) ◦ Timothy ◦ Wheatgrass (crested, intermediate)
 - Fescue (creeping red, tall)

*NOTE: Since these uses are registered under the User Requested Minor Use Label Expansion (URMULE) program, the manufacturer assumes no responsibility for herbicide performance. Those who apply these uses do so at their own risk.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

The following weeds are controlled at the 2 to 4 leaf stage, unless otherwise specified:

[§]NOTE: The amount of 2,4-D 700 Ester provided in the Rush 24 and MPower Foxy Pro packages is roughly 75% of the 2,4-D Ester required to achieve the rates listed below. Additional 2,4-D Ester will need to be purchased to achieve labelled use rates.

- *Attain XC A* at 95 mL per acre plus *Attain XC B* at 260 mL per acre or; *Nufarm* or *ADAMA Fluroxypyr 180* or *Mpower Foxy* at 180 mL per acre plus 2,4-D Ester 700 component[§] at 260 mL per acre (*Flurox-24* treats 40 acres per case, *Rush 24* or *Mpower Foxy Pro* plus additional 2,4-D[§] treats 52 acres per case) controls the weeds controlled by 2,4-D ester at 170 gae/acre (see 2,4-D page) plus the following weeds:
 - Cleavers* ◦ Vetch ◦ Wild buckwheat**
 - Kochia
- * 1 to 4 whorls with *Flurox-24*, *Rush 24* and *Mpower Foxy Pro*; 1 to 6 whorls with *Attain XC* only.
- ** 1 to 4 leaf with *Flurox-24* and *Mpower Foxy Pro*; 1 to 6 leaf with *Attain XC* and *Rush 24* only.
- *Attain XC A* at 125 mL per acre plus *Attain XC B* at 340 mL per acre or; *Nufarm* or *ADAMA Fluroxypyr 180* or *Mpower Foxy* at 240 mL per acre plus 2,4-D Ester 700 component[§] at 340 mL per acre (*Flurox-24* treats 30 acres per case, *Rush 24* or *Mpower Foxy Pro* plus additional 2,4-D[§] treats 40 acres per case) controls the weeds controlled by 2,4-D ester at 227 gae/acre (see 2,4-D page) plus the following weeds:
 - All weeds listed above plus:
 - Cleavers (1 to 8 whorls)^Δ ◦ Kochia (2 to 8 leaf) ◦ Wild buckwheat***
 - Hemp-nettle (2 to 6 leaf stage)[†]
- *** 1 to 4 leaf with *Flurox 24* and *Mpower Foxy Pro*; 1 to 8 leaf with *Attain XC* and *Rush 24* only
- ^Δ *Attain XC* only
- [†] Suppression only

Make only ONE APPLICATION per year of any of these products or other products containing the same active ingredients. Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:**
 - **Ground:** *Attain XC* use 20 to 40 L per acre. All other products minimum 40 L per acre.
 - **Aerial:** *Attain XC* only use 12 to 20 L per acre.
- **Nozzles and Pressure:** Maximum 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of *ASABE coarse* droplets.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

The following mixes may be used with each of the combinations above unless noted otherwise.

- **In spring wheat (including durum) and barley:**
 - Imazamethabenz (*Assert* only – 0.53 to 0.65 L per acre)
 - Tralkoxydim^{†*}
- **In spring wheat (including durum) only:**
 - Clodinafop 240EC[†] (93 mL per acre)
 - Fenoxaprop[†]
 - *Simplicity OD*^{††}
 - *Simplicity GoDR*^{††}

Insecticides: None registered.

Fungicides: None registered.

Fertilizer: None registered.

* Temporary crop injury or reduced wild oat control may occur with this tank mix.

† See product labels for specific brands registered.

†† Low rate of *Attain XC* only.

Note: The above mixes are those listed on the fluroxypyr + 2,4-D product labels only.

Manufacturers may also support mixes between their products and other pesticides that are not on their labels. Check with each manufacturer for the products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Grazing Restrictions:** DO NOT permit lactating dairy animals to graze cereal fields within 7 days of application. DO NOT harvest cereal crops for forage or cut hay within 30 days of application. Withdraw meat animals from treated fields at least 3 days before slaughter. DO NOT feed or cut forage grasses for hay
- **Re-cropping Interval:**
 - **All products:** Barley, canola, flax, forage grasses, lentils, mustard, oats, peas, rye, and wheat, may be grown the year after application. There are no re-cropping restrictions the second year after application.
 - **Attain XC only:** Alfalfa, corn, dry beans, potatoes, soybeans, and sunflowers may also be seeded the year following.
- **Aerial Application:** *Attain XC* may be applied by air.
- **Buffer Zones:**
 - **Flurox-24, Rush 24:** Leave a buffer of 15 metres from water bodies, wetland areas and plants that may be injured.
 - **Attain XC:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	3
Fixed wing aircraft	6	0	100
Helicopter	6	0	80

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

See component products for more information on restrictions application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

Fluroxypyr + MCPA

This product is a prepackaged tank mix of Fluroxypyr (see Fluroxypyr – page 217) and MCPA ester (page 284). Information listed is restricted to Crop, Weeds, Rates and Tank mixes.

For other detailed restrictions and other general information on the component products see the product pages listed above.

**Herbicide Group
4 - fluroxypyr & MCPA**
(Refer to page 45)

Company:

ADAMA Canada (*Rush M*)

AgraCity (*MPower Foxy M*)

Nufarm Agriculture (*Trophy*)

Formulation:

The Fluroxypyr + MCPA package has 2 components:

Nufarm Fluroxypyr (PCP#30194), MPower Foxy (PCP#32952) or ADAMA Fluroxypyr 180 EC (PCP#30815): 180 g/L fluroxypyr.

- Container size – 4.8 L

NuFarm MCPA Ester 600 (PCP#27803), MPower MCPA Ester 600 (PCP#32912) or ADAMA MCPA 2 EH Ester 600 (PCP#31669): 600 g/L MCPA ester.

- Container size – 7.5 L

All components above are formulated as emulsifiable concentrates.

Crops and Staging:

Spring wheat (including durum), canaryseed* & barley: 3 leaf up to full emergence of the flag leaf.

*Trophy only - Since the use of this product on canaryseed is registered under the User Requested Minor Use registration system, the manufacturer assumes no responsibility for herbicide performance. Users of this product on canaryseed do so at their own risk.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds and Staging:

Weeds controlled at the 2 to 4 leaf stage, unless specified, include weeds controlled by MCPA 600 ester at 380 mL/acre plus:

- Cleavers (1 to 4 whorls)
- Kochia
- Volunteer flax (1 to 12 cm)
- Hemp-nettle (2 to 6 leaf)
- Vetch

Weeds suppressed include:

- Stork's-bill (1 to 8 leaf)
- Wild buckwheat (1 to 4 leaf)

Rate:

Fluroxypyr component: 0.24 L per acre

MCPA Ester 600 component: 0.38 L per acre.

(One case treats 20 acres)

Maximum ONE APPLICATION per year of Trophy or Rush or other products containing fluroxypyr.

Tank Mixes:

Tank mix partners may be mixed at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

- **In spring wheat (including durum) and barley:**
 - Imazamethabenz (Assert only – 0.53 to 0.65 L per acre)
 - Tralkoxydim[†]
 - **In Spring wheat (including durum) only:**
 - Clodinafop[†]
- [†] See product labels for specific brands registered.

Note: The above mixes are those listed on the Fluroxypyr + MCPA ester labels only.

Individual manufacturers may also support additional mixes that are not on the Fluroxypyr+MCPA labels. Check with manufacturers for more details.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Re-cropping Interval:** Wheat, barley, oat, rye, forage grasses, flax, canola, mustard, lentil and pea may be grown the year after application. There are no re-cropping restrictions the second year after application.
- **Aerial Application:** DO NOT apply by air.
- **Buffer Zones:**
 - Hand-held or backpack sprayers, inter-row hooded sprayers and spot treatments are exempt from buffer zone requirements.

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	15	15	15

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

See component products for more information on restrictions application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

Focus

Herbicide Group
 14 - carfentrazone
 15 - pyroxasulfone
 (Refer to page 45)

Company:

FMC Corporation

Formulation:

Focus (PCP#32292): 447 g/L pyroxasulfone and 53 g/L carfentrazone formulated as a suspension emulsion.

- Container size – 4 x 4.5 L

-or-

Focus co-pack[†], containing:

Aim EC Herbicide (PCP#28573): 240 g/L carfentrazone formulated as an emulsifiable concentrate.

- Container size - 1 x 2 L

Pyroxasulfone 85 WG (PCP#30572): 85% pyroxasulfone formulated as a water dispersible granule.

- Container size - 2 x 2 kg

[†] **Note:** This product is no longer manufactured but inventories still remain in distribution. This product may be removed from future editions.

Crops, Rates and Staging:

Note: The use of this chemical may result in contamination of groundwater particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

Apply prior to seeding of or up to 3 days after seeding of:

- Corn
- Lentil[†]
- Soybean
- Wheat (spring and winter, NOT durum)*

Treatment	Product	Rate (per acre)		Acres Treated per Jug	
		Soil Type		Soil Type	
		Coarse to Medium Texture (1 to 4% O.M.)**	Medium to Fine Texture (4 to 7% O.M.)	Coarse to Medium Texture (1 to 4% O.M.)	Medium to Fine Texture (4 to 7% O.M.)
Non-residual	Focus co-formulated	90 mL		50	
	Focus co-pack Aim EC Pyroxasulfone 85 WG	24 mL 48 g		84	
Residual	Focus co-formulated	113 mL	136 mL	40	33
	Focus co-pack: Aim EC Pyroxasulfone 85 WG	30 mL 60 g	36 mL 73 g	66	55

* DO NOT apply prior to seeding durum wheat.

** O.M. = organic matter content

[†] Under certain conditions, Focus can affect lentil growth. See details under "Effects of Growing Conditions" below.

Coarse to Medium soils	Medium-Fine to Fine soils
Sand, Loamy sand, Sandy loam, Loam, Silt loam, Silt	Sandy clay loam, Sandy clay, Silty clay loam, Silty clay, Clay loam, Clay

Maximum ONE APPLICATION of Focus or other products containing carfentrazone or pyroxasulfone per season.

Use Agral 90 or Ag-Surf at 0.25 L per 100 L of spray solution or Merge at 1 L per 100 L of spray solution for emerged broadleaf weeds, if using Focus without glyphosate.

Refer to the product label for complete mixing instructions for this product and its mixes. A general guide to mixing can be found on page 11.

WARNING – application to emerged crops will result in severe damage to the crop.

DO NOT apply *Focus*:

- to soils with 7% or more organic matter content.
- to sandy soils with less than 1% organic matter content.
- in conjunction with products containing saflufenacil (*Heat*), before or after the application of *Focus* as crop injury may occur.

Weeds and Staging:

Control of the following weeds emerging from seed (not controlled if emerged at application):

- Barnyard grass
- Brome (downy, Japanese)
- Cleavers
- Foxtail (green, yellow)
- Foxtail barley*
- Kochia*
- Lamb's-quarters*
- Mustard (wild*, wormseed)
- Pigweed (green, redroot)
- Ryegrass (Italian)
- Stinkweed*
- Waterhemp, common
- Wild buckwheat*
- Wild oats*
- Velvetleaf

* **Suppression only.**

Application Information:

- **Water Volume:** Minimum of 40 L per acre. Higher spray volume is required for dense weed stands. Weed control improves with the amount of coverage.
- **Nozzles & Pressure:** Maximum 35 psi (210 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE medium* droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
carfentrazone	POST (foliar)	PPO Inhibitor/ Membrane disruptor	Little movement due to rapid cell leakage (Symplast)	Non-selective Broadleaf	14
pyroxasulfone	PPI, PRE (surface) with residual soil activity	Long-chain Fatty Acid Inhibitor	Little movement (Symplast)	Broadleaf & grass	15

Effects of Growing Conditions:

All Crops: Moisture is necessary to activate the Pyroxasulfone component in soil for effective weed control. Dry weather following applications may reduce effectiveness. Extremes in environmental conditions such as temperature, moisture, soil conditions, and cultural practices may affect activity. Excessive rainfall, irrigation, or prolonged wet soil conditions after application of *Focus* from seed germination through seedling emergence may increase the risk of seedling injury, especially with shallow seeded crops.

Lentils: Under certain conditions, *Focus* can affect lentil growth. These conditions include high pH (7.5 and above), cool weather, prolonged and excessive moisture, seedling diseases, and any other conditions, including poor agronomic practices, that are unfavorable to vigorous crop growth. Such effects are often observed as stunting and discoloration. The duration of these effects is somewhat dependent on the duration of the adverse growing conditions. These effects lessen and generally diminish with the return to normal growing conditions.

Tank Mixes:

Herbicides:

- **Prior to Corn only:**
 - *AAtrex* (0.85 to 1.25 L per acre) (soil activity).
- **Prior to All Crops:**
 - Glyphosate (180 to 360 g ae per acre)

FMC also supports the following mixes that are not on the *Focus* label. Apply mixes according to the most restrictive use limitations for either label:

- **Herbicides:** 2,4-D amine or ester + glyphosate

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Rainfall within 1 hour of application or heavy rainfall shortly after application may reduce weed control of the *Aim* component. Moderate rainfall beyond the above limitations will improve the activity of the *Pyroxasulfone 85WG* component.
- **Re-entry Interval:** DO NOT re-enter treated fields for 12 hours.
- **Grazing Restrictions:** DO NOT allow livestock to graze or feed on wheat grain, forage, hay or straw within 42 days after application.
- **Pre-harvest Interval:** Not applicable.
- **Re-cropping Interval:** Conduct a field bioassay to confirm crop safety prior to seeding any rotational crops other than wheat (spring or winter), field corn, lentils or soybeans.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a cool, dry place in original container.
- **Buffer Zones:**

Application Method	Formulation	Buffer Zones (metres [†]) Required for the Protection of:		
		Aquatic Habitats of Depths		Terrestrial habitat
		Less than 1 m	Greater than 1 m	
Ground *	<i>Focus</i> co-formulated	5	3	5
	<i>Focus</i> co-pack	5	3	1

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:

No specific hazards.

Fortress MicroActiv

Herbicide Group
3 - trifluralin
8 - triallate
(Refer to page 45)

Company:

Gowan Canada (PCP#19521)

Formulation:

10% triallate and 4% trifluralin formulated as a granular.

- Container size - 22.7 kg, 454 kg

Crops and Staging:

Prior to planting wheat (spring and durum), barley, canola, flax (not including Solin - low linolenic acid flax), mustard.

Pre-plant incorporated: In fall after September 15 until soil freeze-up or in the spring prior to seeding crop.

Surface application: Apply in the fall after October 1 and when soil temperature is less than 4°C at a depth of 2 inches (5 cm). Incorporation using a harrow operation is recommended. Incorporation can be delayed until the following spring.

Some wheat and barley injury may be noted on eroded knolls.

DO NOT apply *Fortress MicroActiv* to fields:

- after snowfall
- with heavy crop residue.

Weeds and Staging:

Pre-emergent control of:

- Foxtail (green, yellow)
- Wild oat

Suppression of:

- Kochia
- Redroot pigweed
- Wild buckwheat
- Lamb's-quarters
- Russian thistle

Rates:

Fortress MicroActiv – Fall Treatment

Crop	Rate (Kg per acre)				Acres Treated per 454 Kg Bag			
	Organic Matter				Organic Matter			
	Less than 2%	2 to 4%	4 to 6%	Greater than 6%	Less than 2%	2 to 4%	4 to 6%	Greater than 6%
Wheat	N.R.*	4.4	5.7	5.7**	N.R.*	102	80	80
Barley	4.4	5.7	5.7	6.9	102	80	80	66
Canola, flax [†] , mustard	5.7	5.7	5.7	6.9	80	80	80	66

* N.R. - Not Recommended.

** For fall incorporated applications (not surface) apply 6.88 kg per acre when organic matter exceeds 8 percent.

[†] Excluding Solin (low linolenic acid flax).

Fortress MicroActiv – Spring Treatment

Crop	Rate (Kg per acre)				Acres Treated per 454 Kg Bag			
	Organic Matter				Organic Matter			
	Less than 2%	2 to 4%	4 to 6%	Greater than 6%	Less than 2%	2 to 4%	4 to 6%	Greater than 6%
Wheat	N.R.*	N.R.*	4.4	5.7	N.R.*	N.R.*	102	80
Barley	N.R.*	4.4	5.7	6.9	N.R.*	102	80	66
Canola, flax [†] , mustard	5.7	5.7	6.9	6.9	80	80	66	66

* N.R. - Not Recommended.

[†] Excluding Solin (low linolenic acid flax).

Application Information:

- *Fortress MicroActiv* may be applied in the fall with or without a fall tillage operation, or in the spring as a pre-plant incorporated treatment. Before application of this product, the soil must be in good working condition. Application to a field that is wet, lumpy, rough or ridged will result in reduced weed control and promote crop thinning.
- *Fall Surface Application:* Where fields are prone to water and/or wind erosion, and tillage is therefore undesirable, fall surface application should be made within 3 weeks of soil freeze-up, when the soil begins to cool (less than 4°C), which typically begins on or around October 1. Application can be made to standing stubble or to previously worked fields with incorporation delayed until spring. Incorporation using a harrow operation is recommended. For best results on heavy wild oat infestations, use the incorporated treatment.
- *Fall Incorporated Application:* *Fortress MicroActiv* must be applied after September 15 and before soil freeze-up. Application prior to September 15 may result in reduced weed control. Initial incorporation may be completed within 24 hours of application. Incorporation using a harrow operation is recommended. The second incorporation may be done in the fall (prior to soil freeze-up) or in the spring. Fall incorporation is not recommended on soils where a lack of crop residue cover combined with the required incorporation operation could result in soil erosion.
- *Spring Application:* *Fortress MicroActiv* can be applied before seeding but must be incorporated within 24 hours of application. The second incorporation must be delayed at least 48 hours after the first and may be performed at any time prior to crop emergence. Incorporation using a harrow operation is recommended.
- **Incorporation:**
 - *Fortress MicroActiv* applications require two incorporations, with the second incorporation at right angles to the first. Seeding with a seeder that provides soil disturbance equivalent to a cultivator may replace one incorporation. Incorporate to a maximum depth of 2 inches (5 cm) by setting disk or cultivator implements to cut a maximum of 3 inches (7.5 cm) into the soil.

- Mixing the product to greater depths will dilute the herbicide, decrease wild oat control, and may cause injury to cereals. If the second incorporation is conducted after seeding, it should be done with harrows or other suitable tillage equipment adjusted so as not to disturb the seed. Harrowing does not provide effective in-corporation if compact soil prevents penetration of harrow teeth, if crop residue accumulates in the harrow sections, or if the harrows bounce.
- **Seeding Requirements:** Accurate seeding depth control is critical. Thinning of wheat and barley has been known to occur when seeding depth has been inadequate. Ensure that cereals are seeded below the treated layer (2 to 3 inches or 5 to 7.5 cm). DO NOT seed deeper than 3 inches (7.5 cm). To ensure an even crop stand, increase the usual seeding rate of wheat or barley by 10 percent, especially if soil conditions are cold or dry. See product label for more information.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
trifluralin	PPI (Soil active)	Mitosis Inhibitor/cell division	Little movement in plant (Apoplast)	Broadleaf & grass	3
triallate	PPI (soil active)	Lipid Synthesis Inhibitor (Non-ACCase)	Little movement in plant (Apoplast)	Wild oat	8

Effects of Growing Conditions:

Crop injury can occur on fields where *Fortress MicroActiv* has been applied and heavy rainfall or cold weather occur after seeding but prior to crop emergence. Seeding under warm soil conditions (greater than 10°C and generally after May 15) will ensure optimum crop germination and emergence and will reduce the risk of crop injury. Very dry conditions in spring or prolonged cool soil temperatures at time of wild oat germination will result in reduced control.

Poor results may be expected from incomplete incorporation due to wet, cloddy soil or heavy crop residues. Ridges left at seeding may disrupt the treated layer and allow weed escapes.

Restrictions:

- **Rainfall:** Moisture is required for activation. Rainfall of at least 0.6 inches (1.5 cm) within 2 weeks of seeding is required to ensure optimum results.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hour
- **Grazing Restrictions:** DO NOT graze or cut treated crops for livestock feed prior to crop maturity.
- **Re-cropping Interval:** *Fortress MicroActiv* will leave a residue in the soil. Oats, canaryseed, and small seeded forage grasses may be injured if planted within 24 months of application. DO NOT apply on land to be sown to wheat if the land has been treated with trifluralin since June 1 of the previous year.
- **Aerial Application:** May be applied by airplane with attachments designed for applying low volumes of granules.

Hazard Rating:

 Warning – contains the allergen soy.

May cause Skin and Eye Irritation

For an explanation of the symbols used here see pages 7 and 8.

Frontier Max

**Herbicide Group
15 - dimethanamid**
(Refer to page 45)

Company:

BASF Canada (PCP#29194)

Formulation:

720 g/L dimethanamid-P formulated as an emulsifiable concentrate.

- Container size - 3 L to 1000 L

Crops and Staging:

Pre-plant incorporated:

- Corn (NOT sweet corn, popcorn, or corn grown for seed).
- Dry beans (navy and kidney beans only).

Pre-emergence surface:

- Dry beans (navy and kidney beans only).
- Potatoes – after planting or after hilling, but before emergence of the crop or weeds.

Weeds and Staging:

Pre-emergent control of green foxtail.

Rates:

Pre-plant incorporated treatments:

- Apply at 0.35 to 0.39 L per acre. Apply at the higher rate on fine-textured or high organic soils and for heavier anticipated weed problems.

Pre-emergence surface treatments:

Soil Type (Texture)	Rate (L per Acre)		
	Less than 3% Organic Matter	3 to 6% Organic Matter	7 to 10% Organic Matter
Coarse	0.31	0.31	0.35
Medium and Fine	0.31	0.35	0.39

Application Information:

- **Water Volume:** A minimum of 40 L per acre.
- **Pressure:** 30 to 43 psi (200 to 300 kPa).
- **Nozzles:** Flat fan or flood-jet. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of *ASABE medium* droplets.
- **Screens:** Use 16 mesh suction screen, 50 mesh elsewhere on sprayer.
- **Incorporation:** For pre-plant incorporated treatments, apply *Frontier Max* as a broadcast treatment and incorporate using a harrow, rolling cultivator or other implement capable of giving uniform, shallow incorporation into the top 5 cm (2 inches) of soil within 7 days of planting. Avoid deeper incorporation or reduced weed control and/or crop injury may result. Immediate incorporation after application is not necessary.
 - Beans must be planted at least 4 cm (1.5 inches) deep or crop injury may occur.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
dimethanamid-P	PPI, PRE (surface) with residual soil activity	Long-chain Fatty Acid Inhibitor	Little movement (Symplast)	Broadleaf & grass	15

Effects of Growing Conditions:

Rainfall is required within 7 to 10 days of application to activate and move *Frontier Max* into the soil zone. If dry conditions persist, a shallow cultivation or the use of a rotary hoe is necessary to move the herbicide into moist soil and control weed escapes. Shallow tillage is important to minimize dilution of the herbicide. If drought conditions persist after pre-plant incorporated or pre-emergence applications, weed control may not be adequate.

Tank Mixes:

Herbicides: None registered.

Fertilizers: May be applied with a liquid fertilizer carrier. Test compatibility with liquid fertilizer by mixing a small amount of herbicide with a proportional quantity of liquid fertilizer in a jar. May also be impregnated on dry bulk fertilizers for pre-plant incorporated treatments. A minimum of 90 kg per acre of dry bulk fertilizer should be applied. DO NOT impregnate *Frontier Max* on nitrate fertilizers, superphosphates or limestone.

Insecticides: None registered.

Note: The above mixes are those listed on the *Frontier Max* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Rainfall after application is important for good weed control.
- **Re-entry Interval:** DO NOT enter treated fields for 24 hours.
- **Grazing Restrictions:** DO NOT graze or feed the treated corn crop within 40 days of application. DO NOT graze the treated bean crop or feed bean forage, hay or straw to livestock.
- **Re-cropping Interval:** DO NOT plant winter wheat within 120 days of application.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** DO NOT freeze. Must be stored under heated warehouse conditions.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	3

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13. When mixing with other pesticides, combine the method above with the method recommended for the tank mix partner if different from above for thorough cleaning.

Hazard Rating:



Caution – Poison.



Warning – Eye Irritant and Potential Skin Sensitizer.

For an explanation of the symbols used here see pages 7 and 8.

Glufosinate 150SN

Herbicide Group
10 - glufosinate
(Refer to page 45)

Company:

BASF Canada (*Liberty 150SN* - PCP#28837)

AgraCity (*MPower Vigor* – PCP#33267)

Formulation:

150 g/L glufosinate ammonium formulated as a solution.

- Container sizes:
 - *Liberty 150SN* - 13.5 L, 108 L, 432 L
 - *MPower Vigor* - 2 x 10.8 L, 108 L

Crops and Staging:

Liberty Link Canola - cotyledon to early bolting stage. Temporary crop discoloration (bronzing, speckling) may be observed after application.

Note: A valid Liberty and Trait Agreement is required to purchase Liberty 150SN only.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weed	Weed Stage (from emergence to stage)	Rate (L per acre)
Cow cockle	4 leaf	0.54
Green foxtail	6 leaf (max. 3 tillers)	
Barnyard grass	4 leaf	0.81
Wild mustard	5 leaf	
Lamb's-quarters, smartweed (lady's-thumb)	6 leaf	
Stinkweed	8 leaf	
Volunteer flax	2.5 inches (6 cm)	
Russian thistle	3 inches (8 cm)	
Wild buckwheat	3 leaf		1.08
Redroot pigweed, round-leaved mallow, quackgrass*	4 leaf	
Light to moderate infestations† of volunteer wheat	4 leaf volunteer barley* (max. 2 tillers)	
Hemp-nettle (1 to 3 leaf pairs), shepherd's-purse	6 leaf	
Common chickweed (max. 4 leaf pairs), sow-thistle	8 leaf	
Kochia	3 inches (8 cm)	
Canada thistle*, scentless chamomile	4 inches (10 cm)	
Cleavers	2 whorls (nodes)	1.35
Stork's-bill and heavy populations of wild buckwheat	3 leaf	
Quackgrass (light to moderate** or heavy infestations*)†, volunteer wheat, volunteer barley*, wild oat	4 leaf (max.2 tillers except quackgrass)	
Hemp-nettle	8 leaf (1 to 4 leaf pairs)	
Dandelion rosettes	6 in. (15 cm) across	
Flixweed, Canada thistle*	4 inches (10 cm)	
Jimsonweed	1 to 6 leaf	
Quackgrass***	4 leaf	1.6
Canada thistle**	4 inches (10 cm)	

* Temporary top growth control. Plants may return from surviving growing points.

** Extended top growth control.

*** Season long control.

† The company does not provide guidelines for weed densities. When in doubt as to the infestation level, use the high rate or contact the manufacturer.

Second Application:

A second application of up to 1.35 L per acre may be made to fields that were treated initially with *Glufosinate 150SN* to a maximum total combined rate of 2.97 L per acre (1.62 L + 1.35 L). DO NOT apply more than 2.97 L per acre of *Glufosinate 150SN* in one season.

Application Information:

- **Water Volume:**
 - *Ground applications:* 45 L per acre.
 - *Aerial applications:* 22 L per acre.
- **Nozzles and Pressure:**
 - *Ground Application:* Use 40 psi (275 kPa) when using conventional 80° or 110° flat fan nozzles; 45 psi (310 kPa) when using check valves. Angle nozzles forward at 45° to improve coverage of vertical leaf surfaces. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE medium* or larger droplets.
 - *Aerial applications:* DO NOT use raindrop nozzles. Use a combination of nozzles and pressure to provide *ASABE coarse* or larger droplet size distribution.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
glufosinate	POST (foliar)	Glutamine Synthase Inhibitor/ Membrane disruptor	Little movement due to rapid cell leakage (Symplast)	Broadleaf & grass	10

Effects of Growing Conditions:

Glufosinate 150SN activity is influenced by environmental conditions. Cool temperatures (less than 10°C), drought, and low humidity conditions slow weed growth. Applications made under these stressed conditions may result in reduced weed control.

Tank Mixes:

Herbicides:

- Clethodim (*Centurion* or *Select* only) 50 mL to 77* mL per acre plus *Amigo*. For *Centurion* or *Select* tank mixes add *Amigo* to the tank first followed by *Glufosinate 150SN* and then *Centurion* or *Select*. Consult label for specific mixing instructions.
- *Facet* (quinclorac)* (113 mL/acre) plus *Merge* adjuvant (0.2 to 0.4 L per acre)
- Clethodim + *Facet* plus *Merge* adjuvant (rates above)*

* *Liberty 150SN* only.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Glufosinate 150SN* labels only.

BASF Canada also supports the following mixes that are not on the *Liberty 150SN* label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:** *Facet* at 227 mL/acre (with or without clethodim tank mix) plus *Merge*.
- **Insecticides:** *Decis*, *Sevin XLR*.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 4 hours may reduce control.
- **Re-entry Interval:** DO NOT re-enter treated areas for 24 hours after application.
- **Grazing Restrictions:** DO NOT graze the treated crop or cut for feed.
- **Preharvest Interval:** DO NOT apply within 60 days of harvest.
- **Re-cropping Interval:** No restrictions for field corn, canola and soybeans, dry common beans (not grown for seed), alfalfa, carrot, lettuce, onion and potato. 70 days for buckwheat, barley, millet, oats, rye, sorghum, triticale and wheat. Minimum 120 days for all other crops.
- **Aerial Application:** May be applied by air.
- **Storage:** DO NOT freeze.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	1	0	1
Fixed wing airplane or Helicopter	1	0	30

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

- DO NOT apply when dead calm or when winds exceed 16 km/hr when using unprotected booms or applying by air, or exceeding 25 km/hr when using shrouded booms.

Sprayer Cleaning:

Refer to 'Method B' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:

 Warning – Poison

 Caution – Skin Irritant

 Warning – Eye Irritant

For an explanation of the symbols used here see pages 7 and 8.

Glyphosate

Herbicide Group

9 - glyphosate

(Refer to page 45)

Product names, Company, Formulation and Package sizes:

All products are formulated as solutions.

Container sizes available: Various

Product Name	Company	Salt type*	Active** content (g ae /L)
<i>ClearOut 41 Plus</i> (PCP#28322)	AgraCity	IPA	360
<i>Credit 45</i> (PCP#29124)	Nufarm Agriculture	IPA	450
<i>Credit Xtreme</i> (PCP#29888)	Nufarm Agriculture	IPA/K	540
<i>Crush'R Plus</i> (PCP#29995)	AgriStar	IPA	360
<i>Crush'R 540</i> (PCP#31655)	AgriStar	K+	540
<i>Factor 540</i> (PCP#27988)	IPCO	K+	540
<i>Guardman Glyphosate</i> (PCP#32228)	Univar Canada Ltd.	IPA/K+	540
<i>Matrix</i> (PCP#29775)	IPCO	DMA	480
<i>MPower Disruptor 360</i> (PCP#29290)	AgraCity	IPA	360
<i>MPower Disruptor 540</i> (PCP#32817)	AgraCity	K+	540
<i>Roundup Transorb HC</i> (PCP#28198)	Bayer	K+	540
<i>Roundup WeatherMax</i> (PCP#27487)	Bayer	K+	540
<i>R/T 540</i> (PCP#28487)	Bayer	K+	540
<i>Smoke</i> (PCP#31063)	Great Northern Growers	IPA	360
<i>Sharda Glyphosate</i> (PCP#31493)	Sharda CropChem Canada	IPA	360
<i>StartUp</i> (PCP#29498)	Loveland Products Canada	K+	540
<i>Stonewall</i> (PCP#31655.01)	WinField United Canada	K+	540
<i>Vector</i> (PCP#30319)	Federated Co-operatives Ltd.	DMA	480
<i>Vector 540</i> (PCP#31327)	Federated Co-operatives Ltd.	K+	540
<i>VP480</i> (PCP#28840)	Corteva Agriscience	DMA	480

* Salt type: IPA = Isopropylamine, MA = Monoammonium, DA = Diammonium, DMA = dimethylamine, K+ = Potassium

** Formulation concentration is expressed as "grams of acid equivalent per litre of product (g ae/L)".

Glyphosate acid is the herbicidally active component of the formulation and is proportional to the activity of the formulation

Note: Some products may be more effective due to formulation differences (not related to higher glyphosate content) under adverse conditions, but that benefit is reduced when applications are made under optimal conditions for activity (i.e. rapid weed growth, clean leaf surfaces). When selecting a glyphosate product, consult the product labels.

Rate (g ae per acre)	Glyphosate formulation concentration (g ae/L)				
	356/360	450	480	500	540
36.5	100 mL	81 mL	76 mL	73 mL	67 mL
73	200 mL	162 mL	152 mL	146 mL	134 mL
110	0.3 L	0.24 L	0.23 L	0.2 L	0.2 L
120	0.33 L	0.27 L	0.25 L	0.24 L	0.22 L
136	0.38 L	0.30 L	0.28 L	0.27 L	0.25 L
145	0.4 L	0.32 L	0.3 L	0.28 L	0.27 L
180	0.5 L	0.4 L	0.38 L	0.36 L	0.33 L
275	0.77 L	0.61 L	0.57 L	0.54 L	0.51 L
325	0.91 L	0.73 L	0.68 L	0.65 L	0.61 L
360	1.0 L	0.81 L	0.76 L	0.73 L	0.67 L
510	1.42 L	1.13 L	1.1 L	1.0 L	0.94 L
540	1.5 L	1.21 L	1.13 L	1.09 L	1.0 L
690	1.9 L	1.54 L	1.44 L	1.38 L	1.28 L
720	2.0 L	1.62 L	1.5 L	1.46 L	1.34 L
1020	2.8 L	2.27 L	2.13 L	2.02 L	1.89 L
1750	4.9 L	3.88 L	3.6 L	3.48 L	3.24 L

Crops and Uses:

1. Annual weed control prior to crop emergence or in fallow.
2. Quackgrass control prior to seeding or after harvest.
3. Dandelion control (other than Preharvest).
4. Canada thistle control in fallow, shelterbelts and post-harvest.
5. Alfalfa control (other than Preharvest).
6. Other perennial weeds control in fallow, shelterbelts and post-harvest.
7. Patch treatments of perennial weeds in cereals, corn, soybean and forages.
8. Preharvest perennial weed control.
9. For use in Glyphosate tolerant crops.
10. Tank Mixes.

1. Annual weed control prior to crop emergence or in fallow:

Weeds listed may not occur on all product labels. Check individual product labels for a specific list of weeds controlled.

Rate (g ae per acre)	Surfactant*	Weeds Controlled	Weed Stage
110	0.14 L per acre	Grasses: Green foxtail, volunteer cereals, wild oat (light infestations) Broadleaves: lady's-thumb, stinkweed, volunteer canola (NOT including glyphosate tolerant varieties), wild mustard.	Less than 3 inches (8 cm) high. Apply at the 1 to 3 leaf stage of wild oat.
145	0.14 L per acre	<i>Above weeds plus:</i> Grasses: heavy infestations of wild oat Broadleaves: suppression of flixweed, kochia.	1 to 3 leaves for wild oat Weeds 3 to 6 inches (8 to 15 cm).
180 to 275	Not required	<i>Above weeds plus:</i> Grasses: downy brome, Persian darnel. Broadleaves: Canada fleabane, cleavers, common ragweed, flixweed, hemp-nettle, lamb's-quarters, narrow-leaved hawk's-beard, redroot pigweed, Russian thistle, volunteer flax, wild buckwheat.	Canada fleabane, common ragweed, less than 3 inches (8 cm) high. Other weeds less than 6 inches (15 cm). Use high rate for narrow-leaved hawk's-beard 3 to 6 inches (8-15 cm) or wild buckwheat at the 3-4 leaf stage.

Rate (g ae per acre)	Surfactant*	Weeds Controlled	Weed Stage
325	Not required	<i>Above weeds plus:</i> Grasses: annual blue grass, crabgrass. Broadleaves: annual sow-thistle, kochia, prickly lettuce, shepherd's-purse, narrow-leaved vetch**.	Less than 6 inches (15 cm) high
510	Not required	Above weeds.	Greater than 6 inches (15 cm) high

* Unless otherwise specified on the product label, use one of the following surfactants: *Agral 90, Agsurf II, Companion or LI700.*

** Note: Narrow-leaved vetch is an annual species. Established perennial vetches, such as American vetch, may not be controlled at this rate.

2. Quackgrass control prior to seeding or after harvest:

Rate (g ae per acre)	Quack Grass Stage
360	Season long control of light to moderate infestations. Apply when quack grass is 8 inches (20 cm) tall and has 3 to 4 actively growing leaves. Apply spring or fall.
360 to 1020	Apply when quack grass has 3 to 4 new leaves for long term control of heavy infestations. Use high rate for sod-bound quack grass (left undisturbed for at least 2 years).

DO NOT apply fall treatments if a hard frost has occurred (-5°C) or if plants are drought stressed. Spread straw to allow regrowth and good spray coverage.

Cultivation prior to application will result in reduced control. DO NOT cultivate between harvest and treatment when using fall applications. If using spring applications on fields which have been fall-tilled, delay application until the quack grass has reached the 4 to 5 leaf stage. (This will occur 1 to 4 weeks later on fall-tilled fields than in undisturbed fields).

Cultivation after application usually will improve control of quack grass. Wait a minimum of 3 days after application before cultivating. If growing conditions are poor (cold or dry), particularly in the fall, waiting longer than 5 days may improve control.

3. Dandelion control (other than Preharvest):

Apply up to and including dandelion bloom for best results.

Rate (g ae per acre)	Dandelion Growth Stage
360	Less than 6 inches (15 cm) diameter. Allow 3 or more days after treatment before tillage.
540 to 720	Greater than 6 inches (15 cm) diameter. Use higher rate when infestations are heavy.

4. Canada thistle control in fallow, shelterbelts and post-harvest:

Rate (g ae per acre)	Weed Staging
360	Rosettes at least 6 inches (15 cm) in diameter, treated in late summer, following tillage in spring and early summer (up to August 1). Allow thistles to regrow for 5 weeks following last tillage. Wait a minimum of 10 days after application before tillage. Treatment after a mild frost is possible if leaves are green and pliable and plants are actively growing.
690 to 1020	Bud stage or beyond. Allow at least 5 days after application before tillage. -or- Post-harvest treatment. Allow 8 to 10 inches (20 to 25cm) of new growth before application. Must be sprayed at least 2 weeks prior to killing frost. Straw should be removed or evenly spread to allow for proper regrowth and spray coverage.

5. Alfalfa Control (other than Preharvest):

Rate (g ae per acre)	Weed Staging
540 to 720	Fall control of alfalfa in early bud to full bloom stage. Use high rate when alfalfa populations are high or when perennial grasses are present. Allow at least 5 days before tillage. See tank mix section for minimum tillage or spring applications. Apply with 23 to 135 L per acre water.

6. Other perennial weed control in fallow, shelterbelts and post-harvest:

(Refer to individual product labels for detailed application information.)

Foxtail Barley:

- Control from seedling to heading (all products) at 360 to 720 g ae per acre. Late fall applications may provide better control of established foxtail barley plants than spring applications.

Yellow toadflax: 360 g ae per acre.

Other Perennial weeds*: 1020 to 1750 g ae per acre

* Perennial weeds such as absinthe, blue grass spp., smooth brome grass, cattail, curled dock, field bindweed (bloom stage or beyond), hemp dogbane, hoary cress, poison ivy, purple loosestrife, perennial sow-thistle, and yellow nutsedge applied at the early heading to early bud stage.

7. Patch treatments of perennial weeds in wheat, oat, barley, corn, soybean, forage legumes and forage grasses:

(Refer to individual product labels for detailed application instructions)

Rate (g ae per acre)	Weed
360 to 1020	Quack grass 8 in (20 cm) tall
690 to 1020	Canada thistle Bud or beyond
1750	Milkweed Bud to bloom
1020 to 1750	Other perennial weeds*
36.5 to 73	Spot treatment rates for hand held equipment (per 10 L water**)

* Perennial weeds such as absinthe, blue grass spp., smooth brome grass, cattail, curled dock, field bindweed (bloom stage or beyond), hemp dogbane, hoary cress, poison ivy, purple loosestrife, perennial sow-thistle, and yellow nutsedge applied at the early heading to early bud stage.

** Use the low rate for quack grass and the high rate for all other perennials.

8. Preharvest perennial weed control:

DO NOT apply to any crops grown for seed.

Note: As of January 1, 2019 www.keepingitclean.ca indicates that grain from crops treated with this product prior to harvest may have market access concerns. Please see page 10 for more information AND *consult potential grain buyers before using this product.*

Not all glyphosate products are registered for Preharvest applications on all crop species listed below. Refer to specific glyphosate labels for a list of registered uses and crop species.

RATES:

- Prior to the harvest of annual grains (see staging chart below for specific crops):** 360 g ae per acre.
- Prior to the final cut of forages to be removed from production:** 360 to 720 g ae per acre.
- Weeds Controlled with Preharvest applications:**

Quack grass 4-5 green leaves	Canada thistle and perennial sow-thistle at bud stage or beyond	Common milkweed at bud to bloom stage	Toadflax at bud to full bloom stage	Dandelion from rosette to full bloom stage
X	X	X	X	X

- Crop Staging for Preharvest applications:**

- Apply to crops (except forage) when grain moisture is less than 30%. The following chart lists visual symptoms that can be used as guidelines to when 30% grain moisture has been reached.

Crop*	Visual Guide to Proper Application Stage
Wheat, Barley*, Oat*, Canaryseed***†	Hard dough stage – a thumbnail impression remains on seed.
Canola, Mustard†****†	Pods are green to yellow and most seeds are yellow to brown.
Flax (and Solin - low linolenic acid flax)	Majority (75 to 80% of bolls) are brown.
Lentil	Lowermost pods (bottom 15%) are brown and rattle when shaken.
Pea	Majority (75 to 80%) of pods are brown.
Chickpea***†, Lupin***†, Faba bean***†, Dry Bean	Stems are green to brown in colour; pods are mature (yellow to brown in colour); 80%-90% leaf drop (original leaves).

Crop*	Visual Guide to Proper Application Stage
Camelina***†	When 95% of pods have changed colour, seed is firm and less than 40% of seed is green.
Soybean	Stems are green to brown in colour and pod tissue is brown and dry in appearance (80 to 90% leaf drop).
Forage	3 to 7 days prior to the last cut before rotation or forage renovation. DO NOT apply to forage stands that are to be maintained.

* Registered for application to barley grown for malt and tame oat grown for milling. Contact malt barley or milling oat buyers prior to application to confirm acceptance of glyphosate-treated grain.

** Preharvest applications on these crops are registered with *Roundup Transorb HC*, *Roundup WeatherMax*, *R/T 540*, *Stonewall* and *StartUp* only.

*** Preharvest applications on these crops are registered with *RoundUp Weather Max* only.

‡ Yellow/white, brown, oriental mustard only.

† **NOTE: Since these uses are registered under the User Requested Minor Use Label Expansion (URMULE) program, the manufacturer assumes no responsibility for herbicide performance. Those who apply glyphosate to chickpea, lupin, faba bean, canaryseed, camelina or mustard do so at their own risk.**

9. For use in glyphosate tolerant canola:

Weeds, Staging and Rates:

Genuity (original) glyphosate tolerant canola:

All applications must be made within the cotyledon to 6 leaf stage. Temporary yellowing may occur if applied at the 4 to 6 leaf stage of the crop.

Not all glyphosate products are registered for use on glyphosate tolerant canola at all rates listed. Refer to individual product labels for specific uses and rates.

Single application of 120 g ae per acre:

- **Weeds controlled at all stages unless indicated otherwise:**
 - *Annual grasses*: barnyard grass, green foxtail, volunteer cereals, wild oat.
 - *Annual broadleaves*: annual smartweed spp.**; chickweed, corn spurry, cow cockle*, hemp-nettle, kochia, lamb's-quarters, night-flowering catchfly*, redroot pigweed, Russian thistle, shepherd's-purse*, stinkweed, volunteer canola (except glyphosate tolerant varieties), wild mustard, wild tomato.

Single application of 180 g ae per acre:

- **All stages of the weeds listed above plus:**
 - *Annual broadleaves*: cleavers, flixweed, wild buckwheat, stork's-bill, narrow-leaved hawk's-beard.
 - *Perennial weeds suppressed*: Canada thistle, dandelion, perennial sow-thistle, and season long quack grass control.

Double application of 180 g ae per acre plus 180 g ae per acre:

- **Additional flushes of the weeds listed above plus:**
 - *Annual broadleaves*: round-leaved mallow
 - *Season long control of following perennials*: Canada thistle, foxtail barley, and perennial sow-thistle.

Single application of 270 g ae per acre:

- **All weeds in single applications above plus:**
 - *Season long control of following perennials*: Canada thistle and perennial sow-thistle.

* Low rates can be used only up to the 3 leaf stage of the crop otherwise use the high rate.

** Low rates can be used only when annual smartweed is in the 4 to 6 leaf stage.

NOTE: A maximum of 360 g ae per acre per season is allowed in glyphosate tolerant canola

TruFlex canola varieties only:

Roundup brands and *R/T 540* only may be applied to *TruFlex* canola varieties only from emergence to first flower stage (50% of plants in field have no more than 1 flower) for rates up to one or two applications of the 360 g ae per acre rate. The maximum timing at the 720 g ae per acre rate is the 6 leaf stage.

Single application of 120 to 180 g ae per acre:

- **Weeds controlled at all stages unless indicated otherwise:**
 - *Annual grasses*: barnyard grass, green foxtail, volunteer cereals, wild oat.
 - *Annual broadleaves*: annual smartweed (incl. lady's-thumb)**; chickweed, cleavers, corn spurry, cow cockle*, flixweed, hemp-nettle, kochia, lamb's-quarters, narrow-leaved hawk's-beard, night-flowering catchfly*, pigweed (redroot), Russian thistle, shepherd's-purse*, stinkweed, stork's-bill, volunteer canola (except glyphosate tolerant varieties), wild buckwheat, wild mustard, wild tomato.
 - *Perennial weeds suppressed*: Canada thistle, dandelion, perennial sow-thistle, and season long quack grass control.

Double application of 180 g ae per acre plus 180 g ae per acre:

- **Additional flushes of the weeds listed above plus:**
 - Annual broadleaves: round-leaved mallow
 - Season long control of following perennials: Canada thistle, foxtail barley, and perennial sow-thistle.

Single application of 270 g ae per acre:

- **All stages of the weeds listed above plus:**
 - Season long control of following perennials: Canada thistle and perennial sow-thistle.

Single application of 360 g ae per acre:

- **All weeds above plus:**
 - Grasses: foxtail barley, yellow foxtail, wild proso millet.
 - Broadleaves: biennial wormwood (2 to 8 leaf), cocklebur, common milkweed[†], nightshade (eastern black), pigweed (smooth), ragweed (common), smartweed (Pennsylvania).

Double application of 360 g ae per acre plus 360 g ae per acre at least 2 weeks apart:

- **Additional flushes of the weeds listed above plus:**
 - Season long control of following perennials: Dandelion, common milkweed (15 to 60 cm), field bindweed, tall waterhemp (up to 18 leaf stage).

Single application of 720 g ae per acre (maximum 6 leaf stage of TruFlex canola):

- **All weeds above.**

[†] Suppression only.

* Low rates can be used only up to the 3 leaf stage of the crop otherwise use the high rate.

** Low rates can be used only when annual smartweed is in the 4 to 6 leaf stage.

NOTE: A maximum of 720 g ae per acre per season is allowed in TruFlex glyphosate tolerant canola.

10. For use in glyphosate tolerant corn and soybean:

Weeds, Staging and Rates:

All applications must be made within the following crop growth stages.

- **Corn:** up to and including 8 leaf stage
- **Soybean:** first trifoliolate leaf through flowering.

Not all glyphosate products are registered for use on glyphosate tolerant corn and soybeans at all rates listed. Refer to individual product labels for specific uses and rates.

- **Single application of 360 g ae per acre controls the following weeds:**

◦ Barnyard grass	◦ Proso millet	◦ Volunteer barley and wheat
◦ Crabgrass spp.	◦ Quack grass	◦ Wild oats
◦ Foxtail (green, yellow, giant)		
- **Broadleaves:**

◦ Biennial wormwood	◦ Kochia	◦ Smartweed spp.
◦ Canada thistle	◦ Lamb's-quarters	◦ Stinkweed (suppression only)
◦ Chickweed	◦ Narrow-leaved hawk's-beard	◦ Stork's-bill
◦ Cleavers	◦ Night-flowering catchfly	◦ Velvetleaf
◦ Corn Spurry	◦ Nightshade (Eastern black)	◦ Volunteer canola (except glyphosate tolerant varieties)
◦ Cocklebur	◦ Perennial sow-thistle	◦ Wild mustard
◦ Common milkweed (suppression only)	◦ Pigweed (smooth, redroot)	◦ Wild buckwheat
◦ Common ragweed	◦ Round-leaved mallow	◦ Wild tomato
◦ Flixweed	◦ Russian thistle	
	◦ Shepherd's-purse	

* Registered for control in glyphosate tolerant soybean only with Roundup products and R/T 540 only.
- **Second applications of 360 g ae per acre controls the following weeds:**
 - **Late flushes of heavy infestations of the above weeds plus control of:**

◦ Common milkweed	◦ Round-leaved mallow	◦ Yellow nutsedge
◦ Field bindweed		
- **Single application of 720 g ae per acre in glyphosate tolerant soybean from the first trifoliolate to flowering stage and corn up to and including 6 leaf stage:**
 - **Heavy infestations of the annual weeds listed above plus control of:**

◦ Field bindweed	◦ Canada thistle	◦ Yellow nutsedge
◦ Common milkweed	◦ Perennial sow-thistle	

- Single application of 1020 g ae per acre in glyphosate tolerant soybean (*Roundup Ready 2 Yield* soybeans only) from the first trifoliolate to flowering stage
 - Weeds listed above plus control of:
 - Volunteer alfalfa
 - Smooth brome grass
- ** The single application rate in glyphosate tolerant corn and soybean is not labeled for all glyphosate products. Refer to individual glyphosate labels for the registration status of this rate usage in glyphosate tolerant soybean and corn.

11. Tank Mixes:

Tank mix partners may be mixed at all label rates and include recommended adjuvants unless otherwise noted. Not all glyphosate products are registered for all tank mix options below. Refer to individual glyphosate labels for registered tank mixes, glyphosate rates and registered crop species.

	Rate per Acre
Preseeding before all crops ^{†††}	<i>Aim</i>
Preseeding canola ^{††}	Bromoxynil – all bromoxynil products at the highest rate indicated on the Bromoxynil page
Preseeding cereals ^{***}	2,4-D (108 to 273 g ae)*
	<i>Banvel II</i> (0.12 L)*
	Bromoxynil - <i>Pardner</i> (0.51 L), <i>Koril</i> (0.48), <i>Brotex</i> (0.6 L)
	MCPA [♦] (0.2 to 0.4 L)*
	Bromoxynil/MCPA* - <i>Buctril M</i> (0.2 to 0.4 L), <i>Logic M</i> (0.25 to 0.5 L)
Preseeding corn (field and sweet) & flax	MCPA ^{♦♦} (0.2 to 0.4 L)* [♦]
	Bromoxynil/MCPA* - <i>Buctril M</i> (0.2 to 0.4 L), <i>Logic M</i> (0.25 to 0.5 L)
Preseeding corn (field only)	<i>Banvel II</i> (0.12 L)*
Preseeding field pea, lentil [†] & chickpea [†]	MCPA Amine ^{♦♦} (0.2 to 0.28 L)* [♦]
Preseeding canaryseed & seedling forage grasses ^{♦♦♦}	Bromoxynil/MCPA* - <i>Buctril M</i> (0.2 to 0.4 L), <i>Logic M</i> (0.25 to 0.5 L)
Preseeding or prior to emergent of soybeans (all varieties)	Imazethapyr (<i>Pursuit</i>)
Chem fallow	2,4-D (235 g ae)*
	Dicamba (0.12 L)*
	Bromoxynil - <i>Pardner</i> (0.51 L), <i>Koril</i> (0.48), <i>Brotex</i> (0.6)
Canada thistle control following harvest or in fallow	Dicamba (0.51 L)**
Alfalfa control in spring / fall	2,4-D (235 to 470 g ae)*

* Volunteer glyphosate tolerant canola control: Tank mixes of 2,4-D at 108 to 160 g ae per acre, MCPA and Bromoxynil/ MCPA will control volunteer glyphosate tolerant canola up to the 4 leaf stage and 2,4-D at 212 to 320 g ae per acre will give control up to the 6 leaf stage. Earlier application will result in more consistent control. Dicamba at 0.12 L per acre will not control glyphosate tolerant canola.

** See re-cropping restrictions for Dicamba with fall applications.

*** 2,4-D tank-mixes in cereals are registered for winter wheat, wheat, barley, and rye; Bromoxynil tank-mixes in cereals are registered on wheat, oats and barley; bromoxynil/MCPA and MCPA tank-mixes registered on cereals include wheat, barley oat and rye; *Banvel II* tank-mixes in wheat, barley, rye oats.

† Under drought conditions, deep seeding and/or brief rain showers after seeding may cause injury to emerging seedlings in sprayer overlaps. NOT for use with *Credit 45*, *Mpower Glyphosate*, *SharpShooter*, *SharpShooter Plus*, *Smoke*, or *Sharda Glyphosate*.

†† *Roundup WeatherMax*, *R/T 540*, *Roundup Transorb*, *Mpower Disruptor 540*, *Startup* only.

††† *Credit 45*, *Credit Xtreme*, *Guardman Glyphosate* only.

♦ Rates based on 500 g/L formulations. All formulation concentrations are registered unless indicated otherwise.

♦♦ Use only amine formulations of MCPA prior to corn, lentil, chickpea and field peas.

♦♦♦ Forage grasses include brome grass, crested wheatgrass, intermediate wheat grass, slender wheatgrass, tall wheatgrass, Russian wildrye, timothy, orchard grass, creeping red fescue, meadow fescue, meadow foxtail, tall fescue, meadow brome grass, streambank wheatgrass and reed canarygrass.

Tank mixes in glyphosate tolerant crops:

- **Tank mixes or rates listed may not occur on all product labels. Refer to individual product labels for registered tank-mixes.**
 - **Canola (Original Genuity varieties only):**
 - *Lontrel 360* (112 mL per acre)
 - **Soybean:**
 - *Assure II* (101 to 154 mL per acre)
 - *Pursuit* (65 to 85 mL per acre)
 - **Corn:**
 - *AAtrex* (0.63 to 0.84 L per acre)
 - 2,4-D single application (108 to 212 g ae per acre)*
 - 2,4-D split application (108 g ae per acre followed by 80 to 108 g ae per acre)*
- * 2,4-D applications to corn may result in serious injury to some corn hybrids. Consult corn seed provider for varietal tolerance to 2,4-D applications. Apply prior to 4 leaf stage of corn.

Note: The above mixes are those listed on the glyphosate labels only.

Bayer also supports the following mixes that are not on the *Roundup* brand labels to manage glyphosate resistant kochia and other labelled weeds at the pressed burnoff timing prior to planting soybean. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:** *Heat* (also glyphosate tolerant canola volunteers), *Valtera*, *Authority*, *Authority Charge*.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. See the general guidelines for mixing pesticides for more information.

Application Information:

- **Water Volume:**
 - **Ground:** Use 20 to 40 L per acre in most situations; use of the lower volume may improve control when hard water (Ca or Mg) or iron (Fe) ions are present (See Effects of Growing Conditions below). For certain crop situations, perennial weeds and tank mixes may require up to 120 L per acre of clean low ion water.
 - **Aerial:** Use 8.1 to 20 L per acre for registered preharvest uses only (see Aerial Application below). Minimum 20 L per acre for preseed, fallow, glyphosate tolerant crops and post-harvest treatments with *Roundup WeatherMax* only.

Refer to specific weed control situations or labels for more information on water volumes and adjuvants.
- **Nozzles and Pressure:** Use 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressure designed to deliver thorough, even coverage with **ASABE medium** droplets for ground applications and **ASABE coarse** droplets for aerial applications.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
glyphosate	POST (foliar), Preharvest	EPSP Amino Acid Synthesis Inhibitor	Toward growth areas (Symplast)	Broadleaf & grass	9

Effects of Growing Conditions:

Best results are achieved under relatively warm sunny conditions when weeds are actively growing. Frost which kills more than 40% of the above ground tissue will reduce control. Control will also be reduced if foliage is heavily covered with dust. "Hard water" or water containing calcium (Ca), magnesium (Mg) or iron (Fe) ions will reduce the activity of glyphosate products proportional to the level hardness. Reducing application water volume and /or adding ammonium sulphate at 1.2 kg per acre (99% dry) or 2.4 L per acre (49% solution) will reduce the negative effects of low levels of hard water ions. If water is extremely hard (greater than 700 ppm or 40 grains), another water source should be found. Dirty water or water with suspended soil or organic matter will reduce control.

Restrictions:

- **Rainfall:** DO NOT apply if rainfall is forecast for the time of application, as weed control may be reduced. Consult manufacturer for more information.
- **Grazing Interval:** All portions of forage and crops treated with glyphosate products may be fed to livestock.
- **Re-cropping Interval:** No restrictions.

- **Aerial Application:** DO NOT apply *Credit 45*, *Crush'R Plus*, *Guardsman*, *Matrix*, *Sharpshooter*, or *Vector* brands of glyphosate to cropland by air.
 - All other glyphosate products listed in the "Product names, Company, Formulation and Packaging" chart are registered for aerial application for certain pre-harvest treatments. Not all crop species listed in the pre-harvest section are registered for aerial glyphosate application. Consult manufacturer for current aerial pre-harvest registration status.
 - ONLY *Roundup WeatherMax* may be applied by air when fields are too wet to access by ground sprayer (flooded) for preseed burndown, fallow treatment, or application to glyphosate tolerant crops (canola, corn, soybean).
 - Aerial applicators of *Roundup WeatherMax* for use prior to seeding, in glyphosate tolerant crops and to fallow must have successfully completed a *Roundup* herbicide aerial application training course provided by Bayer.
- **Storage:** May be stored below 0°C.
- **Equipment:** DO NOT mix, store or apply this product in galvanized steel or unlined steel (except stainless steel) containers or spray tanks.
- **Buffer Zones:**

Application method	Uses	Buffer Zones (metres ^{††}) Required for the Protection of:	
		Aquatic habitats	Terrestrial habitat
Ground *	All uses	15	15
Aerial	Preharvest only**	25	55
	Preharvest only***	100	100
	Glyphosate tolerant canola only [†]	5	40
	Preseed, fallow, glyphosate tolerant crops (corn, soybeans) [†]	30	70

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

** *ClearOut 41 Plus*, *Roundup Transorb HC*, *Roundup WeatherMax*, *R/T 540*, *Mpower Disruptor 540*, *StartUp* only.

*** *Mpower Disruptor 360*, *SharpShooter Plus*, *VP480* only.

[†] *Roundup WeatherMax* only when conditions are too wet for access by ground sprayer.

^{††} Distance measured as metres from the downwind edge of the spray boom to sensitive habitat. Glyphosate is very toxic to non-target plants.

Sprayer Cleaning:

Refer to pages 12 and 13.

Hazard Rating:

Roundup Transorb HC, *Roundup WeatherMax*, *Mpower Disruptor 540*, *Stonewall*, *R/T 540*:



Caution – Poison

ClearOut 41 Plus, *Mpower Disruptor 540*, *Guardsman Glyphosate*, *Roundup TransorbHC*, *Roundup WeatherMax*, *R/T 540*, *Sharpshooter Plus*, *Stonewall*:



Warning – Eye and Skin Irritant

All other products:



Caution – Skin and Eye Irritant. Potential Skin Sensitizer

For an explanation of the symbols used here see pages 7 and 8.

Glyphosate + clopyralid

Herbicide Group

4 - clopyralid

9 - glyphosate

(Refer to page 45)

This product is a prepackaged tank mix of clopyralid (page 151) and glyphosate (page 233). Information listed is restricted to Crop, Weeds and Rates. For other detailed information on the component products see the product pages listed above.

Company:

Corteva Agriscience (Eclipse Brands)

AgraCity (MPower Clobber G)

Formulation:

The Eclipse III/XC packages contain 2 components:

Eclipse III A (PCP#29032): 360 g/L clopyralid formulated as a solution.

- Container size - 4.45 L; 3 x 8.9 L

-or-

Eclipse XC A (PCP#32883): 600 g/L clopyralid formulated as a solution.

- Container size - 2.67 L

-plus-

Eclipse III B (PCP#29033); Eclipse XC B (PCP#32852): 480 g/L glyphosate present as a dimethylamine (DMA) salt and formulated as a solution.

- Container size - 2 x 7.5 L; 90L

-or-

The MPower Clobber G package contains 2 components:

MPower Clobber (PCP#33114): 360 g/L clopyralid formulated as a solution.

- Container size - 2 x 8.9 L

-plus-

MPower Disruptor 360 (PCP#29290): 360 g/L glyphosate present as an isopropylamine (IPA) salt and formulated as a solution.

- Container size - 80L

Crops and Staging:

Glyphosate tolerant canola varieties only in the 2 to 6 leaf stage. Some yellowing may occur when applied at the 4 to 6 leaf stage. This effect is temporary and will not influence crop growth, maturity or yield.

Weeds and Staging:

No staging is specified on the label.

The weeds controlled by glyphosate at 180 g ae per acre plus:

- **Annual broadleaf weeds:**

- | | | |
|---------------|----------------------------|---------------------|
| ◦ Chickweed | ◦ Kochia | ◦ Smartweed |
| ◦ Corn spurry | ◦ Night-flowering catchfly | ◦ Wild tomato |
| ◦ Cow cockle | ◦ Shepherd's-purse | ◦ Volunteer canola* |

- **Perennial weeds (season long control):**

- | | | |
|--|--|---------------------------|
| ◦ Canada thistle | ◦ Dandelion greater than 15 cm diameter*** | ◦ Perennial sow-thistle** |
| ◦ Dandelion less than 15 cm diameter** | | ◦ Quackgrass |

* Not including glyphosate tolerant (*Roundup Ready*) varieties.

** Top growth only.

*** Suppression only.

Rates:

Eclipse III A: 112 mL per acre

Eclipse III B: 375 mL per acre

-or-

MPower Clobber: 112 mL per acre.

MPower Disruptor 360: 500 mL per acre

(Container size above treats 160 acres)

To prepare spray solution, add the clopyralid component to the spray tank. Once it is half filled with water, add the glyphosate component as the remaining water is added to the tank.

Application Information:

- **Water Volume:** 40 L per acre.
- **Nozzles and Pressure:** Maximum 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage and a minimum of fine droplets that are prone to drift. **DO NOT use with galvanized sprayer tanks since explosive hydrogen gas can be produced.**

Restrictions:

- **Re-cropping Interval:** Wheat, oat, barley, rye (not underseeded to legumes such as alfalfa and clover), forage grasses, flax, canola, mustard and field pea* can be grown the year after application. Manure bedded with straw from treated crops may only be applied prior to the crops listed above with the exception of field pea.
* **DO NOT seed to field peas for at least 10 months following treatment. Very dry soil conditions following application can result in a risk of injury to field peas grown in rotation. If severe drought conditions are experienced during the months of June to August inclusive in the year of application delay seeding field peas an additional 12 months (22 months following application). Contact your local the manufacturer or retailer for more information before seeding field pea following drought conditions in the previous year.**
- **Aerial Application:** DO NOT apply by air.

See component products for more information on restrictions application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

Glykamba*

Herbicide Group
4 - dicamba
9 - glyphosate
(Refer to page 45)

Company:

Nufarm Agriculture (PCP#30870)

Formulation:

194 g ae/L glyphosate and 46 g ae/L dicamba present as isopropylamine (IPA) salts formulated as a solution.

- Container sizes - 10 L, 115 L, 450 L, 750 L

* Nufarm will manufacture on a pre-order basis.

Crops and Staging:

Fallow.

Pre-seeding on fields to be sown to wheat, barley, oats and rye.

May also be applied prior to sowing field corn in fields with more than 2.5% organic matter (DO NOT use on sandy or sandy loam soils).

Glykamba SHOULD NOT be applied prior to broadleaf crops such as lentils, peas, canola and flax due to the risk of injury.

Weeds, Rates and Staging:

Annual Weeds: 1 L per acre may be applied to emerged, actively growing weeds. Application at early growth stages generally provides the best results.

- **Annual grasses:** between emergence and heading.
 - Downy brome
 - Green foxtail
 - Persian darnel
 - Volunteer cereals
 - Wild oats
- **Annual broadleaves:** up to 6 inches (15 cm) height unless otherwise indicated.
 - Cow cockle
 - Flixweed
 - Kochia
 - Lamb's-quarters
 - Redroot pigweed
 - Russian thistle
 - Smartweed (including lady's-thumb)
 - Stinkweed
 - Volunteer canola*
 - Wild buckwheat (1 to 4 leaf)
 - Wild mustard

* NOT including glyphosate tolerant varieties.

Foxtail barley suppression: Apply 1.26 L per acre before initiation of the seedhead or bottom leaves beginning to brown off.

Application Information:

- **Water Volume:** 20 to 40 L per acre water. Avoid the use of extremely hard water (greater than 700 ppm calcium and/or magnesium or high levels of iron). Use of the lower water volume may improve control in situations where hard water is the only source available.
- **Nozzles and Pressure:** Use 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of *ASABE coarse* droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
dicamba	POST (foliar) with slight soil activity	Synthetic Auxin	Moves throughout the plant (Symplast)	Broadleaf only	4
glyphosate	POST (foliar)	EPSP Amino Acid Synthesis Inhibitor	Toward growth areas (Symplast)	Broadleaf & grass	9

Effects of Growing Conditions:

Reduced effectiveness may result if application is made to weeds that are drought-stressed, damaged by disease or insects. Poor control under cool, cloudy weather can occur. Dust on foliage can also cause reduction in control.

Tank Mixes:

Herbicides:

- **Prior to seeding wheat, winter wheat, barley and rye only:**
 - 2,4-D Ester or Amine (113 to 170 g ae per acre)* or (226 to 283 g ae per acre)**
- * to control volunteer glyphosate tolerant canola up to 4 leaf stage
- ** to control volunteer glyphosate tolerant canola up to 6 leaf stage.

Restrictions:

- **Rainfall:** Within 6 hours may reduce weed control. Heavy rainfall within 2 hours of application may require a repeat treatment.
- **Re-entry Interval:** DO NOT enter treated fields for 12 hours.
- **Grazing Restrictions:** DO NOT allow lactating dairy animals to graze within 7 days of treatment or cut for feed or hay within 30 days. Remove meat animals from treated areas at least 3 days prior to slaughter.
- **Re-cropping Interval:** No restrictions in the season following treatment. DO NOT apply in fall or spring prior to broadleaf crops such as lentils, peas, canola and flax due to the risk of injury.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store above 5°C.
- **Equipment:** DO NOT mix, store or apply this product or spray solutions of this product in galvanized steel or unlined steel (except stainless steel) containers or spray tanks.

• **Buffer Zones:**

Product	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Medium droplets	1	1	15
Coarse droplets	1	1	5

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to pages 12 and 13.

Hazard Rating:



Caution – Poison



Danger – Corrosive to eyes.



Warning – Skin Irritant, Potential Skin Sensitizer

For an explanation of the symbols used here see pages 7 and 8.

GoldWing

Herbicide Group
4 - MCPA Ester
14 - pyraflufen-ethyl
(Refer to page 45)

Company:

Nufarm Agriculture (PCP#32112)

Formulation:

13.5g/L pyraflufen-ethyl and 420g/L MCPA ester formulated as an emulsifiable concentrate.

- Container size: 2 x 10.7 L, 85.5 L

Crops and Staging:

For application up to 3 days after planting and prior to the emergence of:

- Barley
- Buckwheat
- Canaryseed
- Corn (Field, sweet)
- Field Pea
- Flax
- Oats
- Proso (Crown) or Pearl Millet
- Rye (spring and winter)
- Triticale
- Wheat (spring, durum, winter)

Weeds, Rates and Staging:

Unless otherwise stated, apply to emerged, young, actively growing weeds that are less than 5 cm tall or across.

GoldWing at 133 mL[†] per acre (10.7 L treats 80 acres and 85.5 L treats 643 acres) controls:

- Annual sow-thistle*
- Canada fleabane*
- Cleavers*
- Cow cockle*
- Dandelion*
- Flixweed*
- Kochia**
- Lamb's-quarters***
- Mallow
- Mustards (except dog and tansy)
- Narrow-leaved hawk's-beard
- Night-flowering catchfly
- Redroot pigweed***
- Stinkweed
- Volunteer canola (all varieties)
- Wild buckwheat*
- Wild mustard*

GoldWing at 266 mL per acre (10.7 L treats 40 acres and 85.5 L treats 321 acres) provides control or suppression of the weeds above plus control of the following weeds:

- Canada fleabane
- Cow cockle
- Flixweed
- Goat's-beard*
- Wild buckwheat

* Suppression only.

† Including glyphosate resistant biotypes

** Including Group 2 and glyphosate resistant biotypes

*** Including Group 2 and 5 resistant biotypes

† *GoldWing* applied alone requires the addition of a non-ionic surfactant (*Nufarm Enhance, Agral 90*) at 0.25 L per 100 L of spray solution.

Maximum TWO APPLICATIONS of this product or *Blackhawk* (with pyraflufen) at the rates listed in this Guide WITHIN A TWO YEAR TIME SPAN.

Application Information:

- **Water Volume:** Minimum 20 to 40 L per acre. Higher water volumes may provide better performance.
- **Nozzles & Pressure:** Use 30 to 40 psi (210 to 275 kPa) if applying without drift reduction nozzles. Drift reduction nozzles may require higher pressures for proper performance. Select the nozzle and pressure combination that produces of *ASABE medium* droplets while maintaining good coverage of foliage. Keep booms lower than 60 cm from crop canopy.
- **Screens:** Use 50 mesh filter screens or larger.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
MCPA	POST (foliar)	Synthetic Auxin	Moves throughout the plant (Symplast)	Broadleaf only	4
pyraflufen	POST (foliar) with little soil activity	PPO Inhibitor/ Membrane disruptor	Little movement due to rapid cell leakage (Symplast)	Broadleaf only	14

Effects of Growing Conditions:

Extreme growing conditions such as drought or near freezing temperatures prior to, at and following time of application may reduce weed control. Wet foliage at the time of application may result in reduced weed control.

Tank Mixes:

Herbicides:

- Glyphosate (label rates)

Note: The above mixes are those listed on the *GoldWing* label only.

Nufarm Agriculture also supports the following mixes that are not on the *GoldWing* label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:** *Valtera* (field pea)

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** No specific recommendation. May be up to 8 hours. Contact the manufacturer for more information.
- **Re-Entry Interval:** DO NOT enter treated fields for 12 hours.
- **Grazing Restrictions:** DO NOT graze or feed treated crop to livestock within 7 days of application. DO NOT cut for hay within 30 days of treatment. Withdraw meat animals from treated fields 3 days prior to slaughter and feed untreated feed.
- **Pre-harvest Interval:** N/A when used prior to emergence.
- **Re-cropping Interval:** Any crop may be seeded one month after application.
- **Aerial Application:** Apply by ground equipment only.
- **Storage:** Store in original containers in a secure, dry heated storage out of direct sunlight. Freezing will not impair effectiveness.
- If frozen, return to original state by allowing product to warm to 10 to 20°C and agitate thoroughly before use.

• **Buffer Zones:**

Crop	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Canary seed	1	1	1
All other labelled crops	1	1	2

See the key to product pages on page 36 for an explanation of the different habitats.

* Buffer zones may be reduced when using drift reduction measures. See the Buffer Zone Calculator on the Pest Management Regulatory Agency website.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Tank Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13. The addition of detergent may improve the effectiveness of tank cleanout, especially when tank mixed.

Hazard Rating:



Caution – Skin Irritant. Potential skin sensitizer.

Contains the allergen soy.

For an explanation of the symbols used here see pages 7 and 8.

Gramoxone

Herbicide Group

22 - paraquat

(Refer to page 45)

Note: As of December 31, 2018, this formulation of Gramoxone (PCP#8661) must not be used and must be properly disposed of. Growers that have any unused product can contact Syngenta Canada's Customer Interaction Centre (1-87-SYNGENTA or 1-877-964-3682) to arrange for pick-up and disposal of any remaining inventory.

Grazon XC

Herbicide Group

4 - picloram & 2,4-D

(Refer to page 45)

Company:

Corteva Agriscience (PCP#31642)

Formulation:

97.5 g/L picloram and 360 g/L 2,4-D formulated as a solution.

- Container size - 2 x 10 L and 110 L

Note: Available only through selected retail outlets.

Crops and Staging:

Permanent grass pasture and rangeland. Apply in spring or early summer.

Note: The use of this chemical may result in contamination of groundwater particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

Weeds, Rates and Staging:

Apply at 1.0 L per acre for season long control ONLY:

- Canada thistle
- Common yarrow
- Dandelion

Apply at 1.9 L per acre: for control of the above weeds and the following weeds:

- Burdock
- Clovers (red, sweet)
- Dock
- Fleabane
- Goldenrod
- Leafy spurge*†
- Plantain
- Ragweed (common)
- Prickly lettuce
- Toadflax*†
- Vetch
- Wild carrot

* For control of leafy spurge and toadflax, use a recommended surfactant (such as *Intake Adjuvant* or any non-ionic surfactant) at the rate of 250 mL per 100 L of water). If maximum rainfastness is desired increase the rate to 375 mL per 100 L of water.

† Research has shown that annual applications may be required for up to 4 years to achieve a high level of sustained control of leafy spurge.

Apply at 2.5 L per acre for control of the following woody species:

- Aspen
- Birch
- Wild rose
- Balsam poplar^Δ
- Western snowberry^Δ
- Willow

^Δ Suppression

Note: Maximum one application per year.

Application Information:

- **Water volume*:**
 - **Ground application:** 40 to 80 L per acre.
- * Use higher water volumes for when foliage is dense. Higher water volumes provide more reliable control.
- **Nozzles and Pressure:** Use nozzles that will deliver coarse droplets in a uniform pattern. Maximum 30 psi (207kPa) by ground or air when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressure designed to deliver thorough, even coverage with **ASABE coarse** droplets.
- Drift of even small amounts of *Grazon XC* into sensitive plants or areas where sensitive crops may be grown can cause injury. DO NOT apply under conditions prone to drift (i.e. high winds, dead calm and temperature inversions).

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
picloram	POST (foliar) with residual soil activity	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4
2,4-D	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4

IMPORTANT: Picloram is a very persistent and water-soluble herbicide. Treated soil should not be moved from the treated area. **DO NOT** apply to soils that are permeable, have sinkholes, or lie over limestone bedrock. **DO NOT** apply to soils whose surfaces are composed of fractured rock or unconsolidated gravel. Application to these sites may allow the movement of herbicide to underlying water sources or aquifers. When applying *Grazon XC* over sandy soils ensure that aquifers are not within 1.8 m of the soil surface. If shallow aquifers are present, **DO NOT APPLY** *Grazon XC*. *Grazon XC* must not be applied on range and pasture acres that are irrigated. **DO NOT** compost or mulch clippings or manure from grass treated with *Grazon XC* unless being reapplied to the treated area.

Effects of Growing Conditions:

Nothing listed on the *Grazon XC* label. Avoid application when pasture and target weeds are under stress from drought, flooding, extreme heat or cold, as injury to grass or unacceptable control may result. Avoid application when temperatures exceed 28°C.

Tank Mixes:

None registered.

Note: The above mixes are those listed on the Grazon XC label only.

Corteva Agriscience also supports the following mixes that are not on the *Grazon XC* label. Apply mixes according to the most restrictive use limitations for either product:

- Herbicides: *Reclaim II*

Restrictions:

- **Rainfall:** DO NOT apply if rainfall is forecast. No specific time frame is indicated on the label. Contact manufacturer for more information.
- **Re-entry Interval:** DO NOT re-enter pastures within 12 hours of application.

- **Grazing Restrictions:** DO NOT allow lactating dairy animals to graze treated areas within 7 days of application. Withdraw meat animals from treated fields at least 3 days before slaughter. DO NOT harvest forage or cut hay within 30 days of application. Feed livestock untreated forage for 7 days prior to moving onto land that produce broadleaf crops; otherwise, urine or manure may contain picloram. See restrictions in “How it Works” section above.
- **Re-cropping Interval:** Legumes may not be established in a pasture for several years after treatment. If legumes are essential in a pasture, DO NOT use *Grazon XC*. DO NOT break up treated pasture and plant to sensitive broadleaf crops for at least 5 years after application.
- **Aerial Application:** May be applied by air.
- **Storage:** Store product in original containers in a secure, dry, cool area. DO NOT freeze.
- **Buffer Zones:**

Product - Use Rate (L per acre)	Buffer Zones (metres ¹) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Field Sprayer (Rangeland Uses):	2	1	70

See page 36 for an explanation of the different habitats.

* These distances can be reduced by 30% using cones on individual nozzles and by 70% using a full shield (shroud, curtain) that extends to the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat. Refer to the label for buffer zone requirements for aerial application.

° Heavy rains can move this product from its application site down slope toward sensitive areas. DO NOT load or mix near wells, dugouts or other water bodies.

Sprayer Cleaning:

There are no sprayer cleaning recommendations on the product label. A combination of Method A and B found on the general page on sprayer cleaning on pages 12 and 13, or the use of a commercial tank cleaner, completed immediately after application is finished may be the best cleanout option.

Hazard Rating:



Caution – Poison



May cause skin and eye irritation

For an explanation of the symbols used here see pages 7 and 8.

Heat Brands

Herbicide Group
14 - saflufenacil
(Refer to page 45)

Company:

BASF Canada

Formulation:

Heat WG (PCP#29368): 70 % saflufenacil formulated as a water soluble granule.

- Container size - 8 x 844 g containers per case.

Merge sold separately.

-or-

Heat LQ (PCP#31468): 342 g/L saflufenacil formulated as a suspension concentrate.

- Container size - 1 x 1.73 L *Heat LQ*; 2 x 8.1 L *Merge* adjuvant or tote containing 4 x 10.79 L *Heat LQ* packaged with 1 x 400 L *Merge*.

Crops, Rates and Staging:

Prior to the seeding of; or following seeding and prior to the emergence of the following crops; fallow or post-harvest:

Note: Must be applied as part of a tank mix with glyphosate from 180 to 360 g ae per acre (see glyphosate page for specific product rates).

Crop	Rate (per acre)	
	Heat WG (g)	Heat LQ (mL)
Barley, canaryseed, chickpea, corn (field and sweet*), field pea, oat, wheat (spring, winter and durum)	10.4 to 28.4	21.4 to 59
Bromegrass, seedling, grown for seed**	10.4 to 28.4	NR***
Lentil†, soybean†*	10.4	21.4
Fallow and post-harvest	10.4 to 28.4	21.4 to 59

* Some varieties may be more sensitive to Heat and injury may occur

† DO NOT use rates higher than 10.4 g per acre of Heat WG or 21.4 mL per acre of Heat LQ or injury could result.

** NOTE: Since this use registered under the User Requested Minor Use Label Expansion (URMULE) program, the manufacturer assumes no responsibility of herbicide performance. Application to this crop is at the risk of the user.

*** NR, not registered.

Note: Crop injury may occur in lentil when Heat is used in conjunction with certain soil applied/soil active herbicides. Consult with the manufacturer for more guidance.

Add either Merge or Amigo adjuvant or MSO Concentrate (sold separately with Heat WG) at 0.2 to 0.4 L per acre.

(One 844 g container of Heat WG or one 1.73 L container of Heat LQ treats 80 to 30 acres).

Harvest Aid/ Desiccation:

Note: As of January 1, 2019 www.keepingitclean.ca indicates that grain from crops treated with this product prior to harvest may have market access concerns. Please see page 10 for more information AND consult potential grain buyers before using this product.

Apply 14.4 to 28.4 grams per acre of Heat WG or 29.5 to 59 mL per acre of Heat LQ to speed the rate of dry-down of the following crops and green weedy material.

Merge adjuvant or MSO Concentrate (sold separately with Heat WG) must be added spray solutions of both formulations at 0.2 to 0.4 L per acre. The required delay before harvest of each crop is indicated below.

Crop	Pre-Harvest Interval (Days after application)	Application Stage
Barley††	3	Hard dough stage (Zaddok's growth stage 87) <30% seed moisture
Canola	3	Apply when 60 to 75% of seeds have changed colour.
Chickpea††	2	Desi – Apply when most seeds turned yellow/brown Kabuli – Apply when most seeds turned white/tan
Field Pea	3	A majority of the pods are brown (70 to 80%)
Red lentil varieties only	3	Lower most pods (15%) are brown and rattle when shaken
Dry bean	2	Stems are green to brown, pods are mature (yellow to brown), and 80 to 90% of leaves have dropped
Soybean	3	
Sunflower	7	The backs of flower heads and bracts are turning yellow, and seed moisture is 20 to 30%.
Wheat††	3	Hard dough stage (Zaddok's growth stage 87) <30% seed moisture

†† Heat LQ only

Apply Heat WG at 28.4 g per acre or Heat LQ at 59 mL per acre with 0.4 L per acre Merge Adjuvant when the product is not used as part of a tank mix.

Heat (WG or LQ) may be tank mixed with glyphosate on barley (feed only), field pea, lentil, dry beans, soybeans and wheat for additional pre-harvest weed control. When tank mixing with glyphosate, it is recommended to apply Heat WG at 20.4 g per acre or Heat LQ at 42.8 mL per acre. DO NOT tank mix with glyphosate when the harvested grain is to be used for seed.

Weeds, Rates and Staging:

Apply up to the 8 leaf stage unless otherwise indicated to control the weeds controlled by glyphosate plus rapid burndown of:

- Canada fleabane[†]
- Cleavers (4 whorl-stage)**
- Common ragweed[†]
- Dandelion***
- Kochia (up to 15 cm)
- Lamb's-quarters
- Flixweed
- Narrow-leaved hawk's-beard (up to 8 cm)
- Pigweed (redroot)**†
- Ragweed (common)
- Round-leaved mallow
- Stinkweed**
- Volunteer canola***†
- Wild buckwheat ***†
- Wild mustard**

* All varieties

** Applications at the 28.4 g per acre rate of *Heat WG* or 59 mL per acre rate of *Heat LQ* will also provide suppression of the emergence of these weeds following application.

*** Top growth burndown of perennial plants, control of spring germinating plants.

[†] *Heat LQ* will control indicated weeds when applied for pre-harvest weed management in wheat and barley.

Application Information:

- **Water volume:**
 - *Preseed, pre-emergent, fallow or post-harvest by ground only:* 20 to 40 L per acre.
 - *Harvest aid/Desiccation:*
 - *Ground:* 81 L per acre stand alone or 40 L per acre when tank mixed with glyphosate
 - *Aerial:* 20 L per acre.
- Higher volumes are required for dense weed stands. Weed control improves with the amount of coverage.
- **Nozzles and Pressure:** Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE medium* classification droplets. Low drift nozzles may require higher pressures for proper performance. Higher pressures may be required to penetrate dense plant stands.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
saflufenacil	POST (foliar) with slight soil activity, or Preharvest	PPO Inhibitor/ Membrane disruptor	Little movement due to rapid cell leakage (Symplast)	Non-selective Broadleaf	14

Effects of Growing Conditions:

Rainfall shortly after application can result in slight injury to the crop. See the 'Restrictions' section below for more details. Warm, moist growing conditions promote active weed growth. Weeds hardened off by environmental stress such as cold weather, drought or excessive heat may not be adequately controlled.

Tank Mixes:

Note: Crop injury may occur in lentil when *Heat* is used in conjunction with certain soil applied/soil active herbicides. Consult with the manufacturer for more guidance.

Herbicides:

- *Preseed, pre-emergent, fallow or post-harvest:* Glyphosate (180 g to 360 g ae per acre)*
* must be mixed with glyphosate.
- *Harvest Aid/Desiccation:* Glyphosate (360 g ae per acre)[†]
[†] NOT for use on crops to be used for seed. Mixes with glyphosate for harvest aid uses are for ground boom application only.
DO NOT apply by air.
(see glyphosate page for product concentrations and equivalent application rates)

Fungicides: None registered

Insecticides: None registered

Note: The above mixes are those listed on the *Heat (WG or LQ)* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Rainfall shortly after product application can result in slight injury to the crop. Lentils will be more susceptible to injury on coarse textured (sandy or gravelly) and low organic matter soils. Injury will appear usually as burning on the outer edges of the leaves. Lentils will grow out of injury symptoms, and yield will not be impacted at recommended rates.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Pre-harvest Interval:**
 - **Preseed and pre-emergent:** Leave 60 days between application and harvest.
 - **Harvest Aid/Desiccant:** Refer to table in 'Crops, Rates and Staging' section.
- **Grazing Interval:**
 - **Preseed and pre-emergent:** DO NOT graze or cut cereal crops for feed within 30 days of application or chickpea, corn, field pea, lentil and soybean within 60 days.
 - **Harvest aid/Desiccant:** DO NOT graze or feed dry bean, lentil or soybean. Treated field pea may be grazed or used as feed.
- **Re-cropping Interval:**

Crop	Application Rate (per acre) and Timing		
	Spring Application		Pre-harvest Application
Heat WG rate	10.4 g	up to 28.4g	up to 28.4g
Heat LQ rate	21.4 mL	up to 59 mL	up to 59 mL
Barley	PB	PB	1
Canary seed	PB	PB	1
Canola	1	1	1
Chickpea	PB	PB	1
Corn	PB	PB	1
Dry Bean	1	1	2
Flax	1	1	1
Lentil	PB	1	1
Mustard	1	1	1
Oat	PB	PB	1
Field Pea	PB	PB	1
Soybean	PB	1	1
Spring Wheat (including durum)	PB	PB	1
Winter wheat	PB	PB	1

PB = May be planted back in the same season

1 = May only be planted the season following application

2 = May only be planted the second season following application

- **Aerial Application:** May be applied by aircraft for desiccation use only. DO NOT apply by air for any other use.
- **Storage:** Store in dry, cool storage. May be frozen.
- **Buffer Zones:**

Application method	Crop	Buffer Zones (metres [†]) Required for the Protection of Terrestrial Habitat
Ground only*	Lentil, Soybean	3
	All other crops	10
Fixed wing airplane	All desiccation uses	175
Helicopter	All desiccation uses	150

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

- DO NOT apply in areas where surface water from the treated area can run off to adjacent cropland, streams

Sprayer Cleaning:

Heat can cause injury to sensitive crops at very low concentrations. Sprayers used to apply this product should be flushed out immediately after each day of use.

Refer to 'Method B' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:



Caution – Possible Skin Irritant

For an explanation of the symbols used here see pages 7 and 8.

Heat Complete

Herbicide Group
14 - saflufenacil
15 - pyroxasulfone
(Refer to page 45)

Company:

BASF Canada

Formulation:

The *Heat Complete* package contains the following components:

Heat LQ (PCP#31468): 342 g/L saflufenacil formulated as a suspension concentrate.

- Container size - 1 x 1.73 L

-plus-

Zidua SC (PCP#32542): 500 g/L pyroxasulfone formulated as a suspension concentrate.

- Container size - 1 x 3.89 L

-plus-

Merge adjuvant (PCP#24702): Container size - 2 x 8.1 L

Crops, Rates and Staging:

Prior to the seeding of; or following seeding and prior to the emergence of the following crops:

Crop	Rate (per acre)	
	<i>Heat LQ</i> (mL)	<i>Zidua SC</i> (mL)
Corn, Field peas	22 to 43	49 to 97
Lentils [†]	22	49
Soybeans*	22 to 29	49 to 65

[†]DO NOT use rates higher than 22 mL per acre of *Heat LQ* or 49 mL per acre of *Zidua SC* or injury could result.

*Some varieties may be more sensitive to *Heat Complete* and injury may occur.

Note: Crop injury may occur in lentil when *Heat Complete* is used in conjunction with certain soil applied/soil active herbicides. Consult with the manufacturer for more guidance.

Add *Merge* adjuvant at 0.2 to 0.4 L per acre.

Weeds, Rates and Staging:

Apply up to the 8 leaf stage unless otherwise indicated to control the weeds controlled by glyphosate plus rapid burndown of:

- Canada fleabane
- Cleavers* (up to 4 whorls)
- Common waterhemp* (prior to emergence)
- Dandelion (up to 15 cm)**
- Flixweed
- Foxtail (green and yellow)^{ΔΔ}
- Kochia^{†*} (up to 15 cm)
- Lamb's-quarters*
- Narrow-leaved hawk's-beard (up to 8 cm)
- Perennial sow-thistle^{***Δ}
- Prickly lettuce^{***Δ}
- Ragweed (common, giant)^{***}
- Redroot pigweed*
- Round-leaved mallow
- Shepherd's-purse^{***}
- Smartweed (lady's-thumb)^{***}
- Stinkweed*
- Volunteer canola (all types)*
- Wild buckwheat*
- Wild mustard*
- Wild oats^{ΔΔ}

[†] Includes Group 2 and glyphosate-resistant biotypes.

* Residual suppression (may be rate dependent).

** Top growth burndown control only of perennial plants; control of spring-germinating plants.

*** Burndown control is rate-dependent.

^ΔTop growth burndown control only.

^{ΔΔ}Prior to emergence; residual suppression by *Zidua* component only.

Application Information:

- **Water volume:** 20 to 40 L per acre. Higher volumes are required for dense weed stands. Weed control improves with the amount of coverage.
- **Nozzles and Pressure:** Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE medium* droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
saflufenacil	POST (foliar) with slight soil activity	PPO Inhibitor/ Membrane disruptor	Little movement due to rapid cell leakage (Symplast)	Non-selective Broadleaf	14
pyroxasulfone	PRE (surface) with residual soil activity	Long-chain Fatty Acid Inhibitor	Little movement (Symplast)	Broadleaf & grass	15

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

- **Preseed and pre-emergent:** Glyphosate (180 g to 360 g ae per acre)*
* must be mixed with glyphosate.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Rainfall shortly after product application can result in slight injury to the crop. Lentils will be more susceptible to injury on coarse textured (sandy or gravelly) and low organic matter soils. Injury will appear usually as burning on the outer edges of the leaves. Lentils will grow out of injury symptoms, and yield will not be impacted at recommended rates.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Pre-harvest Interval:** Leave 60 days between application and harvest.
- **Grazing Interval:** DO NOT graze or cut labeled crops for feed within 60 days of application.
- **Re-cropping Interval:** All crops 1 year after spring, pre-seed or pre-emergent application.
- **Aerial Application:** DO NOT apply by aircraft.
- **Storage:** Store in a cool, dry place. Avoid freezing. If frozen, bring to room temperature and agitate before use.

• **Buffer Zones:**

Application method	Crop	Buffer Zones (metres [†]) Required for the Protection of:		
		Aquatic Habitats of Depths		Terrestrial habitat
		Less than 1 m	Greater than 1 m	
Ground*	Lentils	5	3	3
	Soybeans	5	3	4
	Corn, Field peas	5	3	10

See page 36 for an explanation of the different habitats.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Heat Complete can cause injury to sensitive crops at very low concentrations. Sprayers used to apply this product should be flushed out immediately after each day of use.

Refer to Method B in the general section on sprayer cleaning on page 15-16. Let solution stand for an extended period for better results. Flush sprayer system with water. See the label for product specific cleaning details.

Hazard Rating:



Caution – Possible Skin Irritant



Warning – Contains the allergen soy

For an explanation of the symbols used here see pages 7 and 8.

Hotshot

Herbicide Group
6 - bromoxynil
2 - florasulam
(Refer to page 45)

Company:

ADAMA Canada

Formulation:

The *Hotshot* package contains two components:

Bromotrill II (PCP#30371): 235 g/L bromoxynil formulated as an emulsifiable concentrate.

- Container size – 2 x 9.7 L

Florasulam 50 SC (PCP#30814): 50 g/L florasulam formulated as a suspension concentrate.

- Container size – 1.6 L

Crops and Staging:

Barley, oats, wheat: Prior to crop emergence

Weeds and Staging:

Unless otherwise noted below, apply to young and actively growing weeds.

• **Weeds Controlled up to the 4 leaf stage:**

- | | | |
|--|-------------------------------------|--------------------------------|
| ◦ Annual smartweed (green, pale, Lady's-thumb) | ◦ Cow cockle | ◦ American nightshade |
| ◦ Bluebur | ◦ Kochia (up to 2 inches high) | ◦ Velvetleaf (up to 8 cm high) |
| ◦ Chickweed | ◦ Ragweed (Common) | ◦ Volunteer canola |
| ◦ Cleavers | ◦ Russian thistle (up to 5 cm high) | ◦ Wild mustard |
| ◦ Cocklebur | ◦ Shepherd's-purse | |
| | ◦ Stinkweed | |

- **Weeds Controlled up to the 8 leaf stage:**

- Buckwheat (tartary, volunteer, wild)
- Groundsel, Common
- Lamb's-quarters

- **Weeds Suppressed:**

- Hemp-nettle
- Redroot pigweed
- Sow-thistle (Annual, Perennial)
- Narrow-leaved hawk's-beard

Rate:

Bromotril II: 388 mL per acre

Florasulam 50 SC: 32 mL per acre

Maximum ONE APPLICATION of this product or other products containing florasulam WITHIN A TWO YEAR TIME SPAN.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:** 20 to 40 L per acre
- **Nozzles and Pressure:** Use a combination of nozzles and pressure designed to deliver thorough, even coverage with **ASABE medium to coarse** droplets by ground. Sprayers without drift reduction nozzles should use between 30 to 40 psi (200 to 275 kPa). Low drift nozzles may require higher pressures for proper performance.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
bromoxynil	POST (foliar)	PSII Inhibitor/Membrane disrupter	Little (Apoplast)	Broadleaf only	6
florasulam	POST	ALS Amino Acid synthesis Inhibitor	Toward growth areas (Symplast)	Broadleaf only	2

Effects of Growing Conditions:

Dust on leaves can reduce efficacy.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

- Glyphosate

Fungicides: None registered.

Insecticides: None registered.

Fertilizers: None registered.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** No rainfast period is specified on the *Priority* label; required interval may be up to 8 hours. Contact manufacturer for more information. DO NOT apply excessive irrigation following application as *Priority* has the potential to leach.
- **Re-entry Interval:** DO NOT re-enter treated fields for 24 hours.
- **Pre-harvest Interval:** Leave 60 days between application and harvest.
- **Grazing Restrictions:** MUST NOT be grazed or fed to livestock for 30 days after treatment.
- **Re-cropping Interval:** Barley, canola, chickpeas, dry beans, field peas, flax, lentils, mustard (brown, oriental, yellow and oilseed quality *B. juncea*) oat, soybeans, sunflower and wheat, may be grown following applications made the previous season.
- **Aerial Application:** DO NOT apply by aircraft.
- **Storage:** Store in a cool, dry place. Can be stored to -10°C. If frozen, bring to room temperature and agitate before use.

- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground*	5	5	30

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13. Let solution stand for an extended period for better results. Flush sprayer system with water. See the label for product specific cleaning details.

Hazard Rating:



Warning – Poison.



Danger – Skin and eye irritant.

Potential skin sensitizer.

Imazamethabenz

Herbicide Group
2 - imazamethabenz
(Refer to page 45)

Company:

Nufarm Agriculture (*Assert 300SC* - PCP#21032)

Loveland Products Canada (*Avert* - PCP#29618)

Formulation:

300 g/L imazamethabenz formulated as a suspension concentrate.

- Container size - 2 x 10.8 L

pH adjuster: 94.5% sodium bisulfate formulated as a soluble granule.

- Container size - 2 x 2.5 kg bags (1 bag per 10.8 L jug of imazamethabenz)

Crops, Rates and Staging:

pH adjuster: 1 packet per jug of imazamethabenz to be used.

Imazamethabenz up to 0.67 L per acre (16.1 acres per jug):

- **Barley, spring wheat (including durum):** 1 to 6 leaf stage.
- **Annual ryegrass (seed production only):** 4 to 6 leaf stage.

Imazamethabenz at 0.34 L per acre (32 acres per jug):

- **Sunflower:** 2 to 8 leaf stage. Crop must be less than 15 inches (38 cm) tall except for semi-dwarf varieties, which must be less than 12 inches (30 cm), and dwarf varieties, which must be less than 4 inches (10 cm). Stunting and head deformation can occur from applications made beyond recommended stages.

Maximum ONE APPLICATION EVERY TWO YEARS of *Assert 300SC* or *Avert* or other products containing imazamethabenz.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions. Refer to the product label for complete mixing instructions.

A general guide to mixing can be found on page 11.

Weeds, Rates and Staging:

Weeds	Stage	Rate	
		(L per acre)	Acres per 10.8 L jug
Stinkweed, Wild mustard	Up to 6 leaves	0.34	32
Weeds above plus: Buckwheat (wild and tartary) (suppression) Volunteer canola (except Clearfield varieties)	Up to 4 leaves	0.54	20
Wild oat	1 to 3 leaves		
Wild oat	1 to 4 leaves	0.67	16

* Main stem leaves.

Application Information:

- **Water volume:** In cereals only, imazamethabenz may be applied in 20 to 40 L of water per acre when applied alone or when tank mixed with dichlorprop/2,4-D, 2,4-D ester, or MCPA ester. For all other applications, apply in 40 L per acre.
- **Nozzles and Pressure:** 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of *ASABE medium* droplets or larger.
- **Screens:** Use 50 mesh screens for nozzles and in-line filters.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
imazethabenz	POST	ALS Amino Acid synthesis Inhibitor	Toward growth areas (Symplast)	Broadleaf & Grass	2

Effects of Growing Conditions:

DO NOT apply imazamethabenz 24 hours before or after a frost. It works best at warm temperatures. Performs relatively consistently under dry conditions. If cold, wet soil conditions persist in the days after application, retiling of wild oats may occur. DO NOT apply to drought stressed sunflowers.

Tank Mixes:

Herbicides:

Imazamethabenz may be applied at either 0.53 L or 0.67 L per acre in tank mixes in the brown and dark brown soils, but must be applied at 0.67 L per acre when tank mixing in the black and grey wooded soils for adequate wild oat control.

In spring wheat (including durum) and barley:

- *Curtail M* (0.80 L per acre)
- *Dichlorprop/2,4-D* ester (0.7 L per acre)*†
- Fenoxaprop** (0.118 L per acre)
- Fenoxaprop** (0.118 L per acre) + MCPA Ester (0.28 L per acre)
- Fenoxaprop** (0.118 L per acre) + *Refine SG* (12 g per acre)
- *Frontline XL* (0.65 L per acre)
- *Infinity* (0.33 L per acre)
- MCPA Ester* (up to 0.38 L per acre) (600 g/L formulations)
- *Refine SG* (12 g per acre)
- *Refine SG* (12 g per acre) + MCPA Ester (0.28 L per acre)
- *Spectrum* (20 acres per case)
- *Trophy* (20 acres per case)

† *Dichlorprop-DX* registered with *Assert* only.

* Apply in 20 to 40 L of water per acre. For all other tank mixes use 40 L per acre.

** Use the 0.54 L per acre rate of imazamethabenz when tank mixing with fenoxaprop (see product labels for specific products).

Fenoxaprop rate provides green foxtail control only.

*** When tank mixing dry broadleaf products, add products to the tank in the following order: dry broadleaf products, acidifier, imazamethabenz, and other liquid herbicides if required. For repeat tanks, dry broadleaf products need to be mixed with water to form a slurry prior to adding to the remaining spray solution in the tank.

- Refer to imazamethabenz labels for specific mixing order and application details when tank-mixing. Refer to tank mix partner for additional crop staging restrictions.

Fertilizers: None registered.

Insecticides: None registered.

Fungicides: None registered.

Note: The above mixes are those listed on the imazamethabenz labels only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 6 hours will reduce control.
- **Re-entry Interval:** Wait at least 12 hours before entering treated fields.
- **Grazing Restrictions:** DO NOT graze treated fields or cut treated forage for silage or hay. Mature barley and wheat grain or straw from fields treated with imazamethabenz can be fed to livestock. DO NOT feed or graze treated annual ryegrass.
- **Pre-harvest Interval:** DO NOT apply beyond the recommended crop stage.
- **Re-cropping Interval:**
- DO NOT apply imazamethabenz to the same field more than once in two years.

Year After Application	Black and Grey Wooded Soils	Brown and Dark Brown Soils
Year 1	Spring wheat (including durum), barley, canola, field peas, flax, sunflowers	Spring wheat (including durum), CLEARFIELD canola, barley, sunflowers
Year 2	Spring wheat (including durum), barley, canary-seed, canola, field peas, flax, oats, sunflowers	

- Conduct a field bioassay (a test strip grown to maturity) the year before growing any crop not listed in the table. Lentils are known to be particularly sensitive to imazamethabenz residues in the soil. The additive effect of soil residues from the use of imazamethabenz and sequential applications of imazethapyr, metsulfuron, or *Odyssey* herbicides on the same land area has not been determined. Crop rotation guidelines are not known and injury to rotational crops other than wheat (excluding durum) may occur. Plant only wheat (excluding durum) on fields where these herbicides have been used until a field bioassay demonstrates other crops can be grown successfully.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** DO NOT freeze. Shake well before using.
- **Buffer Zones:**
Buffers are not required for hand-held and backpack applications.

Crop	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Sunflower	0	0	1
Annual ryegrass, Cereals	1	0	1

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:



Caution – Poison



Warning – Eye Irritant

For an explanation of the symbols used here see pages 7 and 8.

Imazamox

Herbicide Group

2 - imazamox

(Refer to page 45)

Company:

BASF Canada (*Solo, Solo NXT*)Loveland Products Canada (*Mizuna*)ADAMA Canada (*Davai 80 SL*)

Formulation:

Solo ADV (PCP#32066): 25 g/L imazamox formulated as a water soluble concentrate with built in adjuvant.

- Container size - 2 x 6.5 L jugs

Mizuna (PCP#32696), Solo (PCP#25496)*: 70% imazamox as a water dispersible granule.

- Container size - 4 x 117 g water soluble bags

Davai 80 SL (PCP#32929): 80 g/L imazamox formulated as a solution.

- Container size - 2 x 8 L, 96 L

* **Note:** *Solo* (dry formulation) is no longer manufactured but some may remain in the distribution system. It is likely to be removed from future editions of this guide.

Crops and Staging:

CLEARFIELD sunflower*:** 2 to 8 leaf stage.

CLEARFIELD canola*:** 2 to 6 leaf stage.

CLEARFIELD lentil*:**

- *Solo ADV:* 2 to 9 leaf stage.
- *Mizuna and Solo:* 2 to 6 leaf stage.

CLEARFIELD oilseed mustard (*Brassica juncea*)*:** 2 to 6 leaf stage.

Field Pea:** 1 to 6 leaf stage.

Soybean: Cotyledon to 4 leaf (3 expanded trifoliates) stage*

* *Solo ADV and Davai 80 SL* only.

** *Davai 80SL* only.

*** *Solo, Solo ADV and Mizuna* only.

Temporary crop yellowing may be observed shortly after application in CLEARFIELD canola.

Weeds, Rates and Staging:

MAXIMUM ONE APPLICATION of these or any other product containing imazamox in a year.

***Solo/Mizuna* at 8.5 g per acre or *Davai 80 SL* at 76 mL per acre plus *Merge* at 0.5 L per 100 L of spray solution will control up to the 4 leaf stage:**

- Lamb's-quarters
- Stinkweed
- Volunteer wheat (not CLEARFIELD varieties)
- Wild mustard

***Solo ADV* at 325 mL per acre (no adjuvant required) or *Solo/Mizuna* at 11.7 g per acre or *Davai 80 SL* at 100 mL per acre plus *Merge* at 0.5 L per 100 L of spray solution will control:**

The weeds above plus:

Grasses - 1 to 4 main stem leaves, early until tillering:

- Barnyard grass
- Green foxtail
- Japanese brome[†]
- Persian darnel
- Volunteer barley
- Volunteer canaryseed
- Volunteer oat
- Wild oat
- Yellow foxtail

Broadleaf Weeds - cotyledon to 4 leaf stage:

- Cleavers[†]
- Cow cockle
- Green smartweed
- Redroot pigweed
- Round-leaved mallow[†]
- Shepherd's-purse
- Volunteer canola (not CLEARFIELD varieties)
- Wild buckwheat[†]

[†] Suppression only.

Refer to the product label for complete mixing instructions for this product and its mixes. A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:** 40 L per acre.
- **Nozzles and Pressure:** Use 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE (S572.1) medium* or larger droplets.
- **Screens:** Use 50 mesh or coarser on both nozzle and primary plumbing screens (*Solo* and *Mizuna* only).

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
imazamox	POST (foliar) with slight soil activity	ALS Amino Acid inhibitor	Toward growth areas of the plant (Symplast)	Broadleaf & grass	2

Effects of Growing Conditions:

DO NOT spray if temperatures of +5°C or lower are forecast within 3 days of application. Treat crops during warm weather when weeds are actively growing and soil moisture is adequate for rapid growth. Under cool or dry conditions, control of some weeds may be severely reduced.

Tank Mixes:

Unless otherwise indicated, imazamox and tank mix partners are applied at all label rates and include adjuvants indicated in "Rates:" above.

Herbicides:

- Field Peas:
 - *Davai 80 SL* at 76 mL/acre only
 - Imazethapyr (*Phantom* only at 26.3 mL/acre)
- Soybean:
 - *Davai 80 SL* at 81 mL/acre only
 - Imazethapyr (*Phantom* only at 26.3 mL/acre)

Fungicides: None registered.

Insecticides: None registered.

Fertilizers: None registered.

Restrictions:

- **Rainfall:** Rainfall within 3 hours of application may reduce product efficacy.
- **Re-entry Interval:** DO NOT enter treated fields for 12 hours.
- **Grazing Restrictions:** DO NOT graze treated canola or lentil or cut for feed within 20 days of application. DO NOT graze treated sunflower or cut for straw.
- **Pre-harvest Interval:**
 - **Solo, SoloADV or Mizuna only:** DO NOT apply to canola or lentil within 60 days of harvest. DO NOT apply to sunflower within 70 days of harvest.
 - **Davai 80 SL:** DO NOT graze treated crops. Field peas may be fed to livestock 30 days after application.
- **Re-cropping Interval:**
 - **Solo, SoloADV or Mizuna only:** Winter wheat may be seeded 3 months after application.
 - **All products:** Barley, canaryseed, canola, chickpea, field corn, field pea, flax, lentil, oat, sunflower, and spring wheat (including durum) may be seeded the first spring after application and tame mustard (condiment types only) the second season after application. The company recommends that a field bioassay (a test strip grown to maturity) be conducted the year before growing any crops other than those listed above. Contact manufacturer for additional information on recropping intervals. Check any tank mix partners for additional recropping restrictions.

- **Aerial Application:** DO NOT apply by air.
- **Storage:** DO NOT freeze. Store in a cool, dry place above 5° C.
- **Buffer Zones:** Avoid spraying in situations where drift may occur.

Application method	Buffer Zones (metres ¹) Required for the Protection of:
	Terrestrial and Aquatic Habitat
<i>Solo</i>	11
<i>Mizuna, Davai 80SL and Solo ADV</i>	1

See page 36 for an explanation of the different habitats.

* These distances can be reduced by 30% using cones on individual nozzles and by 70% using a full shield (shroud, curtain) that extends to the crop canopy.

[†] Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Refer to 'Method C' in the general sprayer cleaning section on pages 12 and 13.

Hazard Rating:

Davai 80SL:



Caution – Poison

Solo, SoloADV, Mizuna:



Warning – Eye and Skin Irritant. May cause eye damage.

For an explanation of the symbols used here see pages 7 and 8.

Imazamox/Imazethapyr

Herbicide Group
2 - imazamox
& imazethapyr
(Refer to page 45)

Company:

BASF Canada (*Odyssey**, *Odyssey NXT*)

Loveland Products (*Duet*)

AgraCity (*MPower Ninja*)

Formulation:

***Duet* (PCP#32659), *MPower Ninja* (PCP#32995):** 35% imazamox and 35% imazethapyr formulated as a dispersible granule.

- Container size - 8 x 86.5 g water soluble packs. Adjuvant sold separately.

***Odyssey** (PCP#25111):** 35% imazamox and 35% imazethapyr formulated as a dispersible granule.

- Container size - 8 x 86.5 g water soluble packs per 40 acre case (*Merge* sold separately).

***Odyssey NXT* (PCP#32303):** 35% imazamox and 35% imazethapyr formulated as a dispersible granule.

- Container size – 2 x 692 g jugs per 80 acre case. One case will also include 2 x 8.1 L jugs of *Merge*.

* Note: This product is no longer manufactured but some still remains in the distribution system. This product may be removed from future editions when supplies are exhausted.

Crops and Staging:

Crop	Leaf Stage
Field pea; Faba bean ^A	1 to 6 nodes/true leaf stage
Clearfield canola ^A ; Clearfield oilseed mustard ^A (<i>Brassica juncea</i>)	2 to 6 leaf

Crop	Leaf Stage
Clearfield lentil ^Δ	1 to 9 above ground nodes
Soybean ^Δ	1 to 3
Fenugreek (seed or forage) ^Δ ; Alfalfa ^{*†Δ} ; Bird's-foot trefoil ^{*†Δ}	1 to 4

* Seed production only

† Seedling and established

Δ *Odyssey NXT* and *Duet* only

Temporary crop yellowing may be observed shortly after application in field pea, faba bean, and CLEARFIELD canola.

Weeds, Rates and Staging:

Merge adjuvant (sold separately for *Duet* and *Mpower Ninja* and *Odyssey*; included in *Odyssey NXT*) must be used at a rate of 0.5 L per 100 L of spray solution.

MSO adjuvant (for use with *Duet* only) must be used at a rate of 1 L per 100 L of spray solution.

At 17.3 g per acre, *Imazamox/Imazethapyr* will control:

- **Grasses - 1 to 4 main stem leaves, until tillers are visible:**
 - Barnyard grass
 - Green foxtail
 - Persian darnel
 - Volunteer cereals (wheat excluding CLEARFIELD varieties, barley, oats)
 - Wild oat
 - **Broadleaf Weeds - cotyledon to 4 leaf stage unless otherwise indicated:**
 - Chickweed
 - Cleavers (up to 4 whorls)
 - Flixweed
 - Green smartweed
 - Hemp-nettle*
 - Lamb's-quarters***
 - Redroot pigweed
 - Russian thistle†
 - Shepherd's-purse
 - Stinkweed
 - Stork's-bill
 - Volunteer canola (not CLEARFIELD varieties)
 - Volunteer tame mustard (not CLEARFIELD oilseed (*B. juncea*) varieties)
 - Wild buckwheat*
 - Wild mustard
- * Suppression only in field peas and CLEARFIELD lentils.
 ** Suppression only in field peas and CLEARFIELD canola, not controlled in CLEARFIELD lentils.
 *** Suppression only.
 † Suppression only in CLEARFIELD lentils. Not labelled for control in peas with *Mpower Ninja*.

Note: DO NOT apply *Imazamox/Imazethapyr* more than once or follow it with any other product containing imazamox or imazethapyr in the same year.

Refer to the product label for complete mixing instructions for this product and its mixes. A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:** 40 L per acre.
- **Nozzles and Pressure:** Maximum 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of *ASABE medium* droplets or larger.
- **Screens:** Use 50 mesh or coarser on both nozzle and primary plumbing screens.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
imazamox	POST (foliar) with slight soil activity	ALS Amino Acid inhibitor	Toward Areas of Growth (Symplast)	Broadleaf & grass	2
imazethapyr	POST (foliar) with some soil activity	ALS Amino Acid inhibitor	Toward Areas of Growth (Symplast)	Broadleaf only	2

Effects of Growing Conditions:

DO NOT spray if temperatures of +5°C are forecast within 3 days of application. Treat crops during warm weather when weeds are actively growing and soil moisture is adequate for rapid growth. Under cool or dry conditions, control of some weeds may be severely reduced.

Tank Mixes:

Herbicides[†]:

- In CLEARFIELD canola only:
 - Lontrel 360 (0.17 to 0.23 L per acre).
- In field peas, CLEARFIELD canola, CLEARFIELD lentils, and soybeans only:
 - Poast Ultra (190 mL per acre).

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

[†] **Note:** The above mixes are those listed on the *Odyssey* and *Duet* labels only. No tank mixes are listed on the *MPower Ninja* label.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Rainfall within 3 hours of application may reduce control.
- **Re-entry Interval:** DO NOT enter treated fields for 12 hours.
- **Grazing Restrictions:** DO NOT graze treated canola or soybean or cut for hay. Field pea may be fed to livestock 30 days after application. DO NOT harvest forage or cut for hay.
- **Pre-harvest Interval:** DO NOT apply within 60 days of harvesting canola, faba bean, oilseed *Brassica juncea*, field pea, and lentil. DO NOT apply within 85 days of harvesting soybean.
- **Re-cropping Interval:** Field pea, lentil, CLEARFIELD canola, canaryseed, oat, barley, field corn*, chickpea and spring wheat (including durum) may be seeded the first full season after application. Flax, canola and sunflower may be seeded the second full season after application. The manufacturers recommend that a field bio-assay (a test strip grown to maturity) be conducted the year before growing any crops other than those listed above.
 - **NOTE:** Breakdown of Imazamox/Imazethapyr may be slowed or delayed by environmental conditions such as drought, excessive cold and/or acid soils (pH less than 6.5) resulting in an increased risk of injury to rotational crops. The most tolerant crops are CLEARFIELD canola and legume crops, then cereals. Contact manufacturer for additional information on re-cropping interval.
- * Field corn is not listed as a registered recrop option on the *MPower Ninja* label.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** DO NOT freeze. Store in a cool, dry place above 5°C.
- **Buffer Zones:** Avoid spraying in situations where drift may occur.

Application method	Buffer Zones (metres [†]) Required for the Protection of:	
	Aquatic Habitats of Depths	Terrestrial habitat
Ground*	11	1

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method C' in the general sprayer cleaning section on pages 12 and 13.

Hazard Rating:

 Warning – Eye and Skin Irritant.

 Warning – Contains allergen "sulfites"

For an explanation of the symbols used here see pages 7 and 8.

Imazethapyr

Herbicide Group
2 - imazethapyr
(Refer to page 45)

Company:

BASF Canada (*Pursuit 240* - PCP#23844)
AgraCity (*Mpower Kamikaze* - PCP#30127)
ADAMA Canada (*Phantom* - PCP#30017)
Univar Canada Ltd (*Gladiator* - PCP#28923)
Loveland Products Canada (*MultiStar* - PCP#29259)

Formulation:

240 g/L imazethapyr formulated as a solution.
• Container size - 2 x 3.3 L jugs per case

Crops and Staging:

All products: DO NOT use in the brown or dark brown soil zones (except for use in dry bean and alfalfa under irrigated brown soils); rotational crops may be severely injured due to carry over in these soils.

Crop	Stage
Field pea	May be applied up to the sixth above-ground node stage (6 true leaves).

Pursuit, Gladiator, MultiStar and Phantom only:

Crop	Stage
Dry bean (pinto, pink and red varieties only)	Up to and including the second trifoliolate leaf stage
Soybean (Manitoba only)	Up to and including the third trifoliolate leaf stage
Seedling alfalfa (forage or seed production)*	Apply after the first trifoliolate leaf stage.
Established alfalfa (seed production only)**	Apply before alfalfa reaches 12 inches (30 cm) in height.
Chickling vetch (<i>Lathyrus</i>) grown for seed	Apply at the 5 to 7 leaf stage.

* Apply only to seedling alfalfa that will remain in production for at least 3 years following application. Apply only once during the life of the alfalfa stand.

** DO NOT apply in the last year of established alfalfa stands.

Weeds and Staging:

In field peas. Apply up to the 4 leaf stage, unless otherwise indicated:

- Chickweed
- Cleavers
- Green foxtail
- Hemp-nettle
- Redroot pigweed
- Shepherd's-purse
- Smartweed
- Stinkweed
- Volunteer canola (not CLEARFIELD varieties)
- Wild buckwheat[†]
- Wild mustard
- Wild oats[†] (2 to 4 leaf stage)

In seedling and established alfalfa:

- Common groundsel^{*†}
- Green foxtail[†]
- Green smartweed *
- Redroot pigweed
- Shepherd's-purse^{*†}
- Stinkweed
- Volunteer canola (not CLEARFIELD varieties)
- Wild mustard

In dry bean:

- Hairy nightshade (up to 6 leaf stage)

* Seedling alfalfa only.

† Suppression only.

Rates:

85 mL per acre (40 acres per jug).

A non-ionic surfactant with at least 80% active ingredient (*Agral 90*, *Agsurf II*, *Surf 92*) should be added at a rate of 0.25 L per 100 L of spray solution. DO NOT over apply imazethapyr, as crop injury may result.

DO NOT apply imazethapyr more than once per season or follow imazethapyr with other products containing imazethapyr in the same year.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:** 40 to 160 L per acre.
- **Nozzles and Pressure:** Maximum 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressure designed to deliver proper coverage with **ASABE medium** droplets or larger.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
imazethapyr	POST (foliar)	ALS Amino Acid inhibitor	Toward Areas of Growth (Symplast)	Broadleaf & grass	2

Effects of Growing Conditions:

DO NOT spray if temperatures of +5°C are forecast within 3 days of application. Treat crops during warm weather when weeds are actively growing and soil moisture is adequate for rapid growth. Under cool or dry conditions, control of some weeds may be severely reduced.

Tank Mixes:

None registered.

Restrictions:

- **Rainfall:** No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.
- **Re-entry Interval:** DO NOT enter treated fields for 12 hours.
- **Grazing Restrictions:** DO NOT graze or harvest seedling alfalfa within 14 days of treatment. DO NOT graze or harvest field peas for feed within 30 days. DO NOT graze other treated crops or cut for feed prior to crop maturity.
- **Pre-harvest Interval:** DO NOT apply within 60 days of harvesting field peas or chickling vetch, within 75 days of harvesting dry beans, or within 85 days of harvesting soybeans.
- **Re-cropping Interval:** Rotate to barley, spring wheat (not durum), lentils, alfalfa, field pea or CLEARFIELD canola the year following application. The manufacturer recommends that a field bioassay (a test strip grown to maturity) be conducted the year before growing any crop other than those listed above. However, yield losses within the test strips may not be noticed unless the yield can be compared to an untreated area seeded adjacent to the imazethapyr-treated strip. In case of crop failure, only field peas or CLEARFIELD canola may be replanted in the year of application.
 - *NOTE: Breakdown of imazethapyr may be slowed or delayed by environmental conditions such as drought, excessive cold and/or acid soils (pH less than 6.5) resulting in an increased risk of injury to rotational crops. The most tolerant crops are CLEARFIELD canola and legume crops, then cereals. Contact manufacturer for additional information on re-cropping intervals.*
- **Aerial Application:** DO NOT apply by air.
- **Storage:** DO NOT freeze. If the product is exposed to temperatures below 0°C, thaw the product completely and shake the container vigorously prior to use.
- **Buffer Zones:**
 - *Pursuit, MultiStar, Gladiator:*

Application method	Buffer Zones (metres [†]) Required for the Protection of:	
	Aquatic Habitats	Terrestrial habitat
Ground only*	1	15

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured is metres from the downwind edge of the spray boom to sensitive habitat.

- **Other Products:** DO NOT apply within 15 m of shelterbelts, water bodies, wetlands, and woodlots.

Sprayer Cleaning:

There are no specific sprayer cleaning directions on the product label. The use of 'Method C' in the general section on sprayer cleaning on pages 12 and 13 is recommended for other products with similar chemistry. Contact the manufacturer for more information.

Hazard Rating:

▼ Caution – May cause skin irritation

▼ Caution – May cause eye damage

For an explanation of the symbols used here see pages 7 and 8.

Inferno Duo

Herbicide Group
2 - flucarbazone, tribenuron
(Refer to page 45)

Company:

Arysta LifeScience Canada (PCP#30663)

Formulation:

45% flucarbazone and 25% tribenuron formulated as a water dispersible granules.

- Container size - 4 x 254.5 gram pouches

Crops and Staging:

Spring wheat (NOT including durum): Apply to the soil surface from one week before seeding until crop emergence.

Weeds, Rates and Staging:

Apply 12.75 g per acre of *Inferno Duo* (one 254.5 g pouch treats 20 acres) plus 180 g ae per acre of glyphosate IPA or K+ salts (see glyphosate page) to control:

- Weeds controlled by glyphosate at 180 g ae per acre (see glyphosate page) plus:
 - Cow cockle
 - Dandelion[†]
 - Foxtail barley (up to 10 cm)*
 - Narrow-leaved hawk's-beard
 - Shepherd's-purse
 - Volunteer canola
 - Wild oats[†]

Mix with glyphosate at 360 g ae per acre to control:

- Foxtail barley (greater than 10 cm, heavy infestations or stressed plants)*

* Apply prior to seed head emergence and the loss of older leaves.

† Suppression only.

NOTE: The entire 254.5 g pouch must be added to the spray tank. DO NOT use part pouches.

DO NOT apply *Inferno Duo* more than once per season or follow the application of *Inferno Duo* with an application of another flucarbazone product.

Application Information:

- **Water Volume:** 40 L per acre.
- **Nozzles and Pressure:** Use 30 to 50 psi (200 to 345 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage and a minimum of fine droplets that are prone to drift.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
flucarbazone	POST (foliar – emerged weeds) PRE (soil activity)	ALS Amino Acid inhibitor	Toward Areas of Growth (Symplast)	Broadleaf & grass	2
tribenuron	POST (foliar – emerged weeds)	ALS Amino Acid inhibitor	Toward Areas of Growth (Symplast)	Broadleaf only	2

Effects of Growing Conditions:

Crop tolerance and weed control may be reduced if applications are made to plants growing under stress. Stress includes saturated or water-logged soil, drought, extreme temperatures, low fertility or visible disease symptoms at application.

Adopting practices to increase crop vigor will improve crop tolerance.

Tank Mixes:

Herbicides: Glyphosate IPA or K+ salts only.

Fungicides: None registered.

Insecticides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Inferno Duo* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** DO NOT apply if rainfall is expected within 1 hour of application.
- **Re-entry Interval:** Wait at least 12 hours before re-entering treated fields.
- **Grazing Restrictions:** DO NOT graze treated fields. Mature grain or straw may be fed to livestock.
- **Pre-harvest Interval:** Leave at least 80 days from application to harvest.
- **Re-cropping Interval:** The following crops may be planted 11 months after application.

Soil Zones and Rotational Crops			
Grey-Wooded	Black	Dark Brown	Brown
Spring Wheat Barley Canola (all varieties) Field Pea*	Wheat (Spring & durum) Barley Canola (all varieties) Field Pea* Flax Field Bean	Wheat (Spring & durum) Barley Canola (all varieties) Field Pea* Flax	Spring Wheat

* **NOTE:** Field peas may be grown the year following application in fields where precipitation has been equal to or above the 10 year average during the growing season, and where organic matter content is above 4%, and pH is below 7.5. The company suggests a minimum of 100 mm (4 inches) of rain is needed in the 60 days following application for adequate breakdown to take place.

◦ **NOTE:** Other rotational crops may also be affected if rainfall is less than the 10 year average for the area. Soils in the grey wooded, black and dark brown soil zones with a combination of low organic matter (less than 2%), light textured soils or high pH (greater than 7.5) (i.e. eroded knolls, sandy soils) may result in delayed growth and development in rotational crops. DO NOT plant crops other than those listed above in the year following application.

- **Aerial Application:** DO NOT apply by air.
- **Storage:** May be frozen.
- **Buffer Zones:** Leave at least 20 metres from the downwind edge of the spray swath to sensitive upland plants like shelterbelts and woodlots and at least 35 metres to water sources or wetland habitats. Avoid drift onto sensitive crops like canola and tame oat. DO NOT mix or load within 10 metres of water sources or wetland habitats.

Sprayer Cleaning:

Inferno Duo residues in the spray tank can cause severe injury to sensitive crops at very low concentrations. Sprayers should be cleaned out immediately before using another product.

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13.

When mixing with other pesticides, combine the method above with the method required for the tank mix partner if it is different from above.

Hazard Rating:



Warning: Contains the allergen milk and sulphites.



Caution – Skin irritant.

For an explanation of the symbols used here see pages 7 and 8.

Infinity

Herbicide Group
6 - bromoxynil
27 - pyrasulfotole
(Refer to page 45)

Company:

Bayer (PCP#28738)

Formulation:

37.5 g/L pyrasulfotole and 210 g/L bromoxynil formulated as an emulsifiable concentrate.

- Container size - 2 x 6.7 L jugs per case

Crops and Staging:

The following crops may be treated when at the 1 leaf stage of growth until the flag leaf is just visible but still rolled:

- Barley
- Perennial ryegrass*
(seedling & established, grown for seed or forage)
- Red fescue and bromegrass*
(established, grown for seed or forage)
- Timothy (seed production only)
- Triticale
- Wheat (spring, durum, winter)

*** NOTE: Since the uses on forage grasses were registered under the User Requested Minor Use Label Expansion (URMULE) program, the manufacturer assumes no responsibility for herbicide performance. Those who apply this use do so at their own risk.**

Weeds, Rates and Staging:

At 0.33 L per acre (one case treats 40 acres) the following weeds are controlled at the 1 to 6 leaf stage unless otherwise noted:

- Annual sow-thistle
- Chickweed
- Canada fleabane (seedlings up to 10 cm)*
- Canada thistle[†] (up to 30 cm)
- Cleavers (1 to 3 whorls)
- Cleavers (4 to 6 whorls)*
- Dandelion[†] (up to 25 cm across^{††})
- Flixweed (up to 10 cm)
- Hemp-nettle
- Kochia (up to 10 cm)
- Lamb's-quarters
- Narrow-leaved hawk's-beard (up to 10 cm before bolting)
- Pale smartweed
- Ragweed (common, giant^{†*})
- Perennial sow-thistle[†]
- Redroot pigweed
- Round-leaved mallow^{**†}
- Russian thistle (up to 10 cm)
- Shepherd's-purse
- Spreading atriplex (up to 10 leaf)^{†*}
- Stinkweed
- Stork's-bill (up to 8 leaf)^{***}
- Volunteer canola^{**}
- Volunteer soybean*
- Wild buckwheat
- Wild mustard

[†] Suppression only.

^{††} Spring seedlings and overwintered rosettes.

^{*} Suppression alone or control with the addition of AMS*

^{*} Add 200 g of active ammonium sulphate per acre (202 g per acre of 99% dry; 0.5 L per acre of 40% liquid; or 0.4 L per acre of 49% solution).

^{**} All herbicide tolerant varieties.

^{***} Only when mixed with 2,4-D + ammonium sulphate.

DO NOT apply *Infinity* or other products containing pyrasulfotole or bromoxynil more than once in the same year.

Application Information:

- **Water Volume:**
 - **Ground:** Minimum 19 L per acre
 - **Aerial:** Minimum 11.4 L per acre

Higher water volumes should be used under dense crop and weed canopies to ensure thorough coverage of the target weeds.
- **Nozzles and Pressure:** Maximum 40 to 45 psi (275 to 310 kPa) with conventional flat fan nozzles. Use nozzles and pressure designed to deliver proper coverage with **ASABE medium** droplets. Angle ground sprayer nozzles forward at a 45° angle to improve coverage of vertical leaf targets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
bromoxynil	POST (foliar)	PSII Inhibitor/ Membrane disruptor	Little (Apoplast)	Broadleaf only	6
pyrasulfotole	POST (foliar)	HPPD Pigment Inhibitor	Some – both foliar and root (Apoplast) Somewhat systemic (has soil residues)	Broadleaf only	27

Effects of Growing Conditions:

For best results, apply to emerged, young, actively growing weeds according to the weed stages listed. Under stressed conditions and/or heavy crop canopy, early application will result in improved weed control. Weeds growing under adverse environmental conditions such as drought will be less susceptible herbicide effects.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

- **Wheat (spring, winter, and durum), barley and triticale:**
 - *Liquid Achieve*
- **Wheat (spring and durum) and barley only:**
 - *Puma Advance*
 - 2,4-D Ester (113 g ae per acre) + Ammonium sulphate (see Rates:)

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: DO NOT mix with fertilizers other than those indicated above.

Note: The above mixes are those listed on the *Infinity* label only.

Bayer also supports the following mixes that are not on the *Infinity* label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:** 2,4-D Ester (56 to 112 g ae per acre), *Axial+Tilt*, *Horizon NG*, *Lontrel*, MCPA 600 Ester (94.5 to 189 mL per acre), *Puma Advance + Tilt*, *Traxos*, *Varro*, *Traxos+Tilt*.
- **Fungicides:** *Tilt*.
- **Insecticides:** *Decis*, *Sevin XLR*.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 1 hour of application may reduce control.
- **Re-entry Interval:** DO NOT re-enter treated area within 12 hours.
- **Grazing Restrictions:** DO NOT graze treated crops or cut for hay within 25 days of application.
- **Pre-harvest Interval:** Leave at least 50 days for wheat and triticale and 45 days for barley from application to harvest of grain or straw.
- **Re-cropping Interval:** Alfalfa, barley, canaryseed, canola, field corn (Manitoba only), flax, potatoes, soybeans (Manitoba only), sunflowers, tame oat, and wheat (durum, spring) may be seeded the year following application. Field peas may be grown the season following application in black, grey-wooded and dark brown soil zones. DO NOT plant field peas the season following *Infinity* use in the brown soil zone where organic matter content is below 2.5 % and where soil pH is above 7.5. Lentils may be seeded the second season after application.

- **Aerial Application:** May be applied by air.
- **Storage:** Store product in original containers in a secure, dry area, away from other pesticides, food or feed above –20°C. If stored over winter, shake or mix well before using.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	1	1	5
Fixed wing airplane	10	1	375
Helicopter	10	1	225

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

The manufacturer recommends a cleanout process similar to “Method A” on pages 12 and 13 using a combination of water and ammonia solution rinses.

For additional information, Refer to pages 12 and 13.

Hazard Rating:

 Warning – Warning Poison

 Warning – Eye and Skin Irritant.

 Warning – Contains the allergen soy.

For an explanation of the symbols used here see pages 7 and 8.

Infinity FX

This product is a prepackaged tank mix of Infinity (see page 269) and FX (fluroxypyr - see Fluroxypyr page 217). Information listed is restricted to Crop, Weeds, Rates and Tank mixes. For other detailed restrictions and other general information on the component products see the product pages listed above.

Herbicide Group
6 - bromoxynil
27 - pyrasulfotole
4 - fluroxypyr
(Refer to page 45)

Company:

Bayer

Formulation:

Infinity (PCP #28738): 37.5 g/L pyrasulfotole and 210 g/L bromoxynil formulated as an emulsifiable concentrate.

- Container size - 13.4 L

FX (PCP #32006): 180 g/L fluroxypyr formulated as an emulsifiable concentrate.

- Container size - 6.5 L

Crops and staging:

Spring Wheat, Durum, Barley: Apply at the 2 leaf stage of growth until stem elongation.

Weeds, Rates, Staging:

At the *Infinity* 335 mL per acre and *FX* 160 mL (one case treats 40 acres) the weed species controlled by the *Infinity* label plus the following.

- Cleavers (1 to 9 whorls)*
- Chickweed (up to 8 leaf stage)
- Hemp-nettle (up to 8 leaf stage)
- Kochia (up to 15 cm in height)
- Round-leaved mallow (1 to 6 leaf stage)
- Volunteer flax (up to 12 cm)

* **Ammonium sulphate at 200 g of active ingredient per acre may be added for improved broad leaf control (202 g per acre of 99% dry; 0.5 L per acre of 40% liquid; or 0.4L per acre of 49% liquid).**

Application Information

- **Water Volume**
 - **Ground:** Minimum of 19 L per acre . Higher water volumes should be used under dense crop and weed canopies to ensure thorough coverage of the target weed.
- **Nozzles and Pressure:** Maximum 40 to 45 psi (275 to 310 kPa) with conventional flat fan nozzles. Use nozzles and pressure to deliver proper coverage with *ASABE medium* droplets. Angle ground sprayer nozzles forward at a 45° angle to improve coverage of vertical leaf targets.

Tank Mixes

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides :

- **Spring wheat, durum, and barley:**
 - 2,4-D ester + AMS
 - *Liquid Achieve*
 - *Puma Advance*
- **Spring wheat and durum:**
 - *Horizon NG*
 - *Varro*
- **Spring wheat and barley:**
 - *Axial*

Fertilizers: DO NOT mix fertilizers other than those indicated above

Bayer also supports the following mixes that are not on the *Infinity FX* label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:** 2,4 D ester, MCPA ester

Adding ingredients in the correct order is critical for optimum performance. Check label of both products to be mixed for directions. General guidelines can be found on page 11.

See component products for more information on restrictions application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

Kerb

**Herbicide Group
15 - propyzamide**
(Refer to page 45)

Company:

Corteva Agriscience

Formulation:

Kerb 50WP (PCP#25595): 50% propyzamide formulated as a wettable powder.

- Container size - 1.36 kg (3 x 454 g water soluble pouches)

Kerb SC (PCP#30264): 400 g/L propyzamide formulated as a suspension concentrate.

- Container size - 2 x 10 L

Crops and Staging:

Apply to the following established crops between October 1 and freeze-up or very early spring*. Temperatures should be above freezing at time of application but should not exceed 12°C after application or a reduction in control may be observed. Applications are more effective if followed by a rain. Contact manufacture for specific staging and application guidelines prior to application.

Established alfalfa, bird's-foot trefoil, and established pastures**.

* Early spring application for seed alfalfa only.

** **Severe stand thinning** may occur to pastures consisting primarily of crested wheatgrass, meadow fescue and timothy.

- Some thinning (10 to 15%) may occur with tall fescue and creeping red fescue.

Weeds, Rates and Staging:

Apply in late fall or very early spring (seed alfalfa only) prior to the emergence of weeds.

Established grass or grass/legume pastures for control of foxtail barley:

- **Brown, dark brown or gray wooded soils:**
 - *Kerb SC*: 0.45 L per acre.
- **Black soils:**
 - *Kerb 50WP*: 0.45 kg per acre.
 - *Kerb SC*: 0.56 L per acre.

Established Alfalfa[†] and bird's foot trefoil[†]:

Weed	Rate (kg per acre)	
	<i>Kerb WP</i>	<i>Kerb SC</i>
Annual grasses, volunteer cereals, wild oat	0.71 kg [†]	0.89 L [†]
Quackgrass, orchardgrass, timothy, chickweed	0.91 to 1.32* kg	1.13 to 1.62* L
Dodder (fall application only)	1.3 kg	1.62 L

Note that complete control may not be achieved.

* **Maximum 0.91 kg per acre with spring application. Low temperatures and adequate moisture following application are needed for efficacy.**

[†] Including fall application on spring seeded crops.

Caution: DO NOT use on soils with more than 6% organic matter. DO NOT apply to soils prone to flooding. DO NOT apply to pastures that contain high proportions of timothy, crested wheat grass or meadow fescue. Consult the manufacturer for other forage grass species sensitivities to Kerb.

Application Information:

- **Water Volume:** 120 to 200 L per acre.
- **Nozzles and Pressures:** Maximum 30 to 40 psi (200 to 275 kPa) with conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressure designed to deliver thorough, even coverage with **ASABE medium** droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
propazomide	PRE (soil active)	Long-chain Fatty Acid Inhibitor/ Membrane & cell wall production	Little (apoplast)	Broadleaf & grass	15

Effects of Growing Conditions:

Dry soil conditions at time of weed emergence may result in reduced control. Approximately 3 inches of total precipitation is required for adequate activation. Best results when soil temperatures are low but above freezing.

Tank Mixes:

None Registered

Restrictions:

- **Rainfall:** Surface applications are most effective if followed by 0.5 to 1 inch (1.25 to 2.5 cm) of rain within 2 days of application. Avoid application when heavy rain is forecast.
- **Re-entry Interval:** DO NOT re-enter treated areas for 24 hours.
- **Grazing Restrictions:** DO NOT graze or harvest for livestock feed within 90 days of the 1.32 kg per acre rate of *Kerb 50WSP* or the 1.62 L per acre rate of *Kerb SC*, and 60 days of application for lower rates.
- **Re-cropping Interval:** May be replanted to leafy vegetable crops after 30 days of treatment and root or tuber vegetables within 90 days of treatment. DO NOT re-plant to any other crops within 1 year of treatment.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a cool, dry place. DO NOT freeze.
- **Buffer Zones:** DO NOT contaminate domestic or natural water sources or wetlands.

Crop	Buffer zone* (metres [†]) for terrestrial habitat
Established grass pastures, established grass /legume pastures, alfalfa or trefoil grown for seed	5

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:

Kerb WSP:



Caution – Poison

For an explanation of the symbols used here see pages 7 and 8.

Ko-Act (this referring text to be removed in the 2022 edition)

See Tribenuron + 2,4-D on page 393.

Korrex II

Herbicide Group
2 - florasulam
4 - dicamba
(Refer to page 45)

Company:

Corteva Agriscience

Formulation:

The *Korrex II* package contains two components:

Korrex II A (PCP#31405): 25% florasulam formulated as water dispersible granules.

- Container size - 1 X 0.45 Kg

Korrex II B (PCP#31205): 480 g/L dicamba dimethylamine salt formulated as a solution.

- Container size - 1 X 7.76 L

Crops and Staging:

Barley, Durum, Oats, Spring Wheat, Winter Wheat:

In the fall following harvest of the previous crop or in spring prior to seeding. No later than 48 hours after seeding and prior to crop emergence.

Weeds, Rates and Staging:

Korrex II must be mixed with glyphosate at least 180 g ae per acre or up to 1000 g ae per acre of glyphosate to control the weeds controlled by glyphosate at these rates (see glyphosate page for product rates and weeds controlled).

- **Spring application:**
 - *Korrex II A* at 5.7 g per acre plus *Korrex II B* at 97 mL per acre (one package of *Korrex II* will treat 80 acres)
- **Fall application** (Note: Fall application is generally more effective in control of perennial weeds):
 - *Korrex II A* at 8.1 g per acre plus *Korrex II B* at 139 mL per acre (one package of *Korrex II* treats 56 acres)

Weeds controlled by glyphosate at the rates above plus enhanced control of the following weeds at the 2 to 4 leaf stage unless otherwise indicated:

- | | | |
|--|------------------------------------|--------------------------|
| ◦ Annual sow thistle [†] | ◦ Hemp-nettle | ◦ Smartweed |
| ◦ Cleavers | ◦ Kochia | (including lady's-thumb) |
| ◦ Chickweed | ◦ Narrow-leaved hawk's-beard | ◦ Stinkweed |
| ◦ Cow cockle | (up to 8 cm tall) | ◦ Volunteer canola* |
| ◦ Dandelion (seedling, overwintered or mature plants up to 30 cm across) | ◦ Perennial sow-thistle** | ◦ Wild buckwheat |
| | ◦ Scentless chamomile [†] | ◦ Wild mustard |
| | ◦ Shepherd's-purse | |

[†] **Suppression only.**

* **Including all herbicide-tolerant canola varieties.**

** **Applications at advanced stages will reduce control.**

Refer to the product labels for complete mixing instructions for these products. A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:** Use a minimum of 20 to 40 L per acre
- **Nozzles and Pressure:** Maximum 22 psi (150 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE coarse* droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
florasulam	POST (foliar)	ALS Amino Acid inhibitor	Toward Areas of Growth (Symplast)	Broadleaf only	2
dicamba	POST (foliar)	Synthetic Auxin	Moves throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

Korrex II A: Warm, moist growing conditions promote active weed growth and enhance activity. Weeds hardened off by cold weather or drought stress may not be adequately controlled or suppressed and re-growth may occur.

Korrex II B: Crop damage (stunting, reduced seed set) can occur if the chemical is applied at any time other than the recommended stage. DO NOT apply to crop under stress from adverse environmental conditions, such as excess moisture, drought and disease. Apply when air temperature is between 10 and 25°C.

Tank Mixes:

Herbicides:

- **Prior to crop emergence:**
 - *Korrex II* must be mixed with glyphosate* (180 to 1000 g ae per acre – see glyphosate page for conversion to product rates).
 - * **All salt types.**

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Heavy rainfall immediately after application may wash the chemical off the foliage and a repeat treatment may be required. DO NOT apply if rainfall is forecast for the time of application. Consult manufacturer for more detail on the time period they support.
- **Re-entry Interval:** No specific re-entry period is indicated on the label. Other products with similar component indicated a minimum re-entry period of 12 hours.
- **Pre-harvest Interval:** DO NOT harvest crops for 60 days from application.
- **Grazing Restrictions:** Livestock may graze the treated area 7 days after application.
- **Re-cropping Interval:** Registered crops may be seeded any time after treatment. Preseed fields treated with *Korrex II* in the spring season can be seeded the following year to barley, canola, chickpeas, corn, field beans, flax, *Juncea* canola, lentils, mustard (brown, oriental, yellow), oats, peas, potato (except seed potato), soybeans, sunflower, wheat or fields can be summerfallowed. Fields treated with *Korrex II* for fall application season after August 1st can be seeded only to registered crops.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a cool, dry place in original container.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground	15	15	30

See page 36 for an explanation of the different habitats.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Korrex II A: Refer 'Method A' in the general section on sprayer cleaning on pages 12 and 13.

Korrex II B: Refer to 'Method B' in the general section on sprayer cleaning on pages 12 and 13.

A combination of 'Method A' and 'Method B' is the best option. The use of *All-Clear* or *Clean-Out* sprayer cleaners are also recommended as an alternative to the combination of methods above.

Hazard Rating:

Korrex II A:



Warning – Eye Irritant.

Korrex II B:



Caution – Poison



Warning – Eye Irritant.

For an explanation of the symbols used here see pages 7 and 8.

Liberty 150SN (this referring text to be removed in the 2022 edition)

See Glufosinate 150SN on page 230.

Liberty 200SN

Herbicide Group

10 - glufosinate

(Refer to page 45)

Company:

BASF Canada (PCP#25337)

Formulation:

200 g/L of glufosinate ammonium formulated as a solution.

- Container sizes - 10 L

Crops and Staging:

Liberty 200 SN tolerant Corn only: 1 to 8 leaf stage. Refer to product label for appropriate method of determining crop leaf stage.

Liberty tolerant soybean varieties only: up to the start of flowering and prior to canopy closure.

Weeds Rates and Staging:

Weeds controlled with 0.61 L per acre rate

Weed	Weed Stage (from emergence to stage)
Cocklebur	4 leaf
Green foxtail, Proso millet, Ragweed	5 leaf
Redroot pigweed, Shepherd's-purse	6 leaf
Chickweed	8 leaf

Weeds controlled with 0.81 L per acre rate

Weed	Weed Stage (from emergence to stage)
Perennial sow-thistle, wild buckwheat, wild mustard, wild oat, Yellow foxtail	4 leaf
Barnyard grass, eastern black nightshade	5 leaf
Canada thistle*, field bindweed*, lady's-thumb, lamb's-quarters, wormseed mustard	6 leaf
Ragweed	7 leaf
Stinkweed	8 leaf

* season long suppression.

Weeds controlled with 1.0 L per acre rate

Weed	Weed Stage (from emergence to stage)
Quackgrass**	4 leaf
Jimsonweed	1 to 6 leaf stage

** season long suppression, apply with ammonium sulphate, 2.4 L per acre (49% solution) or 1.2 kg per acre (99%).

Second Application:

- A second application may be made to fields treated initially with up to 1 L per acre, if weeds and crop are at the correct leaf staging. DO NOT apply more than 2 L per acre *Liberty 200SN* to a crop in a single season.

Split Application Program:

- For season long control of the weeds above a split application of *Liberty 200SN* may be employed. The first application must be a minimum of 0.81 L per acre made at the correct weed staging. For the second application of a 0.51 L per acre rate may be used. The second application timing must be made as soon as the second flush of weeds occurs and before the maximum leaf stage for the crop.

Application Information:

- **Water Volume:** A minimum of 45 L per acre.
- **Nozzles and Pressure:** Use 25 to 40 psi (175 to 275 kPa) when using conventional 80° or 110° flat fan nozzles. Angle nozzles forward at 45° to improve coverage of vertical leaf surfaces. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with **ASABE medium** droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
glufosinate	POST (foliar)	Glutamine Synthase Inhibitor/ Membrane disruptor	Little movement due to rapid cell leakage (Symplast)	Broadleaf & grass	10

Effects of Growing Conditions:

Liberty 200SN activity is influenced by environmental conditions. Cool temperatures (less than 10°C), drought and low humidity conditions slow weed growth. Applications made under these stress conditions may result in reduced weed control. Weed control may also be reduced when heavy dew, fog, or mist are present at the time of application.

Tank Mixes:

None registered.

Restrictions:

- **Rainfall:** Within 4 hours of application may reduce control.
- **Re-entry Interval:** DO NOT re-enter treated areas for 24 hours after application, without protective clothing as for spraying.
- **Grazing Restrictions:** DO NOT graze treated fields within 20 days of application.
- **Pre-harvest Interval:** Leave 86 days between application and corn harvest, and 70 days for soybean.
- **Re-cropping Interval:** No re-cropping restrictions the year after treatment.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** DO NOT freeze.
- **Buffer Zones:**
 - Hand-held or backpack sprayers, inter-row hooded sprayers and spot treatments are exempt from buffer zone requirements.

Application method	Buffer Zones (metres ¹) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	1	0	1

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method C' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:



Caution – Poison



Caution – Skin Irritant



Warning – Eye Irritant

For an explanation of the symbols used here see pages 7 and 8.

Linuron

Herbicide Group

7 - linuron

(Refer to page 45)

Company:

Tessenderlo Kerley Inc. (*Lorox L*)

Loveland Products Canada (*Linuron 400*)

The following recommendations are a blend of recommendations of all linuron products. Consult the individual product labels for specific recommendations.

Formulations:

Linuron 400L (PCP#15544): 400 g/L linuron formulated as a suspension concentrate.

- Container size - 10 L

Lorox L (PCP#16279): 480 g/L linuron formulated as a suspension concentrate.

- Container size - 10 L

Crops, Rates and Stages:

Post-emergent applications only:

Crop	Stage	Linuron 400 L (L per acre)	Lorox L (L per acre)
Spring wheat (including durum), oats and barley*	2 to 4 leaf stage	0.20 to 0.26	0.17 to 0.22
Field corn (post-emergent** directed spray, do not spray over top of corn)	Apply when corn is at least 15 inches (38 cm) high (highest leaf on free standing plant)	1.16 to 2.18	0.97 to 1.82
Caraway, coriander	Apply when in the 2 to 4 leaf stage	—	0.50 to 0.67
Dill†	Apply when dill has at least 2 full leaves developed	—	0.77 to 1.9
Shelterbelts (caragana, green ash, Siberian and American elm, Manitoba maple, poplar, willow, white spruce, Colorado spruce, Scots pine)	Apply as an overall spray to dormant stock or as a directed spray if buds have broken.	2.18	1.82
Short Rotation Intensive Poplar	Apply as a directed spray under plants that have been established for 1 year or more	—	1.82

* Only when tank mixed with MCPA amine at 0.28 to 0.38 L per acre (600 formulation) or 0.4 to 0.57 L per acre MCPA K (400 formulation).

** Use lower rate when weeds do not exceed 2 inches (5 cm) and higher rate for weeds up to 8 inches (20 cm) in height, preferably before they are 5 inches (13 cm) high. Requires the addition of a mineral oil surfactant blend at 1 to 2 L per 100 L or spray solution or spray oil at 1 to 2 L per 10 L of spray solution. See oil labels for directions. DO NOT apply if linuron has been applied pre-emergent.

† A split pre-emergent/post emergent application of linuron may be made in dill. See below for more information.

Pre-emergent surface (not incorporated) applications for use on loam to clay soils only:

	Linuron 400 (L per acre)		Lorox L (L per acre)	
	Soil Organic Matter		Soil Organic Matter	
	less than 2%	from 2 to 5%	less than 2%	from 2 to 5%
Field corn	1.09*	1.58	0.91*	1.31*
Soybeans	1.09 to 1.58	1.58 to 2.18	0.91 to 1.31	1.31 to 1.82
Sweet white lupins	1.01	1.50	0.85	1.25
Potatoes	1.11 to 1.72	1.72 to 2.22	0.91	1.82
Dill†	—	—	0.53 to 0.77	0.77 to 1.0

* Must be tank mixed. Refer to specific labels for registered tank mix partners.

† A split pre-emergent/post emergent application of linuron may be made in dill. See below for more information.

If used on sandy soils, severe crop injury may result.

Seed the crop at least 2 inches (5 cm) deep. Make only one application per year to field crops.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Split applications:

- This product may also be applied to dill as a split pre/post-emergent application. A pre-emergent surface application of up to 0.77 L per acre, followed by a second post-emergent application, no sooner than two weeks after the first, of up to 1.0 L per acre. Minimum staging for post-emergent applications given above still applies.

Banded Applications:

- This product may also be applied in a narrow band directly over the row in wide rowed crops if another method is to be used for weed control in between the rows. For band treatment, use proportionately less; for example, for 10 inch band on 30 inch row, use 1/3 of the broadcast rate.

Weeds and Staging:

- **Post-Emergence:**
 - Apply when annual broadleaf weeds are in the 2 to 4 leaf stage and when green foxtail is in the 1 to 3 leaf stage.
 - In shelterbelts, apply when weeds are less than 4 inches (10 cm) tall.
 - **When tank mixed with MCPA amine in cereals, the following weeds are controlled:**
 - Buckwheat (tartary, wild)
 - Chickweed
 - Corn spurry
 - Cow cockle
 - Flixweed
 - Green foxtail (suppression possible)
 - Green smartweed
 - Hemp-nettle
 - Lady's-thumb
 - Lamb's-quarters
 - Ragweed (common, giant)
 - Redroot pigweed
 - Shepherd's-purse
 - Stinkweed
 - Stork's-bill
 - **Pre-emergent surface treatments and Post-emergent applications in corn and shelterbelts:**
 - Sufficient moisture (1 to 2 inches or 3 to 5 cm) in the form of rainfall or irrigation is necessary within 7 to 10 days of a pre-emergence application or poor weed control will result.
 - Barnyard grass*
 - Common chickweed
 - Common groundsel†
 - Corn spurry†
 - Dandelion (seedlings only)†
 - Foxtail (green, yellow)*
 - Goosefoot
 - Knotweed
 - Kochia†
 - Lamb's-quarters
 - Pigweed (prostrate†, redroot)
 - Plantain (seedlings only)†
 - Purslane
 - Ragweed (common)
 - Shepherd's-purse
 - Smartweed (annual)
 - Sow-thistle (annual, perennial† seedlings only)
 - Stinkweed°
 - Wild buckwheat
 - Wild radish†
 - Witch grass
 - Wormseed mustard
- * Suppression
 † Not registered with *Lorox L.*
 ° Not registered with *Linuron 400.*

Application Information:

- **Water Volume:**
 - *Cereals, coriander & caraway:* 40 L per acre.
 - *Field Corn directed spray:* 69 to 138 L per acre.
 - *Dill:* 89 to 178 L per acre
 - *Pre-emergent surface:* 81 to 162 L per acre.
 - *Shelterbelts:* 90 to 180 L per acre.
- **Nozzles and Pressure:** 30 to 40 psi (200 to 275 kPa) when using conventional stainless steel flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage and a minimum of fine droplets that are prone to drift.
- **Screens:** Use a 50 mesh or coarser line strainers and screens.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
linuron	PPI (soil active) POST (foliar)	PSII Inhibitor/ Membrane disruptor	Little foliar; upward soil applied (Apoplast)	Broadleaf & grass	7

Effects of Growing Conditions:

In post-emergent applications the best weed control occurs when temperatures are moderate, when relative humidity is high and when soil moisture is adequate. Injury to cereals (crop lightening) will occur when the crop is under stress because of drought or disease. This injury is worse when the product is applied at advanced leaf stages. In pre-emergent surface treatments, rainfall or irrigation (1 to 2 inches or 3 to 5 cm) is required to move linuron into the root zone of germinating seeds.

Insufficient moisture will result in poor weed control. Drought conditions after application will result in little to no weed control. If rainfall does not occur within 7 to 10 days of application and prior to crop emergence, a shallow rotary hoeing (0.75 to 1.5 inches/ 2 to 4 cm) should be made to mix the top layer of soil to help activation. Avoid covering treated ground with un-treated soil. If unusually heavy rain follows application, severe crop injury may result from herbicide in the root zone of the crop. DO NOT use on sandy soils or severe crop injury will result.

Tank Mixes:

Herbicides:

- **In Cereals:** For post-emergent applications in cereals, linuron must be tank mixed with MCPA amine or MCPA K. DO NOT tank mix with other herbicides.
- **In Corn:**
 - *AAtrex*
 - *Dual II Magnum*
 - *Primextra II Magnum*
- Not all linuron products have the same tank mix options, refer to specific labels.

Fertilizers: None registered.

Insecticides: None registered.

Note: The above mixes are those listed on the linuron labels only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** No rainfast period is specified on the label for post-emergent applications; required interval may be up to 8 hours. Pre-emergent applications require rainfall for activation. Contact manufacturer for more information.
- **Grazing Restrictions:** DO NOT graze treated crops or cut for feed prior to crop maturity.
- **Pre-harvest Interval:** DO NOT harvest sweet corn within 50 days of treatment and field corn within 60 days of treatment or until tassel emergence..
- DO NOT harvest caraway, coriander and dill within 60 days of treatment.
- **Re-cropping Interval:** If the intended crop fails, fields treated with pre-emergent surface applications of linuron, may be seeded back to corn, soybeans, sweet white lupins, or potatoes. Till the soil thoroughly before reseeding. No restrictions 1 year after treatment.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** DO NOT store liquid Linuron formulations at temperatures below 5°C. *Lorox L* may be frozen.

Sprayer Cleaning:

Refer to the general section on sprayer cleaning on pages 12 and 13.

Lontrel 360 (this referring text to be removed in the 2020 edition)

See clopyralid on page 151.

Luxxur

This product is a co-pack of components that are the equivalent of Varro (page 413) and the equivalent of Express SG (Tribenuron, page 390). Information listed is restricted to Crop, Weeds, Rates and Tank mixes. For other detailed restrictions and other general information on the component products see the product pages listed above.

**Herbicide Group
2 - thiencazabzone-methyl
& tribenuron
(Refer to page 45)**

Company:

Bayer Canada

Formulation:

The *Luxxur* package contains two components:

Luxxur Component A (PCP#32458): 50% tribenuron methyl, formulated as a water soluble granule.

- Container size – 243 g

Luxxur Component B (PCP#31990): 10 g/L thiencazabone-methyl formulated as a suspension concentrate.

- Container size – 8 L

Crops and Staging:

Spring wheat (including durum):

- 1 to 6 main stem leaf stage to a maximum of three tillers, and before the first node can be felt in the stem. Under drought conditions, DO NOT apply if there is >35 days between seeding and spraying, as drought hastens crop development.

Winter wheat:

- Spring or fall application from 1 to 6 main stem leaf stage and before the first node can be felt in the stem. Under drought conditions, DO NOT apply if there is >35 days between seeding and spraying, as drought hastens crop development.

Weeds and Staging:

Weeds controlled by *Varro* (page 421) plus:

- Canada thistle (15 cm) *
- Cow cockle (10 cm)
- Dandelion (1 to 6 leaf stage)
- Narrow-leaved hawk's-beard (prior to bolting)
- Perennial sow-thistle (15 cm)*
- Round leaved mallow**
- Scentless chamomile (10cm)

* For control the addition of an additive is required, see rates section for more information

** Suppression only

Rate:

Maximum of one application of this or other products containing thiensulfuron or tribenuron (see the charts beginning on page 14 for a list of products) per year.

Luxxur Component A: 6 g per acre

Luxxur Component B: 0.2 L per acre

(One case will treat 40 acres)

Add ammonium sulphate **on spring wheat only** for improved weed control. Add 200 g active ammonium sulphate per acre (202 g per acre of 99% dry; 0.5 L per acre of 40% liquid or 0.4 L per acre of 49% solution) to the tank before adding other components.

DO NOT add ammonium sulphate to applications on durum wheat.

For improved weed control in durum wheat add either *Agral 90* or *AgSurf* at 0.2L per 100 L.

Tank Mixes:

None registered.

Bayer supports the following mixes that are not on the *Luxxur* label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:** 2,4-D ester, *Buctril M*, *Curtail M*, *Frontline XL*, *Infinity*, *Infinity FX*, MCPA ester, *OcTTain*, *Pixxaro*, *Paradigm*, *Prestige XC*, *Stellar*, *Thumper*, *Trophy*.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

See component products for more information on restrictions application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

Manipulator 620

Plant growth regulator

Company:

Taminco US Inc. (PCP#31462); Distributed by Engage Agro

Formulations:

620 g/L chlormequat chloride formulated as a solution.

- Container size – 2 x 10 L

Crops, Rates and Stages:

Apply *Manipulator 620* when risk of lodging is high.

Crop*	Application	Rate (L per acre)	Stage
Spring wheat (including durum)	Single Application	0.7	1 to 2 node stage
	Split Application	0.3 – First application 0.4 – Second application	2 leaf stage to beginning of stem elongation 1 to 2 node stage
Winter wheat	Single Application	0.7	1 node stage to just before flag leaf emergence
	Split Application	0.4 – First Application 0.3 – Second Application	2 leaf stage 1 node stage to just before flag leaf emergence

* May be applied to crops under-seeded to clover or grasses. DO NOT apply later than just before flag leaf emergence.

DO NOT exceed 0.7 L of *Manipulator 620* per acre in a single year.

Application Information:

- **Water Volume:** Minimum 40 L per acre
- **Nozzles and Pressure:** Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE medium* droplets. Boom height must be 60 cm or less above the crop.

How it Works:

Manipulator 620 affects the production of plant hormones responsible for cell elongation resulting in plants with shorter, thicker stems.

Effects of Growing Conditions:

DO NOT apply *Manipulator 620* to crops under stress from drought, excess moisture or nutrient deficiency. Best results from early morning or evening application.

Applications of *Manipulator 620* may be made under normal seasonal temperatures down to 1° Celsius. DO NOT apply during frost.

Tank Mixes:

None registered.

DO NOT use in a tank mixture with liquid nitrogen fertilizer.

Restrictions:

- **Rainfall:** Within 2 hours may reduce effectiveness. Avoid application when heavy rain is forecast.
- **Re-entry Interval:** Leave 12 hours before entering treated fields.
- **Grazing Restrictions:** DO NOT graze treated crops or cut for hay.
- **Pre-harvest Interval:** DO NOT apply later than just before flag leaf emergence.
- **Re-cropping Interval:** No restrictions the year after application.

- **Aerial Application:** DO NOT apply by air.
- **Storage:** DO NOT freeze.
- **Buffer Zones:**

Application method	Crops	Buffer Zones (metres [†]) Required for the Protection of:
		Terrestrial habitat
Ground	All crops	1

See page 36 for an explanation of the different habitats.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:



Danger – Poison

For an explanation of the symbols used here see pages 7 and 8.

MCPA

Herbicide Group

4 - MCPA

(Refer to page 45)

Company and Formulation

	PCP# (Product Name)				
	Na 300*	Amine 500*	Amine 600*	Ester 500**	Ester 600**
AgraCity		30461		30462	
Agri Star		27858	31322 (Albaugh)	27860	
Federated Cooperatives Ltd.					29001
IPCO	20306		31327		27802
Nufarm	14718		28384		27803
Loveland	9858	9516			27804 (<i>CheckMate</i>)

* Formulated as a solution

** Formulated as an emulsifiable concentrate

Crops, Rates and Staging:

The maximum safe rates for various crops are given below. Higher rates used for harder to control weeds (see "Weeds, Rates and Staging") may cause crop injury. Application rates for individual products may vary from those listed. Refer to the label for product specific use rates. Rates greater than those for harder to control weeds may cause crop injury. When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Crop	Stage	Maximum Rate (L per acre)		
		Amine 500	Amine or Ester 600	Na Salt
Wheat (spring and durum), barley	4 leaf to just before flag leaf emergence.	0.45	0.42 (E)	0.81
Oats	3 leaf to just before flag leaf emergence. ^{††}	0.45	0.36	0.81
Spring rye	4 leaf to just before flag leaf emergence.	0.45	0.42	0.81

Crop	Stage	Maximum Rate (L per acre)		
		Amine 500	Amine or Ester 600	Na Salt
Flax (NOT Solin - low linolenic acid flax)	2 inches (5 cm) in height to prebud stage. Apply at 2 to 4 inches (5 to 10 cm) in height for maximum crop tolerance.	0.4	0.28 (E) or 0.34 (A)	0.71
Winter wheat (WW), fall rye (FR)	In spring, apply from the time growth commences until the early flag leaf stage.	0.45	0.42	0.81
Corn	As a broadcast spray up to 6 to 7 in. (15 to 18 cm) tall or 6 leaf stage. Up to 3 weeks before tasseling as a directed spray using drop nozzles.	0.45	0.37 (Amine only)	0.61
Peas	Vines 4 to 7 inches (10 to 18 cm) long. For short-statured, determinate flowering peas, apply at the early stages within this range.	0.22*	0.17 (Amine only)	0.36*
Cereals underseeded to alfalfa (not Flemish varieties)	Apply when the majority of seedling legumes are in the 1 to 3 trifoliate leaf stage.	0.22	0.19 (Amine only)	0.4
Underseeded alsike, ladino and red clover	Apply when the majority of seedling legumes are in the 1 to 3 trifoliate leaf stage.	0.28	NR	0.4
Red clover [†] Seedling (seed and forage) Established [†] (seed only)	Seedlings: 1 to 3 trifoliate stage. DO NOT feed to livestock in the first year. Established: Apply at the breaking of dormancy in the spring up to 7.5 cm.	0.23	0.19 (Amine only)	NR
Grass pastures	Spring or fall.	1.42	1.13 (E) or 1.42 (A)	0.71
Seedling forage** grasses (not for seed)	Apply from the 3 leaf stage to the shot blade stage.	0.45**	NR	NR
Established forage** grasses (not for seed)	Apply in the spring up to the shot blade stage or in the fall after harvest.	0.45**	NR	NR

(E) or (A) indicates Ester or Amine formulations. NR = Not Registered

* The rates given are lower than the registered rates for peas. Less than the maximum label rates are recommended because of crop injury concerns.

** MCPA is NOT registered for use on forage grasses grown for forage seed.

[†] Nufarm MCPA Amine only.

^{††} Use the lowest rate of MCPA Amine 600 on oats between the 3 and 6 leaf stage.

Formulation Characteristics:

Formulation	Risk of Vapour Drift	Activity on Weeds	Risk of Crop Injury
LV Ester	Medium	Fast	Medium
Amine	Very Low	Medium	Low
Salts	Very Low	Slow	Very Low

Weeds, Rates and Staging:

Apply at lower rates when weeds are small (2 to 4 leaf stage) and actively growing. Higher rates are needed when weeds are larger, in heavy populations, or growing under stressful conditions (excessively cold, hot, dry or wet).

NOTE: The following rates are a general range for all products. Rate ranges for individual products may differ slightly. Consult the product label for specific rates for each application.

+ Not controlled by Na salt formulations

Susceptible weeds:

- **Amine 500 formulations – 0.28 to 0.45 L per acre**
- **Amine and Ester 600 formulations – 0.24 to 0.36 L per acre**
- **Na formulations – 0.5 to 0.81 L per acre.**
 - Burdock
 - Cocklebur
 - Flixweed (late fall applications or small seedlings)
 - Kochia
 - Lamb's-quarters
 - Mustards (except dog and tansy)
 - Prickly lettuce
 - Ragweed
 - Russian pigweed
 - Shepherd's-purse
 - Stinkweed
 - Wild Radish
 - Wild Sunflower

Harder to control weeds:

- **Amine 500 formulations – 0.45 to 0.71 L per acre.**
- **Ester 600 formulations – 0.42 to 0.61 L per acre.**
- **Na formulations – 0.81 to 1.1 L per acre.**
 - Annual sow-thistle
 - Biennial wormwood
 - Bluebur+
 - Common peppergrass
 - Curled dock
 - Flixweed (overwintered rosettes prior to bolting)
 - Goat's-beard+
 - Goosefoot+
 - Hemp-nettle (suppression only)
 - Mustard (including dog, tansy and tumble)
 - Plantain
 - Purslane+
 - Redroot pigweed
 - Smartweed (annual)
- **Top growth control only (rates as for harder to control weeds):**
 - Blue lettuce
 - Bindweed (field, hedge)
 - Canada thistle
 - Corn spurry+
 - Dandelion+
 - Gumweed
 - Field horsetail+
 - Hoary cress
 - Leafy spurge
 - Perennial sow-thistle
 - Russian thistle+

Application Information:

- **Water Volumes:**
 - **Cereals, flax, pastures, forage grasses:** 40 to 81 L per acre.
 - **Peas:** Minimum 61 L per acre.
 - **Cereals Underseeded to Forage Legumes:** 61 to 81 L per acre.
- **Nozzles and Pressure:** Maximum 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressure designed to deliver thorough, even coverage with **ASABE coarse** droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
MCPA	POST (foliar)	Synthetic Auxin	Moves throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

Best weed control occurs when temperatures are above 21°C (daytime) or 10°C (night time) and humidity is above 70 percent. DO NOT apply if temperature exceeds 27°C. If applying to flax, injury and a delay in maturity may result from application under hot or humid conditions. Extremely hard water may reduce performance or cause problems in spraying the product.

Tank Mixes:**Herbicides:**

- **In Wheat and barley:**
 - *Banvel II* (amine only)
 - Linuron and *Sencor* (500 amine only).
- **In Oats:**
 - Linuron (500 amine only)
 - Not all brands are labelled for tank mixing. Check the product label prior to use for registered mixes and rates. Follow all precautions and restrictions on both labels.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: Liquid nitrogen (28-0-0) may be used in place of water as a carrier with certain amine formulations for application in spring to winter wheat or fall rye.

Note: The above mixes are those listed on the MCPA labels only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 6 hours of MCPA Na salt, 4 hours of MCPA amine, or 2 hours of MCPA ester application will reduce control.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Grazing Restrictions:** DO NOT graze within 7 days of application.
- **Re-cropping Interval:** No restrictions the year after application.
- **Aerial Application:** Some products may be applied by air to specific crops. Check the label for detailed instructions.
- **Storage:** MCPA ester may be frozen. DO NOT freeze MCPA amine or MCPA sodium salt.
- **Buffer Zones:**
 - Hand-held or backpack sprayers, inter-row hooded sprayers and spot treatments are exempt from buffer zone requirements.

Crop	Application method	Buffer Zones (metres [†]) Required for the Protection of:		
		Aquatic Habitats of Depths		Terrestrial habitat
		Less than 1 m	Greater than 1 m	
Cereals, Flax	Ground*	1	1	4
	Fixed wing aircraft	1	0	60
	Helicopter	1	0	50
Legume forages	Ground*	1	1	4
	Fixed wing aircraft	1	1	25
	Helicopter	1	1	25
Pastures	Ground*	1	1	4
	Fixed wing aircraft	15	0	60
	Helicopter	15	0	50

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

No specific cleaning procedures are indicated on the label. Based on products with similar chemistry, 'Method B' found in the general sprayer cleaning section on pages 12 and 13 or a commercial spray sprayer cleaning product, may provide adequate cleaning. Contact the manufacturer for more information.

Hazard Rating:

 Warning – Poison

For an explanation of the symbols used here see pages 7 and 8.

MCPB / MCPA

Herbicide Group
4 - MCPB & MCPA
(Refer to page 45)

Company:

IPCO (*Clovitox Plus* - PCP#24336)

Nufarm Agriculture (*Tropotox Plus* - PCP#8211)

Loveland Products Canada (*Topside* - PCP#22003)

Formulation:

375 g/L MCPB present as a sodium (Na) salt and 25 g/L MCPA present as potassium (K) or sodium (Na) salt and formulated as a solution.

- Container size - 10 L

Crops, Rates and Staging:

Registered for all products:

- **Apply 1.11 to 1.72 L per acre. Apply only that needed to control the target weeds:**

Crop	Stage
Pea	3 to 6 expanded leaves.
Clover (alsike, ladino, red, white Dutch, wild white)	Monofoliolate to 3 trifoliolate leaf stage (with or without a cover crop).
Oats, wheat, rye or barley (alone or as a companion crop)	2 leaf to flag leaf stage.
Field corn	45 cm high to the start of tasseling – use drop nozzles.
Established pasture	After grazing or cutting when weeds have regrown to a susceptible stage.

Seedling Forage Grasses:

- **Apply at 1.11 to 1.42 L per acre from the 2 to 4 leaf stage:**

- Bromegrass (smooth, meadow)
- Fescue (altai, red, meadow, tall)
- Green needlegrass
- Reed canarygrass
- Timothy
- Wheatgrass (crested, creeping intermediate, northern, pubescent, slender, stream-bank, tall, western)
- Wild rye (altai, Russian)

Registered for *Tropotox Plus* and *Clovitox Plus* only:

- Seedling alfalfa for seed production* at the 3 to 6 trifoliolate stage.

NOTE: Seedling alfalfa vigour may be reduced in the year of treatment, however, the crop recovers and yield will not normally be affected.

*** Since this use is registered under the User Requested Minor Use Label Expansion program, the manufacturers assume no responsibility for herbicide performance. Users of this treatment on seedling alfalfa do so at their own risk.**

Maximum ONE APPLICATION per year of these and other products containing the active ingredients MCPA/MCPB.

Weeds, Rates and Staging:

Weeds	Stage	Rate (L per acre)
Lamb's-quarters, Mustards (ball, wild, wormseed), Stinkweed	Seedlings	1.11
Annual sow-thistle*, Hemp-nettle*, Redroot pigweed, Ragweed, Shepherd's-purse, Volunteer rapeseed (including canola), Wild radish*	Seedlings	1.72
Curled dock, Perennial sow-thistle**, Plantain	Rosette	1.72
Bull thistle	Rosette to early bud	1.72
Buttercup (creeping, tall), Field bindweed	In spring during rapid growth	1.72
Canada thistle	6 inches (15 cm) to early bud	1.72
Horsetail*	6 inches (15 cm)	1.72

* Suppression only

** Top growth control only

Application Information:

- **Water Volume:**
 - *Clovitox Plus*: 71 to 91 L per acre.
 - *Tropotox Plus, Topside*: 61 to 81 L per acre.
- **Nozzles and Pressure:** Maximum 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE coarse* droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
MCPB & MCPA	POST (foliar)	Synthetic Auxin	Moves throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

Damage to peas or seedling forage legumes may occur if the crop is sprayed when under drought or disease stress. Under extremely hot or humid conditions, crop injury may be severe. DO NOT apply when temperatures are over 27°C. Best activity on weeds occurs in warm weather.

Tank Mixes:

None registered.

Restrictions:

- **Rainfall:** No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.
- **Re-entry Interval:**
 - **Field com:** A re-entry interval of 9 days after application is required.
 - **For all other registered crops:** DO NOT enter treated fields for at least 12 hours.
- **Grazing Restrictions:** DO NOT graze crop treated with *Topside* or cut for hay. DO NOT graze or cut seedling forage grasses in the year of treatment. Cereals treated with *Tropotox* or *Clovitox* may be used for grazing or cut for greenfeed or hay 30 days after application. Forage legumes and peas treated with *Clovitox* may be used for animal feed 30 days after application. Withdraw meat animals from fields treated with *Tropotox* or *Clovitox* at least 3 days before slaughter.
- **Re-cropping Interval:** A minimum rotational crop plant back interval of 12 months must be observed for all crops other than those registered for use with MCPA or MCPB. Phenoxy herbicides can persist in soils for weeks, particularly if dry or cool weather persists. DO NOT seed sensitive crops immediately after spraying.
- **Aerial Application:** *Clovitox* may be applied by air to established pasture and cereal crops (not underseeded to clover).
- **Storage:** DO NOT freeze.
- **Buffer Zones:**
 - Hand-held or backpack sprayers, inter-row hooded sprayers and spot treatments are exempt from buffer zone requirements.

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	4

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

No specific cleaning procedures are indicated on the label. Based on products with similar chemistry, 'Method B' found in the general sprayer cleaning section on pages 12 and 13 or a commercial spray sprayer cleaning product, may provide adequate cleaning. Contact the manufacturer for more information.

Hazard Rating:*Clovitox Plus:* Danger – Poison Danger - Corrosive to eyes*Tropotox Plus & Topside:* Caution – Poison*Tropotox Plus:* Warning – Contains the allergen caseinate (milk)

For an explanation of the symbols used here see pages 7 and 8.

Mecoprop-p

Herbicide Group**4 - mecoprop-p***(Refer to page 45)***Company:**Loveland Products Canada (*Mecoprop-P* - PCP#27891)**Formulation:**

150 g/L mecoprop-p present as potassium salt formulated as a liquid.

Crops and Staging:**Spring wheat (including durum), barley and oats:** 3 leaf to flag leaf stage.**Weeds, Rates and Staging:**Apply *Mecoprop-P* at 2.2 to 2.8 L per acre to weeds from the 2 to 4 leaf stage. Use the high rate for weeds in an advanced stage of growth.

- Black medic
- Canada thistle (top growth control only)
- Chickweed
- Cleavers
- Clover (volunteer)
- Corn spurry
- Lamb's-quarters
- Plantain
- Wild mustard

Application Information:

- **Water Volume:** 81 to 121 L per acre.
- **Nozzles and Pressure:** Maximum 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE coarse* droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
mecoprop	POST (foliar)	Synthetic Auxin	Moves throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

Apply in warm weather under good growing conditions. Avoid spraying in very hot weather or in drought conditions.

Tank Mixes:

None registered.

Restrictions:

- **Rainfall:** No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.
- **Grazing Restrictions:** DO NOT graze or feed treated crop to livestock prior to crop maturity.

- **Re-cropping Interval:** No restrictions the year after application.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** DO NOT freeze.
- **Buffer Zones:**
 - Hand-held or backpack sprayers, inter-row hooded sprayers and spot treatments are exempt from buffer zone requirements.

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	0	5

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

No specific cleaning procedures are indicated on the label. Based on products with similar chemistry, 'Method B' found in the general sprayer cleaning section on pages 12 and 13 or a commercial spray sprayer cleaning product, may provide adequate cleaning. Contact the manufacturer for more information.

Hazard Rating:



Caution – Poison

For an explanation of the symbols used here see pages 7 and 8.

Metribuzin

Herbicide Group
5 - metribuzin
(Refer to page 45)

Company:

Bayer (*Sencor 75 DF*)

United Phosphorus Inc. (*TriCor 75 DF*)

ADAMA Canada (*Squadron*)

Sharda CropChem Canada (*Buzzin 70 WDG; Mextrix SC*)

Formulations:

Sencor 75 DF (PCP#17242); *Squadron* (PCP#32081); *TriCor 75 DF* (PCP#30661): 75% metribuzin formulated as a dispersible granule.

- Container sizes -
 - *Sencor 75 DF* - 4 x 2.5 kg
 - *Squadron* - 4 x 5 kg jugs
 - *TriCor 75 DF* - 2.5 kg

Buzzin 70 WDG (PCP#32756): 70% metribuzin formulated as wettable granule.

- Container size – 2.5 kg

Mextrix SC (PCP#32876): 480 g/L metribuzin formulated as suspension concentrate.

- Container size – 4 x 5 L

Crops and Staging:

Barley and Wheat (Spring and durum only): Post-emergence (POST) 2 to 5 leaf stage.

Chickpea*: Up to 2.5 inches (6 cm) in height, when vines have 1 to 3 above ground nodes. **Note:** application past recommended growth stage may result in severe crop injury.

Faba bean, Lentil[†], Soybean*:** Preplant incorporated (PPI) (only in a tank mix with *Treflan EC*).

Lentil*: Single or split post-emergent applications** - up to 6 inches (15 cm) of vine length. For maximum crop tolerance, apply at the 1 to 4 above ground node stage.

Peas (Field only): Preplant incorporated (PPI) (when tank mixed with *Rival* or *Treflan EC*).

Peas (Field and Processing): Post-emergence (single or split applications**) - up to 6 inches (15 cm) of vine length. For short-statured, determinate flowering peas, apply at the early stages within this range.

Potato (except Belleisle or Tobique)*:** Preplant incorporated (PPI) or Pre-emergence (PRE) in sprinkler irrigation systems (apply only in a tank mix with *Eptam Liquid EC* for both systems).

Potato (except Atlantic, Belleisle, Eramosa, Tobique and red-skinned or early maturing varieties)*:** Early post-emergence (up to 4 inches or 10 cm in height).

† Fall application only.

* DO NOT use on lentils, peas or chickpeas seeded less than 2 inches (5 cm) deep or in soils with less than 4 percent organic matter.

** Under certain field or weather conditions a split application may provide better weed control and crop tolerance than single applications. The first application should be made at the cotyledon to 2 leaf stage of the weeds. The second application should be made when a second flush of weeds have emerged or if weeds which were more advanced at the time of the first application have started to show regrowth. The split applications are normally 7 to 10 days apart.

***Consult manufacturer or seed supplier for varietal tolerances to metribuzin applications in soybean and potato.

Crops and Rates:

Crop		Rates		
		75 WDG forms (g per acre)	<i>Buzzin</i> (g per acre)	<i>Metrix SC</i> (mL per acre)
Barley		80 to 152	87 to 163	112 to 222
Chickpea		111	119	172
Faba bean - Spring PPI†	Coarse soils	111 to 152	119 to 163	172 to 222
	Medium to Fine soils	152 to 222	163 to 238	222 to 344
Faba bean - Fall PPI†	Coarse soils	152 to 192	163 to 206	222 to 238
	Medium to Fine soils	192 to 222	206 to 238	238 to 344
Lentil	Single POST app	111	119	172
	Split POST app	60 to 80 (each)	61 to 82 (each)	85 to 112 (each)
Pea (field only) - Spring PPI†	Coarse soils	152	163	222
	Medium to Fine soils	152 to 192	163 to 206	222 to 283
Pea (field only), Lentils - Fall PPI†	Coarse soils	192	206	283
	Medium to Fine soils	190 to 222	206 to 238	283 to 344
Pea (field and processing)	Single POST app	111 to 152	119 to 163	172 to 222
	Split POST app	60 to 80 (each)	61 to 82 (each)	85 to 112 (each)
Potato (PPI or PRE)		152 to 222	163 to 238	222 to 344
Potato (POST)		152	163	222
Spring wheat (including durum)		80 to 111	87 to 119	112 to 172
Soybean (Spring PPI only):	Coarse soils	111 to 152	119 to 163	172 to 222
	Medium to Fine soils	152 to 222	163 to 238	222 to 344

† Only in tank mix with liquid trifluralin only.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

Post-emergence applications should be made when weeds are small – 2 inches (5 cm) in height or diameter.

Split applications (post-emergence on lentils and peas) – 1st application at cotyledon to 2 leaf stage of weeds. The 2nd application (if necessary) 7 to 10 days after the first.

The following rates are based on the 75 WDG formulations. Check the table in Crops and Rates for corresponding rates for other formulations.

- **Post-emergence at 81 g per acre:**
 - **Weeds controlled in spring wheat, barley, field pea and suppressed in lentil and chickpea:**
 - Chickweed
 - Green smartweed
 - Hemp-nettle*
 - Lamb's-quarters
 - Stinkweed
 - Volunteer canola
 - Wild mustard
 - **Additional weeds controlled in spring wheat and barley only:**
 - Lady's-thumb
 - Redroot pigweed
- **Post-emergence at 111 g per acre:**
 - **Weeds controlled in spring wheat, barley, potato, field pea, and suppressed in lentil and chickpea:**
 - Ball mustard
 - Corn spurry
 - Hemp-nettle
 - Tartary buckwheat
 - **Additional weeds controlled in spring wheat and barley only:**
 - Common groundsel
 - Night-flowering catchfly
 - Wormseed mustard
- **Post-emergence at 152 g per acre in spring wheat and barley only:**
 - Henbit
 - Russian thistle
- **Post-emergence at 152 g per acre in potatoes only:**
 - **Weeds listed for peas above plus:**
 - Lady's-thumb
 - Redroot pigweed
 - Shepherd's-purse
- **Preplant Incorporated in faba beans, lentils, field pea and soybean (see "Crops and Rates:" above). Must be applied in tank mix with Treflan EC or Rival (see trifluralin page for rates):**
 - **Weeds controlled by either Rival or Treflan EC plus:**
 - Chickweed
 - Corn spurry
 - Green smartweed
 - Hemp-nettle
 - Lamb's-quarters
 - Stinkweed
 - Volunteer canola
 - Wild mustard
 - * Use the high rate for best control.
 - ** Suppressed only in lentils and chickpeas.

Application Information:

- **Water Volume:**
 - **Preplant incorporated:** 40 L per acre.
 - **Post-emergence applications:**
 - Cereals - 40 L per acre.
 - Lentils, peas, chickpeas - 70 L per acre.
- **Nozzles and Pressure:** Use a combination of nozzles and pressure designed to deliver thorough, even coverage with **ASABE medium** droplets. If using conventional flat fan nozzles use a maximum of 30 to 40 psi (200 to 275 kPa) with opening no smaller than 8002 or TK2. For lentils, peas and chickpeas use nozzles no smaller than 8003 or TK3. Angle nozzles 45° forward to achieve better coverage of vertical weed targets.
- **Screens:** Use 50 mesh or coarser on both nozzle and primary plumbing screens.
- **Incorporation:** All plant growth and stubble should be thoroughly worked into the soil before treatment. Apply directly to the soil surface. Two incorporations are required at right angles for thorough mixing. The first incorporation must be made within 24 hours of spraying. For fall applications, it is preferred that both incorporations be done in the fall. The second incorporation may be delayed until spring to conserve crop residue; however, both incorporations must be done the recommended depth.
- Incorporate with a tandem disc, discer or field cultivator (Vibrashank type). Set equipment to work at a depth of 3 to 4 inches (8 to 10 cm). Operate disc implements at 4 to 6 mph (7 to 10 km/hr), cultivators at 6 to 8 mph (10 to 13 km/hr).

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
metribuzin	PPI (soil active) POST (foliar)	PSII Inhibitor/ Membrane disruptor	Little foliar; upward soil applied (Apoplast)	Broadleaf & grass	5

Effects of Growing Conditions

Crop height reductions or yellowing may occur if high temperatures occur within 48 hours of application. Cold, cloudy weather or frost within 3 days of application will also aggravate injury. If frost occurs, allow 4 to 5 days for crop to recover prior to applying metribuzin. Heavy rainfall soon after application to peas, lentils and chickpeas can result in stand reduction on soils with less than 4 percent organic matter.

Tank Mixes:

Herbicides:

- **In spring wheat or barley:** Dicamba, *Target*, MCPA amine or 2,4-D amine.
- **In potatoes (post emergent) Sencor 75 DF, Buzzin 70 WDG and TriCor only:** *Prism**
- **In potatoes (preplant incorporated):** *Eptam Liquid EC* (Required).
- **In faba beans (preplant incorporated):** *Treflan EC* (Required).
- **In soybeans (preplant incorporated):** *Treflan EC* (Required).
- **In peas:**
 - *Treflan* (PPI)
 - *Rival* (PPI).
 - All products – 75 WDG forms at 77 g per acre** plus 0.19 L per acre MCPA sodium salt (300 g/L).

* Consult manufacturer or seed supplier for varietal tolerances to metribuzin and *Prism* tank-mix applications in potato. *Prism SG* with *TriCor* only.

** See corresponding rates for other formulations in the chart in "Crops and Rates"

Insecticides: None registered.

Fungicides: None registered.

Note: The above mixes are those listed on the metribuzin labels only.

Allow 5 days between application of metribuzin and application of other pesticides.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 6 hours may reduce control.
- **Re-entry Interval:** DO NOT re-enter treated areas for 12 hours after application.
- **Grazing Restrictions:** DO NOT graze treated cereal crops within 30 days of application, or peas, chickpeas or lentils within 70 days of application.
- **Pre-harvest Interval:** DO NOT harvest barley, wheat or potatoes within 60 days of application. DO NOT harvest lentils, chickpeas, or field peas within 70 days of application. DO NOT harvest processing peas or chickpeas within 40 days of application.
- **Re-cropping Interval:** Preplant incorporated treatments may leave a residue in the soil that will affect succeeding crops when using higher rates of product. DO NOT seed canola, sunflowers, onions, celery, peppers, cole crops, lettuce, spinach, red beets, turnips, pumpkin, squash, cucumbers or melons the year after treatment. Fall seeded crops may be injured when seeded the same year as preplant or post-emergence applications of these products.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** May be frozen.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:			
	Aquatic Habitats of Depths			Terrestrial habitat
	Less than 1 m	1 to 3m	Greater than 3 m	
Ground only*	5	2	1	10

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured is metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Use 'Method B' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:



Caution – Poison

For an explanation of the symbols used here see pages 7 and 8.

Metsulfuron

Herbicide Group
2 - metsulfuron
(Refer to page 45)

Company:

FMC Corporation (*Ally Toss-N-Go* - PCP#24388)

Formulation:

60% metsulfuron methyl formulated as a water dispersible granule.

- Container size:
 - 122 g (4 x 30.5 g water soluble bags)

Crops and Staging:

Wheat (spring and durum), barley: 2 leaf up to emergence of the flag leaf.

Established forage grasses for forage or seed production*:

- Apply from the 2 leaf to flag leaf stage and before canopy is dense enough to prevent thorough leaf coverage.
 - Crested wheatgrass*
 - Creeping red fescue*
 - Timothy**
 - Intermediate wheatgrass*
 - Orchardgrass*

† Fall application only.

* **NOTE - Since applications to forage grasses have been registered under the User Requested Minor Use program, the manufacturer assumes no responsibility for herbicide performance. Application to forage grasses is at the risk of the user.**

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

Apply up to 3 g per acre (one 122 g package treats 40 acres) to control weeds at the 2 to 4 leaf stage unless otherwise indicated.

A rate of 2 to 3 g per acre may be used when mixing with certain other herbicides (See Tank Mixes).

Add a non-ionic surfactant such as *Agral 90*, *Ag-Surf II*, *Companion*, *Super Spreader* or *Citowett Plus* at 0.2 L per 100 L spray volume.

Weeds Controlled:

- Ball mustard
- Bluebur
- Chickweed
- Common groundsel
- Corn spurry
- Cow cockle
- Flixweed
- Hemp-nettle
- Pigweed (prostrate, redroot)
- Scentless chamomile
- Shepherd's-purse
- Smartweed (green, lady's-thumb)
- Stinkweed
- Stork's-bill
- Tartary buckwheat
- Volunteer canola*
- Wild mustard

Weeds Suppressed:

- Canada thistle**
- Lamb's-quarters (up to 3 in (8 cm))
- Russian thistle
- Sow-thistle (annual, perennial)**
- Toadflax
- Wild buckwheat (up to 3 leaf)

* CLEARFIELD varieties will be controlled only with the addition of 2,4-D or MCPA.

** Apply when thistles are less than 6 inches (15 cm) tall.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:** Minimum 40 L per acre.
- **Nozzles and Pressure:** No application pressures are recommended by the manufacturer. Typical application pressures for standard flat fan nozzles are from 35 to 40 psi (240 to 275 kPa). Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressures designed to deliver proper coverage with **ASABE medium** droplets.
- **Screens:** Use a 50 mesh nozzle screens and in-line filter system.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
metsulfuron	PRE	ALS Amino Acid synthesis Inhibitor	Toward growth areas (Symplast)	Broadleaf	2

Effects of Growing Conditions:

Metsulfuron may injure crops stressed by heavy rainfall, prolonged cool weather, frost conditions, wide fluctuations in day/night temperatures, drought, or water-saturated soils, either before or after application. Weed control will be reduced under dry, cold conditions.

Tank Mixes:

DO NOT mix the soluble bags with liquid fertilizers, substances that contain boron or substances that release free chlorine. Mixing the water soluble bags with any of these compounds will result in an insoluble substance in the tank.

Herbicides:

- **In wheat:**
 - *Puma Advance*
 - **In wheat and barley:**
 - 2,4-D Amine or Ester (170 to 227 g ae per acre – refer to 2,4-D page), plus surfactant*.
 - MCPA Amine or Ester (0.23 to 0.38 L per acre – 600 g/L formulation), plus surfactant.
 - **In creeping red fescue:**
 - *Assure II* (0.2 to 0.3 L per acre) plus *Sure-Mix* adjuvant*.
- * Use with the 3 g per acre rate only.

Consult tank mix partner labels for additional crop staging and variety restrictions.

Insecticides: None registered.

Fungicides: None registered.

Fertilizer: None registered. DO NOT mix the soluble bags with fertilizers.

Note: The above mixes are those listed on the *Ally* label only.

FMC Corporation also supports the following mixes that are not on the *Ally* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Clodinafop*, *Everest 2.0*, *Everest 2.0* + 2,4-D, *Everest 3.0* + 2,4-D

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Rain within 4 hours of application of tank mixes with 2,4-D amine, 2 hours of application of tank mixes with 2,4-D ester, will reduce weed control.
- **Re-entry Interval:** DO NOT enter treated fields for 12 hours.
- **Grazing Restrictions:** No restrictions.
- **Re-cropping Interval:**
 - **Caution:**
 - DO NOT apply more than 3 g per acre per year.
 - DO NOT use on highly variable soils that have large gravelly or sandy areas, eroded knolls, or calcium deposits.
 - Metsulfuron residues can persist for long periods, potentially limiting re-cropping options. Degradation of metsulfuron is dependent on the pH, moisture, and temperature of the soil. Refer to the label for details on rotation and minimum re-cropping intervals.
 - The following re-cropping intervals, based on soil pH, should be considered as guidelines only. Metsulfuron residues may affect crops for a longer period of time than outlined in the following table. Add 12 months to recommendations if less than 5 inches (130 mm) of rainfall in brown and dark brown soils or less than 10 inches (250 mm) rainfall in black or grey wooded soils in any year following application.

Minimum Re-Cropping Interval (Months)

Soil PH	Barley, Wheat	Oat*	Canola*	Flax*	Lentils	Canary Seed	Yellow Mustard
less than 7.0	10	10	10 (22)	10 (22)	34	48	48
7.0 -7.9	10	10 (22)	22 (34)	34	48	48	48

* Figures in brackets refer to re-cropping intervals in brown and dark brown soil zones.

- On black and grey wooded soils with pH of 7.5 or less, fescue may be planted 10 months after application and alfalfa, red clover, peas and flax may be planted 22 months after application. DO NOT use on soils with pH greater than 7.9.

- Effects of metsulfuron residues on crops other than those listed in the table have not been fully evaluated. Because of the length of re-cropping restrictions and the lack of information on many rotational crops, land previously treated with metsulfuron cannot be rotated to crops other than those listed until a field biosassay confirms that residues of metsulfuron are not present. Consult the label for additional instruction on how to perform a field bioassay. Failure to follow these instructions could result in injury to subsequent crops.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a cool, dry place. May be frozen.
- **Buffer Zones:**
 - Handheld or backpack applications do not require a buffer.

Use	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat**
	Less than 1 m	Greater than 1 m	
Cropland	1	1	15

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

** Terrestrial buffers are not required for transport and utility rights of way

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Metsulfuron can cause severe injury to sensitive crops at very low concentrations. Sprayers used to apply metsulfuron should be flushed out immediately after metsulfuron is used. All nozzles, screens and filters should be removed and cleaned after applying this product. Refer to 'Method B' found in the general sprayer cleaning section on pages 12 and 13. DO NOT use ammonia with chlorine bleach.

Hazard Rating:



Caution – Poison



Caution – Eye Irritant

For an explanation of the symbols used here see pages 7 and 8.

Momentum

Herbicide Group
4 - clopyralid & fluroxypyr
(Refer to page 45)

Company:

Loveland Products Canada (PCP#30456)

Formulation:

90 g/L clopyralid and 90 g/L fluroxypyr formulated as an emulsifiable concentrate.

- Container size - 8.99 L

Crops and Staging:

Apply at the 3 leaf to just before the flag leaf stage of barley, wheat (spring, durum).

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds and Staging:

The following weeds are controlled at the 1 to 4 leaf/whorl stage unless specified:

- Canada thistle**
- Cleavers
- Kochia (2 to 8 leaf)
- Stork's-bill (1 to 8 leaf)*
- Volunteer flax (1 to 12 cm)
- Wild buckwheat

* Suppression only.

** Season long control, some regrowth may occur in the fall. Apply from the 4 inch (10 cm) to pre-bud stage.

Rates:

0.45 L per acre.

Apply a maximum of ONE APPLICATION of this product or other products containing either clopyralid or fluroxypyr per year.

Application Information:

- **Water Volume:** 40 L per acre.
- **Nozzles and Pressure:** Use 30 to 40 psi (200 to 275 kPa) if applying without drift reduction nozzles. Drift reduction nozzles may require higher pressures for proper performance. Select the nozzle and pressure combination that produces of *ASABE coarse* droplets while maintaining good coverage of foliage.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
clopyralid, fluroxypyr	POST (foliar)	Synthetic Auxin	Moves throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

When weeds are stressed because of drought, flooding, hot or cool (less than 8°C) temperatures, weeds are not actively growing and control may be reduced. DO NOT apply to weeds stressed longer than 20 days from lack of moisture as poor control can result.

Tank Mixes:

Herbicides:

- MCPA Ester 500 (0.34 to 0.45 L per acre)
- MCPA Ester 600 (0.28 to 0.38 L per acre)

Momentum alone or tank mixed with MCPA ester rates above may be mixed with the following:

- **In spring wheat (including durum) and barley:**
 - Tralkoxydim[†] (0.20 L per acre) plus registered adjuvant
 - Imazamethabenz[†] (0.52 to 0.64 L per acre) plus water pH adjuster
 - Fenoxaprop 120 EC[†] (0.16 to 0.31 L per acre).
 - **In spring wheat (including durum):**
 - Clodinafop[†] (label rates)
 - *Simplicity OD* (0.2 L per acre)
 - *Traxos* (label rate)
- [†] **Note: The manufacturer may not support all brand of these products. See the label or contact Loveland Products Canada for more information.**

Check the labels of mix partners for additional crop staging restrictions.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Momentum* label only.

Loveland Products Canada also supports the following mixes that are not on the *Momentum* label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:** *Everest 2.0* (flucarbazone), *Puma Advance* (fenoxaprop), *Varro*, *Avert*(imazamethabenz), *Refine SG* (thifensulfuron/tribenuron) and 2,4-D Ester

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** No rainfast period is specified on the label; required interval between application and rain without loss of control may be up to 8 hours. Contact manufacturer for more information.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Grazing Restrictions:** DO NOT graze treated fields or cut for hay within 3 days of application.
- **Pre-harvest Interval:** Leave 60 days between application and harvest.
- **Re-cropping Interval:** Wheat, barley, oats, rye, flax, canola, mustard and peas may be planted the year after application or the field may be fallowed. DO NOT under-seed crops to forage legumes the year after treatment. DO NOT sow any other crops until the second year after application. Apply manure bedded with straw from treated crops only to the crops listed above.

- *DO NOT seed to field peas for at least 10 months following treatment. Very dry soil conditions following application can result in a risk of injury to field peas grown in rotation. If severe drought conditions are experienced during the months of June to August inclusive in the year of application delay seeding field peas an additional 12 months (22 months following application). Contact your local Loveland Products Canada representative or retailer for more information before seeding field peas following drought conditions in the previous year.*
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a cool (above 5°C), dry area. If product is frozen, bring to room temperature and agitate before use.
- **Buffer Zones:**
 - Hand-held or backpack sprayers, inter-row hooded sprayers and spot treatments are exempt from buffer zone requirements.

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	15	15	15

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

- Spray when winds are under 16 km/hr, but not dead calm.

Sprayer Cleaning:

No specific cleaning recommendations are provided on the *Momentum* label. As a petroleum based emulsifiable concentrate, 'Method B' in the general section on sprayer cleaning on pages 12 and 13 may be the most effective. Check with the manufacturer for more information.

Hazard Rating:



Warning – Eye Irritant

For an explanation of the symbols used here see pages 7 and 8.

MPower Good Harvest

Herbicide Group
10 - glufosinate
(Refer to page 45)

Company:

AgraCity (PCP#30761)

Formulation:

150 g/L glufosinate ammonium formulated as a solution.

- Container sizes: 10.8 L, 108 L, 1000 L

Crops, Rates and Staging:

Harvest Aid Treatment:

Note: As of January 1, 2019 www.keepingitclean.ca indicates that grain from crops treated with this product prior to harvest may have market access concerns. Please see page 10 for more information AND consult potential grain buyers before using this product.

Crop	Rate (L per acre)	Stage
Alfalfa (seed production only)	0.81 to 1.09**	50 to 75% pod turn (brown)
Lentil*	1.09	40 to 60% pod turn (yellow to brown)
Potato*	1.21	14 to 21 days prior to harvest

* Not for crops grown for seed.

** Use the higher rate when crop canopies or weed densities are heavy.

Application Information:

- **Water Volume:**
 - **Ground applications:** Minimum 45 L per acre. When crop canopy and weed densities are heavy, apply in 69 to 89 L per acre of water.
 - **Aerial applications:** 13 to 22 L per acre.
- **Nozzles and Pressure:**
 - **Ground Application:** Use 40 psi (275 kPa) when using conventional 80° or 110° flat fan nozzles; 45 psi (310 kPa) when using check valves. Angle nozzles forward at 45° to improve coverage of vertical leaf surfaces. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with **ASABE medium** or larger droplets.
 - **Aerial applications:** DO NOT use raindrop nozzles. Use a combination of nozzles and pressure to provide **ASABE coarse** or larger droplet size distribution.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
glufosinate	Preharvest	Glutamine Synthase Inhibitor/ Membrane disruptor	Little movement due to rapid cell leakage (Symplast)	Non-selective broadleaf & grass except HT crops	10

Effects of Growing Conditions:

MPower Good Harvest activity is influenced by environmental conditions. Cool temperatures (less than 10°C), drought, and low humidity conditions slow weed growth. Applications made under these stressed conditions may result in reduced weed effectiveness.

Tank Mixes:

None registered.

Restrictions:

- **Rainfall:** Within 4 hours may reduce activity.
- **Re-entry Interval:** DO NOT re-enter treated areas for 24 hours after application, without protective clothing as for spraying.
- **Grazing Restrictions:** DO NOT graze the treated crop or cut for feed.
- **Pre-harvest Interval:** Leave 9 days between application and harvest of lentil and potato.
- **Re-cropping Interval:** No restrictions.
- **Aerial Application:** May be applied by air.
- **Storage:** DO NOT freeze.
- **Buffer Zones:**
 - **Ground:** DO NOT apply within 15 metres of sensitive plants or water or wetland areas.
 - **Aerial:** DO NOT apply within 30 metres of sensitive plants or water or wetland areas.
 - DO NOT apply when dead calm or when winds exceed 16 km/hr when using unprotected booms or applying by air, or exceeding 25 km/hr when using shrouded booms.

Sprayer Cleaning:

Refer to 'Method B' in the general sprayer cleaning section on pages 12 and 13.

Hazard Rating:

 Warning – Poison

 Caution – Skin Irritant

 Warning – Eye Irritant

For an explanation of the symbols used here see pages 7 and 8.

Muster Toss-N-Go

Herbicide Group
2 - ethametsulfuron
(Refer to page 45)

Company:

FMC Corporation (PCP#23569)

Formulation:

75% ethametsulfuron-methyl formulated as a water dispersible granule.

- Container size - 320 g (4 x 80 g water soluble bags).

Crops, Rates and Staging:

NOT for use on Yellow mustard (*Brassica alba*).

Crop	Rate (g per acre)	Stage
Canola	8 to 12	Minimum 2 leaf stage (main stem) to the start of bolting.
Mustards: Brown & Oriental condiment as well as oilseed quality (<i>Brassica juncea</i>)	8	4 leaf stage but prior to bolting.
Ethiopian Mustard (<i>Brassica carinata</i>)		
Sunflower	8 to 12	2 to 8 leaf stage (15 to 45 cm)

Muster applied alone requires the addition of *Agral 90*, *Agsurf II*, or *Citowett* at 0.2 L per 100 L of spray solution. When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Weeds, Rates and Staging:

Apply from the cotyledon to 6 leaf stage. Stinkweed must be sprayed in the 1 to 4 leaf stage

At the 8 g per acre rate (one 320 g package treats 40 acres):

- Flixweed *
- Green smartweed
- Hemp-nettle
- Stinkweed **
- Wild mustard

The 12 g per acre rate (one 320 g package treats 26.7 acres) controls above weeds plus:

- Redroot pigweed **
- Stinkweed

* Spring seedlings only.

** Suppression with *Muster* alone but control with *Assure II* plus *Sure-Mix* or a *Poast Ultra* plus *Merge* tank mix where permitted.

Application Information:

- **Water Volume:** 40 L per acre.
- **Equipment, Nozzles and Pressure:** 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of *ASABE medium* droplets. Sprayer must be equipped with continuous agitation. Maintain the spray boom at 24 inches or less above the crop canopy.
- **Screens:** Use a 50 mesh or coarser nozzle screen and in-line filter system.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
ethametsulfuron	POST	ALS Amino Acid synthesis Inhibitor	Toward growth areas (Symplast)	Broadleaf	2

Effects of Growing Conditions:

DO NOT apply to crops that are stressed by severe conditions such as drought, low fertility, saline soils, waterlogged soils (soils at or near field capacity), disease or insect damage as crop injury may result. Less than acceptable control will occur in fields where high weed populations exist and where stressful environmental conditions prevail (drought, cold weather). Heavy rainfall soon after application may result in visual crop injury or possible yield reduction. Thin crop stands or application prior to the 2-leaf stage of canola or 4-leaf stage of brown condiment mustard and oriental mustard (condiment and oilseed types), sandy soils or soils with low organic matter may increase the severity of the injury.

Tank Mixes:

DO NOT mix the soluble bags with liquid fertilizers, substances that contain boron or substances that release free chlorine. Mixing the water soluble bags with any of these compounds will result in an insoluble substance in the tank.

Herbicides:

- **Canola, Brown and Oriental Mustards (*Brassica juncea* only):**
 - *Assure II* plus *Sure-Mix* adjuvant.
- **Canola only:**
 - *Poast Ultra* plus *Merge* adjuvant.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered. DO NOT mix soluble bags with liquid fertilizers.

Note: The above mixes are those listed on the *Muster* label only.

FMC Corporation also supports the following mixes that are not on the *Muster* label. Mixes must be applied according to the most restrictive use limitations for either product:

- **Herbicides:** *Assure II* (sunflowers), *Assure II* plus *Lontrel*, *Lontrel*, *Lontrel 360* plus *Poast Ultra* (canola only).

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 4 to 6 hours may reduce control.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Grazing Restrictions:** DO NOT graze or feed crop to livestock within 60 days of application. DO NOT graze treated sunflowers.
- **Pre-harvest Interval:** Leave 60 days from application to harvest.
- **Re-cropping Interval:** DO NOT sow wheat, barley, oats or flax within 10 months of application. DO NOT seed canola, lentils, peas, faba beans, tame mustard, alfalfa, canaryseed, dry beans, fescues or red clover within 22 months of application. All other crops must not be sown until a successful "field bioassay" is performed at 22 months after application. Growers may experience reduced yields if other crops are grown without following these guidelines.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** May be frozen.
- **Buffer Zones:**

Crop (By ground only*)	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Canola, Sunflower, Ethiopian Mustard	4	2	55
Mustard (Condiment and Oilseed types)	3	2	40

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Sprayers used to apply *Muster* should be flushed out immediately after *Muster* is used. Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:

None indicated.

Navius

Herbicide Group
2 - metsulfuron
4 - aminocyclopyrachlor
(Refer to page 45)

Company:

Bayer (PCP#31382)

Formulation:

39.5% aminocyclopyrachlor and 12.6% metsulfuron formulated as a water dispersible granule.

- Container size – 8 x 1.361Kg.

Crops and Staging:

Rangeland or Non-crop areas (i.e. Rights of Way, roadsides, industrial sites, fence lines and other non-crop areas)

DO NOT use in residential or recreational areas, where bystanders could be exposed during or after application.

DO NOT apply to cropland.

Note: The use of this chemical may result in contamination of groundwater particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

Avoid application of this product in areas where the roots of desirable trees and/or shrubs may extend unless injury or loss can be tolerated. Root zone areas of desirable trees or vegetation are affected by local conditions and can extend well beyond the tree canopy.

Weeds, and Staging:

For best results, apply to young, actively growing weeds. For woody species, apply between mid-June and mid-August after the brush has leafed out, but before the leaves begin to turn their fall colours.

After the granules have fully dispersed, add surfactant. Either one of the following:

- non-ionic surfactants (i.e. *Agral 90*, *Agsurf II*, or *Citowett*) at 0.25 L per 100 L (25 mL per 10 L) of spray solution.
- *Merge* or a crop oil concentrate (oil-surfactant blends such as *Assist*, *Score*, etc.) at 1 L per 100 L (100 mL per 10 L).

Weeds Controlled at 68 g per acre:

- | | | |
|-------------------------------|--|---|
| ◦ Bluebur | ◦ Hemp-nettle | ◦ Stinkweed |
| ◦ Buckwheat (tartary, wild*) | ◦ Kochia (including Group 2 resistant) | ◦ Stork's-bill |
| ◦ Canada goldenrod† | ◦ Lamb's-quarters* | ◦ Sweet clover (white, yellow) |
| ◦ Canada thistle | ◦ Leafy spurge | ◦ Toadflax* |
| ◦ Chickweed | ◦ Mustard (ball, wild) | ◦ Volunteer canola
(except Clearfield varieties) |
| ◦ Common groundsel | ◦ Orange hawkweed | ◦ White cockle |
| ◦ Common tansy | ◦ Ox-eye daisy | ◦ Wild carrot |
| ◦ Common yarrow | ◦ Pigweed (prostrate, redroot) | ◦ Yellow star-thistle |
| ◦ Corn spurry | ◦ Rough cinquefoil† | |
| ◦ Cow cockle | ◦ Russian thistle | <u>Woody Species:</u> |
| ◦ Dandelion | ◦ Scentless chamomile | ◦ Smooth sumac |
| ◦ Flixweed | ◦ Shepherd's-purse | ◦ Western snowberry |
| ◦ Knapweed (diffuse, spotted) | ◦ Smartweed (green, lady's-thumb) | ◦ Wild rose |
| ◦ Giant buttercup† | ◦ Sow-thistle (annual, perennial) | |

Weeds Controlled at 135 g per acre:

- The weeds listed above plus the following *Woody Species* up to 2,5 metres unless otherwise indicated:

◦ Manitoba maple (Box Elder)	◦ Plains cottonwood	◦ Hackberry
◦ Green ash	◦ Poplar (balsam, black)	◦ Balsam fir (up to 2 metres)
◦ Chokecherry (up to 3 metres)	◦ Trembling aspen (up to 3 metres)	◦ Spruce (Black, White – up to 2 metres)
◦ Pin cherry (up to 3 metres)	◦ Willow (sandbar/ditchbank, Pussy)	

Weeds Controlled at 270 g per acre:

- The species listed above plus the following *Woody Species* to 2 metres tall unless otherwise indicated:

◦ Pine (Eastern white, Jack, Red)	◦ Spruce (Black, White – up to 3 metres)
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* **Suppression only.**

† **Season long control only.**

DO NOT apply more than a total of 270 g per acre of *Navius* per season or apply *Escort* to the same site in the same year as *Navius*. Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Application Information

- **Water Volume:**
 - **Ground:** No specific carrier volumes are indicated for ground application but volumes could be up to 162 L per acre for herbaceous weeds and up to 810 L per acre is recommended for foliar application to woody species. See the label for details.
 - **Aerial:** Apply in 12 to 20 L per acre of water.
- **Nozzles and Pressure:** Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE coarse* droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
metsulfuron-methyl	POST (foliar) also has soil activity	ALS Amino Acid Inhibitor	Toward areas of growth (Symplast)	Broadleaf only	2
aminocyclopyrachlor	POST (foliar) also has soil activity	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

Warm, moist growing conditions promote active weed growth and enhance activity. Weeds stressed by moisture or temperature extremes (heat or cold) may be less susceptible and incomplete weed kill may result. Residual control of weeds germinating after application occurs when *Navius* is carried into the root zone by rainfall. DO NOT apply during periods of intense rainfall or to soil saturated with water. Brush hardened off by cold weather and drought stress may not be controlled.

Restrictions:

- **Rainfall:** Rain within 4 hours may reduce effectiveness.
- **Re-entry Interval:** DO NOT re-enter treated areas until sprays have dried.
- **Re-cropping Interval:** No recropping interval is indicated. Conduct a bioassay when converting pasture to annual crop land to determine tolerance to potential residues in the soil. The following restrictions apply to all plant materials, or manure from animals fed material, from areas treated with *Navius* within the previous 18 months:
 - DO NOT apply to land used for growing susceptible crops. Manure may only be applied on rangeland.
 - DO NOT use as mulch or compost and do not apply directly on or around desirable plants.
 - Must only be used on-farm.
- **Grazing Restrictions:** No grazing or haying restrictions for non-lactating or lactating animals (including cattle, horses, sheep, and goats) when used as directed. Grazing animals do not have to be moved off the pasture or rangeland before, during or after application.
- **Aerial Application:** May be applied by air.
- **Storage:** Store in a cool, dry place. May be frozen.
- **Buffer Zones:**
 - **Contact the Saskatchewan Ministry of Environment or Manitoba Sustainable Development Department for additional permitting requirements.**
 - Hand-held or backpack sprayers and spot treatments are exempt from buffer zone requirements.

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat**
	Less than 1 m	Greater than 1 m	
Ground	5	2	45
Fixed wing aircraft	250	100	800
Helicopter	80	45	800

See page 36 for an explanation of the different habitats.

* For ground vehicle mounted booms, buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

** Terrestrial buffers are not required for transport and utility rights of way. Aquatic buffers still apply.

† Distance is measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Navius can cause severe injury to sensitive plants at very low concentrations. Use 'Method A' on pages 12 and 13 to clean sprayers immediately after using *Navius* or directions on the label.

Hazard Rating:

 Warning - contains the allergens milk and sulfites

For an explanation of the symbols used here see pages 7 and 8.

OcTTain XL

Herbicide Group
4 - fluroxypyr & 2,4-D
(Refer to page 45)

Company:

Corteva Agriscience (PCP#30077)

Formulation:

90 g/L fluroxypyr plus 360 g/L 2,4-D LV ester as a co-formulated product.

- Container size – 2 x 9 L, (40 acres), 108 L (240 acres), 576 L (1280 acres). All products above are formulated as emulsifiable concentrates.

Crops and Staging:

Spring wheat (including durum), barley: 4 leaf up to the emergence of the flag leaf.

Winter wheat: Apply to winter wheat in the spring from the 3 tiller stage to just before the flag leaf stage.

Forage Grasses for seed production only*:

- *Seedling and established grasses at the 4 leaf up to the emergence of the flag leaf.*
 - Bromegrass (meadow, smooth)
 - Timothy
 - Wheatgrass (crested, intermediate)
 - Fescue (creeping red, tall)

***Note:** Since these uses are registered under the User Requested Minor Use Label Expansion (URMULE) program, the manufacturer assumes no responsibility for herbicide performance. **Those who apply these uses do so at their own risk.**

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, and Staging:

The following weeds are controlled at the 2 to 4 leaf stage, unless otherwise specified:

- OcTTain XL at 0.45 L per acre (2 x 9 L treats 40 acres, 108 L treats 240 acres, 576 L treats 1280 acres) controls:
 - Bluebur
 - Burdock
 - Cleavers(1 to 8 whorl)
 - Clover (sweet)
 - Cocklebur
 - Common chickweed (up to 8 cm or 3 inches)[†]
 - Field horsetail[◦]
 - Flixweed
 - Goat's-beard
 - Hemp-nettle (2 to 6 leaf)
 - Hoary cress[◦]
 - Kochia
 - Lamb's-quarters
 - Mustards (except dog or green and grey tansy mustard)
 - Plantain
 - Prickly lettuce
 - Ragweed
 - Redroot pigweed[†]
 - Round-leaved mallow (1 to 6 leaf)
 - Shepherd's-purse
 - Sow-thistle (perennial)^{†◦}
 - Stinkweed
 - Stork's-bill (1 to 8 leaf)
 - Sunflower (annual)
 - Vetch
 - Volunteer canola
 - Volunteer flax (1 to 12 cm)
 - Wild radish
 - Wild mustard
 - Wild buckwheat (1 to 6 leaf)

- **OcTTain XL at 0.45 L per acre (one 2 x 9 L case treats 40 acres and 576 L treats 1280 acres) plus 2,4-D ester (LV700 at 81 mL per acre or LV600 at 95 mL per acre) controls:**

- **All weeds listed above plus:**

- | | | |
|---|-------------------------------|---------------------------------------|
| ◦ Annual sow-thistle [†] | ◦ Dog mustard | ◦ Perennial sow-thistle ^{0†} |
| ◦ Blue lettuce [◦] | ◦ Field bindweed [◦] | ◦ Redroot pigweed |
| ◦ Canada thistle ^{0†} | ◦ Field peppergrass | ◦ Russian thistle |
| ◦ Cleavers (1-8 whorls) ^Δ | ◦ Gumweed | ◦ Smartweed (including lady's-thumb) |
| ◦ Common chickweed (up to 8 cm or 3 inches) | ◦ Hairy galinsoga | ◦ Tansy mustard |
| ◦ Dandelion ^{◦◦} | ◦ Hedge bindweed | ◦ Tartary buckwheat |
| ◦ Docks | ◦ Leafy spurge [◦] | ◦ Wild buckwheat (1 to 8 leaf) |
| | ◦ Oak-leaved goosefoot | |

- † **Suppression only**

- **Top growth only**

- **Spring rosettes only.**

Make only ONE APPLICATION per year of any of these products or other products containing the same active ingredients. Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Application Information

- **Water Volume:**
 - **Ground:** OcTTain XL use 20 to 40 L per acre. All other uses minimum 40 L per acre.
 - **Aerial:** OcTTain XL only use 12 to 20 L per acre.
- **Nozzles and Pressure:** Maximum 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of **ASABE coarse** droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
fluroxypyr	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4
2,4-D	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

The activity these products are influenced by weather conditions. The temperature range for optimum activity is 12°C to 24°C. Reduced activity will occur when temperatures are below 8°C or above 27°C. Frost 3 days before or after application may reduce weed control and crop tolerance. Weed control may be reduced during stress conditions (drought, heat or cold stress) or if extremely heavy infestations exist.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

The following mixes may be used with each of the combinations above unless noted otherwise.

- **In spring wheat (including durum) and barley:**
 - Assert (0.53 to 0.65 L per acre)
 - Tralkoxydim*
- **In spring wheat (including durum) only:**
 - Clodinafop 240EC (93 mL per acre)
 - Fenoxaprop
 - Simplicity OD[†]
 - Simplicity GoDRI

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered. DO NOT mix soluble bags with liquid fertilizers.

* Temporary crop injury or reduced wild oat control may occur with this tank mix.

† OcTTain XL without additional 2,4-D ester only.

Note: The above mixes are those listed on the OcTTain XL labels only.

The manufacturers may also support mixes between their product and other pesticides that are not on their labels. Check with the manufacturer for the products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Wet foliage at application will reduce control.
- **Re-entry Interval:** DO NOT re-enter treated area within 12 hours.
- **Re-cropping Interval:** Alfalfa, barley, canola, corn, dry beans, flax, forage grasses, lentils, mustard, oats, peas, potatoes, rye, soybeans, sunflowers and wheat may be grown the year after application. There are no re-cropping restrictions the second year after application.
- **Pre-harvest Interval:** Leave 60 days between application and harvest.
- **Grazing Restrictions:** DO NOT permit lactating dairy animals to graze cereal fields within 7 days of application. DO NOT harvest cereal crops for forage or cut hay within 30 days of application. Withdraw meat animals from treated fields at least 3 days before slaughter. DO NOT feed or cut forage grasses for hay.
- **Aerial Application:** May be applied by air.
- **Storage:** Avoid freezing. If frozen, bring to room temperature and agitate before use. These products are combustible. DO NOT store near heat or open flame.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Field sprayer	1	0	1
Fixed wing aircraft	1	0	55
Helicopter	1	0	45

See page 36 for an explanation of the different habitats.

* For ground vehicle mounted booms, buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:



Caution – Poison



Warning – Eye Irritant



Caution – Skin irritant

For an explanation of the symbols used here see pages 7 and 8.

Odyssey/Odyssey NXT (this referring text to be removed in the 2021 edition)

See imazamox/ imazethapyr on page 262.

Odyssey Ultra/Odyssey Ultra NXT

Herbicide Group

1- sethoxydim

2- imazamox,

imazethapyr

(Refer to page 45)

This product is a prepackaged tank mix of Odyssey/Odyssey NXT (see Imazamox/Imazethapyr - page 262) and Poast Ultra (page 327). Information listed is restricted to Crop, Weeds, Rates and Tank mixes. For other detailed restrictions and other general information on the component products see the product pages listed above.

Company:

BASF Canada

Formulation:

The Odyssey Ultra/Odyssey Ultra NXT packages contain the following components:

Odyssey Ultra A (PCP#31353) or Odyssey Ultra NXT A (PCP#32305): 35% imazamox and 35% imazethapyr formulated as a dispersible granule.

- Container size –
 - **Odyssey Ultra A:** 8 x 86.5 g water soluble packs or
 - **Odyssey Ultra NXT A:** 1 x 692 g jug.

Odyssey Ultra B (PCP#31354) or Odyssey Ultra NXT B (PCP#32304): 450 g/L sethoxydim formulated as an emulsifiable concentrate.

- Container size – 1 x 6.1 L jug.

Merge adjuvant (PCP#24702): Container size – 1 x 8.1 L

Crops and Staging:

Crop	Leaf Stage	Days to Harvest
Field pea	1 to 6*	60
CLEARFIELD canola	2 to 6	60
CLEARFIELD lentil	1 to 9*	60
Soybean	1 to 3	85
Faba bean	1 to 6	80

* Above-ground nodes

Weeds, Rates and Staging:

At 17.4 g per acre *Odyssey Ultra A* and 0.15 L per acre *Odyssey Ultra B* (one package treats 40 acres) controls the weeds controlled by *Odyssey (Odyssey Ultra A)* plus the grasses controlled by *Poast Ultra (Odyssey Ultra B)* plus the weeds below:

- Japanese brome grass (Spring seedlings only)*
- Quackgrass (Suppression - 2 to 5 leaf)

* **Suppression of fall emerged Japanese brome with *Odyssey Ultra* alone but control with *Poast Ultra (0.04 L per acre)* tank mix.**

Odyssey Ultra requires the addition of *Merge* adjuvant at 0.5 L per 100 L of spray solution (included in *Odyssey Ultra NXT* packaging).

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Tank Mixes:

Herbicides:

- *Poast Ultra* (0.04 L per acre)

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

See component products for more information on restrictions application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

Olympus

Herbicide Group
2 - propoxycarbazone-sodium
(Refer to page 45)

Company:

Bayer

Formulation:

Olympus (PCP#32755): 70% propoxycarbazone-sodium formulated as a wettable granule.

- Container size - 463 g

Crops and Staging:

Spring, durum, and winter wheat: Apply pre-seed or prior to crop emergence.

Weeds and Rates:

Weeds Controlled up to 15 cm in height unless otherwise indicated:

Preplant surface or postplant preemergence	Olympus: 5.8 g per acre Glyphosate* : 180 to 360 g a.e. per acre	Weeds Controlled by glyphosate at the rates given plus: <ul style="list-style-type: none"> • Canada fleabane (up to 8 cm)^Δ • Canola, volunteer[†] (1-leaf stage to 4 leaf stage) • Cleavers^Δ • Common ragweed^Δ • Downy brome^{†Δ} • Flixweed^Δ • Green foxtail^Δ • Hemp-nettle^Δ • Japanese brome (up to and including the 2 leaf stage) • Kochia^{ΔΔ} (except glyphosate tolerant biotypes) • Lady's-thumb^Δ • Lamb's-quarters^Δ • Persian darnel^Δ • Redroot pigweed^Δ • Russian thistle^Δ • Stinkweed^Δ • Volunteer barley^Δ • Volunteer flax^Δ • Volunteer wheat^Δ • Wild buckwheat (up to 8 cm in height and up to 3 leaf stage)^Δ • Wild mustard^Δ • Wild oat^Δ • Foxtail Barley (seedling to heading)^{**†}
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* including all salts

** 360 g ae per acre of glyphosate is required for control of foxtail barley

† For more consistent control of subsequent flushes, follow an application of *Olympus* + glyphosate with an in-crop application of *Varro*. Refer to the *Varro* label for additional weeds controlled.

Δ Controlled by glyphosate alone at 180 to 275 g ae per acre.

ΔΔ Controlled by glyphosate alone at 360 g ae per acre.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Application Information:

- **Water Volume:**
 - **Ground:** Minimum 20 L per acre
 - **Aerial:** Minimum 10 L/acre (Note: There are restrictions on aerial application – see the note under Restrictions below)
- **Nozzles and Pressure:** Use a combination of nozzles and pressure designed to deliver thorough, even coverage with **ASABE coarse** droplets or larger. The use of 80° or 110° flat fan nozzles is recommended for optimum spray coverage. DO NOT use flood jet nozzles, controlled droplet application equipment or Sprafoil equipment.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
propoxycarbazone-sodium	POST and PRE (has soil activity)	ALS Amino Acid Inhibitor	Toward areas of growth (Symplast)	Broadleaf & grass	2

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

- **Pre-seed and Pre-Emergent:**
 - Glyphosate

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered. DO NOT mix soluble bags with liquid fertilizers.

Restrictions:

- **Rainfall:** Within 1 hour of application may reduce control.
- **Re-entry Interval:** DO NOT re-enter treated fields for 12 hours.
- **Grazing Restrictions:** MUST NOT be grazed or fed to livestock for 71 days after treatment.
- **Pre-harvest Interval:** Leave 71 days between application and harvest.
- **Re-cropping Interval:** Barley, canola, dry beans, field peas, flax, lentils, oats, and soybeans may be grown in the season following application.
- **Aerial Application:** *Note* – while *Olympus* may be applied by aerial application, due to the requirement that it be mixed with glyphosate, this aerial option is only available for certain glyphosate products and then only when the field to be treated is too wet to support ground based sprayers. (See glyphosate page)
- **Storage:** Store in a cool, dry place.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground*	1	0	1
Fixed wing aircraft	1	0	20
Helicopter	1	0	15

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on page 15 to 16. Let solution stand for an extended period for better results. Flush sprayer system with water. See the label for product specific cleaning details.

Hazard Rating:

 Warning – Contains the allergen soy

For an explanation of the symbols used here see pages 7 and 8.

Optica Trio

Herbicide Group
4 - MCPA, mecoprop & dichlorprop
(Refer to page 45)

Company:

Loveland Products Canada (PCP#29662)

Formulation:

160 g/L MCPA + 130 g/L mecoprop-p + 310 g/L dichlorprop-p formulated as a solution

- Container size - 10 L

Crops and Staging:

Crop	Stage
Barley, oat, spring wheat (including durum)	2 to 5 leaf
Winter wheat	Spring application only; up to 12 inches (30 cm) high (top leaf extended)

Weeds, Rates and Staging:

Weeds controlled at the 2 to 3 leaf stage unless otherwise indicated.

Apply at 0.61 L per acre to control:

- Lamb's-quarters
- Stinkweed
- Volunteer canola
- Wild mustard

Apply at 1.0 L per acre to control the weeds listed above plus:

- Canada thistle*
- Chickweed (Common)
- Cleavers (1 to 2 whorls)
- Kochia
- Lady's-thumb (suppression)
- Ragweed (Common)
- Redroot pigweed
- Wild buckwheat

* Top growth control only.

DO NOT apply *Optica Trio* more than once or follow application with any related product in the same year.

Application Information:

- **Water Volume:** Minimum 20 L per acre.
- **Nozzles and Pressure:** 30 to 43 psi (200 to 300 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of *ASABE medium* droplets or larger.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
dichlorprop-p	POST (foliar)	Synthetic Auxin	Moves throughout the plant (Symplast)	Broadleaf only	4
mecoprop-p					
MCPA					

Effects of Growing Conditions:

Less than satisfactory control may result if weeds are not actively growing such as under conditions that are extremes of hot or cold, dry or wet weather prior to spraying.

Tank Mixes:

Herbicides:

- **Spring wheat (including durum):**
 - *Signal* (93 mL per acre) plus supplied adjuvant.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Optica Trio* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.
- **Re-entry Interval:** DO NOT enter treated fields for 12 hours.
- **Grazing Restrictions:** DO NOT feed treated crops to milking animals or harvest for forage within 7 days of application. Meat animals grazing treated crops must be removed 3 day prior to slaughter.
- **Pre-harvest Interval:** No pre-harvest interval indicated on label when *Optica Trio* is used alone.
- **Re-cropping Interval:** No information provided on label. Contact manufacturer for information.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Keep from freezing.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	2

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

No specific cleaning procedures are indicated on the label. Based on products with similar chemistry, 'Method B' found in the general sprayer cleaning section on pages 12 and 13 or a commercial spray sprayer cleaning product, may provide adequate cleaning. Contact the manufacturer for more information.

Hazard Rating:



Caution – Poison



Danger – Corrosive to eyes

For an explanation of the symbols used here see pages 7 and 8.

Option 2.25 OD

For use in Manitoba only.

**Herbicide Group
2 - foramsulfuron**

(Refer to page 45)

Company:

Bayer

Formulations:

Option 2.25 OD (PCP#27424): 22.5 g/L foramsulfuron formulated as an oil-dispersion.

- Container size - 6.3 L jug

Crops and Staging:

Field corn at the 1 to 8 leaf stage or 5 to 6 visible collars

Weeds and Staging:

Annual Grasses:

Weed	Leaf Stage
Barnyard grass	1 to 6 (to early tillering)
Foxtail (green and yellow), Proso millet	2 to 5 (to early tillering)
Witchgrass	2 to 4

Broadleaf Weeds:

Weed	Leaf Stage
Chickweed, common	4 to 6
Lamb's-quarters	4 to 8
Mustard, wild	5 to 7
Mustard, wormseed	5 to 9
Nightshade, eastern black	1 to 5
Pigweed, redroot	1 to 7
Ragweed, common*	2 to 4

* Suppression only.

Rates:

Option 2.25 OD: 0.63 L per acre (10 acres per jug) plus 28% UAN (liquid 28-0-0) at 1.0 L per acre.

NOTE: *Option 2.25 OD* should be tank mixed with *Banvel II* at 121 mL per acre for enhanced control of broadleaf weeds and the management of Group 2 resistant weed biotypes.

Add *Option 2.25 OD* to a half full tank, followed by *Banvel II*, then 28% UAN.

Application Information:

- **Water Volume:** 60 L per acre
- **Nozzles and Pressure:** Use 25 to 40 psi (175 to 275 kPa) when using conventional 80° or 110° flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of *ASABE medium* or larger droplets.
- **Screens:** Use 50 mesh or coarser on both nozzle and primary plumbing screens.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
Foramsulfuron	POST (foliar) also has soil activity	ALS Amino Acid Inhibitor	Toward areas of growth (Symplast)	Broadleaf only	2

Effects of Growing Conditions:

Under optimum conditions weed growth ceases within 1 to 3 days and yellowing of the growing point occurs in 5 to 10 days. Warm moist conditions provide for the best activity. Activity may be reduced or delayed if applied under cool and/or dry conditions or in the presence of heavy dew, fog, mist or rain or if weeds are dust covered. If the crop or weeds are under stress due to environmental conditions, delay application until the both crop and weeds have resumed active growth.

Tank Mixes:

Herbicides: *Banvel II* (121 mL per acre)*

Insecticides: Avoid application to corn that has been treated with organophosphorous insecticides.

Fungicides: None registered.

Fertilizers: DO NOT use any fertilizers or additives other than 28% UAN (1 L per acre), recommended*.

* *Option 2.25 OD* should be applied to corn in Manitoba as a tank-mixture with *Banvel II*. UAN 28% is required. See 'Rates' section above.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 6 hours may reduce control.
- **Re-entry Interval:** DO NOT enter treated fields until residues have dried.
- **Grazing Restrictions:** DO NOT graze treated corn crops or cut for forage within 45 days of application.
- **Pre-harvest Interval:** Leave 70 days between application and harvest of grain.
- **Re-cropping Interval:** The following crops may be grown the season following application: alfalfa, barley, bean (dry common), canola, clover (red), corn (field and sweet), oat, pea, potato, soybean, timothy, spring wheat. Winter wheat may be seeded 4 months after application.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Keep dry.
- **Buffer Zones:**

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	3

See page 36 for an explanation of the different habitats.

* Buffer zones for ground applications can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Option 2.25 OD residues in the spray tank can cause severe injury to sensitive crops at very low concentrations. Sprayers should be cleaned out immediately before using another product. Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:



Caution – Eye Irritant



Warning – Skin Irritant

Potential Skin Sensitizer

For an explanation of the symbols used here see pages 7 and 8.

Outlook*

* Note: This product is no longer manufactured but some still remains in the distribution system. This product may be removed from future editions when supplies are exhausted.

Herbicide Group
15 - dimethanamid
(Refer to page 45)

Company:

BASF Canada (PCP#29194)

Formulations:

720 g/L dimethanamid-P formulated as an emulsifiable concentrate.

- Container size – 2 x 9 L

Crops and Staging:

Potatoes - After seeding or hilling prior to emergence of the crop. DO NOT apply before seeding or hilling.

Weeds and Staging:

Prior to the emergence of:

- Barnyard grass
- Crabgrass (large, smooth)
- Foxtail (green and yellow)
- Eastern black nightshade*
- Redroot pigweed

* Control with highest rate (390 mL per acre) only. Lower rates provide suppression only.

Rates:

Apply at 306 to 390 mL per acre. Apply at the higher rate on fine-textured or high organic soils and for heavier anticipated weed problems. DO NOT exceed the equivalent of a single application of *Outlook* or *Frontier Max* in a single season.

Pre-emergence surface treatments:

Soil Type (Texture)	Rate (mL per Acre)		
	Less than 3% Organic Matter	3 to 6% Organic Matter	7 to 10% Organic Matter
Coarse	306	306	348
Medium and Fine	306	348	390

Application Information:

- **Water Volume:** A minimum of 40 L per acre.
- **Pressure:** 30 to 43 psi (200 to 300 kPa).
- **Nozzles:** Flat fan or flood-jet. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of *ASABE medium* droplets.
- **Screens:** Use a 16 mesh suction screen, 50 mesh elsewhere on sprayer.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
dimethanamid-P	PPI, PRE (surface), early POST (foliar) with residual soil activity	Long-chain Fatty Acid Inhibitor	Little movement (Symplast)	Broadleaf & grass	15

Effects of Growing Conditions:

Rainfall is required within 7 to 10 days of application to activate and move *Outlook* into the soil zone. If dry conditions persist, a shallow cultivation or the use of a rotary hoe is necessary to move the herbicide into moist soil and control weed escapes. Shallow tillage is important to minimize dilution of the herbicide. If drought conditions persist after pre-emergence applications, weed control may not be adequate.

Restrictions:

- **Rainfall:** Avoid heavy rainfall after application. A light to moderate rainfall 7 to 10 days after application is important for good weed control.
- **Re-entry Interval:** DO NOT enter treated fields for 24 hours.
- **Pre-harvest Interval:** Leave 40 days between application and harvest.
- **Grazing Restrictions:** DO NOT graze within 40 days of application.
- **Re-cropping Interval:** In the event of a crop failure, treated fields may be seeded back to corn (field or sweet), soybeans, or dry common beans. DO NOT reseed potatoes after a crop failure. Cereal crops may be planted 100 days after application. The crops above plus green onions, potato and transplanted cabbage may be planted the next season after use. All other crops may be seeded 11 months after application.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** DO NOT freeze. Must be stored under heated warehouse conditions.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	3

See page 36 for an explanation of the different habitats.

* Buffer zones for ground applications can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13. When mixing with other pesticides, combine the method above with the method recommended for the tank mix partner if different from above for thorough cleaning.

Hazard Rating:



Warning – Poison



Caution – Eye Irritant

Potential Skin Sensitizer

For an explanation of the symbols used here see pages 7 and 8.

Overdrive

Herbicide Group
4 - dicamba
19 - diflufenzopyr
(Refer to page 45)

Company:

BASF Canada (PCP#30065).

Formulation:

20% diflufenzopyr and 50% dicamba sodium salts formulated as water dispersible granules.

- Container size - 4 x 3.4 kg

Crops and Staging:

Established permanent grass pasture, non-cropland sites and rangeland. DO NOT apply *Overdrive* on annual crops or newly seeded grasses.

Note: The use of this chemical may result in contamination of groundwater particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

Weeds and Staging:

- | | | |
|---------------------------|--|-----------------------------------|
| ◦ Biennial wormwood | ◦ Leafy spurge** | ◦ Velvetleaf |
| ◦ Canada thistle* | ◦ Perennial sow-thistle (2 to 10 leaf) | ◦ Vetch* |
| ◦ Dandelion** | ◦ Ragweed (common) | ◦ Volunteer canola (up to 4 leaf) |
| ◦ Kochia (up to 15 cm)*** | ◦ Redroot pigweed | ◦ Wild buckwheat |
| ◦ Lady's-thumb | ◦ Sweet clover* | |
| ◦ Lamb's-quarters | ◦ Tall waterhemp | |

* Top growth control

** Top growth suppression

*** Including Group 2 and 9 resistant biotypes.

Rates:

115 g per acre.

(One package treats 118 acres)

Merge Adjuvant at the rate of 0.25 L per 100 L of spray solution or a non-ionic surfactant at 0.25 L per 100L of spray solution plus ammonium nitrate (UAN 28%) at 1.25L per 100L of spray solution must also be added. Use of an anti-foam agent is suggested.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:** Minimum 89 L per acre. Use higher water volumes when treating dense or tall vegetation.
- **Nozzles and Pressure:** Maximum 20 psi (150 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of application equipment and pressure that is designed to deliver an even coverage of *ASABE coarse* droplets that are less prone to drift. Non-target broadleaf plants are very sensitive to *Overdrive* drift. Avoid conditions that are conducive to drift. (See page 7 for drift control suggestions).

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
dicamba	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4
diflufenzopyr	POST (foliar)	Auxin transport inhibitor	To growth areas of the plant (Symplast)	Broadleaf only	19

Effects of Growing Conditions:

DO NOT spray if temperatures are expected to exceed 27°C. DO NOT spray in high humidity or fog. DO NOT spray if wind velocity exceeds 8 km/h. Established grasses growing under stress conditions can exhibit various injury symptoms that may be more pronounced if herbicides are applied.

Tank Mixes:

None registered.

Restrictions:

- **Rainfall:** Heavy rain within 4 hours of application may reduce control.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Grazing Restrictions:** DO NOT permit lactating dairy animals to graze fields within 7 days after application. DO NOT harvest forage or cut hay within 30 days after application. Withdraw meat animals from treated fields at least 3 days before slaughter.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a cool, dry place.
- **Buffer Zones:**
 - Hand-held or backpack sprayer and spot treatment DO NOT require a buffer zone from sensitive habitat, but efforts should be made to minimize exposure to sensitive plants and open water or wetlands.

Application method	Buffer Zones (metres [†]) Required for the Protection of:	
	Freshwater habitat	Terrestrial habitat
Field sprayer*	15	10

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:



Caution – Poison



Caution – Eye Irritant, Potential Skin Sensitizer



Warning – Contains the allergen sulfites

For an explanation of the symbols used here see pages 7 and 8.

Paradigm

Herbicide Group

2 - florasulam

4 - halauxifen

(Refer to page 45)

Company:

Corteva Agriscience (PCP#31304)

Formulation:

20% halauxifen present as methyl ester and 20% florasulam formulated as a water dispersible granule.

- Container size - 4 x 0.8 kg jugs per case

Crops and Staging:

Pre-seed and Post Harvest Applications:

- Prior to the planting of wheat (winter, spring and durum) and barley (or within 48 hours of seeding)
- Must be used in combination with a mixture of glyphosate at 180 to 1000 g ae per acre.

In Crop:

- *Spring wheat (including durum) and barley*: 2 leaf stage to just prior to emergence of the flag leaf.
- *Winter wheat*: 3 leaf stage to just prior to emergence of the flag leaf.

Weeds, Rates and Staging:

Apply to actively growing weeds at the 1 to 8 leaf stage unless otherwise specified.

In-Crop Treatments: Add Intake adjuvant at 0.5 to 1.0 L per 100 L of spray solution, Turbocharge or Merge adjuvants at 0.5 L per 100 L, or a 90% active non-ionic surfactant (NIS) at 0.25 L per 100 L of spray solution. Surfactant purchased separately.

Weeds Controlled alone at 10 g per acre (one 0.8 kg jug treats 80 acres) in-crop or in a fall burndown in a mix with glyphosate in addition to the weeds controlled by glyphosate:

- | | | |
|---|--|---|
| ◦ American dragonhead (up to bud stage or 15 cm) | ◦ Henbit (up to 8 leaf or 15 cm) | ◦ Smartweed (green, lady's-thumb) |
| ◦ Buckwheat, wild | ◦ Kochia* (suppression up to 15 cm; control in fall burndown) | ◦ Sow-thistle, annual (control up to 4 leaf in-crop; suppression in fall burndown) |
| ◦ Canada thistle (suppression up to 30 cm) | ◦ Lamb's-quarters | ◦ Sow-thistle, perennial [§] (up to 6 leaf) |
| ◦ Chickweed | ◦ Mustard (wild) [†] | ◦ Stinkweed [†] |
| ◦ Cleavers (1 to 9 whorl stage) | ◦ Narrow-leaved hawk's-beard (in-crop up to bolting and 30 cm in height; fall burndown up to 8 cm) | ◦ Stork's-bill |
| ◦ Cow cockle | ◦ Night-flowering catchfly [§] (up to bolting, 15 cm in height) | ◦ Velvet leaf (up to 5-leaf) |
| ◦ Dandelion (seedlings, overwintered rosettes and mature plants up to 30 cm across) | ◦ Ragweed, common (in-crop up to 6 leaf; fall burndown up to 8 cm) | ◦ Volunteer alfalfa (up to 25 cm) |
| ◦ Fleabane, Canada (up to 15 cm in-crop & up to 8 cm in fall burndown) | ◦ Redroot pigweed | ◦ Volunteer canola (NOT Clearfield varieties alone but all varieties with glyphosate) |
| ◦ Flixweed (up to 8 leaves or 8 cm high) | ◦ Round-leaved mallow (up to 6 leaf) | ◦ Volunteer flax (up to 15 cm) |
| ◦ Hemp-nettle (suppression alone in crop; control in fall burndown) | ◦ Scentless chamomile [§] (up to the bud stage) | ◦ White cockle [§] (spring seedlings and over-wintered plants up to the bud stage) |
| | ◦ Shepherd's-purse [†] (up to bolting or 20 cm) | |

Weeds controlled at 7.6 grams per acre (one 0.8 kg jug treats 107 acres) when applied in a spring burndown in a mix with glyphosate in addition to those weeds controlled by glyphosate:

- | | | |
|--|--|----------------------------|
| ◦ Buckwheat, wild (1 to 2 leaves) | ◦ Fleabane, Canada (up to 15 cm in-crop & up to 8 cm in fall burndown) | ◦ Lamb's-quarters |
| ◦ Canada thistle (suppression up to 30 cm) | ◦ Flixweed (up to 8 leaves or 8 cm high) | ◦ Mustard (wild) |
| ◦ Chickweed | ◦ Hemp-nettle (suppression alone in crop; control in fall burndown) | ◦ Shepherd's-purse |
| ◦ Cleavers (1 to 9 whorl stage) | | ◦ Smartweed (lady's-thumb) |
| ◦ Dandelion (seedlings and spring rosettes up to 15 cm across) | | ◦ Stinkweed |

[§] Suppression only.

* Light to moderate infestation (up to 150 plants/m²).

[†] Best results prior to the 4 leaf (seedling) stage when applied alone in-crop.

Application Information:

- **Water Volume:** Minimum 20 to 40 L per acre for all *Paradigm* use patterns. Use the higher volume when there is a heavy crop canopy or weeds are at an advanced stage.
- **Nozzles and Pressure:** Use 30 to 40 psi (200 to 275 kPa) if applying without drift reduction nozzles. Drift reduction nozzles may require higher pressures for proper performance. Select the nozzle and pressure combination that produces of *ASABE S572.1 coarse* droplets while maintaining good coverage of foliage.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
florasulam	POST (foliar)	ALS Amino Acid inhibitor	Toward areas of growth (Symplast)	Broadleaf only	2
halauxifen	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

Weeds and crops must be actively growing. Extreme growing conditions such as drought or near freezing temperature prior to, at or following time of application may reduce weed control.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

* An adjuvant is not required with these tank mixes.

** Use *Agral 90* surfactant at 0.25 L per 100 L of spray solution.

Herbicides:

- **In-Crop:**
 - MCPA 600 Ester (161 to 230 mL per acre)*
 - *Curtail M* (0.6 L per acre)*
 - *Lontrel XC* (50 mL per acre)
 - *Everest 2.0***
 - *Everest 2.0* + MCPA (rates above)**
 - *Everest 2.0* + *Curtail M* (rates above)**
 - *Simplicity/Simplicity GoDRI***
 - *Simplicity/Simplicity GoDRI* + MCPA (rates above)**. Consult label use for specific surfactant requirements.
 - *Simplicity/Simplicity GoDRI* + *Curtail M* (rates above)**. Consult label use for specific surfactant requirements.
- **Preseed Burndown (Fall or Spring):**
 - Glyphosate IPA, DMA or K+ formulations up to 1000 g ae per acre (see glyphosate page for details)

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Paradigm* label only. Corteva Agriscience also supports the following mixes that are not on the *Paradigm* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Axial*, *Axial Xtreme*, *Assert*, *Traxos*, *Sierra 2.0* and *Varro*

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 1 hour of application may reduce the activity of *Paradigm*.
- **Re-Entry Interval:** DO NOT enter treated fields for 12 hours.
- **Grazing Restrictions:** DO NOT graze livestock within 7 days of application. DO NOT cut for silage or hay within 21 days of application.
- **Pre-harvest Interval:** DO NOT harvest crops within 60 days of application.
- **Re-cropping Interval:** Barley (spring), canola (including oilseed quality *B. juncea*), dry bean, field pea, flax, mustard (oriental, brown and yellow), oats, soybeans, sunflower, wheat (spring) can be seeded a minimum of 10 months after treatment or fields can be summerfallowed. Lentils may be grown 22 months after application.
- **Aerial Application:** DO NOT apply by air.

- **Storage:** Store in a cool, dry place in original container.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only	1	1	1

See page 36 for an explanation of the different habitats.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13. Check the cleanout requirements of pesticides mixed with this product. Additional cleanout measures may need to be integrated into those provided here.

Hazard Rating:

 Caution – Potential skin sensitizer.

For an explanation of the symbols used here see pages 7 and 8.

Permit WG

**Herbicide Group
2 - halosulfuron**
(Refer to page 45)

Company:

Gowan Canada (PCP#31210)

Formulation:

72.6 % halosulfuron methyl ester formulated as water dispersible granules.

Container size: 567 g

Crops and Staging:

Pre-emergent surface[†]:

- **Dry beans***: Apply 14.2 to 19 g per acre after seeding but prior to soil cracking.

Post-emergent foliar[†]:

- **Dry beans***: Apply 14.2 to 28.3 g per acre at the 2 to 4 trifoliolate leaves, prior to flowering. Maximum of one application per year.
- **Corn (sweet, popcorn)**: Apply 19 to 28.3 g per acre up to the 10 to 12 leaf stage. A second application of 19 g per acre may be applied with drop nozzles if needed, avoiding contact with the whorl. Maximum of two applications per year.
- **Corn (Field)**: Apply 19 to 37.6 g per acre up to the 10 to 12 leaf stage. A second application of up to 37.6 g per acre may be applied with drop nozzles if needed. Maximum of two applications per year.
- **Proso (Crown) millet**: Apply 14 to 19 g per acre from the 2 leaf up to prior to head emergence. Maximum one application per year.

* **Note: not all varieties have been tested for tolerance. For untested varieties apply to a small area to determine tolerance prior to use on a large scale.**

[†] **Applications to emerged weeds require the addition of a non-ionic surfactant with 80% or greater active ingredient content at the lowest labelled rate for the surfactant regardless of crop stage.**

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

Weeds controlled with pre-emergent soil applications of 14 to 19 g per acre unless otherwise indicated:

- Annual sunflower
- Canada fleabane
- Chickweed (common)
- Cocklebur
- Common groundsel
- Corn spurry
- Creeping yellow cress
- Flower-of-an-hour
- Fringed (Northern) willowherb
- Hairy galinsoga
- Jimsonweed
- Lamb's-quarters
- Plantain, broadleaf
- Pigweed (redroot, smooth)
- Prickly lettuce
- Purslane*
- Ragweed (common)
- Round-leaved mallow
- Shepherd's-purse
- Smartweed (Lady's-thumb, Pennsylvania)
- Spiny amaranth
- Stinking mayweed
- Wild mustard
- Wild radish
- Velvetleaf
- Volunteer canola (except Clearfield varieties)
- Yellow nutsedge**

* Suppression only

** Requires a rate of 28.3 to 37.6 g per acre rate for suppression based on the maximum rate for each crop.

Weeds controlled from the 3 leaf stage (unless otherwise indicated) to the maximum weed height indicated:

Weed	Maximum Weed Height (cm)	
	14 to 19 g per acre	28.3 to 37.6 g per acre
Annual sunflower	31	38
Bindweed (Hedge)*	5	10
Cocklebur	23	36
Common milkweed*	13	31
Corn spurry	5	10
Creeping yellowcress	5	10
Fleabane (Philadelphia)	8	8
Flower-of-an-hour	8	31
Hairy galinsoga	5	10
Horsetail*	5	10
Pigweed (redroot, smooth)	8	15
Ragweed (common)	23	31
Ragweed (giant)	8	15
Shepherd's-purse	5	10
Smartweed (Lady's-thumb, Pennsylvania)	5	10
Spiny amaranth	8	15
Wild mustard	8	15
Wild radish	8	15
Velvetleaf	23	31
Volunteer canola (except Clearfield varieties)	8	-
Yellow nutsedge	8 to 15	8 to 31

* Suppression only.

Application Information:

- **Water Volume:** Minimum 40 to 55 L per acre. Use the higher volume when there is a heavy crop canopy or weeds are at an advanced stage.
- **Nozzles and Pressure:** Use 40 psi (275 kPa) if applying without drift reduction nozzles. Drift reduction nozzles may require higher pressures for proper performance. Select the nozzle and pressure combination that produces of *ASABE medium* droplets while maintaining good coverage of foliage.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
halosulfuron	PRE, POST	ALS Amino Acid synthesis Inhibitor	Toward growth areas (Symplast)	Broadleaf	2

Effects of Growing Conditions:

Moisture is necessary to activate the herbicide in soil for effective weed control. Dry weather following applications may reduce effectiveness. Extremes in environmental conditions such as temperature, moisture, soil conditions, and cultural practices may affect activity.

Optimum activity is experienced between 12 to 24° C when weeds are actively growing. Weeds may not be actively growing and as a result reduced activity will occur when temperatures are below 8° C or above 27° C.

Tank Mixes:

Herbicides:

- **In dry beans:**
 - *Eptam Liquid EC* (1.72 to 2.12 L per acre) as pre-plant incorporated tank mix – see *Eptam Liquid EC* page for incorporation instructions.
- **In field corn only:**
 - 2,4-D (label rates)
 - *Accent* (label rates)
 - *AAtrex* (label rates)
 - Dicamba (label rates)
 - Glyphosate in glyphosate tolerant corn only (label rates)

Insecticides: None registered.

NOTE: The application of foliar organophosphate insecticides to treated crops can increase the risk of crop injury.

Fungicides: None registered.

Fertilizers: UAN or high grade ammonium sulfate (21-0-0) may be used if a tank mix partner requires it as an additive. DO NOT use liquid fertilizer as a spray carrier.

Note: The above mixes are those listed on the *Permit WG* label only. Gowan Canada supports the use of the following mixes that are not on the label:

- **Herbicide:** glyphosate (Dry Bean prior to ground crack).

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Activity of foliar applications may be reduced if rainfall or irrigation occurs within 4 hours. Pre-emergent surface applications will benefit from some rainfall but excessive rainfall (greater than 1 inch or 2.5 cm) shortly after application may result in injury, especially when seeding is shallow.
- **Re-entry Interval:** DO NOT enter treated fields for 12 hours.
- **Grazing Restrictions:** DO NOT graze or cut corn for livestock greenfeed within 30 days of the last application. Allow 30 days for sweet corn and 65 days for popcorn or grain corn from the last application to foliage and the harvesting of silage. Proso (crown) millet may be grazed immediately after treatment. DO NOT cut proso (crown) millet for hay within 37 days of application or feed straw within 50 days of application.
- **Pre-harvest Interval:** DO NOT harvest dry beans within 30 days of post-emergent applications. DO NOT harvest proso (crown) millet within 50 days of application. There is no pre-harvest interval indicated for grain corn.
- **Re-cropping Interval:** Delay seeding the following crops for the interval indicated:
 - **Dry common beans** – no delay required
 - **Field corn** - 1 month
 - **Cereals (wheat barley and oats)** - 2 months
 - **Potatoes, peas forage legumes and soybeans** - 1 year
 - **Canola and sunflowers** - 2 years
 - Refer to label for all other crops including vegetable field crops.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a cool, dry place in original container.

• **Buffer Zones:**

Crop	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Proso (Crown) millet	10	4	15
Dry beans	10	5	20
Corn (sweet, pop)	15	5	30
Corn (field)	15	10	40

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

- Spray when winds are under 16 km/hr, but not dead calm.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:



Caution – Poison



Caution – Eye Irritant

For an explanation of the symbols used here see pages 7 and 8.

Pinnacle SG Toss-N-Go

Herbicide Group
2- thifensulfuron
(Refer to page 45)

Company:

FMC Corporation (PCP#30741)

Formulation:

50% thifensulfuron methyl as a water soluble granule.

- Container size - 8 x 12 g water soluble pouches

Crops and Staging:

Soybean: First fully expanded trifoliolate leaf to before soybeans have initiated flowering.

Weeds, Rates and Staging:

Apply up to weeds 4 inches (10 cm) tall or wide.

Pinnacle SG Toss-N-Go at 3.3 g per acre will control:

- Lady's-thumb
- Redroot pigweed
- Wild Mustard

Pinnacle SG Toss-N-Go at 4.8 g per acre (one container treats 28.7 to 19.8 acres) will control the weeds above plus:

- Lamb's-quarters
- Velvetleaf *

* The addition of 28-0-0 liquid fertilizer at 4 L per 100 L of spray solution or 2.4 kg of 46-0-0 dry urea fertilizer may improve control of velvetleaf. Refer to the product label for complete mixing instructions.

Pinnacle SG Toss-N-Go requires the addition of a non-ionic surfactant such as *Agral 90*, *Agsurf II*, or *Citowett* at 1 L per 1000 L of spray solution. Oil surfactant blends such as *Assist* at 0.4 to 0.8 L per acre, or *Sure-Mix* at 0.5 L per 100 L of spray solution may be used as adjuvants (check label for use rates).

A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:** Minimum of 45 L per acre.
- **Nozzles and Pressure:** Maximum 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of *ASABE medium* droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
thifensulfuron	POST	ALS Amino Acid synthesis Inhibitor	Toward growth areas (Symplast)	Broadleaf	2

Effects of Growing Conditions:

Pinnacle SG Toss-N-Go applied to crops that have been under stress before application may result in crop injury. Stress conditions within 3 days after application may also result in crop injury.

Weeds under stress conditions at the time of application may not be adequately controlled.

Stress conditions are severe weather conditions, frost, low fertility, drought, water-saturated soils, and disease or insect damage.

Injury symptoms can be crop discoloration (yellowing, purpling or reddening of leaf veins), or stunting.

Tank Mixes:

Herbicides:

- *Assure II* (0.2 L per acre) plus *Sure-Mix** adjuvant.
- *Basagran* (0.71 or 0.91 L per acre) plus *Assist* adjuvant*.
- *Basagran Forté* (0.71 or 0.91 L per acre)*.
- *Assure II* (0.25 L per acre) plus *Basagran Forté* (0.71 or 0.91 L per acre) plus *Sure-Mix* adjuvant*.

* Refer to appropriate labels for *Pinnacle SG Toss-N-Go* and adjuvant rates of application.

Fungicides: None registered.

Insecticides: None registered.

Note: The above mixes are those listed on the *Pinnacle SG Toss-N-Go* label only.

FMC also supports the use of the following mixes that are not on the label:

- **Herbicide:** glyphosate (glyphosate tolerant soybean only).

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Up to 25 mm of rain beginning 1 hour or more after spraying will not reduce the effectiveness of *Pinnacle SG Toss-N-Go*.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Pre-harvest Interval:** Leave 60 days from application to harvest.
- **Re-cropping Interval:** DO NOT plant any crop other than soybean, tomatoes, Clearfield canola, wheat or barley for 30 days after application.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in closed original container in a dry area away from food or feed.
- **Buffer Zones:**
 - Hand-held or backpack sprayers, inter-row hooded sprayers and spot treatments are exempt from buffer zone requirements.

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	0	15

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Pinnacle SG Toss-N-Go can cause severe injury to sensitive crops at very low concentrations. Sprayers used to spray *Pinnacle SG Toss-N-Go* should be flushed out immediately after use. Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:

 Warning: Contains the allergen milk.

For an explanation of the symbols used here see pages 7 and 8.

Pixxaro

Herbicide Group
4 - halauxifen,
fluroxypyr & MCPA
(Refer to page 45)

Company:

Corteva Agriscience

Formulation:

The *Pixxaro* package contains 2 components:

***Pixxaro A* (PCP#31303):** 16.2 g/L halauxifen and 250 g/L fluroxypyr present as ester and formulated as an emulsifiable concentrate.

- Container size – Case: 1 x 4.9 L; Pallet: 4 x 9.8 L

***Pixxaro B/Plus M Ester 600* (PCP#29622):** 600 g/L MCPA ester formulated as an emulsifiable concentrate.

- Container size – Case: 1 x 9.45 L; Pallet: 75.1 L

Crops and Staging:

Wheat (spring, durum, winter) and barley: 3 leaf stage to just prior to emergence of the flag leaf.

Weeds and Staging:

Apply to actively growing weeds up to 10 cm high or wide unless otherwise specified:

• Weeds Controlled:

- | | | |
|---|--|---------------------------------------|
| ◦ American dragonhead [†]
(up to bud stage) | ◦ Hemp-nettle ^{††} | ◦ Shepherd's-purse (up to 20 cm) |
| ◦ Burdock (prior to 4 leaf) | ◦ Henbit [†] (up to bud stage) | ◦ Smartweed (green, lady's-thumb)* |
| ◦ Canada thistle (up to 30 cm)* | ◦ Kochia [†] | ◦ Sow-thistle, annual* (up to 4 leaf) |
| ◦ Chickweed ^{††} | ◦ Lamb's-quarters ^{††} | ◦ Stinkweed |
| ◦ Cleavers (1 to 9 whorl) | ◦ Marshelder (false ragweed) | ◦ Stork's-bill ^{††} |
| ◦ Cocklebur | ◦ Mustard (ball, wild) | ◦ Velvetleaf (up to 5 leaf stage) |
| ◦ Cow Cockle (up to 8 leaf or 15 cm) | ◦ Nightshade
(black, hairy and cutleaf) | ◦ Vetch |
| ◦ Dandelion (rosettes up to 30 cm
in diameter)* | ◦ Plantain, common | ◦ Volunteer alfalfa (up to 25 cm) |
| ◦ Field horsetail* | ◦ Prickly lettuce | ◦ Volunteer canola ^{††} |
| ◦ Fleabane, Canada [†] | ◦ Ragweed (common, giant) | ◦ Volunteer flax [†] |
| ◦ Flixweed | ◦ Redroot pigweed ^{††} | ◦ Wild buckwheat ^{††} |
| | ◦ Round-leaved mallow (up to 6 leaf) | ◦ Wild radish |
| | | ◦ Wild sunflower (annual) |

* **Suppression only.**

[†] **Up to 15 cm in height.**

^{††} **1 to 8 leaf stage.**

Rates:

Pixxaro A: 125 mL per acre.

Pixxaro B: 236 to 283* mL per acre. Use the 283 mL per acre* rates for improved control of heavy infestations or larger redroot pigweed or smartweeds.

(One case treats 40 acres, bulk unit treats 320 acres)

* **Note: Additional MCPA ester must be purchased separately above what is indicated in "Container Size:" above to achieve this higher rate.**

Application Information:

- **Water Volume:**
 - **Ground:** Minimum 20 to 81 L per acre.
 - **Aerial:** Minimum 12 L per acre.
- **Nozzles and Pressure:** Use 30 to 40 psi (200 to 275 kPa) if applying without drift reduction nozzles. Drift reduction nozzles may require higher pressures for proper performance. Select the nozzle and pressure combination that produces of **ASABE coarse** droplets while maintaining good coverage of foliage.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
halauxifen	Early POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4
fluroxypyr	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4
MCPA	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

Weeds and crops must be actively growing. Weeds hardened off by cold weather or drought stress may not be adequately controlled or suppressed and re-growth may occur.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

- **Spring wheat (including durum) and barley:**
 - Fenoxaprop 120 EC (0.31 L per acre)
 - *Liquid Achieve*
 - *Puma Advance* (0.41 L per acre)
- **Spring Wheat and Barley:**
 - *Axial*
- **Spring Wheat (including durum):**
 - *Simplicity OD/Simplicity GoDRI*
 - Clodinafop 240 EC (93 mL per acre plus adjuvant)
 - *Everest 2.0*
 - *Horizon NG* (376 mL per acre)
 - *Traxos*

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Pixxaro* label only. Corteva Agriscience also supports the following mixes that are not on the *Pixxaro* label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:** *Assert*, *Varro*

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 1 hour may reduce control.
- **Re-Entry Interval:** DO NOT enter treated fields for 12 hours.
- **Grazing Restrictions:** DO NOT graze livestock within 7 days of application. DO NOT cut for silage or hay within 21 days of application.
- **Pre-harvest Interval:** DO NOT harvest crops within 60 days of application.
- **Re-cropping Interval:** Winter wheat and fall rye may be seeded 3 months after application. Alfalfa, barley, canola, corn, dry bean (*Phaseolus vulgaris* species including pinto, kidney and white types), flax, field peas, mustard (oriental, brown and yellow and oilseed quality (*B. juncea* varieties), oats, soybean, spring wheat, sunflower and timothy may be seeded the first spring following application. Lentils may be grown the second season after application.

- **Aerial Application:** May be applied by air.
- **Storage:** Store over winter in a heated, dry place in original container.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Field sprayer	1	1	2
Aerial (Fixed wing)	5	1	80
Aerial (Helicopter)	5	1	65

See page 36 for an explanation of the different habitats.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13. Check the cleanout requirements of pesticides mixed with this product. Additional cleanout measures may need to be integrated into those provided here.

Hazard Rating:

Pixxaro A:

 Warning – Skin and Eye Irritant.

 Caution – Potential skin sensitizer.

Pixxaro B:

 Warning – Poison

For an explanation of the symbols used here see pages 7 and 8.

Poast Ultra

Herbicide Group
1 - sethoxydim
(Refer to page 45)

Company:

BASF Canada (PCP#24835)

Formulation:

450 g/L sethoxydim formulated as an emulsifiable concentrate.

- Container size - 2 x 7.7 L

Crops, Rates and Staging:

Crops are tolerant at all growth stages. However, the Preharvest interval outlined in the "Restrictions:" section must be followed to avoid unacceptable residues of sethoxydim in harvested crops.

To a maximum of 0.13 L per acre: Borage

To a maximum rate of 0.19 L per acre: Chickpea

To a maximum rate of 0.23 L per acre: Tame buckwheat

To a maximum rate of 0.26 L per acre:

- Alsike clover**
- Caraway
- Cicer milkvetch**
- Coriander
- Dill
- Safflower
- Sainfoin**
- Solin (low linolenic acid flax)
- Sweet clover**

To a maximum rate of 0.45 L per acre:

- Alfalfa
- Alsike clover*
- Canola
- Chickling vetch
- Cicer milkvetch*
- Creeping red fescue (for seed only)
- Dry beans (kidney, pinto, white)
- Dry field peas
- Faba beans
- Fenugreek
- Flax (NOT including low linolenic acid flax)
- Lentil
- Lupin
- Mustard
- Potatoes
- Sainfoin*
- Shelterbelts
- Soybeans
- Sunflower
- Sweet clover*

* Established stands

** Seedling stands

Weeds, Rates and Staging:

Optimum yield response occurs when weeds are controlled early.

Weeds and Stages	Staging	Rate (L per acre)	Acres Treated per 7.7 L Container
Green or yellow foxtail, barnyard grass, volunteer corn, Persian darnel, proso millet, witchgrass, large crabgrass	1 to 6 leaf	0.13	60
Wild oats, volunteer wheat, oats and barley	1 to 6 leaf stage except for low rate (See footnote*)	0.13* or 0.19	60 or 40
Quackgrass suppression	1 to 3 leaf stage	0.19	40
Quackgrass (season long control)	1 to 3 leaf stage	0.45	17
Foxtail barley suppression	prior to tillering	0.45	17

* Use the low rate in canola, flax and peas only under the following conditions:

- when wild oat, volunteer wheat and volunteer barley are from 1 to 4 leaves (best results prior to tillering)
- under ideal growing conditions (adequate moisture, good fertility and moderate temperatures (15 to 28°C). DO NOT apply under stress conditions.
- with water volumes between 20 to 40 L per acre.

Merge Adjuvant (sold separately): Must always be used with *Poast Ultra*. When *Poast Ultra* is applied alone use *Merge* at 0.5 L to 1.0 L per 100 L of total spray solution. When applying to quackgrass and/or foxtail barley use *Merge* at 1.0 L per 100 L of spray solution. See the tank mix section for *Merge* rates for tank mixing. *Merge* should be added at rates of 0.10 to 0.20 L per acre when applied by air.

Application Information:

- **Water Volume:**
 - **Ground:** 20 to 40 L per acre - 40 L to 81 L per acre if crop or weed growth is dense, and when spraying quackgrass.
 - **Aerial:** 10 to 20 L per acre
- **Nozzles and Pressure:** Use 40 to 45 psi (275 to 300 kPa) with conventional 80° or 110° flat fan nozzles tilted forward at an angle of 45°. Low drift nozzles may require higher pressures for proper performance. Contact the herbicide manufacturer regarding the suitability of low drift nozzles for use with this product. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE medium* droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
sethoxydim	POST (foliar)	ACCCase Lipid Synthesis Inhibitor	Toward areas of growth (Symplast)	Grass only	1

Effects of Growing Conditions:

Most effective control is achieved when grasses are actively growing. Weeds stressed by drought, flooding, hot or prolonged cool temperatures (<15°C) and poor fertility are more difficult to control. Use the higher of the recommended rates for grasses stressed for less than 20 days. DO NOT apply to grasses stressed more than 20 days because of lack of moisture. Control may be reduced if temperatures are below 15°C. Subsequent tillering may occur under stress conditions or if fertility is low.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides: The following tank mixes can be applied with 0.13 to 0.19 L per acre of *Poast Ultra*.

Merge Adjuvant (sold separately): Use at 0.75 to 1.0 L of *Merge* per 100 L of mixed spray solution for most mixes except when mixing with *Pursuit* use 1.0 L per 100 L of solution.

- **In Flax:**
 - *Buctril M* (including Solin).
 - *Logic M* (including Solin).
 - *Lontrel 360* (0.23 to 0.34 L per acre).
 - *Lontrel 360* (0.23 to 0.34 L per acre) + MCPA Ester (0.28 to 0.38 L per acre - 600 g/L formulations).
 - MCPA Ester (up to 0.38 L per acre - 600 g/L formulations)
 - The above tank mixes may reduce grass control, especially under adverse weather conditions.
- **In Canola:**
 - *Lontrel 360*
 - *Muster*
 - *Lontrel 360* (0.17 L per acre) + *Muster* (8 g per acre) + *Merge* (0.4 L per acre)
- **In Liberty Link Canola only:**
 - *Poast Ultra* (0.09 L per acre) + *Liberty* (1.08 L per acre)
- **In Field Pea:**
 - ***Poast Ultra* (0.19 L per acre) plus *Merge* (0.4 L per acre) may be tank mixed with:**
 - *Pursuit* (40mL per acre) to control:

◦ Chickweed	◦ Smartweed	◦ Wild buckwheat
◦ Cleavers	◦ Stinkweed	(light infestations only)
◦ Hemp-nettle (peas only)	◦ Volunteer canola (non-	◦ Wild mustard
◦ Redroot pigweed	CLEARFIELD varieties)	
 - The company does not provide guidelines for weed densities under light infestations. When in doubt, use the higher rate below or contact the manufacturer.
 - *Pursuit* (85 mL per acre) for all weeds on the *Pursuit* label.

Check label directions for mixing order and additional timing restrictions for broadleaf partners.

Allow 4 days between application of *Poast Ultra* and application of herbicides other than those registered for tank mixing. Allow 5 days between application of *Sencor* and *Poast Ultra*. Allow 14 days for regrowth when applied in sequence with a grass control herbicide.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Poast Ultra* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 1 hour of application may reduce control.
- **Re-entry Interval:** DO NOT enter treated field for 12 hours.
- **Grazing Restrictions:** DO NOT graze the treated crop or cut for feed prior to crop maturity. Forage legumes may be cut after the specified
- **Preharvest interval:**

Preharvest Interval (Days)	Crops
30	Forage legumes (excluding alfalfa)
60	Dry peas, fenugreek, flax
65	Lentil, chickpea
70	Canola, chickling vetch, alfalfa, borage
76	Mustard
80	Potato, dry bean, soybean, faba bean, lupin

Preharvest Interval (Days)	Crops
85	Buckwheat
86	Solin
90	Safflower
105	Sunflower

- **Re-cropping Interval:** DO NOT plant cereals or grass within 14 days of application.
- **Aerial Application:** May be applied by air.
- **Storage:** May be frozen.
- **Buffer Zones:**

Application method	Crops	Buffer Zones (metres [†]) Required for the Protection of:		
		Aquatic Habitats of Depths		Terrestrial habitat
		Less than 1 m	Greater than 1 m	
Ground*	All	1	0	2
Fixed wing airplane	Food or feed crops	1	0	70
	Shelter-belts	5	0	150
Helicopter	Food or feed crops	1	0	60
	Shelter-belts	1	0	85

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance from downwind edge of spray boom and non-target area.

Sprayer Cleaning:

Refer to 'Method B' in the general section on sprayer cleaning on pages 12 and 13. Empty and clean spray tank using this method if an oil film accumulates.

Hazard Rating:



Caution – Poison



Caution – Eye and Skin Irritant

For an explanation of the symbols used here see pages 7 and 8.

Predicade

This product is a prepackaged tank mix of Predicade Broadleaf (equivalent to Barricade SG page 114), Predicade Grass (equivalent to Varro page 413), Perimeter II (see fluroxypyr page 217), and NuFarm MCPA Ester 600 (page 284). Information listed is restricted to Crop, Weeds, Rates and Tank mixes. For other detailed restrictions and other general information on the component products see the product pages listed above.

Herbicide Group
**2 - thifensulfuron/
tribenuron, thiencazone**
4 - fluroxypyr, MCPA
(Refer to page 45)

Company:

FMC Corporation

Formulation:

The *Predicade* package contains the following components:

Predicade Broadleaf (PCP#31713): 25% thifensulfuron methyl and 25% tribenuron methyl formulated as a soluble granule.

- Container size - 486 g

Predicade Grass (PCP#31735): 10 g/L thien carbazole-methyl formulated as a suspension concentrate.

- Container size – 8 L

Perimeter II (PCP#30094): 333 g ae/L fluroxypyr formulated as an emulsifiable concentrate.

- Container size – 3.4 L

Nufarm MCPA Ester 600 (PCP#27803): 600 g ae/L MCPA ester formulated as an emulsifiable concentrate.

- Container size – 7.6 L

Crops and Staging:

Spring wheat (including durum):

Apply from the fully emerged 3 leaf to 6 leaf stage, with a maximum of three tillers, and before the first node can be felt in the stem. DO NOT apply beyond 35 days of emergence.

Winter wheat:

Spring application from the 3 tiller stage and before the first node can be felt in the stem. DO NOT apply after the presence of the first node as crop injury may occur.

Rates

Predicade Broadleaf: 12 g per acre

Predicade Grass: 200 mL per acre

Perimeter II: 85 mL per acre

MCPA Ester 600: 190 mL per acre

(One case treats 40 acres)

Weeds and Staging:

Weeds controlled by *Barricade II* and *Varro* plus:

- Dandelion (spring and fall rosettes, up to 15 cm in diameter)
- Volunteer canola (all varieties) – 2 to 4 leaf
- White cockle
- Scentless chamomile

See component products for more information on restrictions application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

Prestige Brands (this referring text to be removed in the 2021 edition)

See Clopyralid/MCPA + fluroxypyr on page 156.

Primextra II Magnum

Herbicide Group
15 - metolachlor

5 - atrazine
(Refer to page 45)

Company:

Syngenta Canada (PCP#25730)

Formulation:

400 g/L of s-metolachlor and 320 g/L of atrazine formulated as a liquid.

- Container size – 2 x 10 L

Crops and Staging:

Pre-plant incorporated or pre-emergent in corn. Pre-emergent applications of *Primextra II Magnum* require at least 0.5 inches of water (1.25 cm) within 10 days of application for proper activity.

Weeds and Staging:

Apply prior to the emergence of weeds. Weeds that have emerged prior to application will not be controlled.

- Barnyard grass
- Buckwheat
- Foxtail (green, yellow)
- Lamb's-quarters
- Nightshade (American, Eastern black)
- Pigweed (prostrate, redroot)
- Purslane
- Ragweed
- Smartweed (lady's-thumb)
- Wild mustard
- Witch grass
- Yellow nutsedge*

* Herbicide must be incorporated for best control.

Rates:

Weed Populations	Rate (L per acre)	Acres Treated per 14 L Container
Light infestations	1.2	11.7
Medium infestations	1.4	10
Heavy infestations	1.6	8.8

DO NOT apply *Primextra II Magnum* to:

- soils with less than 1% organic matter content
- soils with more than 10% organic matter content.

It is recommended that any products containing atrazine not be used in areas treated with this product during the previous season.

Application Information:

- **Water Volume:** 61 L per acre
- **Pressure:** 30 to 45 psi (200 to 300 kPa).
- **Nozzles:** Flat fan
- **Screens:** Use 50-mesh nozzle and main plumbing screens.
- **Incorporation:**
 - Incorporate using S-tine or C-tine cultivators or tandem disk. DO NOT incorporate deeper than 4 inches (10 cm).
 - To ensure that the product remains in the top 2 inches (5 cm) of soil, apply to a firm seedbed free of large clods or lumps. If using tandem disks, set disks to work the soil at a depth of 4 inches (10 cm) and operate at a speed of 6 km/hr (4 mph). If using an S-tine cultivator, set the implement to work the soil to a depth of 4 inches (10 cm) and operate at a speed of 10 km/hr (6 mph).

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
atrazine	PPI, PRE (surface) with residual soil activity	PSII Inhibitor/ Membrane disruptor	Little foliar; upward soil applied (Apoplast)	Primarily broadleaf	5
metolachlor	PPI, PRE (surface) with residual soil activity	Long-chain Fatty Acid Inhibitor	Little movement (Symplast)	Broadleaf & grass	15

Effects of Growing Conditions:

Extended periods of dry soil conditions may result in reduced weed control. Moderate rainfall (0.5 inch) after application will enhance activity. Heavy rainfall following application of *Primextra II Magnum* may dilute the metolachlor deeper than 2 inches (5 cm) and result in reduced weed control, particularly on light textured soils.

Tank Mixes:

Herbicides: None registered.

Fertilizers: May be tank mixed with liquid fertilizer for pre-plant incorporated applications. Conduct a compatibility test by performing a jar test prior to mixing the products in the tank. May be impregnated onto dry bulk fertilizers (except nitrate or superphosphate fertilizers or limestone).

Note: The above mixes are those listed on the *Primextra* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Moderate rainfall shortly after application will enhance activity. Heavy rainfall reduces weed control by leaching the chemical out of the top few centimeters of soil. Inadequate rainfall after application (within 10 days) will cause reduced weed control.
- **Re-entry Interval:** DO NOT re-enter treatment area within 12 hours of application.
- **Grazing Restrictions:** DO NOT graze or cut corn for feed before ear emergence.
- **Re-cropping Interval:** This product contains atrazine. All crops except corn and triazine-tolerant canola may be affected the year following the use of atrazine. Other more sensitive crops may be affected two or more growing seasons after application.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a dry place.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:	
	Aquatic habitat	Terrestrial habitat
Ground only*	29	10

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

- DO NOT mix or load this product within 30 metres of any sensitive aquatic habitats

Sprayer Cleaning:

No specific cleaning procedures are indicated on the label. Based on products with similar chemistry, 'Method B' found in the general sprayer cleaning section on pages 12 and 13 or a commercial spray sprayer cleaning product, may provide adequate cleaning. Contact the manufacturer for more information.

Hazard Ratings



Caution Poison



Caution - Eye Irritant

Potential Skin Sensitizer

For an explanation of the symbols used here see pages 7 and 8.

Prism SG

Herbicide Group
2 - rimsulfuron
(Refer to page 45)

Company:

Corteva Agriscience (PCP#30057)

Formulation:

25% rimsulfuron formulated as a water soluble granule.

- Container size - 480 g

Crops and Staging:

Irrigated potato* prior to flower initiation.

Potato tolerance differs by variety. Limit first use to a small area of each variety prior to widespread adoption in the field. Delay cultivation for 7 to 10 days after application.

* **NOTE - Since applications to irrigated potato in western Canada has been registered under the User Requested Minor Use program, the manufacturer assumes no responsibility for herbicide performance. Application to irrigated potato in western Canada is at the risk of the user.**

Weeds, Rates and Staging:

Note: Maximum of 6 g per acre of the active ingredient rimsulfuron per acre (24 g Prism SG per acre) PER YEAR.

24 g per acre (one package treats 20 acres) controls the following weeds at the stage indicated:

Weeds	Weed Stage
Barnyard grass, Foxtail (green, yellow), Witch grass	1 to 6 leaf, maximum 2 tillers
Quackgrass	3 to 6 leaf (less than 10 inches or 25cm leaf extended)
Lamb's-quarters*, Redroot pigweed	4 to 6 leaf (less than 4 inches or 10 cm tall or across)

* Suppression

Add a recommended non-ionic surfactant such as *Citowett Plus*, *Ag surf II*, or *Agral 90* at 0.2 L per 100 L spray solution.

Refer to the product label for complete mixing instructions for this product and its mixes. A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:** Minimum 40 L per acre.
- **Nozzles and Pressure:** 25 to 40 psi (175 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of *ASABE medium* droplets.
- **Screens:** Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
rimsulfuron	POST (foliar)	ALS Amino Acid Inhibitor	Toward areas of growth (Symplast)	Broadleaf & grass	2

Effects of Growing Conditions:

Apply when the temperature 24 hours before and after application is between 5°C and 28°C. Temperatures beyond this range increase the potential for crop injury. Rapid fluctuations in temperature will stress the crop (greater than a 20°C difference within 24 to 36 hours). Allow 48 to 72 hours for the crop to acclimatize before spraying if severe temperature fluctuations occur.

Crop injury may result if applications are made when potatoes are stressed by abnormally hot, humid, or cold weather conditions, frost, low fertility, drought, water saturated soil, compacted soil, previous pesticide applications, disease or insect damage. If potatoes have been injured by frost, wait 48 to 72 hours after normal growing conditions have resumed before applying.

Warm, moist conditions after application promote good weed control while cool and/or dry conditions may reduce or delay activity. Weeds hardened off by cold weather or drought stress may not be controlled.

Tank Mixes:

None registered.

Restrictions:

- **Rainfall:** Within 2 to 4 hours may reduce control.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Pre-harvest Interval:** Leave 30 days from application to harvest.
- **Grazing Restrictions:** DO NOT graze the treated crop or cut for hay.
- **Re-cropping Interval:** Field corn may be planted any time after application. Winter wheat may be planted 4 months after application. Barley, canola, chickpeas, clover (red), corn (sweet and seed), dry bean, faba bean, field pea, flax, lentil, oat, potato, soybean, sorghum, spring wheat (including durum) and sunflowers may be planted the year after application. For all other crops, a field bioassay is recommended before planting.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** May be frozen.

- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	5

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

- DO NOT apply in areas where surface water from the treated area can run off to adjacent cropland, streams, irrigation water or wells.

Sprayer Cleaning:

Refer to 'Method A' found in the general sprayer cleaning section on pages 12 and 13. Check the label or contact the manufacturer for more specific sprayer cleaning information.

Hazard Rating:

 Warning – Eye Irritant

 Warning – Contains the allergen sodium sulfite.

For an explanation of the symbols used here see pages 7 and 8.

Pulsar

Herbicide Group
4 - dicamba & fluroxypyr
(Refer to page 45)

Company:

Syngenta Canada (PCP#29450)

Formulation:

86.9 g/L dicamba and 113.3 g/L fluroxypyr formulated as an emulsifiable concentrate.

- Container size - 2 x 9.82 L, 78.6 L

Crops and Staging:

Barley and spring wheat (including durum): 2 to 5 leaf stage.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

Unless otherwise indicated apply when weeds are at the 2 to 3 leaf stage and rosettes are less than 2 inches (5 cm) across.

At 246 mL per acre (80 acre per case) Pulsar controls:

- Cleavers
- Kochia (up to 9-leaf)
- Wild buckwheat*

At 371 mL per acre (53 acre per case) Pulsar controls the weeds above plus:

- Lamb's-quarters*
- Redroot pigweed*
- Russian thistle
- Stork's-bill*
- Volunteer flax
- Wild buckwheat (up to 9-leaf)

* **Suppression only**

ONE APPLICATION per year is permitted.

Application Information:

- **Water Volume:** Minimum 44.5 L per acre.
- **Nozzles and Pressure:** Use a maximum pressure between 40 and 45 PSI (275 to 310 kPa) for conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE medium* droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
dicamba, fluroxypyr	POST (foliar)	Synthetic Auxin	Moves throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

DO NOT apply to crops that are stressed (frost, low fertility, drought or flooding, disease or insect damage) as crop injury or reduced weed control may result.

Tank Mixes:

Herbicides:

- **Barley, Spring wheat, and durum only:**
 - MCPA LV600 ester (0.23 L/acre)
- **Spring wheat, and durum:**
 - *Horizon NG* (376 mL per acre)
 - *Horizon NG* (376 mL per acre) + MCPA LV600 ester (0.23 L per acre)
 - *Traxos* (label rate)
 - *Traxos* (label rate) + MCPA Ester (rates above)

Fertilizers: None registered

Note: The above mixes are those listed on the *Pulsar* label only.

Syngenta also supports the following mixes that are not on the *Pulsar* label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:** 2,4-D Ester, 2,4-D Ester + *Sierra 2.0*, *Express SG*, *Refine SG*, *Sierra 2.0*.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 1 hour may reduce control.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Pre-harvest Interval:** Leave 60 days between treatment and harvest.
- **Grazing Restrictions:** Treated crops may be grazed, or cut for hay or silage after 7 days when used alone, or a minimum of 12 days when mixed or longer if the intervals are longer for the tank mix partner.
- **Re-cropping Interval:** Wheat, barley, oats, rye, forage grasses, flax, canola, mustard, lentils and peas may be grown the following season. There are no re-cropping restrictions the second year after application.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** May be frozen. If frozen, bring to room temperature and agitate before use. This product is combustible. DO NOT store near heat or open flame.
- **Buffer Zones:**
 - Handheld or backpack applications do not require a buffer.

Application method	Buffer Zones (metres [†]) Required for the Protection of:	
	Aquatic habitat	Terrestrial habitat
Ground only*	15	15

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

- Legumes are particularly sensitive to *Pulsar*.

Sprayer Cleaning:

Refer to 'Method B' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:

 Danger – Poison

 Warning – Eye Irritant

 Caution – Skin Irritant

For an explanation of the symbols used here see pages 7 and 8.

Quinclorac

Herbicide Group
4 - quinclorac (broadleaves)
26 - quinclorac (grasses)
(Refer to page 45)

Company:

BASF Canada (*Facet L*)

Manufactured by Productierra for sale by Great Northern Growers (*Clever*)

Manufactured by Productierra for sale by UAP (*Ingenious*)

Univar Canada Ltd (*MasterLine Quinclorac*)

Formulation:

Clever (PCP#31365); *Ingenious* (PCP#32213); *MasterLine Quinclorac* (PCP#31753): 75% percent quinclorac formulated as a water dispersible granule (WDG).

- Container size - 1 kg bags

Facet L (PCP#31539): 180 g/L quinclorac formulated as a solution.

- Container size - 2 x 9.07 L

Crops Rates and Staging:

Merge adjuvant (purchased separately) must be used at 1 L per 100 L of spray solution to control for all products and rates.

Pre-emergent surface:

Facet L at 227 to 280 mL per acre may be mixed with^Δ or without glyphosate and applied prior to the seeding of canola.

^Δ *Merge* not required when mixing with glyphosate.

Post-emergent:

Quinclorac 75% WDG at 55 g per acre (18 acres per case) or *Facet L* at 227 mL per acre may be applied post-emergence to:

- Barley - 1 to 4 leaf (prior to tillering)* (*Facet L* only may be used on barley for human consumption)
- Canola (all varieties) - 2 to 6 leaf

Quinclorac 75% WDG only at 55 g per acre (18 acres per case) acre may be applied post-emergence to:

- Mustard (brown, oriental and oil quality *Brassica juncea*) - 2 to 6 leaf

Quinclorac at 55 to 67 g per acre (18 to 15 acres per case) or *Facet L* at 227 to 280 mL per acre may be applied post-emergence to:

- Canaryseed - 3 to 5 leaf*[†]
- Spring wheat (including durum) - 1 to 5 leaf.

* Not for use on crops for human consumption.

[†] Not for use on crops for livestock consumption.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Note: As of July 3, 2018 Codex Alimentarius adopted an international MRL for quinclorac reducing concerns that canola treated with quinclorac will have market access concerns. However, during this transition year, it may still be prudent to *consult with potential grain buyers to ensure that they will accept canola treated with quinclorac before applying.*

Weeds, Rates and Staging:

Pre-emergent surface:

Facet L applied at 227 mL per acre will control emerged weeds listed below, plus suppression of secondary flushes of cleavers emerging from seed.

Facet L applied at 280 mL/acre will control emerged weeds listed below, plus plus control of secondary flushes of cleavers and green foxtail emerging from seed.

Post-emergent:

Apply *Quinclorac* at 55 to 67* g per acre (18 to 15 acres per case) or *Facet L* at 227 to 280* mL per acre plus *Merge* adjuvant (purchased separately) at 1 L per 100 L of spray solution to control:

Grasses:

- Barnyard grass (1 to 5 leaves)
- Green foxtail* (1 to 5 leaves, up to 2 tillers)

Broadleaves:

- Cleavers (1 to 3 whorls)
- Volunteer flax (1 to 8 cm)
- Sow-thistle (annual and perennial – 2 to 6 leaf)**

* Use the high rate for heavy infestations of green foxtail only. For clarification of what constitutes a heavy infestation contact the manufacturer.

** Suppression only.

DO NOT apply products that contain quinclorac more than once every two years.

Early treatment of weeds is important to maximize crop yield potential by eliminating early weed competition. Refer to broadleaf tank mix partner for additional timing restrictions.

Application Information:

- **Water Volume:** Minimum 45 L per acre.
- **Nozzles & Pressure:** 40 to 60 psi (275 to 425 kPa) when using standard flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage *ASABE fine* droplets or larger. Flat fan nozzles may be tilted forward 45 degrees to improve coverage on vertical surfaces (i.e. grasses).
- **Screens:** Use 50 mesh or coarser on both nozzle and primary plumbing screens

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
Quinclorac	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4
		Cellulose Synthesis Inhibitor	Throughout the plant (Symplast)	Grass only	26

Effects of Growing Conditions:

DO NOT apply to crop that is under stress from conditions such as frost, hail, flooding, drought or extremes in temperature. Cool weather may delay weed control and if prolonged may result in poor weed control.

Tank Mixes:

Herbicides: When mixing with broadleaf partners a slight reduction in green foxtail control may result. If spraying for green foxtail, use the high rate of Quinclorac. Add *Merge* adjuvant at 1 L per 100 L spray solution for all tank mixes.

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

In spring wheat (including durum) only:

- 2,4-D amine or ester (160 to 212 g ae per acre)
- *Buctril M*
- MCPA amine or ester (0.34 to 0.45 L per acre - 500 g/L formulations)
 - Refer to individual product labels for application details such as staging and varietal restrictions.

In canola only:

- Pre-emergent surface – *Facet L* at 227 to 280 mL per acre may be mixed with glyphosate at 180 to 325 g ae per acre (see glyphosate page for product rates).
- Post-emergent - Quinclorac 75%WDG at 25 g per acre or *Facet L* at 170 to 227 mL per acre may be mixed with:
 - Glyphosate at rates registered in glyphosate tolerant canola varieties only
 - *Ares* in Clearfield canola varieties only (*Facet L* only).
- Post-emergent in *Liberty Link* canola Quinclorac 75%WDG at 25 g per acre or *Facet L* at 113 to 227 mL per acre may be mixed with:
 - *Liberty 150SN* - up to 1.35 L per acre
 - *Liberty 150SN* - up to 1.35 L per acre, plus clethodim (*Centurion* only) at 50 to 75 mL per acre (*Facet L* only).

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: Allow 4 days between the application of Quinclorac and any other chemical not listed as a tank mix.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 6 hours may reduce control.
- **Re-entry Interval:** DO NOT enter treated fields for 12 hours after application.
- **Grazing Restrictions:** DO NOT graze or cut for feed within 77 days of application. DO NOT graze canaryseed or use for consumption by livestock. DO NOT graze or cut treated canola crops for feed. Canola meal may be fed.
- **Pre-harvest Interval:** DO NOT harvest wheat or canaryseed within 77 days of application. DO NOT harvest canola or mustard within 60 days of application. DO NOT harvest spring barley within 80 days of application.
- **Re-cropping Interval:** In case of crop failure, only barley, canola or spring wheat (including durum) may be reseeded the same year. Barley, canola, field peas, oats, sunflowers and wheat may be grown the year after application. Flax and lentils may be grown the second year after application. On low organic matter soils or under dry conditions, flax and lentils should not be grown until the third year after application. DO NOT use Quinclorac on land where potatoes or vegetables are grown.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** May be frozen. Should product freeze, warm to room temperature before using.
- **Buffer Zones:**

Application method	Application Rate		Buffer Zones (metres [†]) Required for the Protection of:	
	75WDG (g/acre)	<i>Facet L</i> (mL/acre)	Aquatic habitat	Terrestrial habitat
Wheat, canaryseed	67	270	10	4
Canola, mustard**, barley, wheat, canaryseed	55	227	10	3

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

** 75% WDG formulations only.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:

Caution – Poison



Caution – Eye and Skin Irritant

For an explanation of the symbols used here see pages 7 and 8.

Quizalofop

Herbicide Group
1 - quizalofop
(Refer to page 45)

Company:

Corteva Agriscience (*Assure II* - PCP#25462)

Gowan Canada (*Yuma GL Liquid EC* - PCP#30100)

Interprovincial Cooperative Ltd. (*Contender* – PCP#32091)

Formulation:

96 g/L quizalofop-P-ethyl formulated as an emulsifiable concentrate.

- Container size:
 - *Assure II* + *Sure-Mix* Adjuvant – 8 L + 8 L, 96 L + 96 L, or 500 L + 500 L
 - *Yuma GL Liquid EC* – 2 x 8 L (*adjuvant purchased separately*)
 - *Contender* + *Contender MSO* Adjuvant – 8 + 8 L

Crops and Staging:

Annual Crops: No leaf stage restrictions, but do not apply beyond Preharvest intervals listed in the table:

Crop	Preharvest Interval (Days)	Max Leaf Stage
Camelina*	64	
Canola	64	
Chickpea	85	
Dry Bean*†	30	
Ethiopian Mustard (<i>Brassica carinata</i>)*	64	
Faba Bean*	30	
Flax, or Solin (low linolenic acid flax)	82	
Hemp (for fibre, seed, or oil)*††	73	6 leaf (up to 25 cm)
Lentil	65	
Oriental mustard (condiment types and oilseed quality <i>Brassica juncea</i>)	64	
Pea (field and processing)	65	
Soybean	80	
Sunflower*††	60	
Yellow and Brown Mustard††	64	

† **NOTE:** While Quizalofop has been registered for use on all dry field bean types not all types have been tested for tolerance. When using Quizalofop on a new dry bean type or variety for the first time evaluate tolerance on a small area first before applying large acreages and check with seed supplier for variety sensitivity.

†† *Assure II* and *Yuma GL Liquid EC* only.

Forage Crops (seed production only):

- **Seedling or Established:** Alfalfa, alsike clover*, red clover*, creeping red fescue.
- **Seedling only:** Bird's-foot trefoil*, white clover*, sweet clover*, and sainfoin*.

* **NOTE - Since applications to these crops have been registered under the User Requested Minor Use program, the manufacturer assumes no responsibility for herbicide performance. Application to these crops is at the risk of the user.**

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

Apply Quizalofop according to weed stage below to the maximum rates of 0.3 L per acre for all crops except Ethiopian mustard (*B. carinata*) where the maximum rate is 0.2 L per acre.

Add one of the following registered adjuvants to the spray tank when applying:

- **Assure II only:** *Liberate* or *Sure-Mix* (0.5 L per 100 L of spray solution), *LI700* (0.25 to 0.5 L per 100 L of spray solution), or *Merge* (0.5 to 1.0 L per 100 L of spray solution)
- **Contender:** *Contender MSO* adjuvant (0.5 L per 100 L of spray solution) or *XA Oil Concentrate* (0.5 to 1.0 L per 100 L of spray solution)
- **Yuma GL Liquid EC:** *Merge* or *XA Oil Concentrate* (0.5 to 1.0 L per 100 L of spray solution), or *MSO adjuvant* or *Sure-Mix* (0.5 L per 100 L of spray solution)

Use the higher rate of *XA Oil Concentrate* when wild oats or quackgrass are present in the field or when growing conditions are poor.

Weed	Stage	Rate	
		L per acre	Acres per 8 L
Green foxtail	2 leaf to early tillering	0.15	54
Volunteer wheat, barley & oat*	2 leaf to early tillering	0.15	54
Volunteer corn	2 to 6 leaf stage	0.15	54
Wild oat*	up to 2 tillers	0.20	40
Barnyard grass, yellow foxtail, proso millet, old witchgrass	2 leaf to early tillering	0.20	40
Quack grass suppression	2 to 6 leaf stage		
Foxtail barley	3 to 4 leaf max 3 tillers		
Downy and Japanese brome	2 to 5 leaf stage		
Quack grass season long control	2 to 6 leaf stage	0.30	26

* Best results are likely to occur if applications are made before tillering begins. Apply at the 2 to 3 leaf stage for optimum control.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:**
 - **Ground:** Minimum 40 L per acre. Up to 162 L per acre of water may be used under heavy populations to improve coverage.
 - **Aerial:** Minimum 10 L per acre to a maximum of 20 L per acre.
- **Nozzles and Pressure:** 30 to 40 psi (210 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE medium* droplets.
- **Screens:** Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
Quizalofop-p-ethyl	POST (foliar)	ACCCase Lipid Synthesis Inhibitor	Toward areas of growth (Symplast)	Grass only	1

Effects of Growing Conditions:

Crop injury may occur if crops are stressed because of drought or flooding. Less than acceptable weed control may be expected if weeds are under stress because of drought, flooding or cool weather.

Tank Mixes:**Herbicides:**

- **In Canola:**
 - *Muster* (8 to 12 g per acre) plus adjuvant.
- **Glufosinate tolerant canola (*Liberty Link*) only:**
 - *Liberty 150 SN** (0.54 to 1.6 L/ac) plus *Sure-Mix*, *LI 700* or *Liberate* adjuvant*.
- **In Dry Bean (*Pinto, Pink, Great Northern, Small Red*):**
 - *Basagran* (label rates with Quizalofop at 0.25 L per acre plus *Sure-Mix* adjuvant).
- **In Oriental Mustard (*B. juncea condiment and oilseed*):**
 - *Muster* (8 g per acre plus Quizalofop at 0.15 to 2.0 L per acre plus adjuvant). DO NOT use on yellow mustard as injury will result.
- **In Soybean:**
 - *Pinnacle* (2.2 to 3.3 g per acre).
 - *Pinnacle* (2.2 to 3.3 g per acre) plus *Basagran Forté* (label rates) plus Quizalofop (0.25 L per acre) plus *Sure-Mix*.

- **In Tribenuron Tolerant Sunflowers:**
 - *Express SG* (6 g per acre) plus *Sure-Mix* or *Merge**.
- **In Established creeping red fescue for seed:**
 - *Ally* (label rates) plus Quizalofop (0.2 to 0.3 L per acre) plus adjuvant.
- Allow 24 hours after application before applying a broadleaf herbicide. If the broadleaf herbicide is applied first, wait 7 days before application of Quizalofop.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the Quizalofop labels only.

Quizalofop manufacturers may also support mixes with pesticides that are not on the quizalofop labels. Check with each manufacturer for the products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.

- **Herbicides:** *Ares*, *Eclipse**, Glyphosate (glyphosate tolerant canola and soybean only), *Lontrel**, *Lontrel+Muster**, *Odyssey NXT*, *Pursuit*, *Solo*, *Viper ADV*.
- * *Assure II* only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 1 hour of application may reduce control.
- **Re-entry Interval:** 4 days for camelina and 12 hours for all other crops.
- **Grazing Restrictions:** DO NOT graze treated crops or cut for feed in the year of treatment.
- **Pre-harvest Interval:** See 'Crops and Staging' chart above.
- **Re-cropping Interval:** No restrictions the year after treatment.
- **Aerial Application:** May be applied by air when used alone.
- **Storage:** DO NOT freeze.
- **Buffer Zones:**

Rates (L per acre)	Application method	Buffer Zones (metres [†]) Required for the Protection of:		
		Aquatic Habitats of Depths		Terrestrial habitat
		Less than 1 m	Greater than 1 m	
All rates	Ground *	1	0	3
Up to 0.15	Winged aircraft	0	0	70
	Helicopter	0	0	55
Up to 0.20	Winged aircraft	0	0	85
	Helicopter	0	0	70
Up to 0.30	Winged aircraft	1	0	125
	Helicopter	1	0	100

See page 36 for an explanation of the different habitats.

* Buffer zones for ground applications can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Cleanout is recommended but no specific cleaning procedures are indicated on the label. Based on products with similar chemistry, 'Method B' found in the general sprayer cleaning section on pages 12 and 13 or a commercial spray sprayer cleaning product, may provide adequate cleaning. Contact the manufacturer for more information.

Hazard Rating:

 Danger – Corrosive to eyes

 Skin irritant, Potential skin sensitizer

For an explanation of the symbols used here see pages 7 and 8.

Reclaim II

Herbicide Group
2 - metsulfuron
4 - aminopyralid
& 2,4-D
(Refer to page 45)

Company:

Corteva Agriscience

Formulation:

Reclaim II has two components:

Reclaim II A (PCP#30062): 52.5% aminopyralid + 9.45% metsulfuron methyl formulated as a water dispersible granule.

- Container size - 1.84 kg

Reclaim II B (PCP#30063): 660 g/L 2,4-D ester formulated as an emulsifiable concentrate.

- Container size: 2 X 6.48 L

NOTE: Limited availability through selected retail outlets.

Crops and Staging:

Rangeland and pastures - Apply in spring or early summer.

Note: The use of this chemical may result in contamination of groundwater particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow. Avoid use in these situations.

Weeds, Rates and Staging:

Application timing is critical for weed control. For optimum weed control apply when weeds are emerged, young and actively growing in the vegetative stage for proper translocation and systemic weed activity.

Maximum of 49 g ae(active ingredient) per acre of *Reclaim II* (equivalent of 93 g product/acre) or other product containing aminopyralid (*Restore II*, *Milestone*, *Clearview*, *Sightline*) per season. Treated areas should not receive more than 49 g ae per acre a product containing aminopyralid the year after initial treatment.

Reclaim II A at 55 g per acre plus Reclaim II B at 0.69 L per acre provides season long control of the following weeds unless indicated otherwise:

- | | | |
|------------------------------------|--------------------------------|------------------------------------|
| ◦ Absinthe | ◦ Field scabious | ◦ Russian thistle |
| ◦ Annual sunflower | ◦ Flixweed | ◦ Scentless chamomile [†] |
| ◦ Annual sow-thistle | ◦ Goat's-beard | ◦ Shepherd's-purse |
| ◦ Mustard (ball, dog, wild) | ◦ Gumweed | ◦ Smartweed (green, lady's-thumb) |
| ◦ Biennial wormwood | ◦ Hairy galinsoga | ◦ Stinkweed |
| ◦ Bluebur | ◦ Hawkweed | ◦ Stork's bill |
| ◦ Burdock | ◦ Hedge bindweed | ◦ Sweet clover |
| ◦ Canada fleabane | ◦ Hoary cress | ◦ Tall buttercup |
| ◦ Canada goldenrod | ◦ Hemp-nettle | ◦ Buckwheat (tartary, wild) |
| ◦ Canada thistle* [†] | ◦ Horse-nettle | ◦ Tumbleweed |
| ◦ Chickweed | ◦ Knapweed (Russian, spotted) | ◦ Vetch |
| ◦ Clover | ◦ Lamb's-quarters | ◦ Volunteer canola |
| ◦ Common groundsel | ◦ Musk or nodding thistle | ◦ Wild radish |
| ◦ Common ragweed | ◦ Narrow-leaved hawksbeard | ◦ Wild strawberry ^{††} |
| ◦ Common tansy | ◦ Oak leaf goosefoot | ◦ Yellow star-thistle |
| ◦ Corn spurry | ◦ Oxeye daisy (pre-bud) | |
| ◦ Cow cockle | ◦ Pasture sage | <u>Shrubs</u> |
| ◦ Cocklebur | ◦ Plantain | ◦ Silverberry (wolf willow) |
| ◦ Dandelion ^{††} | ◦ Perennial sow-thistle | ◦ Western snowberry (buckbrush) |
| ◦ Field bindweed (top growth only) | ◦ Prickly lettuce | |
| ◦ Field peppergrass | ◦ Pigweed (prostrate, redroot) | |

Reclaim II A at 69 g per acre plus Reclaim II B at 0.69 L per acre provides season long control of the following weeds unless indicated otherwise:

◦ *Weeds listed above plus:*

- Canada thistle (24 mo. suppression**)
- Cudweed
- Curled dock
- Fireweed
- Hoary alyssum
- Perennial pepperweed

- Perennial ragweed
- Pasture sage^{††}
- Prairie sage[†]
- Pussy toes
- Volunteer alfalfa
- Wild carrot

Shrubs

- Prairie wild rose (or suppressed for 24 mo.)
- Shrubby cinquefoil[†]
- Western snowberry (buckbrush)[†]

Reclaim II A at 81 g per acre plus Reclaim II B at 0.69 L per acre provides season long control of the following weeds unless indicated otherwise:

◦ *Weeds listed above plus:*

- Baby's-breath
- Black henbane
- Canada thistle^{**††}
- Wild caraway
- Wild parsnip

Shrubs

- Prairie wild rose^{††}
- Silverberry (wolf willow)^{††}
- Western snowberry (buckbrush)^{††}

Weeds Controlled by Reclaim II A at 93 g per acre plus Reclaim II B at 0.69 L per acre:

◦ *Weeds listed above plus:*

- Knapweed (Brown, diffuse^{**})
- Hawkweed (orange, yellow)^{***}

- Prairie sage^{††}
- Purple loosestrife

Shrubs

- Shrubby cinquefoil^{††}

[†] Controlled up to 12 months from application.

^{††} Controlled up to 24 months after application. DO NOT retreat again in year after treatment.

* Removal of competing vegetation may result in new Canada thistle shoots emerging.

** Apply *Reclaim II* when plants are actively growing with the optimum time of application occurring from rosette to the bolting stages of development or in the fall. Use of the highest application rate improves or extends the duration of control.

*** Apply *Reclaim II* to plants in the bolting stage of development

Application Information:

- **Water Volume:**
 - **Ground:** 45 L per acre minimum. For better coverage apply at 80 L per acre.
 - **Aerial:** 20 L per acre minimum
- **Nozzles and Pressure:** Use a combination of application equipment and pressures that will apply *ASABE coarse* droplets in a uniform pattern. Drift of even small amounts of *Reclaim II* into sensitive plants or areas where sensitive crops may be grown can cause injury. DO NOT apply under conditions prone to drift (i.e. high winds, dead calm, or temperature inversions).

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
metsulfuron-methyl	POST (foliar) also has soil activity	ALS Amino Acid Inhibitor	Toward areas of growth (Symplast)	Broadleaf only	2
aminopyralid	POST (foliar) also has soil activity	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4
2,4-D	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

Application should be avoided when pasture and targeted weeds are under stress of drought, excess moisture, extreme heat or cold or other environmental stresses. Target weeds must be actively growing. Avoid applications when temperatures exceed 28°C.

Tank Mixes:

Herbicides: *Grazon XC* (1.0 L per acre)

Note: The above mixes are those listed on the *Reclaim II* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** No rainfast period is specified on the label. Contact manufacturer for more information.
- **Re-entry Interval:** DO NOT re-enter treated areas for 12 hours.
- **Grazing Restrictions:** DO NOT allow lactating dairy animals to graze treated areas within 7 days of application. Withdraw meat animals from treated areas and feed untreated feed for at least 3 days before slaughter. DO NOT harvest forage or cut hay within 30 days of application.
- **Re-cropping Interval:** DO NOT apply to pastures where legumes are an essential component. DO NOT break up treated pasture and plant to sensitive broadleaf crops for at least 3 years after application.
- **Aerial Application:** May be applied by air.
- **Storage:** Store product in original, labeled containers in a secure, dry, cool area. DO NOT freeze.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:	
	Aquatic habitat	Terrestrial habitat
Ground*	10	15
Fixed wing airplane	80 to 175**	250 to 750**
Helicopter	70 to 150**	175 to 650**

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

** Distance varies depending on spray droplet size. Consult the *Reclaim* label to determine buffer zone size when applying by air.

† Distance is measured from the downwind edge of the boom to sensitive areas.

- DO NOT apply this product directly to any water body or mix or load near water or wells. DO NOT apply when heavy rains are forecast or on moderate to steep slopes toward sensitive areas or to light soils with shallow water table. Contact the provincial environment department for additional permits to apply near water.

Sprayer Cleaning:

Refer to 'Method A' found in the general sprayer cleaning section on pages 12 and 13 or a commercial spray sprayer cleaning product such as *All Clear* or *Clean Out* spray cleaner. The inclusion of detergent in 'Method B' may provide improved cleaning. Contact the manufacturer for more information.

Hazard Rating:



Warning – Poison

For an explanation of the symbols used here see pages 7 and 8.

Reflex*

* For use only in the Red River Valley of Manitoba.

Herbicide Group
14 - fomesafen
(Refer to page 45)

Company:

Syngenta Canada (PCP#24779)

Formulation:

240 g/L fomesafen formulated as a solution.

- Container size - 10 L

Crops and Staging:

Apply *Reflex* at 235 mL per acre at the 1 to 2 trifoliolate leaf stage of the following crops:

- **Soybeans:** Apply only as a tank mix with *Basagran* at 0.71 L per acre plus *Agral 90* at 1 L per 1000 L of spray solution or as a mix with glyphosate at registered rates in glyphosate tolerant soybean.
- **Dry beans*:** Apply only as a tank mix with *Basagran* at 0.71 L per acre plus *Agral 90* at 1 L per 1000 L of spray solution.

*** NOTE - Since applications to dry beans in the Red River Valley has been registered under the User Requested Minor Use program, the manufacturer assumes no responsibility for herbicide performance. Application to dry beans is at the risk of the user.**

DO NOT use before the 1st trifoliolate leaf stage or increased risk of crop injury may result.

Maximum ONE APPLICATION EVERY TWO CONSECUTIVE YEARS of *Reflex* or other products containing the active ingredient fomesafen.

Weeds, Rates and Staging:

Broadleaf weeds controlled by *Basagran* at the 0.71 L per acre rate or glyphosate at registered rates in glyphosate tolerant soybeans plus improved control of the following weeds up to the 4-leaf stage:

- Cocklebur
- Eastern black nightshade
- Lady's-thumb
- Lamb's-quarters*
- Ragweed (common)
- Redroot pigweed
- Volunteer canola
- Wild mustard
- Velvetleaf (3 leaf)

* **Suppression only**

Application Information:

- **Water Volume:** Minimum 81 L per acre. Increase water volume to 142 L per acre for fields with heavy weed densities or with weeds at the upper limit of their recommended stage.
- **Pressure:** 275 kPa (40 psi). Increase pressure to 420 kPa (60 psi) for fields with heavy weed densities or with weeds at the upper limit of their recommended stage.
- **Nozzles:** Use nozzles capable of delivering appropriate pressures and volumes.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
fomesafen	POST (foliar) with slight soil activity	PPO Inhibitor/ Membrane disruptor	Little movement due to rapid cell leakage (Symplast)	Broadleaf only	14

Effects of Growing Conditions:

Weed control and crop tolerance may be reduced under certain stress conditions such as cold temperatures, excess moisture, drought and injury from hail or previous herbicide applications.

Tank Mixes:

Herbicides:

- **Dry Beans:**
 - *Basagran* (0.71 L per acre)
- **Soybeans:**
 - *Basagran* (0.71 L per acre)
- **Glyphosate tolerant soybeans only:**
 - *Glyphosate* (360 to 720 g ae per acre)

Fungicides: None registered.

Fertilizers: None registered.

Insecticides: None registered.

Note: The above mixes are those listed on the *Reflex* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 4 hours may reduce control.
- **Grazing Restrictions:** DO NOT graze treated crop or cut for hay. There is insufficient data to support such use.
- **Pre-harvest Interval:** Leave at least 84 days from application to harvest.
- **Re-cropping Interval:** Winter wheat may be sown 4 months after application. Spring wheat, dry beans, soybeans and field corn may be grown the year following an application.
 - These re-cropping restrictions refer only to the Red River Valley of Manitoba. Use outside this region is not registered as re-cropping options have not been determined.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a cool place away from food or feed.
- **Buffer Zones:** Leave a buffer zone of at least 15 metres between the last spray swath and the edge of sensitive terrestrial areas such as shelterbelts, hedgerows and shrublands as well as aquatic areas such as ponds, streams, rivers, prairie potholes and sloughs. DO NOT apply when winds are greater than 15 km/hr.

Sprayer Cleaning:

No specific cleaning procedures are indicated on the label. Based on products with similar chemistry, 'Method B' found in the general sprayer cleaning section on pages 12 and 13 or a commercial spray sprayer cleaning product, may provide adequate cleaning. Contact the manufacturer for more information.

Hazard Rating:



Danger – Corrosive to Eyes

For an explanation of the symbols used here see pages 7 and 8.

Restore II

Herbicide Group
4 - aminopyralid & 2,4-D
(Refer to page 45)

Company:

Corteva Agriscience (PCP#30632)

Formulation:

40 g/L aminopyralid and 400 g/L 2,4-D both present as amine salts formulated as a solution.

- Container size - 2 x 10 L

Note: Limited availability through selected retail outlets.

Maximum of 49 g ae (active ingredient) per acre of *Restore II* (97 L product per acre) or other products containing aminopyralid (*Reclaim II*, *Milestone*, *Clearview*, *Sightline*) PER SEASON.

Crops and Staging:

Rangeland and pastures: Apply in spring or early summer.

Note: The use of this chemical may result in contamination of groundwater particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow. Avoid use in these situations.

Weeds, Rates and Staging:

Apply when weeds are young and actively growing in the vegetative stage for control unless indicated otherwise.

Note: the use of the highest rate structure improves level and duration of weed control and is recommended when weed populations are dense.

Restore II at 0.57 L per acre will control:

- Annual sow-thistle
- Bull thistle
- Burdock (<4 leaf)
- Buttercup (hairy, tall)
- Canada fleabane
- Canada thistle^{††}
- Common broomweed
 - As well as other annual "Susceptible Weeds" controlled by 2,4-D on the 2,4-D page.
- Common plantain
- Daisy fleabane
- Goat's-beard
- Horse-nettle
- Nodding thistle
- Ox-eye daisy
- Perennial sow-thistle
- Prickly lettuce
- Spotted knapweed
- Stinging nettle
- Sweet clover
- Yellow star-thistle

Restore II at 0.86 L per acre will control:

- *Weeds listed above plus:*
 - Canada goldenrod^{††}
 - Cudweed
 - Curled dock (<4 leaf)
 - Dog mustard
 - Groundsel
 - As well as other annual "Hard to Control Weeds" controlled by 2,4-D on the 2,4-D page.
 - Hawkweed
 - Hairy fleabane
 - Heal-all
 - Narrow-leaved hawk's-beard
 - Scentless chamomile
 - Sheep sorrel
 - Sulphur cinquefoil^{††}
 - Tansy ragwort
 - Western ragweed

Restore II at 0.97 L per acre will control:

- *Weeds listed above plus:*
 - Absinthe
 - Biennial wormwood^{††}
 - Bindweed (Field and Hedge)^{††}
 - Blue Lettuce^{††}
 - Burdock^{††}
 - Canada goldenrod^{††}
 - Common tansy^{†††}
 - Dandelion^{††}
 - Diffuse knapweed^{†††}
 - Fuller's teasel
 - Gumweed^{††}
 - Hoary cress^{††}
 - Ironweed (tall)
 - Leafy spurge^{††}
 - Mouse-eared chickweed^{††}
 - Russian knapweed^{†††}
 - Yarrow (common)^{†††}
 - Yellow rocket^{††}

[†] Top growth control only

^{††} Season long control

^{†††} Suppression only

Application Information:

- **Water volume:**
 - **Ground application:** 40 L per acre minimum.
 - **Aerial Application:** 20 L per acre minimum
- **Nozzles and Pressure:** Use a combination of application equipment and pressures that will apply **ASABE coarse** droplets in a uniform pattern.
 - Drift of even small amounts of *Restore II* into sensitive plants or areas where sensitive crops may be grown can cause injury. DO NOT apply under conditions prone to drift (i.e. high winds, dead calm, or temperature inversions).
 - Avoid applications closer than the drip line or outer edge of the canopies of trees or injury may occur to the tree.

NOTE: Use closed handling systems when using bulk containers and/or if handling more than 663 L of product per day. Handheld applications are limited to 20 L of product per day. Respirators must be worn if applying more than 12.5 L per day using handheld equipment.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
aminopyralid	POST (foliar) also has soil activity	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4
2,4-D	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

Application should be avoided under conditions of drought or other environmental stress.

Tank Mixes:

None registered.

Restrictions:

- **Rainfall:** No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.
- **Re-entry Interval:** DO NOT re-enter treated areas for 12 hours.
- **Grazing Restrictions:** DO NOT allow lactating dairy animals to graze treated areas within 7 days of application. Withdraw meat animals from treated fields at least 3 days before slaughter. DO NOT harvest forage or cut hay within 30 days of application. Allow 3 days of grazing on an untreated pasture (or feed untreated hay) before transferring livestock to areas where sensitive broadleaf crops may be grown.
- **Re-cropping Interval:** DO NOT use if legumes are essential in a pasture. DO NOT break up treated pasture and plant to sensitive broadleaf crops for at least 3 years after application.
- **Aerial Application:** May be applied by air.
- **Storage:** Store product in original, labelled containers in a secure, dry, cool area. DO NOT freeze.
- **Buffer Zones:**
 - Handheld equipment is exempt from the buffer zones indicated below when implementing Early Detection and Rapid Response (EDRR) measures on isolated plants or patches. DO NOT apply to water.

Application method	Buffer Zones (metres ¹) Required for the Protection of:	
	Aquatic Habitats	Terrestrial habitat
Ground *	10	10
Fixed wing airplane	80 to 175**	80 to 175**
Helicopter	70 to 150**	70 to 150**

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

** Distance varies depending on spray droplet size. Consult the *Restore II* label to determine buffer zone size when applying by air.

† Distance is measured from the downwind edge of the boom to sensitive areas.

- DO NOT apply this product directly to any water body or mix or load near water or wells. DO NOT apply when heavy rains are forecast or on moderate to steep slopes toward sensitive areas or to light soils with shallow water table. Contact the provincial environment department for permits to apply near water.

Sprayer Cleaning:

'Method A' found in the general sprayer cleaning section on pages 12 and 13.

Hazard Rating:



Danger – Eye and Skin Irritant

For an explanation of the symbols used here see pages 7 and 8.

Retain SG

This product is a prepackaged tank mix of the equivalent of thifensulfuron/tribenuron (page 373) and fluroxypyr + 2,4-D (page 220). Information listed is restricted to Crop, Weeds and Rates. For other detailed information on the component products see the product pages listed above.

**Herbicide Group
2 - thifensulfuron
& tribenuron
4 - fluroxypyr & 2,4-D**
(Refer to page 45)

Company:

Loveland Products Canada

Formulation

The *Retain SG* package has 3 components:

Retain A (PCP#30129): 33.35% thifensulfuron + 16.65% tribenuron formulated as a water soluble granule.

- Container size - 486 g

Loveland Products Canada 2,4-D Ester 700 (PCP#29006): 660 g/L 2,4-D ester formulated as an emulsifiable concentrate.

- Container size - 6.8 L

-plus either -

Retain B[†] (PCP#29557): 180 g/L fluroxypyr formulated as an emulsifiable concentrate.

- Container size - 4.8 L

- or -

Retain 333 B (PCP#32845): 333 g/L fluroxypyr formulated as an emulsifiable concentrate.

- Container size - 2.6 L

[†] **Note:** This formulation is no longer manufactured but some may remain in the distribution system. This product will be removed from future editions when supplies are exhausted.

Crops and Staging:

Spring wheat (including durum), barley: 4 leaf to flag leaf stage.

Weeds and Staging:

Apply from the seedling to 4 leaf or whorl stage of the following weeds:

- Weeds controlled by thifensulfuron/tribenuron plus cleavers*

* Not Group 2 resistant biotypes

Rates

Retain A: 12 g per acre

Retain B: 120 mL per acre

-or-

Retain 333 B: 70 mL per acre

Loveland Products Canada 2,4-D: 0.2 L per acre

Add *Agral 90*, *Agsurf II*, or *Citowett Plus* at 0.2 L per 100 L of spray solution.

Retain SG may degrade if left in the sprayer for an extended period. Apply within 24 hours of mixing.

Tank Mixes:

Loveland Products Canada supports the following mixes that are not on the *Retain SG* label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:** *Axial*, *Everest 2.0*, *Traxos*, *Simplicity*, *Varro*, *WildCat*, *Puma Advance*.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

See component products for more information on restrictions application details and handling. Use the most limiting restrictions across all components for the mix.

Reward

Herbicide Group

22 - diquat

(Refer to page 45)

Company:

Syngenta Canada, distributed by Univar Environmental (PCP#26271)

Formulation:

240 g/L diquat formulated as a solution.

- Container size: 4 x 3.78 L

Use:

For use in farm dugouts and other clear, slow moving water bodies to control water weeds, such as:

- Canada water weed
- Duckweed
- Pond weeds
- Coontail
- Flowering rush
- Water milfoil

Offers temporary control of certain species of algae.

High levels of suspended organic matter or clay particles in water will reduce control.

NOTE: A permit must be obtained from Saskatchewan Water Security Agency or Manitoba Sustainable Development for application of pesticides directly to or within a set distance of water bodies that are not wholly contained within a private parcel of land.

Timing:

Mid-May through late June when water weeds or algae are actively growing. Apply before weeds have developed a heavy mat of growth for effective control.

Rates:

Dugouts less than 5 feet (1.5 m) deep: Apply *Reward* at 7.4 L per acre.

- At this rate, 2.2 L of *Reward* will treat a dugout that is 160 feet by 80 feet (49 m x 24.4 m).

Dugouts more than 5 feet (1.5 m) deep: Apply *Reward* at 10.1 to 11.8 L per acre.

- At these rates, a dugout that is 160 feet by 80 feet (49 m x 24.4 m) will require 3.0 to 3.5 L of *Reward*. Milfoil can be controlled in early stages by 3.7 L per acre in early stages of growth.

Application:

- Dilute 1 part *Reward* with 4 parts clean water.
- Spray over the water surface, inject below the water surface or pour directly onto the water surface from a moving boat or for small water bodies, apply from the banks. See label for detailed instructions. Note: *Reward* is bound rapidly to soil, so material must enter the water directly to be effective.

How it Works:

Reward is a non-volatile fast acting herbicide for the control of water weeds. Control of susceptible weeds generally occurs within 1 to 2 weeks. *Reward* is inactivated upon contact with soil, mud or lake bottoms. Therefore, it has no residual herbicidal effect.

Restrictions:

- **Grazing Restrictions:** DO NOT use water for animal consumption for 24 hours after application.
- **Irrigation:** DO NOT use water for irrigation for 5 days after application.
- **Domestic Use:** DO NOT use water for human consumption for 5 days after application. DO NOT swim in water for 24 hours after treatment.
- **Storage:** DO NOT freeze.
- **Environment:** If weed growth is dense, protect fish by not treating more than one-fourth of dugout at a time.

Equipment Clean Out:

Refer to page 'Method C' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:

 Warning – Poison

 Caution – Skin Irritant, Potential Skin Sensitizer

For an explanation of the symbols used here see pages 7 and 8.

Rexade

Herbicide Group
2 - pyroxsulam
4 - halauxifen & 2,4-D
(Refer to page 45)

Company:

Corteva Agriscience

Formulation:

Rexade A (PCP #32520): 5% halauxifen and 15% pyroxsulam formulated as water dispersible granules.

- Container size – 1 x 1.62 kg jug

Rexade B (PCP #32294): 660 g/L 2,4-D ester formulated as an emulsifiable concentrate.

- Container size – 1 x 8.58 L jug

Crops and Staging:

Wheat (including Durum): From the fully expanded 3 leaf stage up to the emergence of the flag leaf.

Winter wheat: Apply at 2 to 7 leaf stage (4 tiller stage)

Weeds, Rates and Staging:

Use *Rexade A* 40 g per acre and *Rexade B* 215 mL per acre (one case treats 40 acres) for control or suppression of following weed species.

Weeds controlled:

- **Grasses: 1 to 5 leaf stage unless otherwise indicated.**
 - Barnyard grass
 - Brome, Japanese (1 to 6 leaf stage)
 - Brome, Downy (2 to 6 leaf, 4 tillers)[§]
 - Foxtail (green)[§]
 - Foxtail (yellow)
 - Wild oats, (up to 4 leaf, 2 tiller)
- **Broadleaves:**
 - Annual sunflower
 - Bluebur
 - Buckwheat, wild
 - Burdock
 - Canada fleabane (up to 15 cm height)
 - Canada thistle (up to 30 cm tall, pre bud stage)[§]
 - Chickweed, common (up to 10 cm)
 - Cleavers[†] (1 to 9 whorl)
 - Cocklebur
 - Corn spurry (up to 2 whorl stage, <10 cm in height)
 - Cow cockle
 - Dandelion (seedlings and overwintered rosettes, up to 20 cm)*
 - Flixweed (up to 10 cm)
 - Hemp-nettle[†]
 - Kochia^{**†§}
 - Lamb's-quarters[†]
 - Mustard (except dog and green tansy)
 - Night flowering catchfly[§] (up to bolting stage, up to 15 cm height)
 - Pigweed (red-root)[†]
 - Plantain
 - Prickly lettuce
 - Ragweed (Common)
 - Round-leaved mallow
 - (up to 6 leaf stage, < 10 cm height)
 - Russian thistle
 - Smartweed (1 to 5 leaf stage)
 - Shepherd's purse (up to 30 cm tall)
 - Stinkweed (up to 30 cm tall)
 - Stork's-bill (up to 8 leaf stage)
 - Sweet clover
 - Velvetleaf (up to 5 leaf stage)
 - Volunteer alfalfa (up to 24 cm height)
 - Volunteer canola (1 to 6 leaf stage)
 - Volunteer flax (up to 15 cm height)
 - White cockle (up to bud stage, less than 15 cm height)
 - Wild raddish

[§] Suppression only.

^{**} Light to moderate infestations (up to 150 plants per m², up to 15 cm in height)

[†] Including group 2 resistant biotypes

Application Information:

- **Water volume:**
 - **Ground:** 20 to 40 L per acre
 - **Aerial:** 12 L per acre
- **Nozzles and Pressure:** Use boom pressure of 235 kPa or less. Use nozzles and pressure designed to produce **ASABE coarse** droplets. To reduce drift caused by turbulent wingtip vortices, the nozzle distribution along the spray boom length must not exceed 65% of the wing or rotor span.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
pyroxsulam	POST (foliar)	ALS Amino Acid Inhibitor	Toward areas of growth (Symplast)	Broadleaf & grass	2
haulaxifen	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4
2,4-D	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

DO NOT apply to registered crops that are stressed by severe weather conditions (frost, drought or saturated soil) as crop injury may result. Reduced activity will occur when temperatures are below 8° C or above 27° C. Frost 3 days before or after application may reduce weed control and crop tolerance. Under certain conditions (heavy rainfall, prolonged cooled weather, frost conditions, wide fluctuation in day/ night temperatures), lightening in crop colour and reduction in crop height may occur.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

- 2,4-D ester up to an additional 70 g ae per acre (see 2,4-D page).

Insecticides: None registered

Fungicide: None registered

Fertilizers: None registered

Adding ingredients in the correct order is critical for optimum performance. Check label of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Avoid application if rainfall is forecast within 4 hours.
- **Re-entry Interval:** DO NOT re-enter treated field until 12 hours post-application.
- **Grazing Restrictions:** DO NOT graze treated crops or cut for hay within 7 days of application.
- **Pre-harvest Interval:** DO NOT harvest treated crops for 60 days after application.
- **Re-cropping Interval:** Fields can be re-seeded 11 months with spring barley, spring wheat, oats, canola, flax, brown and yellow mustard, canola quality *Brassica juncea*, field peas and soybeans or fields can be fallowed. Sunflowers can be planted 10 months and lentils 22 months after application.
- **Aerial Application:** May be applied by air.
- **Storage:** Store in original containers in dry well ventilated storage. Store in heated storage. If the product is frozen, bring to room temperature and agitate before use.

- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:	
	Aquatic Habitats	Terrestrial habitat
Field sprayer	15	15
Aerial (fixed)	1	90
Aerial (rotary)	1	75

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13. Let solution stand for an extended period for better results. Flush sprayer system with water before reuse. See the label for product specific cleaning details.

Hazard Rating:



Warning – Poison



Caution – Eye irritant, Skin Irritant

Potential Skin Sensitizer

For an explanation of the symbols used here see pages 7 and 8.

Rezuvant

This product is the equivalent of a prepackaged tank mix of Pixxaro A (page 325) and Axial (see page 109). Information listed is restricted to Crop, Weeds, Rates and Tank mixes. For other detailed restrictions and other general information on the component products see the product pages listed above.

**Herbicide Group
4 - halauxifen,
fluroxypyr & MCPA**
(Refer to page 45)

Company:

Corteva Agriscience

Formulation:

The *Rezuvant* package contains 2 components:

Rezuvant A (PCP#33262): 16.2 g/L halauxifen and 250 g/L fluroxypyr present as ester and formulated as an emulsifiable concentrate.

- Container size – 4.9 L; 2 x 9.8 L

Rezuvant B (PCP#33277): 50 g/L pinoxaden formulated as an emulsifiable concentrate.

- Container size – 2 x 9.8 L; 80 L

Crops and Staging:

Wheat (spring only) and barley: 1 leaf stage to just prior to emergence of the flag leaf.

Weeds and Staging:

Apply to actively growing weeds up to 10 cm high or wide unless otherwise specified:

- **Grass weeds controlled by Axial plus the following broadleaf weeds from 1 to 8 leaf stage, unless otherwise indicated:**
 - Chickweed
 - Cleavers (1 to 9 whorl)
 - Fleabane, Canada[†]
 - Flixweed (up to 8 leaf & 8 cm)
 - Hemp-nettle
 - Kochia[†]
 - Lamb's-quarters
 - Nightshade (black, hairy and cutleaf)^{††}
 - Ragweed (common^{††}, giant)
 - Redroot pigweed
 - Round-leaved mallow^{††}
 - Shepherd's-purse (to bolting or 10 cm)
 - Sow-thistle, annual* (to 5 leaf)
 - Stork's-bill
 - Velvetleaf (5 leaf stage)
 - Volunteer alfalfa (to 25 cm)
 - Volunteer flax[†]
 - Wild buckwheat
 - Wild Mustard (to 4 leaf or 10 cm)

* **Suppression only.**

[†] **Up to 15 cm in height.**

^{††} **1 to 6 leaf stage.**

Rates:

Note: Maximum of ONE APPLICATION of this or other products containing pinoxaden per year.

Rezuvant A: 125 mL per acre

Rezuvant B: 500 mL per acre

(One case treats 40 acres or bulk co-pallet treats 160 acres)

Addition of surfactant is NOT required. Use the spray suspension as soon as it is prepared. Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

- **Spring wheat (including durum) and barley:**
 - MCPA ester (0.31 L per acre)

Note: The above mixes are those listed on the *Rezuvant* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

See component products for more information on additional restrictions, application details and handling. Unless indicated differently above, use the most limiting restrictions across all components for the mix.

Roundup Xtend

Herbicide Group
9 - glyphosate
4 - dicamba
(Refer to page 45)

Company:

Bayer

Formulation:

Roundup Xtend (PCP#32274): 240 g ae/L glyphosate present as the monoethanolamine salt and 120 g/L dicamba present as the diglycolamine salt. *Roundup Xtend* also contains ingredients within the formulation to reduce volatility (i.e. *VaporGrip Technology*).

- Container size – 2 x 10 L

Crops and Staging:

Glyphosate+dicamba tolerant (RR2 Xtend) Soybean:

- **Pre-plant or pre-emergence:** Apply any time prior to the emergence of the crop.
- **Post-emergence:** Apply once or twice, at least two weeks apart, up to the early flower stage (R1).

Corn hybrids with Roundup Ready 2 Technology:

- **Pre-emergence:** Apply prior to the emergence of the crop.
- **Post-emergence:** Spike to 5-leaf stage

Note: The use of this chemical may result in contamination of groundwater, particularly in areas where soils are permeable (e.g. sand, loamy sand and sandy loam soils) and/or the depth to the water table is shallow. Avoid use in these situations.

Weeds, Staging and Rates:

Apply to small actively growing weeds that are less than 4 inches (10 cm) in height or width. Early applications when the weeds are small reduce early season weed competition and provide maximum yield potential.

Note: DO NOT add acidifying buffering agents, acidic pH adjusting agents or adjuvants other than agriculturally approved NIS to the spray solution. DO NOT add ammonium sulfate (AMS), AMS-containing adjuvants, water conditioners, or sprayable fluid fertilizers.

Rate (L per acre):	Weeds controlled:			
1.0	<table border="0"> <tr> <td>Annual broadleaf weeds: Buckwheat (tartary, wild) Chickweed Cleavers Corn spurry Cow cockle Flixweed Hemp-nettle Narrow-leaved hawk's-beard Night-flowering catchfly Kochia Lamb's-quarters</td> <td>Mustard, wild Pigweed, redroot Shepherd's-purse Smartweed (green, lady's-thumb) Stinkweed Stork's-bill Russian thistle Volunteer canola (non glyphosate-tolerant) Wild tomato</td> <td>Annual grass weeds: Barnyard grass Green foxtail Volunteer barley Volunteer wheat Wild oats Perennial weeds: Canada thistle* Dandelion (suppression only) Foxtail barley* Quackgrass Sow-thistle (perennial)*</td> </tr> </table>	Annual broadleaf weeds: Buckwheat (tartary, wild) Chickweed Cleavers Corn spurry Cow cockle Flixweed Hemp-nettle Narrow-leaved hawk's-beard Night-flowering catchfly Kochia Lamb's-quarters	Mustard, wild Pigweed, redroot Shepherd's-purse Smartweed (green, lady's-thumb) Stinkweed Stork's-bill Russian thistle Volunteer canola (non glyphosate-tolerant) Wild tomato	Annual grass weeds: Barnyard grass Green foxtail Volunteer barley Volunteer wheat Wild oats Perennial weeds: Canada thistle* Dandelion (suppression only) Foxtail barley* Quackgrass Sow-thistle (perennial)*
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1.5	<table border="0"> <tr> <td><i>All weeds listed above plus:</i> Annual broadleaf weeds: Biennial wormwood (2 to 8 leaf stage) Bur cucumber (up to 18 leaf stage)* Cocklebur Canada fleabane (post-emergent up to 8 cm) Eastern black nightshade Narrow-leaved vetch Pigweed (smooth)</td> <td>Prickly lettuce Ragweed (common) Round-leaved mallow* Smartweed (Pennsylvania) Sow-thistle (annual) Stork's-bill Velvetleaf Volunteer flax</td> <td>Annual grass weeds: Annual blue grass Downy brome Persian darnel Yellow foxtail Proso millet Perennial weeds: Common milkweed* Dandelion (pre-emergent to crop) Dandelion ** Field bindweed* Foxtail barley Yellow nutsedge*</td> </tr> </table>	<i>All weeds listed above plus:</i> Annual broadleaf weeds: Biennial wormwood (2 to 8 leaf stage) Bur cucumber (up to 18 leaf stage)* Cocklebur Canada fleabane (post-emergent up to 8 cm) Eastern black nightshade Narrow-leaved vetch Pigweed (smooth)	Prickly lettuce Ragweed (common) Round-leaved mallow* Smartweed (Pennsylvania) Sow-thistle (annual) Stork's-bill Velvetleaf Volunteer flax	Annual grass weeds: Annual blue grass Downy brome Persian darnel Yellow foxtail Proso millet Perennial weeds: Common milkweed* Dandelion (pre-emergent to crop) Dandelion ** Field bindweed* Foxtail barley Yellow nutsedge*
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2.0	<table border="0"> <tr> <td><i>All weeds listed above plus:</i> Mustard (hare's ear, Indian, tumble, wormseed) Russian pigweed Ragweed (false, giant) Short term residual activity on annual broadleaf weeds: Lamb's-quarters Redroot pigweed Ragweed (common) Velvetleaf (suppression only) Wild buckwheat</td> <td></td> <td></td> </tr> </table>	<i>All weeds listed above plus:</i> Mustard (hare's ear, Indian, tumble, wormseed) Russian pigweed Ragweed (false, giant) Short term residual activity on annual broadleaf weeds: Lamb's-quarters Redroot pigweed Ragweed (common) Velvetleaf (suppression only) Wild buckwheat		
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* Single application provides suppression. Sequential applications provide control. For sequential applications, ensure the crop has not advanced beyond the recommended growth stage. The sequential application should be applied at least two weeks after the first application.

** Control with a single application prior to seeding in the spring. The addition of 360 g ae per acre of addition glyphosate (see tank mixes) will improve control of heavy infestation and plants over 15 cm (6 inches) across.

NOTE: The 2 L per acre rate is to be used only once in a growing season. DO NOT exceed the maximum season total of 4 L per acre.

Application Information:

DO NOT allow herbicide solution to mist, drip, drift or splash onto desirable vegetation because severe injury or destruction to desirable broadleaf plants could result. Apply when air temperature is between 10 and 25°C. DO NOT spray when the temperature is expected to exceed 30°C.

When applying *Roundup Xtend* adjacent to sensitive crops, apply as a pre-plant, pre-emergent or early post-emergent treatment to avoid potential drift onto the sensitive crops.

- **Water Volume:** Minimum 40 L per acre.
- **Nozzles and Pressure:** Use only spray nozzles that produce *ASABE S-572.1 Extremely Coarse (XC) to Ultra Coarse (UC)* spray qualities and minimal amounts of fine spray droplets. **DO NOT use conventional flat fan nozzles that produce Medium or Fine spray qualities.** Adjust pressure for selected nozzles to maintain XC to UC spray qualities. Use at least 30 psi (200 kPa) to ensure proper pattern overlap and check this visually.

DO NOT apply during a temperature inversion because off-target movement potential is high. Temperature inversions increase drift potential because fine droplets may remain suspended after application and move in unpredictable directions with light and variable wind. (See 'Avoiding Spray Drift' on page 7 for more information on how to avoid drift.)

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
glyphosate	POST (foliar)	EPSP Amino Acid Synthesis Inhibitor	Toward areas of growth (Symplast)	Broadleaf & grass	9
dicamba	POST (foliar) also has soil activity	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

Reduced control may result if treatments are made during poor growing conditions such as drought stress, disease or insect damage, or if weeds have been mowed, grazed or cut. Heavy dust on foliage or a crop or weed canopy covering smaller weeds may also reduce control. Extremely cool or cloudy weather following treatment or prolonged drought conditions may slow activity of this product and delay the visual effects of control.

Tank Mixes:

Herbicides:

- Glyphosate (*Roundup brands*) – top up of total glyphosate to a maximum of 720 g ae per acre.

Fungicides: None registered.

Insecticides: None registered.

Fertilizers: None registered.

DO NOT add acidifying buffering agents, acidic pH adjusting agents or adjuvants other than agriculturally approved NIS to the spray solution. DO NOT add ammonium sulfate (AMS), AMS-containing adjuvants, water conditioners, or sprayable fluid fertilizers.

Bayer also supports the following mixes that are not on the *Roundup Xtend* label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:**
 - Prior to emergence of Dicamba Tolerant Soybean:
 - Heat LQ, Authority, Valtera

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 4 hours of application may reduce control.
- **Re-entry Interval:** DO NOT enter treated fields for 12 hours following application.
- **Pre-harvest Interval:** 7 to 10 days for soybean forage and 13 to 15 days for soybean hay.
- **Grazing Restrictions:** DO NOT permit lactating dairy animals to graze fields within 7 days after application. DO NOT harvest forage or cut hay within 30 days after application. Withdraw meat animals from treated fields at least 3 days before slaughter.

- **Re-cropping Interval:** A plant back interval of 120 days is required for those crops not on the label.
- **Aerial Application:** DO NOT apply by aircraft.
- **Storage:** Store above -10°C to keep product in solution. If the product freezes and crystals form, place in a warm room (20°C), allow the product to reach room temperature and roll or shake periodically until crystals have re-dissolved.
- **Buffer Zones:**

Method of application	Buffer Zones (metres [†]) required for the protection of:	
	Aquatic Habitat	Terrestrial Habitat
Field sprayer	15	15

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Refer to 'Method A or B' in the general section on sprayer cleaning on pages 12 and 13. Let solution stand for an extended period for better results. Flush sprayer system with water. See the label for product specific cleaning details.

Hazard Rating:

No specific hazards indicated. Wear chemical resistant clothing, gloves and footwear to load mix and cleanup. Avoid direct inhalation of spray mist.

Salute

This product is the equivalent of a prepackaged tank mix of Ares (page 99) and Lontrel Dry (Note: Lontrel Dry is only available with Salute and Tensile – See clopyralid on page 151). Information listed is restricted to Crop, Weeds, Rates and Tank mixes. For other detailed restrictions and other general information on the component products see the product pages listed above.

Herbicide Group
2 - imazamox, imazapyr
4 - clopyralid
(Refer to page 45)

Company:

Corteva Agriscience

Formulation

The *Salute* package contains the following components:

Salute A (PCP#31353): 72% clopyralid formulated as a water soluble granule.

- Container size – 2.25 kg

Salute B (PCP#31354): 35 g/L imazamox and 15 g/L imazapyr formulated as solution.

- Container size – 1 x 9.8 L jug

Merge adjuvant (PCP#24702): Container size - 8.1 L

Crops and Staging:

CLEARFIELD canola from the 2 to 6 leaf stage.

Weeds and Staging:

Weeds controlled by Ares (see page number above) plus:

- Annual sow-thistle
- Perennial sow-thistle
- Canada thistle

Rates

Salute A: 56 g per acre.

Salute B: 245 mL per acre.

Merge adjuvant (purchased separately): 0.5 L per 100 L of spray solution.

Maximum ONE APPLICATION of Salute or other products that contain imazamox (Ares, Solo, Odyssey) per year.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Tank Mixes:

None registered.

Restrictions:

Re-cropping Interval: The year following *Salute* application fields can be seeded to canary seed, field peas*, field corn, CLEARFIELD canola/oilseed *B. juncea*, spring wheat, spring barley, tame oats. Two years following *Salute* application fields can be seeded to canola (all types), flax, sunflower, durum wheat, lentils, chickpea.

* DO NOT seed to field peas for at least 10 months following treatment. Very dry soil conditions following application can result in a risk of injury to field peas grown in rotation. If severe drought conditions are experienced during the months of June to August inclusive in the year of application (22 months following application), contact your local Corteva Agriscience representative or retailer for more information before seeding field peas following drought conditions in the previous year.

See component products for more information on additional restrictions, application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

Shieldex 400SC

Herbicide Group
27 - tolpyralate
(Refer to page 45)

Company:

ISK Biosciences Corporation, distributed in Canada by Engage Agro Corp (PCP#32943)

Formulation:

400 g/L tolpyralate formulated as a suspension concentrate.

- Container size – 4 x 600 mL

Crops and Staging:

Corn: up to 50 cm tall or up to and including 6 leaf collars (V6), whichever is more restrictive.

Weeds, Rates and Staging:

Apply to actively growing weeds less than 10 cm tall:

Broadleaf Weeds	30.4 mL/ac	40.5 mL/ac
Green pigweed	S	S
Cocklebur	S	C
Lamb's-quarters	S	C
Redroot pigweed	S	C
Smooth pigweed	C	C
Purslane	S	S
Ragweed (common, giant)	S	S
Shepherd's-purse	S	S
Smartweed (Pennsylvania)	S	S
Waterhemp (common)	S	S
Waterhemp (tall)	C	C

Apply to grasses less than 10 cm tall or before tillering:

Grasses	30.4 mL/ac	40.5 mL/ac
Barnyard grass	S	S
Crabgrass, large	C	C
Foxtail (yellow)	S	S
Green foxtail	S	C

C = Control S = Suppression

MSO Concentrate (sold separately): Apply 1% v/v or 10 L MSO Concentrate per 1000L of spray mixture.

Refer to the product label for complete mixing instructions for this product and its mixes. A general guide to mixing can be found on page 11.

Application Information:

- **Water volume:** 57 to 190 L per acre.
- **Nozzles and Pressure:** Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ASAE medium or larger droplets.
- **Screens:** Use 50-mesh (or coarser) filter screen.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
tolpyralate	POST (foliar)	HPPD Pigment Inhibitor	Some – both foliar and root (Apoplast) Somewhat systemic (has soil residues)	Broadleaf only	27

Effects of Growing Conditions:

Poor weed control or crop injury may result from applications made to plants under stress from abnormally hot or cold weather; environmental conditions such as drought, water-saturated soils, hail damage or frost; disease, insect or nematode injury; or prior herbicide or carryover from a previous year's herbicide application.

Tank Mixes:

Herbicides:

- Atrazine (227g ai per acre) – DO NOT apply atrazine if corn is greater than 30 cm tall.

Fertilizers: Use 12.5 to 25 L/1000L spray solution of a high-quality urea ammonium nitrate (UAN) such as 28% N or 32% N or 8.4 to 20.4 kg/1000L of a spray grade ammonium sulphate (AMS), recommended.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Rainfast in 1 hour.
- **Re-entry Interval:** DO NOT enter treated fields for 12 hours.
- **Grazing Restrictions:** DO NOT graze or feed treated corn forage or silage for 21 days after application.
- **Pre-harvest Interval:** DO NOT apply to field corn within 85 days of harvest.
- **Re-cropping Interval:** The following crops may be grown 9 months after application: alfalfa, barley, bean (dry), canola, grass (grown for seed or forage), oat, pea, potato, sorghum, soybean, sunflower, spring wheat. Winter wheat or rye (annual and fall) may be seeded 3 months after application.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** To prevent contamination, store this product away from food or feed.
- **Buffer Zones:** Avoid spraying in situations where drift may occur. DO NOT apply during periods of dead calm.

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground*	1	1	2

See page 36 for an explanation of the different habitats.

* Buffer zones may be reduced when using drift reduction measures. See the Buffer Zone Calculator on the Pest Management Regulatory Agency web site.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Tank Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on page 12 and 13.

Hazard Rating:

None listed.

Signal FSU

Herbicide Group
 1 - clodinafop
 2 - thifensulfuron/tribenuron
 4 - fluroxypyr
 (Refer to page 45)

Company:

Nufarm Agriculture

Formulation:

The *Signal FSU* package contains three components:

Signal F (PCP#31434): 112 g/L clodinafop propargyl and 217 g/L fluroxypyr ester formulated as an emulsifiable concentrate.

- Container size – 8 L

Boost (PCP#30377): 50% thifensulfuron methyl and 25% tribenuron methyl formulated as a water dispersible granule.

- Container size – 320 g

NuFarm Enhance Adjuvant (PCP#29952): Container size – 4 L

Crops and Staging:

Wheat (spring, durum) only: 2 leaf up to the emergence of the 4th tiller.

Weeds and Staging:

Grass weeds:

Weed	Stage
Barnyard grass	1 to 5 leaf prior to tillering
Green and yellow foxtail	1 to 5 leaf stage, prior to emergence of 3rd tiller
Volunteer canaryseed, wild oats	1 to 6 leaf, maximum 3 tillers
Volunteer oats	3 to 6 leaf, maximum 3 tillers

Broadleaf weeds:

- Unless otherwise noted below, apply to young and actively growing weeds that are less than 4 inches (10 cm) in height or width.
 - Annual smartweed (green, lady's-thumb)
 - Ball mustard
 - Chickweed (1 to 6 leaf)
 - Cleavers (1 to 4 whorls)
 - Common groundsel
 - Corn spurry
 - Cow cockle
 - Flixweed
 - Hemp-nettle
 - Kochia (2 to 8 leaf)
 - Lamb's-quarters
 - Narrow-leaved hawk's-beard
 - Redroot pigweed
 - Russian thistle
 - Shepherd's-purse
 - Stinkweed
 - Tartary buckwheat
 - Volunteer canola (not CLEARFIELD varieties)
 - Volunteer flax (up to 12 cm)
 - Volunteer sunflower
 - Wild buckwheat (1 to 3 leaf)
 - Wild mustard

Weeds Suppressed:

- Canada thistle, sow-thistle (less than 6 inches (15 cm) tall or across and prior to budding)
- Scentless chamomile
- Stork's-bill (2 to 6 leaf)

Rate:

Signal F: 0.2 L per acre

Boost: 8 g per acre

Enhance Adjuvant: 0.25 L per 100 L of total spray solution.

(One package treats 40 acres)

Maximum ONE APPLICATION per year of *Signal FSU* or other products containing clodinafop, thifensulfuron, tribenuron, or fluroxypyr.

Thifensulfuron/tribenuron may degrade if left in the sprayer for an extended period. Apply within 24 hours of mixing. Refer to the product label for complete mixing instructions.

Application Information:

- **Water Volume:** Minimum 40 L per acre.
- **Nozzles and Pressure:** Use 29 to 40 psi (200 to 275 kPa) if applying without drift reduction nozzles. Drift reduction nozzles may require higher pressures for proper performance. Select the nozzle and pressure combination that produces of **ASABE coarse** droplets while maintaining good coverage of foliage. Keep booms lower than 60 cm from crop canopy.
- **Screens:** Use of 50 mesh screens or coarser are required.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
clodinafop	POST (foliar)	ACCase Lipid synthesis inhibitor	Toward growth areas (Symplast)	Grasses only	1
thifensulfuron/ tribenuron	POST (foliar)	ALS Amino Acid synthesis Inhibitor	Toward growth areas (Symplast)	Broadleaf only	2
fluroxypyr	POST (foliar)	Synthetic Auxin	Moves throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

Application to crops stressed by extreme weather conditions such as frost, hail, saturated soils or drought as well as low fertility, insect damage or disease pressure may result in crop injury and/or reduce weed control.

Crop and weeds that are growing rapidly produce optimum activity. The optimum temperature range for the best activity is between 12 to 24°C. Activity will be reduced below 8°C and above 27°C.

Tank Mixes:

Herbicides:

- **In wheat (spring and durum) only:**
 - 2,4-D Ester (up to 226 g ae per acre)
 - MCPA Ester (up to 452 mL of a 500 g/L form or 377 mL of a 600 g/L form per acre)

Fungicides: None registered.

Fertilizers: None registered.

Insecticides: None registered.

Note: The above mixes are those listed on the *Signal F* and *Boost* labels only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 4 hours will reduce control.
- **Re-entry Interval:** DO NOT enter treated fields for 12 hours.
- **Pre-harvest Interval:** Leave 60 days between application and harvest.
- **Grazing Restrictions:** DO NOT graze or feed treated crop to livestock within 3 days of application.
- **Re-cropping Interval:** Barley, canola, field peas, flax, forage grasses, lentils, mustard, oats, rye and registered crops may be seeded the season after application.
- **Aerial Application:** DO NOT apply by aircraft.
- **Storage:** Store in a cool, dry place in original container. Shake well before using. If frozen, warm liquid component gradually to 10°C and shake well to reconstitute component before use.
- **Buffer Zones:**

Crop	Buffer Zones (metres [†]) Required for the Protection of:	
	Aquatic Habitats	Terrestrial habitat
Ground only	15	15

See the key to product pages on page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Tank Cleaning:

Thifensulfuron/tribenuron can cause severe injury to sensitive crops at very low concentrations. Sprayers used to spray Thifensulfuron/tribenuron should be drained and flushed out immediately after use.

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13. The addition of detergent will enhance cleanout.

Hazard Rating:

Signal F:



Danger – Skin irritant

Caution Eye irritant

Boost:



Warning – Skin and Eye Irritant

Nufarm Enhance Adjuvant:



Caution – Skin irritant



Warning, contains the allergen soy

For an explanation of the symbols used here see pages 7 and 8.

Simazine

Herbicide Group

5 - simazine

(Refer to page 45)

Company:

Syngenta Canada distributed by Univar Environmental (*Princep Nine-T*)

Loveland Products Canada (*Simazine 480*)

Formulations:

Princep Nine-T (PCP#16370): 90% simazine formulated as a water dispersible granular.

- Container size - 5 kg

Simazine 480 (PCP#23181): 480 g/L simazine formulated as a solution.

- Container size - 2 x 10 L

Crops and Staging:

Established alfalfa or bird's-foot trefoil (*Princep Nine-T* only):

DO NOT use in year of seeding. Apply after final cut in fall until freeze-up. DO NOT apply to the same field more than three consecutive years. Residues may build up with yearly applications.

Corn (field, sweet): Apply one week prior to seeding and incorporate to a depth of 1 inch (2.5 cm), or apply no later than 4 days after seeding corn. Rainfall is required to activate herbicide.

Established shelterbelts (elm (American, Siberian), caragana, green ash, Manitoba (boxelder) maple): Apply in fall or early spring before weeds begin growth. Injury may occur to shelter belts growing under saline conditions.

DO NOT apply to frozen ground

Weeds and Staging:

Simazine is applied prior to the emergence of the weeds and kills them when they are exposed to the treated layer of soil.

- Barnyard grass
- Lamb's-quarters
- Perennial species starting from seed
- Purslane
- Ragweed
- Smartweed (including lady's-thumb)
- Volunteer clovers
- Wild buckwheat
- Wild oats
- Yellow foxtail

Rates:

- **Forage crops:**
 - *Princep Nine-T*: 0.45 kg per acre.
- **Corn:***
 - *Princep Nine-T*: 0.61 to 0.81 kg per acre.
 - *Simazine 480*: 1.4 to 3.4 L per acre.
- **Shelterbelts:**
 - *Princep Nine-T*: 1.8 kg per acre.
 - *Simazine 480*: 3.8 to 5.7 L per acre.

* Rate of application to corn is dependent on soil texture. Refer to specific labels for correct application rates on corn.

Application Information:

- **Water Volume:** Minimum 121 L per acre. In shelterbelts, use a minimum of 202 L per acre.
- **Nozzles and Pressure:** For conventional flat fan nozzles use a maximum pressure of 30 to 45 psi (200 to 300 kPa). Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE medium* droplets.
- **Screens:** Use 50 mesh or coarser nozzle screens and filter system.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
simazine	PPI (soil active)	PSII Inhibitor/ Membrane disruptor	Upward soil applied (Apoplast)	Broadleaf & grass	5

Effects of Growing Conditions:

When applying to forage stands, dry soil conditions at the time of weed emergence may result in reduced weed control.

Tank Mixes:

None registered.

Note: The above mixes are those listed on the simazine labels only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Moderate rainfall after application enhances activity.
- **Re-entry Interval:** DO NOT enter treated areas for 12 hours following application.
- **Grazing Restrictions:** In forage stands, allow 30 days between application and grazing, 60 days between application and cutting for feed. DO NOT graze or cut corn for feed prior to ear emergence.
- **Re-cropping Interval:** Simazine is persistent and residues may persist for several years depending on soil pH, available soil moisture, number of yearly applications, and the sensitivity of the following crop. Simazine will break down in soil more slowly under conditions of high pH and/or low rainfall. Corn will tolerate soil residues of simazine and may be planted the year of application. Navy beans, onions, peas may be injured 12 month after application.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** DO NOT freeze *Simazine 480*. *Princep Nine-T* may be frozen. Store in a cool, dry place.

• **Buffer Zones:**

Crops	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Alfalfa	1	1	4
Bird's-foot trefoil, sweet corn	1	1	5
Field corn	1	1	10
Shelter-belts	2	1	20

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

No specific cleaning procedures are indicated on the label. Based on products with similar chemistry, 'Method B' found in the general sprayer cleaning section on pages 12 and 13 or a commercial spray sprayer cleaning product, may provide adequate cleaning. Contact the manufacturer for more information.

Hazard Rating:



Caution – Poison. (*Simazine 480*)

For an explanation of the symbols used here see pages 7 and 8.

Simplicity

Herbicide Group
2 - pyroxsulam
(Refer to page 45)

Company:

Corteva Agriscience

Formulation:

Simplicity 30 OD (PCP#28887): 30 g/L pyroxsulam formulated as an oil-dispersion.

- Container size - 2 x 8 L

Simplicity GoDRI (PCP#31916): 21.5% pyroxsulam formulated as a water dispersible granule.

- Container size - 4 x 2.24 kg

Crops and Staging:

Wheat (Spring, and durum): 3 leaf stage until prior to the emergence of the flag leaf (up to 6 leaf plus 2 tillers).

Winter wheat: 1 to 3 leaf stage in fall or 2 to 7 leaf plus 4 tillers in spring.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

When applied alone, add a 90% active non-ionic surfactant such as *Agral 90* at 0.25 L per 100 L of spray solution.

- Adjuvants purchased separately.

See the *Simplicity* or *Simplicity GoDRI* labels for additional adjuvant requirements.

Shake *Simplicity 30 OD* jug well before adding to spray tank.

Wild oats (less than 75 plants per sqm):

- *Simplicity 30 OD* at 0.15 L per acre (one case treats 106 acres) or *Simplicity GoDRI* at 21 g per acre (one 2.24 kg jug treats 106 acres).

All weeds listed below:

- *Simplicity 30 OD* at 0.20 L per acre (one case treats 80 acres) or *Simplicity GoDRI* at 28 g per acre (one 2.24 kg jug treats 80 acres).
- **Grasses:**

Weed	Stage
Wild oat	up to the 4 leaf, 2 tillers
Barnyard grass, Yellow foxtail Green foxtail*	1 to 5 leaf
Japanese brome	1 to 6 leaf
Downy brome†	

• **Broadleaves:**

- Canada thistle* (up to 30 cm, before budding)
- Cleavers (up to 6 whorl)
- Cow cockle (up to 8 leaf)
- Common chickweed (up to 10 cm)
- Corn spurry (up to 2 whorl or 10 cm tall)
- Dandelion* (spring rosettes <20 cm diameter)*
- Flixweed (up to 10 cm)
- Hemp-nettle (1 to 8 leaf)
- Redroot pigweed (1 to 8 leaf)
- Round-leaved mallow (up to 6 leaf or 10 cm)
- Russian thistle* (up to 10 cm)
- Shepherd's-purse (up to 30 cm)
- Smartweed (1 to 5 leaf)
- Stinkweed (up to 30 cm)
- Volunteer canola (1 to 6 leaf)**
- Wild buckwheat (1 to 4 leaf)*

* **Suppression only.**** **Not Clearfield varieties**† **Control with fall application in winter wheat; suppression only in spring applications on both winter and spring wheat.****Winter wheat (*Simplicity* alone) for downy brome suppression use the following adjuvant:**

- *Merge* at 0.5 L per 100 L of spray (spring application only). See the *Simplicity* or *Simplicity GoDRI* labels for additional adjuvant requirements.

Application Information:

- **Water Volume:**
 - **Ground:** 20 to 40 L per acre
 - **Aerial:** 12 L per acre
- **Nozzles and Pressure:** Use a combination of nozzles and pressure designed to deliver thorough, even coverage with **ASABE coarse** droplets. See the label for detailed instructions on aerial application.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
pyroxsulam	POST (foliar)	ALS Amino Acid Inhibitor	Toward areas of growth (Symplast)	Broadleaf & grass	2

Effects of Growing Conditions:

DO NOT apply to crops that are stressed (frost, low fertility, drought or flooding, disease or insect damage) as crop injury may result and/or weed control may be reduced.

Tank Mixes:**Herbicides:**

- The addition of an adjuvant to *Simplicity OD* is not required in tank mixes unless the adjuvant is required by the tank mix partner. Consult the *Simplicity GoDRI* label for added requirements.

Tank-Mix Partner	Product Rates
2,4-D Ester	280 g ae per acre
<i>Buctril M</i> (bromoxynil + MCPA)	0.4 L per acre
<i>Curtail M</i>	0.6 L per acre
<i>Frontline 2,4-D</i> (florasulam + 2,4-D)	60 acres per case
<i>Frontline XL</i> (florasulam + MCPA)	0.5 L per acre
MCPA ester (600 formulation)	0.23 to 0.38 L per acre
<i>OcTTain XL</i>	0.45 L per acre

Tank-Mix Partner	Product Rates
<i>Paradigm</i> **	10 grams per acre
<i>Pixxaro</i> **	40 acres per case
<i>Prestige XC</i>	27 acres per case
<i>Spectrum</i> (florasulam + <i>Curtail M</i>)	20 acre per case
<i>Stellar/ Stellar XL</i>	40 acres per case
<i>Thumper</i> (bromoxynil + 2,4-D)	0.4 L per acre

Fungicides:

- *Tilt** (label rates)
- *Stratego**(label rates)
- MCPA + *Tilt* *
- MCPA + *Stratego**

Fertilizers: None registered

* High rate of *Simplicity GoDRI* only

** *Simplicity GoDRI* only.

Note: The above mixes are those listed on the *Simplicity OD* or *Simplicity GoDRI* labels only.

Corteva Agriscience also supports the following mixes that are not on the *Simplicity* labels. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:** 2,4-D ester (up to 420 g ae per acre), *Attain XC* (low use rate), *Attain XC* + either *Tilt* or *Stratego*, *Barricade II*, Bromoxynil, *Paradigm*, *Pixxaro*, *Retain*, Thifensulfuron/tribenuron.
- **Fungicides:** *Tilt* and *Stratego* are supported mixes with *Simplicity OD* at the high rate only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 2 hours may reduce control.
- **Pre-harvest Interval:** Leave 60 days between treatment and harvest.
- **Grazing Restrictions:** Must NOT be grazed or fed to livestock for 7 days after treating crop.
- **Re-cropping Interval:** Barley, condiment and oilseed quality brown mustard (*B. juncea* types), canola, chickpea, dry bean, flax, lentil, oat, field pea, potato, spring wheat, soybean, sunflower and yellow mustard may be seeded 11 months following treatment.
- **Aerial Application:** May be applied by air.
- **Storage:** Avoid freezing, store above -9°C. Allow product to warm above 7°C before using and thoroughly mix the product prior to use.
- **Buffer Zones:**

Application method	Buffer Zones (metres ¹) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground*	1	1	2
Helicopter	1	1	60
Fixed wing aircraft	1	1	70

See page 36 for an explanation of the different habitats.

* These distances can be reduced by 30% using cones on individual nozzles and by 70% using a full shield (shroud, curtain) that extends to the crop canopy.

[†] Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Equipment used to apply *Simplicity* should not be used to apply other pesticides to sensitive crops without thorough cleaning. To avoid subsequent injury to crops other than cereals, all spraying equipment must be thoroughly cleaned both inside and out, as follows:

1. Immediately after spraying drain the sprayer tank. Any contamination on the outside of the spraying equipment should be removed by washing with clean water.
2. Rinse inside of tank with clean water and flush through booms and hoses using at least one tenth of the spray tank volume. Drain tank completely.

3. Add *All Clear* tank cleaner at 0.5 L per 100 L of water while filling the tank ½ full with clean water. Agitate for at least 15 minutes ensuring the cleaning solution comes in contact with interior surfaces. Flush the boom and hoses with the cleaning solution and be sure to remove caps at the end of booms to allow cleaning solution to reach all areas of the boom. Leave the spray solution in the sprayer for an extended period if possible (eg. overnight). Thoroughly drain the sprayer.
4. Remove nozzles and screens and clean separately with *All Clear* cleaning solution (50 mL in 10 L water).
5. Rinse the tank with clean water and flush through the booms and hoses using at least one tenth of the spray tank volume. Drain tank completely.

Refer to pages 12 and 13 for additional information on sprayer cleaning.

Hazard Rating:



Warning – Poison



Warning – Contains the allergen soy



Caution – Eye and Skin Irritant, Potential Skin Sensitizer

For an explanation of the symbols used here see pages 7 and 8.

Solo Ultra

This product is a prepackaged tank mix of Solo (see Imazamox page 260) and Poast Ultra (page 327). Information listed is restricted to Crop, Weeds and Rates. For other detailed information on the effect of growing conditions, and restrictions for the component products see the product pages listed above.

Herbicide Group

1 - sethoxydim

2 - imazamox

(Refer to page 45)

Company:

BASF Canada

Formulation:

The *Solo Ultra* package contains the following components:

Solo ADV (PCP#32066): 25 g/L imazamox formulated as a water soluble concentrate with built in adjuvant.

- Container size – 2 x 6.5 L jugs

Poast Ultra B (PCP#31354): 450 g/L sethoxydim formulated as an emulsifiable concentrate.

- Container size – 1 x 6.2 L jug

Crops and Staging:

CLEARFIELD sunflower: 2 to 8 leaf stage.

CLEARFIELD canola: 2 to 6 leaf stage.

CLEARFIELD lentil: 2 to 9 leaf stage.

CLEARFIELD oilseed mustard (*Brassica juncea*): 2 to 6 leaf stage

Soybean: Cotyledon to 4 leaf stage

Temporary crop yellowing may be observed shortly after application in CLEARFIELD canola.

Weeds Staging:

Weeds controlled by *Solo ADV* plus the grasses controlled by *Poast Ultra* at the stages indicated on the component product pages plus:

- Quackgrass (Suppression - 2 to 5 leaf)

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Rates:

Solo ADV: 325 mL per acre

Poast Ultra: 154 mL per acre

(One package treats 40 acres)

Tank Mixes:

Herbicides:

- *Poast Ultra* (40 mL per acre)

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

See component products for more information on restrictions application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

Sortan IS

Herbicide Group
2 - rimsulfuron
(Refer to page 45)

Company:

Corteva Agriscience (PCP#32627)

Formulation:

20% rimsulfuron formulated as a water dispersible granule.

- Container size: 1.2 Kg

Crops and Staging:

Field corn:

- Pre-emergent;
- Post-emergent up to 5 leaf (3 visible collars).

Weeds and Staging:

Maximum 30.4 g per acre of *Sortan IS* or 6.1 g per acre of the active ingredient rimsulfuron PER YEAR.

Pre-emergent surface: 30.4 g per acre (one jug treats 40 acres) controls the following weeds emerging from seed:

- Barnyard grass
- Foxtail (green, yellow*)
- Lady's-thumb*
- Proso millet
- Shepherd's-purse
- Sow-thistle (annual)*
- Volunteer canola (not including Clearfield varieties)

* **Suppression only**

Post-emergent: *Sortan IS* applied alone requires the addition of a non-ionic surfactant such as *Agral 90*, *Agsurf II* or *Cittowet Plus* at 0.2 L per 100 L of spray solution.

- *The weeds listed above plus the following:*

Weed	Maximum leaf stage	Rate	
		15.2 g per acre	30.4 g per acre
Barnyard grass	1 to 4 leaf		✓
Foxtail (green, yellow*)	1 to 4 leaf		✓
Lamb's-quarters*	2 to 4 leaf		✓
Redroot pigweed	2 to 4 leaf	✓	✓
Shepherd's-purse	Cotyledon – 4 leaf		✓
Volunteer canola (not including Clearfield varieties)	Cotyledon – 5 leaf	✓	✓
Wild buckwheat	up to 4 leaf	(If mixed with glyphosate)	✓
Witchgrass	1 to 4 leaf		✓
Quackgrass	3 to 6 leaf		✓

* **Suppression only**

Application Information:

- **Water Volume:** Minimum 40 to 77 L per acre. Higher water volumes may provide better performance.
- **Nozzles and Pressure:** Use 25 to 40 psi (175 to 275 kPa) if applying without drift reduction nozzles. Drift reduction nozzles may require higher pressures for proper performance. Select the nozzle and pressure combination that produces of *ASABE medium* droplets while maintaining good coverage of foliage.
- **Screens:** Use 50 mesh filter screens or larger.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
rimsulfuron	POST (foliar)	ALS Amino Acid Inhibitor	Toward areas of growth (Symplast)	Broadleaf & grass	2

Effects of Growing Conditions:

Crop injury and reduce weed control may result if application is made to plants that have been stressed by extreme environmental conditions, low fertility, compacted soil, disease or insect damage.

Tank Mixes:

Herbicides: Glyphosate (360 g ae per acre) – pre-emergent; post-emergent (glyphosate tolerant corn only).

Insecticides: None Registered.

Sortan IS should not be applied to corn that has been treated with organophosphate insecticides. Leave 7 days between the application of *Sortan IS* and that of a foliar organophosphate insecticide.

Note: The above mixes are those listed on the *Sortan IS* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 2 to 4 hours may reduce the efficacy of post emergent treatments. A modest rainfall after pre-emergent applications will improve control of emerging seedlings.
- **Re-entry Interval:** DO NOT enter treated fields for 12 hours.
- **Grazing Restrictions:** DO NOT feed (silage, grazing, greenfeed, grain) treated crop to livestock within 30 days of application.
- **Pre-harvest Interval:** DO NOT apply within 30 days of harvest for feed or grain.
- **Re-cropping Interval:** Corn may be seeded any time after application. Barley, canola, chickpea, corn (seed or sweet), dry beans, faba beans, field pea, flax, lentil, oat, potatoes, soybean, sunflower and wheat (spring, durum) may be grown the year after application.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in original containers in away from other fertilizers, food or feed. Freezing will not impair effectiveness.
- **Buffer Zones:**

Crops	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground application	1	1	5

See the key to product pages on page 36 for an explanation of the different habitats.

* Buffer zones may be reduced when using drift reduction measures. See the Buffer Zone Calculator on the Pest Management Regulatory Agency web site.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:

 Warning – Contains the allergens milk and sulfites

 Warning – Contains phenol

For an explanation of the symbols used here see pages 7 and 8.

Tandem

This product is the equivalent of a prepackaged tank mix of Tandem A (see Simplicity page 365) and Tandem B (See Fluroxypyr on page 217). Information listed is restricted to Crop, Weeds, Rates and Tank mixes. For other detailed restrictions and other general information on the component products see the product pages listed above.

Herbicide Group
2 - pyrosulam
4 - fluroxypyr
 (Refer to page 45)

Company:

Corteva Agriscience

Formulation:

The Tandem package has 2 components:

Tandem A (PCP#29985): 30 g/L pyrosulam formulated as an oil-dispersion.

- Container size - 8 L jug

Tandem B (PCP#29965): 333 g ae/L fluroxypyr formulated as an emulsifiable concentrate.

Crops and Staging:

Spring wheat (including durum): 3 leaf stage until the first node can be felt in the stem (up to 6 leaf plus 2 tillers).

Winter wheat: Apply in the spring from the 3 tiller stage to just before the flag leaf stage.

When tank-mixing always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

Tandem A at 0.15 L per acre plus Tandem B at 85 mL per acre (53 acres per case):

- Wild oats (less than 75 plants per sqm)

Tandem A at 0.20 L per acre plus Tandem B at 127 mL per acre (40 acres per case):

- **The grass weeds controlled by Simplicity (see page 365) plus the following broadleaf weeds:**

Weed	Maximum Application Stage
Wild buckwheat*	4 leaves
Smartweed	5 leaves
Round-leaved mallow, Volunteer canola**	6 leaves
Cleavers, Cow cockle, Hemp-nettle [†] , Kochia, Redroot pigweed, Stork's-bill*	8 leaves or whorls
Common chickweed, Flixweed, Russian thistle*	10 cm
Volunteer flax	12 cm
Dandelion*	up to 20 cm, diameter
Canada thistle*	up to 30 cm, prebud

* **Suppression only.**

** **Not Clearfield varieties**

[†] **NOTE Group 2 resistant biotypes only controlled to the 6 leaf stage.**

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

- **In spring wheat (including durum):**
 - 2,4-D Ester 700 (0.24 to 0.32 L per acre)
 - *Curtail M*
 - MCPA Ester (0.24 to 0.38 L per acre) (600 g ae/L forms)

Fungicides:

- *In spring wheat (including durum):*
 - *Tilt*
 - *Stratego*

Note: The above mixes are those listed on the *Tandem* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions (different from the components):

- **Aerial Application:** May be applied by air.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	1	1	2
Helicopter	1	1	55
Fixed wing aircraft	1	1	65

See page 36 for an explanation of the different habitats.

* These distances can be reduced by 30% using cones on individual nozzles and by 70% using a full shield (shroud, curtain) that extends to the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

See component products for more information on additional restrictions, application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

Tensile*

Herbicide Group**2 - imazamox****4 - clopyralid***(Refer to page 45)*

This product is a prepackaged tank mix of Solo (page 260) and Lontrel Dry (Lontrel Dry is only available with Salute and Tensile) (page 151). Information listed is restricted to Crop, Weeds and Rates. For other detailed information on the effect of growing conditions, and restrictions for the component products see the product pages listed above.

Company:

BASF Canada

Formulation:

The *Tensile** package contains 2 components:

Solo (PCP#28741): 70% imazamox formulated as a dispersible granule.

- Container size - 4 x 117 g water soluble bags

Lontrel Dry (PCP#27306): 75% clopyralid formulated as a dispersible granule.

- Container size - 2 x 810 g

* **Note:** *Tensile* is no longer manufactured but supplies may still remain in the distribution system. This product may be removed in future editions.

Crops and Staging:

CLEARFIELD canola varieties: 2 to 6 leaf stage.

Apply only to CLEARFIELD canola varieties; application to any other variety of canola or any other crop will result in crop death.

Weeds and Staging:

- Weeds controlled by *Solo* plus:
 - Canada thistle
 - Sow-thistle, annual
 - Wild buckwheat
 - (rosette to pre-bud stage)*
 - Sow-thistle, perennial*
- * Top growth control for 6 to 8 weeks

Rates:

Solo: 11.7 g per acre.

Lontrel Dry: 40 g per acre.

(One case treats 40 acres)

Merge: 0.5 L per 100 L of spray solution (sold separately). At a spray volume of 40 L per acre one 8.1 L jug of *Merge* will treat 40 acres. *Tensile* MUST be applied with *Merge* adjuvant.

DO NOT apply *Tensile* more than once or follow *Tensile* with any other products containing clopyralid or imazamox in the same year.

Refer to the product label for complete mixing instructions for this product and its mixes. A general guide to mixing can be found on page 11.

Restrictions and Application Information:

See component products for more information on restrictions application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

Particular attention should be paid to the recropping restrictions for both *Solo* and *Lontrel*.

Thifensulfuron/tribenuron

Herbicide Group
2 - thifensulfuron
& tribenuron
(Refer to page 45)

Company:

FMC Corporation (*Refine SG*)

Arysta LifeScience Canada (*Deploy WDG*)*

FMC Corporation (*Nimble*)*

AgraCity (*MPower R*)

Nufarm Agriculture (*Boost*)

Rotam North America (*Draft*)

* This product is no longer manufactured but supply may still remain in distribution. This product may be removed from future editions of this guide.

Formulation:

Refine SG (PCP#28285): 33.35% thifensulfuron methyl plus 16.65% tribenuron methyl formulated as a water soluble granule.

- Container size - 486 g

Boost (PCP#30377); *Deploy WDG* (PCP#30846); *Draft* (PCP#31904), *MPower R* (PCP#30945), *Nimble* (PCP#29467)* = 75% WDG formulations: 50% thifensulfuron methyl plus 25% tribenuron methyl formulated as a water dispersible granule.

- Container size - 320 g

Crops and Staging:

Apply from 2 leaf to the flag leaf stage.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions

- Cereals:
 - Barley
 - Oat
 - Wheat (including durum spring and winter)

- **Sulfonylurea (SU) tolerant canola – 2 to 5 leaf and prior to bolting (Draft only).**
- **Seedling or established forage grasses for forage or seed production:***
 - Bromegrass (meadow, smooth)
 - Fescue (creeping red, tall)
 - Kentucky bluegrass**
 - Orchardgrass
 - Wheatgrass (crested, intermediate, northern, pubescent, slender, streambank, tall, western)

* **NOTE: Since the use of this product on forage grasses is registered under the User Requested Minor Use registration system, the manufacturer assumes no responsibility for herbicide performance. Users of this product on forage grass do so at their own risk.**

** Established stands only.

Weeds and Staging:

Unless otherwise noted below, apply to young and actively growing weeds that are less than 4 inches (10 cm) in height or width.

- **Weeds Controlled:**
 - Annual smartweed (green, lady's-thumb)
 - Ball mustard
 - Chickweed (1 to 6 leaf)
 - Common groundsel
 - Corn spurry
 - Cow cockle
 - Flixweed
 - Hemp-nettle
 - Lamb's-quarters
 - Narrow-leaved hawk's-beard
 - Redroot pigweed
 - Russian thistle
 - Shepherd's-purse
 - Stinkweed
 - Tartary buckwheat
 - Volunteer canola (CLEARFIELD varieties controlled with 2,4-D or MCPA mixes in cereals or grass crops only)
 - Volunteer sunflower
 - Wild buckwheat*
 - Wild mustard
- **Weeds Suppressed:**
 - Canada thistle (less than 6 inches or 15 cm tall or across)**
 - Cleavers (1 to 3 whorls)
 - Round-leaved mallow (2 to 6 leaf)
 - Scentless chamomile
 - Sow-thistle (less than 6 inches or 15 cm tall or across)**
 - Stork's-bill (2 to 6 leaves)
 - Toadflax (less than 6 inches or 15 cm tall)

* **Refine SG: up to 5 leaf stage; 75% WDG formulations: up to 3 leaf stage only.**

** Prior to budding

Rate:

Refine SG: 12 g per acre (one 486 g container treats 40 acres).

75% WDG formulations: 8 g per acre (one 320 g container treats 40 acres).

Add *Agral 90*, *AgSurf II**, *Citowett Plus*, *HiActivate**, *Liberate*, *Nufarm Enhance*, or *Super Spreader** surfactants at 0.2 L per 100 L of spray solution.

* **Refine SG only.**

Maximum of ONE APPLICATION per year of thifensulfuron/tribenuron or other products with the same active ingredients.

Thifensulfuron/tribenuron may degrade if left in the sprayer for an extended period. Apply within 24 hours of mixing. Refer to the product label for complete mixing instructions.

A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:**
 - **Ground:** Minimum 22 L per acre.
 - **Aerial (Refine SG only):** Minimum 10 L to maximum 20 L per acre.
- **Nozzles and Pressure:** Use 30 to 40 psi (210 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE medium* droplets.
- **Screens:** Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
thifensulfuron/ tribenuron	POST (foliar)	ALS Amino Acid Synthesis Inhibitor	Toward growth areas (Symplast)	Broadleaf only	2

Effects of Growing Conditions:

DO NOT apply to wheat, barley or oats that are stressed by severe weather conditions (frost, drought or water saturated soil) as crop injury may result.

Under certain conditions (heavy rainfall, prolonged cool weather, frost conditions, wide fluctuations in day/night temperatures) lightening in crop colour and reduction in crop height may occur.

Tank Mixes:

Herbicides:

- Tank mix partners applied at all label rates. Recommended adjuvants are used unless otherwise noted.

Tank Mix Partner	Crops				
	Spring wheat	Winter wheat	Durum	Barley	Oats
2,4-D amine or ester (160 to 212 g ae per acre)*†	✓	✓	✓	✓	
Clodinafop 240EC (95 to 115 mL per acre) plus <i>Score</i> adjuvant	✓		✓		
Clodinafop 240EC (95 mL per acre) + Dicamba (<i>Banvel II</i> rates below) plus <i>Score</i> adjuvant	✓		✓ ^Δ		
Clodinafop 240EC (95 mL per acre) + MCPA ester (0.23 ^G or 0.34 to 0.45 L per acre)* plus <i>Score</i> adjuvant	✓		✓		
<i>Curtail M</i> (0.61 L per acre) [†]	✓			✓	
Dicamba (<i>Banvel II</i> only at 44.5 mL per acre to 58.7 mL per acre**) [†]	✓		✓ ^Δ	✓	
Fenoxaprop 120EC (0.16 to 0.31 L per acre)	✓		✓	✓	
Fenoxaprop 120EC (0.16 to 0.31 L per acre) + MCPA ester (0.23 [♦] or 0.34 L per acre)*	✓		✓	✓	
Fluroxypyr (<i>Perimeter II</i> at 63 mL per acre only) [†]	✓		✓	✓	
Fluroxypyr + 2,4-D (<i>Flurox 2,4</i> only) [†]	✓ ^{ΔΔ}		✓ ^{ΔΔ}	✓ ^{ΔΔ}	
Imazamethabenz (<i>Assert</i> only)	✓		✓	✓	
Imazamethabenz (<i>Assert</i> only) + MCPA ester (0.28 to 0.45 L per acre)*	✓		✓	✓	
<i>Lontrel 360</i> (85 mL per acre) [†]	✓			✓	
<i>Lontrel 360</i> (85 mL per acre) + 2,4-D ester* or MCPA ester* (0.34 L per acre) [†]	✓			✓	
MCPA amine or ester (0.23 [♦] or 0.28 to 0.45 L per acre)* [†]	✓	✓	✓	✓	✓
<i>Simplicity 30 OD</i> (0.15 to 0.20 L per acre) [†]	✓ ^Δ		✓ ^Δ		

† Marked tank mixes require the addition of a non-ionic surfactant. Unmarked mixes do not require additional adjuvant beyond what is provided for by the tank mix partner.

^Δ *Refine SG* only.

^{ΔΔ} *Boost, Deploy, MPower R and Nimble* only.

* 500 g ai/L formulation.

** High rate of *Banvel II* with *Refine SG* only.

♦ Tank mix with 0.23 L per acre to control Clearfield canola at the 2 to 4 leaf stage.

- Check the above tank mix partner(s) respective labels for additional staging and varietal restrictions.

Fertilizers: None registered.

Note: The above mixes are those listed on the Thifensulfuron/tribenuron labels only.

FMC also supports the following mixes that are not on the *Refine SG* label. Mixes must be applied according to the most restrictive use limitations for either product:

- Herbicides:** *Axial, Axial Xtreme, Everest 3.0, Everest 3.0 + 2,4-D, Flucarbazone 2.0, Flucarbazone 2.0 + 2,4-D, Lontrel XC, Puma Advance, Simplicity GoDRI, Traxos, Varro, Varro + 2,4-D ester, Varro + MCPA ester*
- Fungicides:** *Acapela*

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Rainfall of 1 inch (25 mm) or more beginning within 1 hour of application of *Refine SG* or 4 hours for 75% WDG formulations may reduce control.
- **Re-entry Interval:** DO NOT enter treated fields for 12 hours following application.
- **Grazing Restrictions:** Must NOT be grazed or fed to livestock for 7 days after treatment.
- **Re-cropping Interval:** No restrictions the year after treatment. Canola, flax, lentil and alfalfa may be planted 2 months after application.
- **Aerial Application:** *Refine SG* may be applied by air. DO NOT apply 75% WDG formulations by air.
- **Storage:** Store in a cool, dry place. May be frozen.
- **Buffer Zones:**
 - **Refine SG:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	1	0	15
Fixed wing airplane	1	0	125
Helicopter	1	0	100

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

- **75% WDG formulations (Ground equipment only):**
 - Leave a 15 metre buffer zone between last spray swath and sensitive upland or aquatic habitats such as shelterbelts, wetlands, sloughs, and woodlots.

Sprayer Cleaning:

Thifensulfuron/tribenuron can cause severe injury to sensitive crops at very low concentrations. Sprayers used to spray thifensulfuron/tribenuron should be drained and flushed out immediately after use.

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13. If mixing with another pesticide with different cleaning measures, those measures should be integrated into 'Method A' (e.g. addition of detergent).

Hazard Rating:

75% WDG formulations:

 Warning – Eye and Skin Irritant

Refine SG:

 Warning – Contains the allergen milk.

For an explanation of the symbols used here see pages 7 and 8.

Thifensulfuron/tribenuron + MCPA ester

Herbicide Group
2 - thifensulfuron
& tribenuron
4 - MCPA
(Refer to page 45)

These products are prepackaged tank mix of Refine SG (page 349) and MCPA ester (page 269).
Information listed is restricted to Crop, Weeds and Rates and Tank mixes. For other detailed information
on the component products see the product pages listed above.

Company:

FMC Corporation (*Refine M*)
Loveland Products Canada (*BroadSide*)

Formulation:

Refine SG (PCP#28285): 33.35% thifensulfuron methyl + 16.65% tribenuron methyl; formulated as a water soluble granule.

- Container size - 486 g

MCPA ester (PCP#27803): 600g/L MCPA formulated as an emulsifiable concentrate.

- Container size - 1 x 7.6 L of MCPA ester

Crops and Staging:

Barley, wheat (including durum and winter) and oat: fully expanded 3rd leaf to the flag leaf stage.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions

Weeds and Staging:

Weeds controlled or suppressed by *Refine SG* plus 'Susceptible Weeds' controlled by MCPA ester, plus:

- Dandelion (rosettes, less than 15 cm in diameter)
- Volunteer canola (2 to 4 leaf) (including CLEARFIELD varieties)

Rate:

Refine SG: 12 g per acre

MCPA 600 Ester: 0.19 L per acre

(One case treats 40 acres)

Refer to the product labels for complete mixing instructions.

A general guide to mixing can be found on page 11.

Tank Mixes:

Herbicides:

- **In spring wheat (including durum) and barley:**
 - *Assert* (0.54 to 0.67 L per acre)
- **In spring wheat (NOT durum) and barley:**
 - *Lontrel 360* (85 mL per acre)

Check the above tank mix partners respective labels for additional staging and varietal restrictions.

Note: The above mixes are those listed on the *Refine SG* label only.

FMC also supports the following mixes that are not on the *Refine M* label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:** *Axial*, *Axial Xtreme*, *Clodinafop*, *Everest 2.0*, *Everest 3.0*, *Lontrel XC*, *Puma Advance*, *Simplicity OD/GoDRI*, *Traxos*, *Varro*
- **Fungicides:** *Acapela*

See component products for more information on restrictions application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

Topramezone

Herbicide Group
27 - topramezone
(Refer to page 45)

Company:

AmVac Corporation, distributed in Canada by UAP (*Impact* - PCP#28141)

BASF Canada (*Armezon* - PCP#30131)

Formulation:

336 g/L topramezone formulated as a suspension.

- Container size:
 - *Armezon*: 0.6 L
 - *Impact*: 8 L

Crops and Staging:

Corn (field[†], seed, sweet^{††}): From the 1 to 7 leaf stage

[†] Including both conventional and herbicide tolerant varieties.

^{††} NOTE: Tolerance of sweet corn varieties to topramezone and its mix partners may be variable. When tolerance is unknown, check with the supplier of seed and/or apply to a small area first to assess tolerance.

Weeds and Staging:

The following weeds are controlled with topramezone unless otherwise indicated:

Topramezone MUST BE applied in tank mix with one of the herbicide options indicated in "Tank Mixes:"

- **Grass weeds below from the 1 to 4 leaf stage:**
 - Barnyard grass*
 - Foxtail (green and yellow)*
- **Broadleaf weeds below from the 1 to 8 leaf stage:**
 - Chickweed (common)*
 - Kochia (up to 10 cm)**
 - Lamb's-quarters*
 - Lady's-thumb*
 - Nightshade (eastern black)
 - Pigweed (redroot, green)
 - Ragweed (common)
 - Velvetleaf*
 - Volunteer canola (up to 8 leaf) including glyphosate-tolerant varieties**
 - Wild mustard

* **Suppression only.**

** *Armezon* only. All types including glyphosate-resistant varieties.

Rates:

15 mL per acre

Must be applied with either:

- *Merge* adjuvant at 0.5 L per 100 L of spray solution

-or-

- *Assist* (or *XA Oil concentrate**) at 1.25 L per 100 L plus UAN (liquid 28-0-0) at 1.25 L per 100 L of spray solution.

Maximum ONE APPLICATION of topramezone per season.

Application Information:

- **Water Volume:** Minimum 81 L per acre.
- **Nozzles and Pressure:** Use 20 to 40 psi (140-276 kPa) if applying without drift reduction nozzles. Drift reduction nozzles may require higher pressures for proper performance. Select the nozzle and pressure combination that produces of *ASABE medium* droplets while maintaining good coverage of foliage.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
topramezone	POST (foliar)	HPPD Pigment Inhibitor	Little (Apoplast) some uptake by roots	Broadleaf & grass	27

Effects of Growing Conditions:

When weeds are stressed because of drought, flooding, hot or cool temperatures, weeds are not actively growing, control may be reduced.

Tank Mixes:

Herbicides:

Topramezone must be mixed with one of the following:

- **Field and Sweet Corn:**
 - *AAtrex* (0.42 L per acre) (DO NOT use Merge with this mix in sweet corn)
- **Field corn only:**
 - *Frontier Max* (0.3 L per acre) + *AAtrex* (rates above)
- **Glyphosate tolerant corn only:**
 - Glyphosate (360 g ae per acre, no adjuvant required) (see glyphosate page for details)
 - Glyphosate + *AAtrex* (rates above)
 - Glyphosate + *AAtrex* (rates above) + *Frontier Max* (rates above)

Fungicides: None registered.

Fertilizers: None registered.

Insecticides: None registered.

Note: The above mixes are those listed on the topramezone label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** DO NOT apply if heavy rain is forecast. Contact manufacturer for more information.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Grazing Restrictions:** DO NOT graze treated fields or cut for feed within 45 days of application.
- **Pre-harvest Interval:** Leave 45 days between application and harvest.
- **Re-cropping Interval:** Field corn only may be seeded to treated areas after a crop failure. Winter wheat may be seeded a minimum four months after application. Spring wheat, canola, field corn, navy (white) bean, soybean, lentils, pea and alfalfa may be seeded the following crop year. Check tank mix options for additional reseeding restrictions. Conduct a field bioassay (a test strip grown to maturity) the year before growing any other crop.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a cool (above 5°C), dry area. If product is frozen, bring to room temperature and agitate before use.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	1	1	5

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

- Spray when winds are under 16 km/hr, but not dead calm.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:



Warning – Contains the allergen soy.

For an explanation of the symbols used here see pages 7 and 8.

Tordon 22K

Herbicide Group

4 - picloram

(Refer to page 45)

Company:

Corteva Agriscience (PCP#9005)

Formulation:

240 g/L picloram acid present as a potassium salt, formulated as a solution.

- Container size - 10 L, 3.6 L

Note: Available only through selected retail outlets.

Crop and Staging:

Apply at any stage of permanent grass pastures, rangeland and non-cropland.

NOTE: It is strongly recommended that this product be applied by a licensed applicator.

Weeds, Rates and Staging:

For the control of biennial and deep-rooted perennial weeds listed below:

Weed	Rate L per acre	Backpack (mL of Tordon 22K per 100 M ²)*
Scentless chamomile	0.445	11
Knapweed (diffuse, spotted)	0.91	22
Canada thistle, pasture sage, poverty weed, Russian knapweed, perennial sow-thistle or <i>Low plant densities of:</i> Leafy spurge, field bindweed, toadflax	1.8	45
Leafy spurge, field bindweed, toadflax	3.6 [†]	90 [†]

[†] NOTE: This rate is only registered for spot application treating a maximum of one acre out of every two acre area at this rate.

* Mix with 18 litres of water and the spray solution over 100 square metres.

For best results, applications should be made when perennial weeds have fully developed, green leaves. Application in late summer (or periods of dry weather) when plants are not actively growing may result in unsatisfactory control.

Application Information:

- **Water Volume:** 160 to 325 L per acre without spray running off foliage.
- **Nozzles and Pressure:** Maximum 150 to 350 kPa (20 to 50 psi) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of application equipment and pressure that is designed to deliver an even coverage of coarse droplets that are not prone to drift. Non-target broadleaf plants are very sensitive to Tordon 22K drift.
- Avoid conditions that are conducive to drift. (See page 7 for drift control suggestions)

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
picloram	POST (foliar) also has soil activity	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4

IMPORTANT: *Tordon 22K* is a very persistent and water-soluble herbicide. Treated soil should NOT be moved from the treated area. DO NOT apply to soils that are permeable, have sinkholes, or lie over limestone bedrock. DO NOT apply to soils whose surfaces are composed of fractured rock or unconsolidated gravel. Application to these sites may allow the movement of herbicide to underlying water sources or aquifers. If shallow aquifers are present, DO NOT apply *Tordon 22K*. This product is moderately toxic to fish. DO NOT apply to any water bodies or in areas where the runoff from treated areas will reach fish-bearing waters.

Tordon 22K must not be applied on range and pasture acres that are irrigated. DO NOT compost or mulch clippings from grass treated with *Tordon 22K*.

Effects of Growing Conditions:

Avoid application when pasture and target weeds are under stress from drought, flooding, extreme heat or cold, as injury to grass or unacceptable control may result. Avoid spraying if temperatures exceed 28°C.

Tank Mixes:

None registered.

Restrictions:

- **Rainfall:** Rain within 6 hours of application may cause poor results. Heavy rainfall may dissolve and carry *Tordon 22K* away from the target area, or it may leach dissolved *Tordon 22K* out of the root zone or to undesirable locations.
- **Grazing Restrictions:** DO NOT graze lactating dairy animals within 6 weeks after treatment. There are no grazing restrictions for other livestock. DO NOT use manure from animals grazing treated forage to fertilize susceptible plants or crops.
- **Re-cropping Interval:** *Tordon 22K* may persist in the soil for up to 5 years. For this reason *Tordon 22K* may only be applied on permanent grass pastures and rangeland unless applied by an authorized pesticide applicator. Avoid the root zone of desirable trees or shrubs.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** DO NOT freeze.
- **Buffer Zones:**
 - Hand-held or backpack sprayer and spot treatment DO NOT require a buffer zone from sensitive habitat, but efforts should be made to minimize exposure to sensitive plants and open water or wetlands.

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only	4	2	120

See page 36 for an explanation of the different habitats.

* These distances can be reduced by 30% using cones on individual nozzles and by 70% using a full shield (shroud, curtain) that extends to the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Tordon 22K can cause severe injury to sensitive crops (especially pulses and other broadleaf crops) at very low concentrations. Spray equipment should be flushed out immediately after spraying *Tordon 22K*. Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:



Caution – Poison.



Danger – Eye Irritant.



May Cause Skin Irritation.

For an explanation of the symbols used here see pages 7 and 8.

Tralkoxydim

Herbicide Group

1 - tralkoxydim

(Refer to page 45)

Company:

Corteva Agriscience (*Liquid Achieve* - PCP#28555; *Intake* adjuvant - PCP#31243)

ADAMA Canada (*Bison* - PCP#29256; *Addit* adjuvant - PCP#29263)

Loveland Products Canada (*Marengo* - PCP#29289; *Turbocharge B* adjuvant - PCP#29288)

Nufarm Agriculture (*Nufarm Tralkoxydim Liquid* - PCP#32078; *Adjuvant for Nufarm Tralkoxydim* - PCP#30828)

Formulation:

400 g/L tralkoxydim formulated as a suspension concentrate.

- Container sizes:
 - *Marengo*: 8 L of tralkoxydim plus 4L *Turbocharge*.
 - *Bison*: 8 L of tralkoxydim plus 8 L *Addit* adjuvant
 - *Liquid Achieve*: 2 x 8 L or 96 L of tralkoxydim (*Intake* adjuvant sold separately).
 - *Nufarm Tralkoxydim Liquid*: 8 L or 64 L of tralkoxydim plus 8 or 64 L *Adjuvant for Nufarm Tralkoxydim*

Crops and Staging:

No staging restrictions unless otherwise indicated.

Cereals:

- Barley
- Rye (spring & fall)
- Triticale
- Wheat (spring, durum, & winter)

Forage legumes: May be used on wheat and barley crops undersown to the following (if not tank mixed with a broadleaf herbicide).

- Alfalfa
- Bird's-foot trefoil
- Clovers
- Sanfoin

Forage Grasses (seed production only)*:

- ***Under-seeded with a cereal or grown alone (seedling or established)*:***
 - Bromegrass (meadow, smooth)
 - Creeping red fescue
 - Wheatgrass (crested, intermediate)
 - ***Under-seeded with a cereal or grown alone (seedling only)*:***
 - Wheatgrass (northern, slender, western)
- * *Liquid Achieve, Nufarm Tralkoxydim Liquid and Bison only.*

NOTE - Since applications to these crops have been registered under the User Requested Minor Use program, the manufacturer assumes no responsibility for herbicide performance. An application to these crops is at the risk of the user.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds and Staging:

Wild oats - 1 to 6 leaf stage (total leaves including tillers), with a maximum of 2 tillers.

Volunteer tame oats - 1 to 6 leaf stage.

Green and yellow foxtail - 1 to 5 leaf stage (total leaves including tillers), with a maximum of 1 tiller.

Barnyard grass, Persian darnel - 1 to 4 leaf stage (total leaves including tillers).

For forage grasses and perennial cereal rye, apply prior to tillering of the above weeds.

Apply at the 2 to 3 leaf stage for optimum control. Optimum weed control and yield response occurs when weeds are removed before tillering.

Rates:

0.2 L per acre.

(One 8 L jug of tralkoxydim treats 40 acres)

Add *Turbocharge*, *Intake*, *Adjuvant for Nufarm Tralkoxydim*, or *Addit* adjuvant at a rate of 0.5 L per 100 L spray solution. Under adverse conditions or heavy weed infestations, add *Intake* adjuvant to *Liquid Achieve* at 1 L per 100 L of spray solution.

Maximum ONE APPLICATION of these products or other products containing tralkoxydim per season.

Note: If water analysis shows bicarbonate levels are 400 ppm or greater, add 0.9 to 1.8 kg of active ammonium sulphate per 100 L of spray water prior to mixing.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:**
 - **Ground:** 20 to 40 L per acre. Application in less than 20 L per acre water volume may result in mixing problems or unacceptable crop injury.
 - **Aerial:** 12 to 18 L per acre.
- **Nozzles and Pressure:** Use a combination of nozzles and pressure designed to deliver thorough, even coverage with **ASABE medium** droplets. See the label for detailed instructions on aerial application.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
tralkoxydim	POST (foliar)	ACCCase Lipid Synthesis Inhibitor	Toward areas of growth (Symplast)	Grass only	1

Effects of Growing Conditions:

Cereal crops that have set tillers may incur injury (yellowing and/or stunting) if applications are made within 48 hours of freezing temperatures. Cereal crops that have not set tillers may be injured if exposed to temperatures of 4°C or less up to 48 hours before or after application. Tank mixing with a broadleaf weed herbicide under adverse conditions may increase severity of crop injury. Crops under stress from foliar diseases or low fertility are more susceptible to injury from application. Temporary crop injury may occur when tralkoxydim tank mixes (particularly dichlorprop/2,4-D ester products, and bromoxynil/MCPA ester products + additional MCPA Ester) are applied under extreme environmental conditions (dry or wet, cool or hot weather) resulting in crop stress. Control of grasses could be reduced when they are stressed due to drought, heat, lack of fertility, flooding or prolonged cool temperatures.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

DO NOT tank mix tralkoxydim products with a broadleaf herbicide when applying to underseeded forage grasses or legumes.

Tank Mix Partner	Crops						
	Spring wheat	Durum	Winter wheat	Barley	Spring rye	Fall rye	Triticale
2,4-D ester (205 g ae per acre) [†]	•	•	•	•	•	•	
Bromoxynil [†]	•	•	•***	•		•***	•***
Bromoxynil + 2,4-D (0.40 L per acre) ^{†*}	•	•		•			
Bromoxynil/MCPA Ester ^{†*}	•	•	•	•		•	
<i>Curtail M</i> (0.81 L per acre)	•	•		•			
Dichlorprop/2,4-D [*]	•	•	•	•			
Fluroxypyr + 2,4-D ^{†††} (<i>Attain XC</i> only), <i>OcTTain XL</i> ^{†††}	•	•	•	•			
Fluroxypyr + MCPA (<i>Trophy</i> only)	•	•		•			
<i>Infinity</i> ^{††}	•	•	•	•			
<i>Lontrel</i> (0.11 L per acre) + MCPA ester (0.38 L per acre - 600 g/L forms)	•	•		•			
MCPA ester [†] (0.38 L per acre - 600 g/L forms)	•	•	•	•	•	•	

Tank Mix Partner	Crops						
	Spring wheat	Durum	Winter wheat	Barley	Spring rye	Fall rye	Triticale
<i>Prestige XC</i> ^{††}	.	.	• ^{††}	.			

[†] Manufacturers may support different brands of generic products with their product. Check the tralkoxydim product label for specific brands registered.

^{††} *Liquid Achieve* only.

^{†††} *Liquid Achieve* and *Marengo* only.

* Tank mixes may result in some temporary initial injury under adverse environmental conditions.

** Temporary crop injury can occur if applied prior to the 4 leaf stage. A reduction in wild oat control may occur with this mix.

*** *Buctril M* mixed with either *Liquid Achieve* or *Marengo* only in winter wheat, fall rye and triticale.

DO NOT tank mix tralkoxydim products with herbicides or formulations of herbicides not listed above as loss of grass control may result.

When applying broadleaf herbicides not listed above, in the same field, always apply tralkoxydim first. Apply the broadleaf product no sooner than seven days after application of tralkoxydim.

Insecticides:

- *Matador* (49 mL per acre)
- *Matador* tank mixes with *Bison* may also be combined with bromoxynil or bromoxynil/MCPA ester products.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the tralkoxydim labels only.

Various manufacturers may also support additional mixes that are not on the tralkoxydim labels. Check with manufacturers for more details.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 1 hour will reduce control.
- **Re-entry Interval:** DO NOT enter treated field for 12 hours.
- **Grazing Restrictions:** Straw from treated grain crops may be fed to livestock. Immature cereal crops may be grazed or cut for hay 16 days after treatment. DO NOT feed or graze forage crops in year of treatment
- **Pre-harvest Interval:** Leave 60 days from application to harvest.
- **Re-cropping Interval:** DO NOT replant treated areas to tame oat or corn for at least 4 weeks after application.
- **Aerial Application:** May be applied by air to cereal crops only. DO NOT apply within 50 m of fish bearing waters and wildlife habitat.
- **Storage:** Store in a dry place. DO NOT freeze.
- **Buffer Zones:**

Application method	Buffer Zones (metres ¹) Required for the Protection of:
	Terrestrial habitat
Ground*	3
Helicopter	80
Fixed wing aircraft	100

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:

 Caution – Skin and Eye Irritant

For an explanation of the symbols used here see pages 7 and 8.

Travallas

Herbicide Group
2 - metsulfuron, thifensulfuron
4 - fluroxypyr
(Refer to page 45)

Company:

FMC Corporation (PCP#31685)

Formulation:

3 g ai/L metsulfuron methyl; 30 g ai/L thifensulfuron methyl; and 150 g ae/L fluroxypyr ester formulated as suspension concentrate liquid.

- Container size - 2 x 8 L

Crops, Rates and Staging:

Barley, Wheat (spring, durum): 2 leaf to flag leaf stage (prior to head emergence).

Winter Wheat: In the spring up to the flag leaf stage (prior to head emergence).

Weeds and Staging:

- 0.2 L per acre to control or suppress weeds up to 10 cm tall or wide unless otherwise indicated:
 - Canada thistle (maximum 15 cm and prior to bud)*
 - Cleavers (1 to 6 whorl)
 - Common chickweed (1 to 6 leaf)
 - Corn spurry
 - Cow cockle
 - Dandelion (fall or spring germinating rosettes up to 25 cm)
 - Flixweed
 - Hemp-nettle
 - Kochia
 - Lamb's-quarters
 - Narrow-leaved hawk's-beard
 - Night-flowering catchfly
 - Redroot pigweed
 - Russian thistle
 - Shepherd's-purse (up to 20 cm)
 - Smartweed (lady's-thumb, green)
 - Stinkweed
 - Stork's-bill
 - Volunteer canola (except Clearfield varieties)
 - Volunteer flax
 - Wild buckwheat (1 to 8 leaf)
 - Wild mustard
 - White cockle
- * **Suppression only**

Maximum ONE APPLICATION per year of *Travallas* or other products containing metsulfuron, thifensulfuron or fluroxypyr.

Application Information:

- **Water Volume:**
 - **Ground:** Minimum 22 L per acre.
 - **Aerial:** Apply between 10 and 20 L per acre of water
- **Nozzles and Pressure:** Use 30 to 40 psi (210 to 275 kPa) if applying without drift reduction nozzles. Drift reduction nozzles may require higher pressures for proper performance. Select the nozzle and pressure combination that produces of **ASABE coarse** droplets while maintaining good coverage of foliage. Keep booms lower than 60 cm from crop canopy.
- **Screens:** Use of 50 mesh screens or coarser are required.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
metsulfuron, tribenuron	POST (foliar)	ALS Amino Acid synthesis Inhibitor	Toward growth areas (Symplast)	Broadleaf only	2
fluroxypyr	POST (foliar)	Synthetic Auxin	Moves throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

Application to crops stressed by extreme weather conditions such as frost, hail, saturated soils or drought as well as low fertility, insect damage or disease pressure may result in crop injury and/or reduce weed control. The conditions above as well as wide fluctuations in day/night temperatures or prolonged cool weather may shorten the crop slightly.

Crop and weeds that are growing rapidly produce optimum activity. The optimum temperature range for the best activity is between 12 to 24°C. Activity will be reduced below 8°C and above 27°C.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

Tank Mix Partner	Crop			
	Spring Wheat	Durum	Winter Wheat	Barley
<i>Axial</i>	•		•	•
<i>Axial</i> + MCPA (rates as below)	•		•	•
<i>Everest 2.0</i>	•		•	
<i>Everest 2.0</i> plus MCPA ester	•		•	
MCPA ester (up to 113 g ae per acre)	•	•	•	•
<i>Puma Advance</i>	•	•		•
<i>Puma Advance</i> + MCPA	•	•		•
<i>Simplicity OD</i>	•	•	•	
<i>Simplicity OD</i> + MCPA ester (rates as above)	•	•	•	
<i>Traxos</i>	•	•		
<i>Traxos</i> plus MCPA ester (rates as above)	•	•		
<i>Varro</i>	•	•	•	
<i>Varro</i> plus MCPA ester (rates as above)	•	•	•	

Insecticides: None registered.

Fungicides:

- **In Barley and spring wheat (including durum) only:**
 - *Acapela*

Fertilizers: None registered.

Note: The above mixes are those listed on the *Travallas* label only.

FMC also supports the following mixes that are not on the *Travallas* label. Apply mixes according to the most restrictive use limitations for either label.

- **Herbicides:**
 - **Spring wheat only:** *Everest 3.0*
 - **Spring wheat (including durum):** Clodinafop
 - **Wheat (spring, durum, winter):** *Simplicity GoDRI*

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 2 hours will reduce control.
- **Re-entry Interval:** DO NOT enter treated fields for 12 hours.
- **Grazing Restrictions:** DO NOT graze or feed treated crop to livestock within 7 days of application.
- **Pre-harvest Interval:** Leave 60 days between application and harvest.
- **Re-cropping Interval:** Canola, fababeans, field corn, flax, oats, field peas, soybeans, and registered crops may be seeded 10 months after application. Lentils may be seeded 22 months after application.
- **Aerial Application:** May be applied by aircraft.
- **Storage:** Store in a cool, dry place in original container. Shake well before using. If frozen, warm gradually to 10°C and shake well to reconstitute component before use.

• **Buffer Zones:**

Crop	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground application	1	1	5
Aerial (fixed wing)	1	1	200
Aerial (helicopter)	1	1	175

See the key to product pages on page 36 for an explanation of the different habitats.

* Buffer zones may be reduced when using drift reduction measures. See the Buffer Zone Calculator on the Pest Management Regulatory Agency website.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

- Spray when winds are under 16 km/hr, but not dead calm.

Tank Cleaning:

Thifensulfuron/tribenuron and/or metsulfuron can cause severe injury to sensitive crops at very low concentrations. Sprayers used to spray Thifensulfuron/tribenuron and/or metsulfuron should be drained and flushed out immediately after use.

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13. When mixing with another pesticide with different cleaning measures, those measures should be integrated into 'Method A' (e.g. addition of detergent).

Hazard Rating:

 Caution – Skin Irritant

Potential skin sensitizer. Contains the allergen soy.

For an explanation of the symbols used here see pages 7 and 8.

Traxos

Herbicide Group
1 - pinoxaden & clodinafop
(Refer to page 45)

Company:

Syngenta Canada (PCP#29855)

Formulation:

25 g/L pinoxaden and 25 g/L clodinafop propargyl formulated as an emulsifiable concentrate.

- Container size - 2 X 10 L, 80 L, 400 L

Crops and Staging:

Spring wheat (including durum) and winter wheat: prior to the emergence of the 4th tiller.

When tank mixing, check broadleaf product description for additional restrictions.

Weeds, Rates and Staging:

0.5 L per acre, no additional adjuvant required (packages treat 40, 160 and 800 acres)

For control of:

Weed	Stage
Barnyard grass, Persian darnel	1 to 5 leaves prior to tillering
Foxtail (green, yellow)	1 to 5 leaves, maximum 2 tillers
Volunteer canaryseed, Volunteer oat, wild oat, proso millet	1 to 6 leaves, maximum 3 tillers

Optimum yield response occurs when weeds are controlled in early stages.

Maximum of ONE APPLICATION per year of *Traxos* or other products containing pinoxaden.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:**
 - **Ground:** Minimum 20 L up to 40 L per acre.
 - **Aerial:** Minimum 12 L per acre.
- **Nozzles and Pressure:** 40 to 45 psi (275 to 310 kPa) when using conventional 80° or 110° flat fan stainless steel nozzles tilted forward at an angle of 45°. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of **ASABE coarse** droplets.
- **Screens:** Use 50 mesh nozzle screens.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
pinoxaden, clodinafop	POST (foliar)	ACCCase Lipid synthesis inhibitor	Toward growth areas (Symplast)	Grasses only	1

Effects of Growing Conditions:

Warm, moist growing conditions promote active weed growth and enhance activity. Weeds hardened off by environmental stress such as cold weather, drought or excessive heat may not be adequately controlled.

Tank Mixes:

Herbicides:

- *Buctril M** (label rates)
- *Curtail M* (0.6 to 0.81 L per acre)
- *Infinity* (0.33 L per acre)
- MCPA 600 ester (0.28 to 0.37 L per acre)
- *Mextrol 450M* (0.5 L per acre)
- *Pulsar* (80 acres per case)
- *Pulsar* (80 acres per case) + MCPA 600 ester (0.23 L per acre)
- *Trophy* (20 acres per case)
 - Refer to the broadleaf herbicide label for crop staging and other information.

Insecticides:

- *Matador* (25 to 33 mL per acre).

Fungicides:

- *Tilt* (0.1 L* to 0.2 L per acre).

Fertilizers: None registered.

* Aerial application approved.

Note: The above mixes are those listed on the *Traxos* label only.

Syngenta also supports the following mixes that are not on the *Traxos* label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:** *Attain XC* (low label rate), *Barricade II*, *Broadside*, *Enforcer D*, *Enforcer M*, *Infinity FX*, *Momentum*+MCPA ester, *OcTTain XL*, *Paradigm**, *Paradigm* + MCPA Ester 600* (189 mL per acre), *Pixxaro*, *Prestige XC*, thifensulfuron/tribenuron + MCPA, *Retain*, *Stellar*, *Stellar XL*, *Travallas* (no MCPA Ester), *Thumper*
 - **Fungicides:** *Propel*, *Quilt*, *Trivapro*
- * Wild oat control only

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 1 hour may reduce control.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Grazing Restrictions:** DO NOT graze or harvest treated crops for forage within 7 days of application.
- **Pre-harvest Interval:** Leave at least 60 days from application to harvest.
- **Re-cropping Interval:** No restrictions in the year following treatment.
- **Storage:** Store in a cool, dry, ventilated area away from food or feed. Avoid ignition sources. If frozen, thaw and shake well before using.

- **Aerial Application:** May be applied by air.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground	1	0	1
Aerial by airplane or helicopter	1	0	15

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13.

Hazard Rating:

 Warning – Skin Irritant

For an explanation of the symbols used here see pages 7 and 8.

TraxosTwo

This product is a prepackaged tank mix of TraxosTwo Grass (equivalent to Traxos – see page 387) and TraxosTwo Broadleaf (equivalent to OcTTain - see page 305). Information listed is restricted to Crop, Weeds, Rates and Tank mixes. For other detailed restrictions and general information on the component products see the product pages listed above.

Herbicide Group
1 - pinoxaden, clodinafop
4 - fluroxypyr, 2,4-D
(Refer to page 45)

Company:

Syngenta Canada

Formulation:

The *TraxosTwo* package contains the following components:

TraxosTwo Grass Component (PCP#31674): 25 g/L pinoxaden and 25 g/L clodinafop-propargyl formulated as an emulsifiable concentrate.

- Container size - 10 L, 80 L

TraxosTwo Broadleaf Component (PCP#31673): 90 g/L fluroxypyr plus 360 g/L 2,4-D LV ester formulated as an emulsifiable concentrate.

- Container size - 9 L, 72 L

Crops and Staging:

Spring wheat (including durum): 4 leaf stage up to the emergence of the fourth tiller.

Rates:

TraxosTwo Grass: 0.5 L per acre

TraxosTwo Broadleaf: 0.45 L per acre

(One case treats 20 acres and one bulk package treats 160 acres)

Weeds and Staging:

Weeds controlled by *Traxos* plus the weeds controlled by *OcTTain XL*.

See component products for more information on restrictions application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

Tribenuron

Company:

FMC Corporation (*Express SG*)

Nufarm Agriculture (*Spike*)

AgraCity (*MPower Extra*)

Arysta LifeScience Canada (*Inferno WDG*)

Formulation:

Express SG (PCP#28262): 50% tribenuron methyl, formulated as a water soluble granule (WSG).

- Container size - 486 g*

75% WDG formulations (MPower Extra - PCP#33143; Inferno WDG - PCP#30838; Spike - PCP#30376): 75% tribenuron methyl, formulated as a water dispersible granule (WDG).

- Container sizes -
 - *Inferno WDG** and *MPower Extra**: 320 g
 - *Spike*: 160 g, 3.6 kg

* All products are purchased alone but must be used accordingly in combination with a registered tank mix herbicide.

Crops and Staging:

Tribenuron + glyphosate:

- ***In the fall (post-harvest) or spring prior to the seeding of:***

Field Crops:

- Barley
- Canary seed[†]
- Dry bean^{†Δ}
- Faba bean^{†Δ}
- Lupin^{†Δ}
- Oat[†]
- Pea^{†Δ}

- Soybean^{†Δ}
- Wheat (spring, durum, winter[†])

Forage Crops*[†]:

- Alfalfa
- Alsike clover
- Bromegrass (meadow, smooth)
- Creeping red fescue
- Red clover (forage and seed production)
- Timothy[†]

*Allow at least one day (24 hours) between application and seeding.

- ***In the fall prior to the seeding of:***

◦ *The crops listed above plus:*

- Canola[†]
- Flax[†]
- Lentil^{†Δ}
- Field Corn[†]

- ***Fallow:***

◦ Allow 10 days between application and tillage (fallow).

^Δ NOTE: Injury to pulse crops, forage grasses and forage legumes may occur on coarse-textured soils, low in organic matter (less than 3%), or in fields with variable soils, gravelly areas, sandy areas or eroded knolls. Avoid planting pulse crops in soils containing more than 50% sand.

* NOTE: Since these uses are registered under the User Requested Minor Use Label Expansion (URMULE) program, the manufacturer assumes no responsibility for herbicide performance. Those who apply these uses do so at their own risk.

Tribenuron + 2,4-D ester:

- ***Fallow***
- ***Wheat (spring and durum), barley^{††}***: 3 leaf up to emergence of the flag leaf.

Express SG[†] plus non-ionic surfactant:

- ***Post-emergent in rangeland and pasture:*** stage according to weeds.

Express SG + Hasten NT adjuvant:

- ***Tribenuron tolerant sunflower[†] (eg. ExpressSun SU7 variety):*** 2 to 8 leaves.

[†] Express SG only.

^{††} Inferno WDG, MPower Extra and Spike only.

Weeds, Rates and Staging,

Pre-seeding application and fallow mixed with glyphosate[†]:

- Express SG at 6 g per acre or 75% WDG tribenuron formulations at 4 g per acre plus glyphosate (any brand) at 180 g ae per acre (see glyphosate pages for equivalent product rates.)
 - Weeds controlled by glyphosate products at the rates above plus:
 - Canada thistle (rosettes)**
 - Cow cockle *
 - Dandelion (up to 6 inches)
 - Narrow-leaved hawk's-beard
 - Scentless chamomile^{†**}
 - White cockle (rosettes)^{†**}
 - Volunteer canola (including glyphosate tolerant varieties)^{***}

[†] Express SG only.

Fallow[†]:

- Express SG at 6 g per acre or 75% WDG tribenuron formulations at 4 g per acre plus 2,4-D ester 170 g (6 oz.) ae per acre (e.g. 0.24 L per acre LV 700 formulation):
 - Weeds controlled by 2,4-D ester 170 g (6 oz.) ae per acre plus:
 - Flixweed^{♦♦}
 - Stinkweed^{♦♦}

Post-emergent in barley and spring wheat (including durum):

- Inferno WDG, MPower Extra and Spike only at 4 g per acre plus 2,4-D ester 170 g (6 oz.) ae per acre (e.g. 0.24 L per acre LV 700 formulation);
 - Weeds controlled by 2,4-D plus the following weeds up to 4 inches (10 cm) unless otherwise indicated:
 - Annual sunflower
 - Canada thistle (top growth)
 - Cow cockle
 - Redroot pigweed
 - Wild buckwheat (1 to 3 leaf)**

Post-emergent for control of the emerged weeds below in Rangeland and Pasture only:

- Express SG only at 6 g per acre^{♦♦♦} at the early bud – pre-bloom stage:
 - Tall buttercup
 - Narrow-leaved hawk's-beard
- Express SG only at 12 g per acre^{♦♦♦}
 - The weeds listed above plus:
 - Dandelion
 - Common tansy
 - White cockle

Post-emergent in Tribenuron Tolerant Sunflowers:

- Express SG only at 6 g per acre (one package of Express SG treats 80 acres) plus Hasten NT adjuvant at 0.5L per 100L of spray solution will control:
 - Lamb's-quarters (up to 9 leaf)
 - Wild buckwheat** (up to 6 leaf)
- * Up to the 3 leaf stage
- ** Suppression only
- *** Up to 6 inches
- ♦ Allow 10 days between treatment and tillage.
- ♦♦ Fall rosettes and spring seedlings.
- ♦♦♦ Addition of a non-ionic surfactant at 0.2 L per 100 L of spray solution is required.

Tribenuron may degrade if left in the sprayer for an extended period. Apply within 24 hours of mixing.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:** 22 to 40 L per acre.
- **Nozzles and Pressure:** Use appropriate pressure for nozzle. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of *ASABE medium* droplets or larger.
- **Screens:** Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
tribenuron	POST (foliar)	ALS Amino Acid synthesis Inhibitor	Toward growth areas (Symplast)	Broadleaf only	2

Effects of Growing Conditions:

Warm, moist growing conditions promote active weed growth and enhance the activity of tribenuron. Weeds hardened off by environmental stress such as cold weather, drought or excessive heat may not be adequately controlled.

Tank Mixes:

Herbicides:

- **Prior to seeding registered crops (all products):**
 - Must be mixed with glyphosate.
- **Fallow:** All products
 - Must be mixed with either glyphosate or 2,4-D ester.
- **In spring wheat (including durum) and barley (Inferno WDG, MPower Extra and Spike only):**
 - Assert (0.53 to 0.65 L per acre);
 - Fenoxaprop (Cordon only - 155 mL per acre).
- **In spring wheat (NOT durum) and barley (Inferno WDG, MPower Extra and Spike only):**
 - Banvel II (44.5 mL per acre)
- **Tribenuron Tolerant Sunflowers (Express SG only):**
 - Assure II (label rates) plus Merge or Suremix adjuvants.

Note: The above mixes are those listed on the tribenuron labels only.

FMC supports the following mixes that are not on the *Express SG* label. Mixes must be applied according to the most restrictive use limitations for either product:

- **Tribenuron Tolerant Sunflowers:** *Select, Centurion, Shadow RTM, Poast Ultra*

Adding ingredients in the correct order is critical for optimum performance. Check product labels for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 6 hours may reduce control. Check with product manufacturers for specific recommendations.
- **Re-entry Interval:** DO NOT enter treated fields for 12 hours.
- **Grazing Restrictions:**
 - **75% WDG formulations:** DO NOT graze treated crops within 30 days of application.
 - **Express SG:** Forage may be grazed immediately following application.
- **Pre-harvest Interval:**
 - **75% WDG formulations:** Leave 60 days between spraying and harvest of cereals.
 - **Express SG:** Leave 70 days between spraying and harvest of sunflower.
- **Re-cropping Interval:** There are no restrictions one year after treatment.
 - **75% WDG formulations:** Canola, flax, lentil and alfalfa may be planted 2 months after application.
 - **Express SG:** Canola, flax, and lentil may be planted 2 months after application or in the spring following a fall application.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a cool, dry place. May be frozen.
- **Buffer Zones:**
 - Handheld or backpack sprayers do not require a buffer zone.

Application method	Buffer Zones (metres ¹) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Fallow, preseed, range and pasture	1	0	4
Tribenuron tolerant sunflowers	0	0	3

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Tribenuron can cause severe injury to sensitive crops at very low concentrations. Sprayers used to spray Tribenuron should be flushed out immediately after use. Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13.

This ammonia rinse process should be done twice for the WDG formulations. See the labels of the various products for specific instructions. The addition of detergent may improve cleanout, especially when mixing with other products.

Hazard Rating:

Express SG and Spike:

 Warning – Eye Irritant

Potential Skin Sensitizer

Nuance, MPower Extra and Inferno WDG:

 Caution – Eye and skin irritant

All products:

 Warning – Contains the allergens milk and sulfites

For an explanation of the symbols used here see pages 7 and 8.

Tribenuron + 2,4-D

These products are prepackaged tank mixes of Tribenuron (page 390) and 2,4-D (page 81). Information listed is restricted to Crop, Weeds, Rates and Tank mixes. For other detailed restrictions and other general information on the component products see the product pages listed above.

Herbicide Group
2 - tribenuron
4 - 2,4-D
(Refer to page 45)

Company:

Nufarm Agriculture (Ko-Act)

AgraCity (MPower X-KO)

Formulation:

The Tribenuron + 2,4-D packages contain the following components:

Spike (PCP#30376), or MPower Extra (PCP#33143): 75% tribenuron methyl, formulated as water dispersible granule.

- Container size - 2 x 160 g

2,4-D 700 Ester (Nufarm PCP#27820; AgraCity PCP#30460): 2,4-D 660 g/L as emulsifiable concentrate.

- Container size - 2 x 8.69 L

Crops and Staging:

Pre-seed burn-off prior to seeding the following crops:

- Barley
- Wheat

May also be applied to chemfallow.

Weeds, Rates and Staging:

Tribenuron at 4 g per acre plus 2,4-D 700 ester at 212 mL per acre (one case treats 80 acres).

- Weeds controlled up to 10 cm or 3 leaf rosette or less, unless specified, include:
 - Chickweed
 - Dandelion
 - Flixweed
 - Hemp-nettle
 - Kochia*
 - Mustard
 - Narrow-leaved hawk's-beard
 - Shepherd's-purse
 - Volunteer canola*

* All biotypes

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Tank Mixes:

Herbicides:

- Glyphosate (360 g ae per acre*)
- * see glyphosate page for rate conversion

See component products for more information on restrictions application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

Tribenuron/Metsulfuron

Herbicide Group
2 - tribenuron
& metsulfuron
(Refer to page 45)

Company:

FMC Corporation (*Express Pro*)

AgraCity (*MPower X-Pro*)

Formulation:

Express Pro (PCP#29212): 42.9% tribenuron methyl and 8.6 % metsulfuron methyl formulated as a water soluble granule.

- Container size – 560 g container

The *MPower X-Pro* package has 2 components:

MPower Extra (PCP#33143): 75% tribenuron methyl, formulated as a water dispersible granule (WDG).

- Container size: Mini-box – 320 g, Case – 8 x 320 g

MPower Pro (PCP#31118): 60% metsulfuron methyl, formulated as a water dispersible granule (WDG).

- Container size: Mini-box – 80 g, Case – 8 x 80 g

Tribenuron/metsulfuron is purchased alone but must be mixed with glyphosate before use.

Crops and Staging:

For application to fallow, post-harvest* and prior to seeding of the following crops:

- Spring wheat
- Winter wheat
- Durum wheat
- Barley

Allow at least one day (24 hours) between application and seeding.

Fallow and Post-harvest* application:

Allow 10 days between fallow or post-harvest* treatment and tillage.

DO NOT use Tribenuron/Metsulfuron on highly variable soils that have large gravelly or sandy areas, eroded knolls or calcium deposits.

* *Express Pro* only.

Weeds, Rates and Staging:

Express Pro at 7 g per acre (one container treats 80 acres) or MPower X-Pro at 4 g of MPower Extra and 1 g MPower Pro per acre (one Mini box treats 80 acres and one case treats 640 acres) plus glyphosate at a rate equivalent to 180 g ae per acre (see glyphosate page):

- Weeds controlled by glyphosate products at these rates plus the weeds below up to 3 inches (8 cm) unless otherwise indicated:
 - Canada thistle (rosettes)**
 - Narrow-leaved hawk's-beard†
 - Volunteer canola (including glyphosate tolerant varieties)***†
 - Cleavers†
 - Night-flowering catchfly**
 - Cow cockle*
 - Scentless chamomile
 - Dandelion ***†
 - White cockle (rosettes)
- † **Residual control**
- * **Up to the 3 leaf stage**
- ** **Suppression only**
- *** **Up to 6 inches**

Tribenuron/Metsulfuron may degrade if left in the sprayer for an extended period. Apply within 24 hours of mixing.

If using other herbicides containing the active ingredient metsulfuron methyl, restrict total use of metsulfuron methyl to 0.61 grams active ingredient per acre per year.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:** 22 to 45 L per acre.
- **Nozzles and Pressure:** Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE medium* droplets. Low drift nozzles may require higher pressures for proper performance.
- **Screens:** Use 50 mesh or larger screens in both nozzles and in-line filters.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
metsulfuron, tribenuron	POST (foliar)	ALS Amino Acid synthesis Inhibitor	Toward growth areas (Symplast)	Broadleaf only	2

Effects of Growing Conditions:

Registered crops seeded following Tribenuron/Metsulfuron application become stressed by drought, low fertility, saline soils, waterlogged soils (soils at or near field capacity), disease or insect damage may be injured. This injury may be worse on light or low organic matter soils. Weeds hardened off by environmental stress such as those above may not be adequately controlled.

Tank Mixes:

Herbicides:

- Must be mixed with glyphosate.

Fungicides: None registered.

Fertilizers: None registered.

Insecticides: None registered.

Note: The above mixes are those listed on the Tribenuron/Metsulfuron labels only.

Adding ingredients in the correct order is critical for optimum performance. Check product labels for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturers for more information.
- **Re-entry Interval:** Wait 12 hours before re-entering treated fields.
- **Re-cropping Interval:** Barley and wheat (spring, winter and durum) may be seeded a minimum of 24 hours after application. Oats may be seeded the season following application. Canola, faba beans, field corn, flax, peas and soybeans may be planted 10 months following application. Lentils may be seeded 22 months following application.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a cool, dry place. May be frozen.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat*
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	4

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Tribenuron/Metsulfuron can cause severe injury to sensitive crops at very low concentrations. Sprayers used to spray this product should be flushed out immediately after use.

Refer to 'Method A' found in the general sprayer cleaning section on pages 12 and 13. Check the label or contact the manufacturer for more specific sprayer cleaning information.

Hazard Rating:*Express Pro* only:

Caution – Poison



Warning – Eye Irritant



Potential Skin Sensitizer.

Both Products:

Contains the allergens sulphites and milk.

For an explanation of the symbols used here see pages 7 and 8.

Trifluralin

Herbicide Group**3 - trifluralin***(Refer to page 45)***Company:**Gowan Canada (*Treflan Liquid EC, Treflan MicroActiv*)Nufarm Agriculture (*Rival*)Loveland Products Canada (*Bonanza*)**Formulation:****Bonanza 480 EC (PCP#28289):** 480 g/L trifluralin formulated as an emulsifiable concentrate.

- Container size - 9.45 L, 205 L

Bonanza 10G (PCP#22744): 10% trifluralin formulated as a granular.

- Container size - 22.7 kg, 500 kg bags

Rival EC (PCP#18612): 500 g/L trifluralin formulated as an emulsifiable concentrate.

- Container size - 9 L, 900 L

Rival 10G (PCP#18926): 10% trifluralin formulated as a granular.

- Container size - 22.7 kg, 454 kg bags

Treflan Liquid EC (PCP#23933): 480 g/L trifluralin formulated as an emulsifiable concentrate.

- Container size - 9.45 L, 115 L

Treflan MicroActiv (PCP#21742): 10% trifluralin formulated as a granular.

- Container size - 454 Kg bags

Crops and Staging:

Certain formulations are not registered for all the crops listed here. Refer to the specific product label for details. All products are for pre-plant incorporated use only.

Fallow use in the brown soil zone of Saskatchewan, or fall application in all soil zones. (Granular products only): Spring wheat (including durum).

Apply to fallow fields in May, June, or July for weed control during both years of a fallow-wheat rotation, or in the fall (September or October) or spring prior to seeding.

DO NOT apply following harvest when the previous crop was treated with another trifluralin product (*Treflan, Rival* or *Bonanza* products). This includes application the previous summer or fall.

DO NOT apply trifluralin following harvest or to fallow when the previous year's crop was an oilseed, barley or pulse crop treated with a deep incorporated, spring or fall applied trifluralin product.

Green and Yellow Foxtail Control in Cereals:

- Liquids applied in spring only (after seeding but prior to crop emergence) - spring wheat (including durum), barley. Granulars applied in fall only (after September 1 but before freeze-up) - spring wheat (including semi-dwarf and durum).

Broadleaf and Grassy Weed Control in other crops:

- **Spring applied liquid or granular formulations:**
 - Canola, pea, sunflower, safflower (liquid formulations), dry bean, mustard, faba bean, alfalfa, sainfoin, sweet clover, soybean, forage legumes (cicer milk-vetch, seedling alsike clover, red clover, bird's-foot trefoil).
- **Fall applied granular formulations:** Canola, pea, sunflower, dry bean, mustard, faba bean, soybean, barley, lentil and flax.
- **Trifluralin liquids only:** prior to planting shelterbelt transplants (elm, caragana, green ash, Scots pine).

Weeds:**Fallow use in the brown soil zone of Saskatchewan or fall application in all soil zones (Granular products only):**

- **Fallow Year:**
 - Barnyard grass
 - Cow cockle
 - Green foxtail
 - Lamb's-quarters
 - Persian darnel
 - Redroot pigweed
 - Russian thistle*
 - Wild buckwheat
 - Wild oat
 - **Crop Year:**
 - Green foxtail
 - Lamb's-quarters
 - Wild buckwheat *
 - Wild oat *
- * **Suppression only**

Green and Yellow Foxtail Control in Cereals:

- Foxtail (green, yellow)

Broadleaf and Grassy Weed Control in other crops:

- Barnyard grass
- Brome (downy, Japanese)
- Chickweed
- Cow cockle
- Foxtail (green, yellow)
- Knotweed
- Lamb's-quarters
- Persian darnel
- Pigweed
- Purslane
- Wild buckwheat*
- Wild oats†*

* **Some plants may escape herbicide treatment but are not competitive with the crop.**

† **Suppression only with *Treflan Liquid EC* and *Bonanza 480 EC*.**

Rates and Staging:**Fallow use in the brown soil zone of Saskatchewan (Granular products only):**

- DO NOT apply to sandy soils with less than 1% organic matter. Application to severely eroded knolls is not recommended. DO NOT apply to wet soils, soils in poor working condition, soils which contain more than 8 percent organic matter, or soils subject to prolonged periods of flooding.
- Granules may be applied to fallow fields or following harvest, provided crop residues or green growth do not interfere with cultivation (prevent soil mixing).
- Over-application caused by overlapping, improper calibration or non-uniform application may result in reduced crop stand, delayed development or reduced yields.

Soil Organic Matter (%)	Rate (Kg per acre)		
	1 to 3	4 to 8	2 to 8%
May	3.85	4.5	
June	3.25	3.85	
July	2.65	3.25	
September to October			2.23*

* **Control of green foxtail only, on soils between 2 to 8% organic matter.**

- During the fallow year, susceptible weeds may not be fully controlled until after the second fallow operation has established a uniform layer of treated soil. Control of wild oats in the crop year may be variable depending on wild oat population as well as soil and climatic conditions. Some wild buckwheat may escape but its growth will be slowed and result in limited competition to the wheat crop.

Pre-emergent control of green and yellow foxtail:

• **Liquids:**

Product	Rates (L per acre)	
	Light and Medium Soil Texture	Heavy Soil Texture
<i>Rival EC</i>	0.49 to 0.57 L	0.65 L
<i>Treflan Liquid EC, Bonanza 480 EC</i>	0.49 L	0.69 L

• **Granular products (wheat only):**

- 2.23 kg per acre in all soil textures with 2 to 8 % organic matter.

Broadleaf and Grassy Weed Control in other crops:

- For use in canola, pea, sunflower, dry bean, mustard, faba bean, seedling alfalfa (spring only), seedling sweet clover (spring only), soybean.

Product	Soil Type			
	Light soils with less than 6% organic matter		Medium to heavy soils with 6 to 15% organic matter	
	Spring	Fall	Spring	Fall
<i>Rival EC</i>	0.65 L per acre	0.89 L per acre*	0.89 to 1.13 L per acre	1.13 to 1.37 L per acre*
<i>Rival 10G</i>	3.43 kg per acre**	4.45 kg per acre	4.45 to 5.67 kg per acre**	5.67 to 6.88 kg per acre
<i>Treflan Liquid EC</i>	0.69 L per acre	0.93 L per acre*	0.93 to 1.21 L per acre	1.21 to 1.37 L per acre*
<i>Bonanza 10G, Treflan Microactiv</i>	Not registered	4.45 kg per acre	Not registered	5.67 to 6.88 kg per acre
<i>Bonanza 480 EC</i>	0.69 L per acre	0.93 L per acre*	0.93 L per acre	1.17 per acre*

* Although liquid formulations are registered for fall application, this use is not recommended as tillage requirements before and after application will predispose fields to erosion.

** Spring applications of granular formulations are recommended for Manitoba only.

For use in barley (fall only), apply:

Product	Soil Type					
	2 to 4% organic matter		4 to 6% organic matter		6 to 10% organic matter	
	Light Soil Texture*	Medium to Heavy Soil Texture**	Light Soil Texture*	Medium to Heavy Soil Texture**	Light Soil Texture*	Medium to Heavy Soil Texture**
<i>Rival 10G, Bonanza 10G, Treflan Microactiv</i>	3.44 kg per acre	3.44 kg per acre	4.45 kg per acre	4.45 kg per acre	4.45 kg per acre	5.67 kg per acre

* Light textured soils can be defined as sandy to sandy-loam.

** Medium to Heavy textured soils can be defined as loam to clay.

For use in flax or lentils (fall only), apply:

Product	Soil Type			
	Soils with 2 to 6% organic matter		Soils with 6 to 15% organic matter	
	Light Soil Texture*	Medium-Heavy Soil Texture**	Light Soil Texture*	Medium-Heavy Soil Texture**
<i>Rival 10G, Bonanza 10G, Treflan Microactiv</i>	4.45 kg per acre	4.45 to 5.6 kg per acre***	5.67 kg per acre	5.67 to 6.88 kg per acre
<i>Bonanza 480 EC</i>	0.93 L per acre	0.93 L per acre	1.17 L per acre	1.17 L per acre
<i>Treflan Liquid EC</i>	0.93 L per acre	1.21 L per acre	1.21 L per acre	1.21 to 1.38 L per acre
<i>Rival EC</i>	0.89 L per acre	1.13 L per acre	1.89 L per acre	1.13 to 1.38 L per acre

* Light textured soils can be defined as Sandy to Sandy-loam.

** Medium to Heavy textured soils can be defined as loam to clay.

*** Rates vary among products. Refer to product label for specific information.

Application:

Liquid Formulations:

- **Water Volume:** Minimum 40 L per acre.
- **Nozzles and Pressure:** Maximum 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of *ASABE medium* droplets or larger.

Dry Granular Formulations: Use equipment capable of metering granular herbicides and applying in an even layer over the surface of the soil. Close applicator lid after filling to avoid prolonged exposure to direct sunlight.

Incorporation:

Fallow use in the brown soil zone of Saskatchewan:

- Apply granules to the soil surface and incorporate immediately, in the same operation if possible. DO NOT delay incorporation more than 24 hours after application. Use a deep tillage cultivator, field cultivator or disc implement set to work 2 to 3 inches (5 to 8 cm) deep, and operating at 8 to 10 km/hr. Granules should not be incorporated when soil is crusted, lumpy or too wet for good mixing action.
- **May - July:** A second incorporation at the same depth and at an angle to the first should be done when weed growth requires it. Wait at least one week before making the second incorporation. After completing two fallow incorporations, additional operations with a rod weeder, shallow tillage or fall herbicide application may be required to control remaining weed growth.
- **September - October:** A second incorporation may be done in the fall a minimum of 3 days later. Alternatively, to conserve crop residues cover through the winter, the second incorporation can be completed in the spring at the same depth and at an angle to the first incorporation. When both incorporations take place in the fall, shallow spring tillage should be completed in the spring. If a discer or air seeder is used for seeding, separate spring tillage may not be necessary.
 - *NOTE: Fall application is not recommended on soils where a lack of crop residue cover combined with the required incorporation would leave the soil vulnerable to erosion.*
- **Spring (In the year of seeding):** Apply granules and incorporate immediately, in the same operation if possible. DO NOT delay the first incorporation longer than 24 hours after application. The second incorporation must be delayed a minimum of 3 days following the first incorporation. When applied to cold soils, wait 14 days before making second incorporation. The second incorporation should be done at an angle to the first incorporation, and at the same depth. If a discer or air seeder is used for seeding, the seeding operation can be used as the second incorporation.

Green and Yellow Foxtail control in Cereals:

- **Liquid formulations:** Apply and incorporate in spring just after seeding. Incorporate to a depth of 1 to 1.5 inches (2 to 4 cm) into a bare soil free of crop residues (80 percent black when viewed from above) using diamond or tine type harrows operated at a speed of 6 mph (9 km/h). Incorporate twice, with the second incorporation at right angles to the first. The first incorporation should be performed immediately in the same direction of application. Both incorporations should be done within 24 hours of application. When tank mixing liquid formulations with *Avadex BW*, follow the same incorporation procedure.
- **Granular formulations:** May be applied to standing or pre-worked stubble. Very heavy trash fields should be worked prior to application to allow product penetration to the soil surface. Incorporate with cultivators or disc implements only. Perform the first tillage operation within 24 hours of application. Incorporate at a working speed of 5 to 8 mph (8 to 13 km/hr) and to a depth of 2 to 3 inches (5 to 8 cm). Wait a minimum of 5 days, then incorporate a second time at right angles to the first. This second incorporation may be delayed until the following spring. Subsequent working should be no deeper than 2 to 3 inches (5 to 8 cm).

Broadleaf and Grassy Weed Control in other crops:

- Granular formulations are recommended for use in fall or spring as a pre-plant incorporated treatment on broadleaf crops listed on the product label. The liquid formulations should be used only on soils free of lumps and relatively free of crop residues (75% black) and are recommended only for spring use. Granular formulations may be applied to standing or pre-worked stubble. Very heavy crop residues should be worked prior to application to allow product penetration to the soil surface. DO NOT use liquid formulations of trifluralin as a pre-plant incorporated treatment in barley, as severe injury will result. Only the fall applications of granular formulations are registered for use as pre-plant incorporated treatments in barley. For fall application of granular formulations, work the chemical into the soil between September 1 and freeze-up. Use a discer or field cultivator (vibrating shank-type). Disc implements are preferred on stubble. Set equipment to cut at 3 to 4 inches (8 to 10 cm) depth. The initial incorporation should be done within 24 hours of application. The second incorporation should be done at right angles to the first. The second incorporation may be delayed until spring, except when planting barley, flax or lentils; for these crops both incorporations must be done in fall. Delay the second incorporation 5 days for better weed control. This will allow greater release of the chemical onto soil particles and assure more even distribution. Fall application of granular trifluralin on flax, lentils or barley is not recommended on soils prone to erosion, as the 2 fall incorporations necessary in these crops may leave soils vulnerable to wind or water erosion.
- For spring application of liquid and granular formulations, work the chemical into the soil prior to seeding by setting the implement at 3 to 4 inches (8 to 10 cm) cutting depth. The first incorporation must be done within 24 hours of application. The second incorporation must be done at right angles to the first. If incorporating granular trifluralin, delay the second incorporation for 3 days after the first to achieve better weed control.

Seeding:

Fallow use in the brown soil zone of Saskatchewan:

- Allow soil to warm before seeding to reduce risk of injury to crop. Place seed 1.25 to 2.5 inches (3 to 6 cm) deep. If spring seedbed preparation is required, set cultivator 2 inches (5 cm) deep. To reduce the risk of wheat injury, use good quality seed and agronomic practices that will promote good growing conditions. Avoid deep seeding, loose seedbeds and seeding into cold soils. If extended dry periods were present after a fallow application, a 10 percent increase in seeding rate is recommended.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
trifluralin	PPI (Soil active)	Mitosis Inhibitor/ cell division	Little movement in plant (Apoplast)	Broadleaf & grass	3

Effects of Growing Conditions:

Prolonged drought conditions after a May-July application to fallow may result in higher levels of trifluralin in the soil at the time of seeding.

Injury to flax, barley, wheat or lentil may occur if soil and weather conditions are not conducive to rapid crop emergence (cold or dry soils at the time of seeding and crop emergence).

To minimize crop injury, seed into a firm, moist seed bed using a seeder with good depth control and on row packing. Plant barley no deeper than 2 inches (5 cm). Plant cereals, lentil and flax no deeper than 1.5 inches (4 cm).

Less than acceptable weed control will result if dry conditions prevail at the time of weed emergence.

Rainfall has no direct effect on products' activity. Flooding (3 to 5 days) will cause rapid breakdown of the product resulting in reduced weed control. Flooding for 3 weeks or more will result in total breakdown of the product resulting in loss of weed control.

Tank Mixes:

Herbicides:

- **Soybeans:**
 - *Sencor (Treflan Liquid EC only).*

Fertilizers: Liquid product may be applied with liquid fertilizer as a carrier. Before the herbicide is added to the tank, compatibility of the herbicide to liquid fertilizer should be tested following instructions on the herbicide container. Trifluralin liquids may be blended with dry bulk fertilizers (DO NOT mix with nitrate fertilizers). Check label for blending instructions.

Insecticides: None registered.

Fungicides: None registered.

Note: The above mixes are those listed on the trifluralin labels only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** No restriction. Flooding may reduce weed control.
- **Re-entry Interval:** Wait at least 12 hours before entering treated fields.
- **Grazing Restrictions:** DO NOT graze the treated crops or cut for feed prior to crop maturity.
- **Re-cropping Interval:** Oat, canaryseed, and small-seeded grasses may be affected the year after treatment. Corn is sensitive at higher rates of application. Damage to wheat can occur if the crop is seeded into land that has been treated during the previous 21 months with trifluralin products and has received abnormally low amounts of precipitation. Damage is worse if conditions are not conducive to rapid emergence of the wheat (for example, if the crop is seeded deep or if soil conditions remain cool during emergence). Damage tends to be greater on fields treated with granular formulations.
- **Aerial Application:** DO NOT apply by air.
- **Storage:**
 - Granular formulations must be stored in a cool, dry location, out of sunlight.
 - *Rival EC:* DO NOT store below 5°C.
 - *Treflan Liquid EC and Bonanza 480:* DO NOT freeze. Crystallization of the active ingredient may occur at less than 5°C. To reconstitute, bring temperature to 15°C and shake well until no crystals are visible. This should be done before adding to the spray tank.

- **Buffer Zones:** (liquid formulations only)

Crop	Buffer Zones (metres [†]) Required for the Protection of*:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Field crops	80	10	1
Shelterbelts, woody crops	120	20	1

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Refer to 'Method B' in the general section on sprayer cleaning on pages 12 and 13 for liquid formulations only.

Hazard Rating:

Bonanza 480 EC:



Warning – Poison



Warning – Eye and Skin Irritant

All products:

Potential skin sensitizer.

For an explanation of the symbols used here see pages 7 and 8.

Triton C

Herbicide Group
2 - thifensulfuron & tribenuron
4 - quinclorac
(Refer to page 45)

Company:

FMC Corporation (PCP#28622)

Formulation:

51.55 % quinclorac; 10.30 % thifensulfuron methyl; 5.15 % tribenuron methyl formulated as a water dispersible granule.

- Container size - 1.566 kg

Crops and Staging:

Barley, Spring wheat (including durum): 2 to 5 leaf stage.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions

Weeds, Rates and Staging:

39.25 g per acre (one container treats 40 acres) plus *Merge* adjuvant at 1.0 L per 100 L of spray solution. Unless otherwise noted below, apply to young and actively growing weeds that are less than 4 inches (10 cm) in height or width.

Weeds Controlled:

- Annual smartweed (green, lady's-thumb)
- Mustard (ball, wild)
- Chickweed (1 to 6 leaf)
- Cleavers (1 to 4 whorls)
- Common groundsel
- Corn spurry
- Cow cockle
- Flixweed
- Hemp-nettle
- Lamb's-quarters
- Narrow-leaved hawk's-beard
- Redroot pigweed
- Round-leaf mallow (2 to 6 leaf)
- Russian thistle
- Shepherd's-purse
- Sow-thistle, annual
- Stinkweed
- Stork's-bill (2 to 6 leaves)
- Tartary buckwheat
- Volunteer canola (not CLEARFIELD varieties)
- Volunteer sunflowers
- Wild buckwheat (1 to 5 leaf)

Weeds Suppressed:

- Canada thistle
- Perennial sow-thistle (less than 6 inches or 15 cm tall or across and prior to budding)
- Scentless chamomile
- Toadflax (less than 6 inches or 15 cm tall)
- Volunteer flax

Quinclorac is persistent and will carryover. It is recommended that any products containing quinclorac not be used in areas treated with this product during the previous season.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:** Minimum 22 L per acre.
- **Nozzles and Pressure:** 30 to 40 psi (210 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of *ASABE medium* droplets.
- **Screens:** Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
thifensulfuron, tribenuron	POST (foliar)	ALS Amino Acid synthesis Inhibitor	Toward growth areas (Symplast)	Broadleaf	2
quinclorac	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf only	4

Effects of Growing Conditions:

DO NOT apply to wheat, or barley that are stressed by severe weather conditions (frost, drought or water saturated soil) as crop injury may result. Under certain conditions (heavy rainfall, prolonged cool weather, frost conditions, wide fluctuations in day/night temperatures) lightening in crop colour and reduction in crop height may occur.

DO NOT use on highly variable soils that have large gravelly or sandy areas, eroded knolls, or calcium deposits.

Tank Mixes:

None registered.

FMC supports the following mixes that are not on the Triton C label. Mixes must be applied according to the most restrictive use limitations for either product:

Herbicides: *Axial*, *Axial* + MCPA ester, Clodinafop, Flucarbazone 2.0, Flucarbazone 2.0 + 2,4-D, *Puma Advance*.

- **Spring wheat only:** *Everest 3.0* + 2,4-D

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 6 hours may reduce control in general.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Grazing Restrictions:** Must not be grazed or fed to livestock for 77 days after treatment.
- **Pre-harvest Interval:** Leave 77 days between treatment and harvest for wheat and durum and 80 days for barley.

- **Re-cropping Interval:** Spring wheat (including durum) and spring barley may be reseeded immediately following application. Wheat, barley, oat, canola, field pea, flax, lentil and sunflower may be grown the year after application. On low organic matter soils or under dry conditions, flax and lentils should NOT be grown until the second year after application. DO NOT use *Triton C* on land where potato or vegetables are grown. A field bioassay (a test strip grown to maturity) must be conducted the year before growing any crops other than those listed above.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a cool, dry place. May be frozen.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	0	15

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Triton C can cause severe injury to sensitive crops at very low concentrations. Sprayers should be flushed out immediately if application is to be stopped for an extended period. The manufacturer recommends a cleanout procedure similar to 'Method A' in the general sprayer cleaning section on pages 12 and 13. DO NOT use ammonia with chlorine bleach. See label for specific process.

Hazard Rating:



Caution – Poison



Warning – Eye and Skin Irritant

Potential Skin Sensitizer

For an explanation of the symbols used here see pages 7 and 8.

Triton K

Herbicide Group
2 - tribenuron
4 - dicamba, 2,4-D
(Refer to page 45)

Company:

FMC Corporation

Formulation:

The *Triton K* package contains the following components:

***Triton Broadleaf* (PCP#29989):** 58.45% dicamba sodium salt, and 8.25% tribenuron methyl formulated as a water dispersible granule.

- Container size - 1.47 kg

***Nufarm 2,4-D Ester 700* (PCP#27820):** 660 g/L 2,4-D ester formulated as an emulsifiable concentrate.

Crops and Staging:

Spring wheat (including durum), winter wheat and barley: 3 leaves fully expanded to 6 leaves plus 3 tillers. Application outside of this stage range can result in injury to the crop.

Fallow: Stage according to weeds.

Weeds and Staging:

Weeds controlled up to 10 cm tall or across:

- Annual sunflower
- Canada thistle (top growth control)
- Cow cockle
- Dandelion ***
- Flixweed**
- Kochia (2 to 10 leaf)
- Lamb's-quarters
- Mustard (ball, hare's-ear, Indian, tumble, wild, wormseed)
- Narrow-leaved hawk's-beard**
- Prickly lettuce
- Redroot pigweed
- Russian pigweed
- Russian thistle
- Shepherd's-purse**
- Stinkweed**
- Sweet clover
- Thyme-leaved spurge
- Wild buckwheat*
- Wild radish

* 1 to 4 leaf stage

** Fall rosettes and spring seedlings only.

*** Spring or fall rosettes up to 15 cm in diameter.

Rate:

Triton Broadleaf: 36.8 g per acre

2,4-D Ester 700: 243 mL per acre

(One package treats 40 acres)

DO NOT apply more than 36.8 grams per acre of *Triton Broadleaf* per year.

Triton K may degrade if left in the sprayer for an extended period of time. Apply within 24 hours of first mixing.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:** Minimum 22 L per acre.
- **Nozzles and Pressure:** Maximum 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of *ASABE coarse* droplets.
- **Screens:** Use a 50 mesh or coarser screen and filter system

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
tribenuron	POST (foliar)	ALS Amino Acid synthesis Inhibitor	Toward growth areas (Symplast)	Broadleaf	2
dicamba, 2,4-D	POST (foliar)	Synthetic Auxin	Throughout the plant (Symplast)	Broadleaf	4

Effects of Growing Conditions:

DO NOT apply if temperatures are greater than 30°C, if humidity is high, or wind is blowing toward non-target plants as injury from drift may result.

DO NOT apply to wheat, or barley that are stressed by severe weather conditions (frost, drought or water saturated soil) as crop injury may result. Under certain conditions (heavy rainfall, prolonged cool weather, frost conditions, wide fluctuations in day/night temperatures) lightening in crop colour and reduction in crop height may occur.

Kochia control may be reduced during stress conditions or if extremely heavy infestations exist.

Tank Mixes:

None registered.

FMC supports the following mixes that are not on the *Triton K* label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:** Flucarbazone 2.0/3.0, *Puma Advance* (206 mL per acre).

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 4 to 6 hours may reduce control.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Grazing Restrictions:** Lactating dairy animals MUST NOT graze fields with 7 days of treatment.
- **Re-cropping Interval:** No restrictions the year following application.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a cool, dry place. May be frozen.
- **Buffer Zones:**
 - Handheld or backpack sprayers do not require a buffer zone.

Crop	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Cereals	1	0	4
Fallow	1	1	15

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Triton K can cause severe injury to sensitive crops at very low concentrations. Sprayers used to spray this product should be flushed out immediately after use. The manufacturer recommends a process similar to 'Method A' in the general section on sprayer cleaning on pages 12 and 13. DO NOT use ammonia with chlorine bleach. See label for specific instructions.

Hazard Rating:



Caution – Poison



Warning – Eye and Skin Irritant

Potential Skin Sensitizer

For an explanation of the symbols used here see pages 7 and 8.

Tundra

Herbicide Group

1 - fenoxaprop

6 - bromoxynil

27 - pyrasulfotole

(Refer to page 45)

Company:

Bayer (PCP#29367)

Formulation:

46 g/L of fenoxaprop-p-ethyl, 87.5 g/L of bromoxynil and 15.5 g/L of pyrasulfotole formulated as an emulsifiable concentrate.

- Container size - 8.1 L, 129.6 L, 405 L

Crops and Staging:

Application beyond the maximum rates provided below may result in crop injury.

Crop	Stage
Barley, Spring wheat (including durum)	1 to 6 leaves on the main stem plus 3 tillers

Weeds, Rates and Staging:

Apply at the 3 to 4 leaf stage for optimum control. Optimum weed control and yield response occurs when weeds are removed before the crop tillers.

Apply 0.81 L per acre (one 8.1 L container treats 10 acres) to control:

Grass weeds from the 1 to 6 leaf stage up to emergence of 3rd tiller:

- Barnyard grass
- Foxtail (green and yellow)
- Wild oat

Broadleaf weeds from the 1 to 6 leaf stage unless otherwise indicated:

- Canada fleabane (up to 10 cm)*
- Canada thistle[†] (up to 30 cm)
- Chickweed
- Cleavers (1 to 3 whorls)
- Cleavers (4 to 6 whorls)*
- Dandelion[†] (up to 25 cm across^{††})
- Flixweed (up to 10 cm)
- Hemp-nettle
- Kochia (up to 10 cm)
- Narrow-leaved hawk's-beard (up to 10 cm and before bolting)
- Pale smartweed
- Ragweed (common)
- Redroot pigweed
- Round-leaved mallow[†]
- Russian thistle (up to 10 cm)
- Shepherd's-purse
- Sow-thistle (annual, perennial[†])
- Stinkweed
- Stork's-bill (up to 8 leaf)***
- Volunteer canola**
- Wild buckwheat
- Wild mustard

[†] Suppression only

^{††} Spring seedlings and over-wintered rosettes.

* Add 200 g of active ammonium sulfate per acre (202 g per acre of 99% dry; 0.5 L per acre of 40% liquid; or 0.4 L per acre of 49% solution).

** Including all herbicide tolerant varieties.

*** Only when mixed with 2,4-D ester and ammonium sulphate.

DO NOT apply *Tundra* or other products containing fenoxaprop, pyrasulfotole or bromoxynil more than once in the same year.

Application Information:

- **Water Volume:**
 - **Ground:** 18.9 L per acre. Use higher water volumes for dense crop/weed canopies.
 - **Aerial:** 11.4 L per acre.
- **Nozzles and Pressure:** Use a combination of nozzles and pressure designed to deliver thorough, even coverage with **ASABE medium** classification droplets. Low drift nozzles may require higher pressures for proper performance.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
fenoxaprop	POST (foliar)	ACCCase Lipid Synthesis Inhibitor	Toward areas of growth (Symplast)	Grass only	1
bromoxynil	POST (foliar)	PSII Inhibitor/ Membrane disruptor	Little (apoplast)	Broadleaf only	6
pyrasulfotole	POST (foliar)	HPPD Pigment Inhibitor	Some – both foliar & root (Apoplast) – Somewhat systemic (has soil residues)	Broadleaf only	27

Effects of Growing Conditions:

Crop injury may result if applied to a crop that is stressed by severe weather conditions, frost, low fertility, drought, water-saturated soil, disease or insect damage. Weeds growing under adverse environmental conditions such as drought will be less susceptible to *Tundra*. Under stressed conditions and/or heavy crop canopy, early application will result in improved weed control.

Tank Mixes:

Herbicides:

- 2,4-D ester (113 g ae per acre) + ammonium sulphate (see "Weeds, Rates and Staging:" above)

Fungicides: None registered.

Insecticides: None registered.

Fertilizers: DO NOT mix with fertilizers other than those indicated above.

Bayer also supports the following mixes that are not on the *Tundra* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Lontrel*, MCPA Ester + ammonium sulphate.

Fungicides: *Tilt*

Insecticides: *Decis*, *Sevin XLR*.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 1 hour may reduce control.
- **Re-entry Interval:** DO NOT enter treated areas for 24 hours.
- **Grazing Restrictions:** DO NOT graze or cut cereal crops for hay, within 25 days of application.
- **Pre-harvest Interval:** Leave 65 days from application to harvest.
- **Re-cropping Interval:** Alfalfa, barley, canaryseed, canola, corn (Manitoba only), flax, oat, potato, soybean (Manitoba only), sunflower, tomato (Manitoba only), and wheat (spring, and durum) may be planted the season following application. Field pea may be grown the following year in all black, grey-wooded and dark brown soil zones. DO NOT plant field pea the season following *Tundra* use in the brown soil zone where organic matter content is below 2.5% and where soil pH is above 7.5. Lentil may be seeded the second season following application.
- **Aerial Application:** May be applied by air.
- **Storage:** Store in a dry controlled temperature facility. DO NOT freeze. Shake before using if stored for longer than one year.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	3	1	10
Fixed wing aircraft	20	5	375
Helicopter	20	3	225

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on tank mixing on pages 12 and 13.

Hazard Rating:



Caution – Poison



Danger – Corrosive to eyes and skin.



Warning – Eye Irritant.

Potential skin sensitizer.

For an explanation of the symbols used here see pages 7 and 8.

Ultim 75DF/Grande*

* For use only in the Red River Valley of Manitoba

Herbicide Group
2 - rimsulfuron &
nicosulfuron
(Refer to page 45)

Company:

Corteva Agriscience (*Ultim 75DF* - PCP#24736; *Ultim Grande* - PCP#32709)

Formulation:

37.5% rimsulfuron and 37.5% nicosulfuron formulated as a water dispersible granule.

- Container size -
 - *Ultim 75DF* - 134.8 g (4 x 33.7 g water soluble bags)
 - *Ultim Grande* - 270 g

Crops and Staging*:

Field corn: 1 to 4 leaf stage:

Note: Corn hybrids with ratings of less than 2500 corn heat units may be sensitive to *Ultim*. Check with seed supplier prior to applying to ensure the hybrid has known tolerance to Group 2 herbicides.

* **NOTE - Since applications to corn in Manitoba has been registered under the User Requested Minor Use program, the manufacturer assumes no responsibility for herbicide performance. Application to corn is at the risk of the user.**

Weeds, Rates and Staging:

13.5 g per acre (one *Ultim 75DF* container will treat 40 acres; one *Ultim Grande* container will treat 20 acres) plus a non-ionic surfactant (*AgSurf II*, *Agral 90*, *Citowett Plus*) at 0.2 L per 100 L of spray solution. The following weeds will be control or suppressed at the stage indicated:

Weed	Stage
Wild oats	3 to 6 leaf
Foxtail (green and yellow*), barnyard grass, volunteer cereals	1 to 6 leaf (up to 2 tillers)
Quackgrass	3 to 6 leaf stage (with extended leaf 4 to 8 inches long)
Redroot pigweed	2 to 6 leaf
Volunteer canola**	Emergence to 5 leaf stage

Contact the manufacturer for additional weeds not listed on the label.

* **Suppression only.**

** **Not Clearfield varieties.**

Maximum ONE APPLICATION PER YEAR of *Ultim* or other products containing nicosulfuron or rimsulfuron.

Apply *Ultim* within 24 hours of mixing, as product degradation may occur resulting in reduced weed control. Refer to the product label for complete mixing instructions.

Application Information:

- **Water Volume:** Minimum 40 L per acre; for best results apply 56 to 77 L per acre.
- **Nozzles and Pressure:** No pressures listed on label when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of *ASABE medium* droplets.
- **Screens:** Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
rimsulfuron, nicosulfuron	POST	ALS Amino Acid synthesis Inhibitor	Toward growth areas (Symplast)	Broadleaf & grasses	2

Effects of Growing Conditions:

Apply ONLY when the temperature in the 24 hours before AND after application is between 5°C and 28°C. Rapid fluctuations in temperature (greater than 20°C difference within 24 to 36 hours) will stress the corn crop. For maximum crop safety, allow 48 to 72 hours for the corn to acclimatize before applying *Ultim*. Separate applications of *Ultim* herbicide followed by a broadleaf herbicide (minimum 12 hours later) will reduce the potential for injury.

Crop injury may result if application is made to corn that has been stressed by abnormally hot, humid or cold weather conditions, frost, low fertility, drought, water saturated soil, compacted soil, previous pesticide applications, disease or insect damage. If corn has been injured by frost, wait 48 to 72 hours before applying *Ultim*.

Tank Mixes:

Herbicides: None registered.

Insecticides: None registered. *Ultim* should NOT be applied to corn that has been treated with *Chlorpyrifos*. Leave 7 days between the application of *Ultim* and that of a foliar organophosphate insecticide.

Fungicides: None registered.

Note: The above mixes are those listed on the *Ultim* label only. E.I. duPont also supports the following mixes that are not on the *Ultim* label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:** Glyphosate at registered rates in glyphosate tolerant corn.

Restrictions:

- **Rainfall:** Within 2 to 4 hours may reduce control.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Grazing Restrictions:** DO NOT graze or feed treated corn forage, silage, fodder or grain for at least 30 days.
- **Pre-harvest Interval:** Leave 30 days from application to harvest.
- **Re-cropping Interval:** Field corn, winter wheat and spring barley may be planted the year following application. Perform a field bioassay before planting any other crops, or where *Ultim* is more persistent (sandy soils, with low organic matter and pH greater than 7).
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store product in original containers in a secure, dry area, away from other pesticides, food, or feed.
- **Buffer Zones:**

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	5

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

The manufacturer recommends a cleanout process similar to 'Method A' in the general section on sprayer cleaning on pages 12 and 13. See the label for specific instructions.

Hazard Rating:



Warning – Eye Irritant.



Caution – Skin Irritant.

For an explanation of the symbols used here see pages 7 and 8.

Ultra Blazer

Herbicide Group
14 - acifluorfen
(Refer to page 45)

Company:

United Phosphorus Inc. (PCP#32330)

Formulation:

240 g/L acifluorfen present as a sodium salt and formulated as a solution.

- Container size - 10 L jug

Crops and Staging:

Soybean: from the 1 to 3 trifoliolate leaf stage. DO NOT apply before the first trifoliolate leaf stage of the soybean. DO NOT apply to soybeans grown on sand or loamy sand soils.

Weeds and Staging:

Ultra Blazer applied at 0.5 L per acre (one jug treats 20 acres) plus *Assist* adjuvant at 0.5 L per 100 L of spray solution will control:

Weed	Maximum Leaf Stage
Common ragweed	8
Redroot pigweed	4

Ultra Blazer applied at 1.0 L per acre** (one jug treats 10 acres) will control the weeds above plus the following weeds at the maximum leaf stages listed:

Weed	Maximum Stage
Canada thistle*	Pre-bud
Cocklebur	4 leaf
Common milkweed*	-
Field bindweed*	-
Hedge bindweed*	-
Lamb's-quarters	2 leaf
Nightshade (eastern black)	6 leaf
Redroot pigweed	6 leaf
Smartweed (including lady's- thumb)	8 leaf
Wild Mustard	2 leaf

* Top growth control only. The plant will grow back from underground roots

** DO NOT add *Assist* adjuvant with the 1.0 L per acre rate as crop injury will result.

Refer to the product label for complete mixing instructions for this product and its mixes. A general mixing guide can be found on page 11.

Application Information:

- **Water Volume:** No specific water volume is provided on the label but a minimum of 81 L per acre is implied by the adjuvant rates on the label. Good coverage of weed foliage is required for proper control.
- **Nozzles and Pressure:** Use nozzles and pressure designed to deliver thorough, even coverage with *ASABE medium* droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
acifluorfen	POST (foliar)	PPO Inhibitor/ Membrane disruptor	Little movement due to rapid cell leakage (Symplast)	Broadleaf only	14

Effects of Growing Conditions:

Soybeans may exhibit speckling, bronzing and/or leaf burn. The trifoliolate leaf emerging at the time of application may be distorted. Soybeans usually outgrow these conditions and continue to grow at a normal rate with no adverse effect on vigour, maturity, or crop yield. It is important to have good spray coverage on the weeds as *Ultra Blazer* works mainly by contact action. Failure to follow the suggested application rate and timing may result in unsatisfactory control.

Tank Mixes:

Herbicides:

- *Ultra Blazer* (0.5 L per acre) plus *Basagran Forté* (0.5 L per acre)
 - *Ultra Blazer* (0.255 L per acre) plus *Basagran** or *Basagran Forté* (0.71 L per acre) depending on predominant weed species present.
 - See label for details.
- * Add *Assist* adjuvant at 0.5 L per 100 L of spray solution for *Basagran* tank mix only.

Fertilizers: None registered. DO NOT add fertilizers to the spray mixture.

Insecticides: None registered.

Fungicides: None registered.

Note: The above mixes are those listed on the *Ultra Blazer* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 6 hours may reduce weed control.
- **Re-entry Interval:** DO NOT enter treated fields for 12 hours.
- **Pre-harvest Interval:** No specific preharvest interval is indicated on the label.
- **Grazing Restrictions:** DO NOT graze the treated crop or cut for hay.
- **Re-cropping Interval:** The label has no restriction on crops that may be planted the following season.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** DO NOT freeze.
- **Buffer Zones:** Leave a buffer of 15 metres from the last spray pass and sensitive upland areas such as other crops, pastures, rangeland, woodlots or shelterbelts.

Sprayer Cleaning:

Refer to 'Method B' in the general section on sprayer cleaning on pages 12 and 13. Sprayers may require cleaning after several tank loads to remove any excessive oil buildup on the inside of the sprayer.

Hazard Rating:



Caution – Poison



Danger – Corrosive to eyes.



Warning - Causes skin irritation. Avoid contact with skin. Harmful if inhaled.

For an explanation of the symbols used here see pages 7 and 8.

Valtera/Chateau

Herbicide Group
14 - flumioxazin
(Refer to page 45)

Company:

Valent Canada, Inc. Distributed by Nufarm Agriculture

Formulation:

51.1% flumioxazin formulated as a water dispersible granule.

- Container size -
 - *Valtera* (PCP#29230): 4.54 kg
 - *Chateau* (PCP#29231): 1.13 kg

Crops, Rates, and Staging:

Maximum ONE APPLICATION per year of *Valtera* or *Chateau* or other products containing flumioxazin.

Pre-seed or pre-emergent:

Spring Application:

Crop	Product	Rate (g per acre)		Acres Treated per Container	
		Soil Type		Soil Type	
		Coarse	Medium	Coarse	Medium
Potato***	<i>Chateau</i>	42.5	42.5	26.5	26.5
Soybean*	<i>Valtera</i>	56.7	85.0*	80	53
Chickpea, Field pea, Spring wheat (NOT including durum)**	<i>Valtera</i>	56.7	56.7	80	80
Non-crop use – bare ground application	<i>Valtera, Chateau</i>	113.0	170.0	40 (<i>Valtera</i>) 10 (<i>Chateau</i>)	26 (<i>Valtera</i>) 6.5 (<i>Chateau</i>)

* May cause crop injury.

Fall Application:

Crop	Product	Rate (g per acre)		Acres Treated per Container	
		Soil Type		Soil type	
		Coarse	Medium	Coarse	Medium
Soybean	<i>Valtera</i>	56.7	85.0	80	53
Chickpea, Field pea, Lentil (red, green), Spring wheat (NOT including durum)**	<i>Valtera</i>	56.7	85.0	80	53

* Seed soybean at least 1.5 inches (4 cm) deep

** Seed wheat at least 1 inch (2.5 cm) deep; apply *Valtera* a minimum of 7 days prior to seeding spring wheat.

*** **Potatoes (*Chateau* only):** Apply after hilling. A minimum of 2 inches (5 cm) of soil must cover the vegetative portion of the potato or crop injury may result.

If applied without glyphosate, add methylated seed oil (MSO) at 1 L per acre or a non-ion surfactant such as *Nufarm Enhance* at 0.125 to 0.25 L per 100 L of spray solution.

If weeds are emerged, apply *Valtera* in a mix with a foliar herbicide (see tank mix section).

Harvest Aid (*Valtera* only): Apply 42.5 g per acre when crops are physiologically mature to dry green weed material. Add metholated seed oil (MSO) at 1 L per acre or a non-ion surfactant such as *Nufarm Enhance* at 0.125 to 0.25 L per 100 L of spray solution.

- Chickpea, Dry Bean, Field pea – a minimum of 80% of the pods are yellow to tan in colour and 20% are yellow in colour
- Wheat – 30% or less grain moisture.

Note: As of January 1, 2019 www.keepingitclean.ca indicates that grain from crops treated with this product prior to harvest may have market access concerns. Please see page 10 for more information AND consult potential grain buyers before using this product.

Weeds and Rates:

Apply prior to crop and weed emergence.

***Chateau* applied at 42.5 g per acre** provides suppression of the following weeds:**

- Canada fleabane
- Kochia
- Lamb's-quarters
- Nightshade (Eastern black, hairy)
- Pigweed (green, redroot)
- Ragweed, common

***Valtera* applied at 56.7 to 85.0 g per acre provides control of the weeds above plus:**

- Common chickweed
- Dandelion
- Green foxtail*
- Volunteer canola
- Waterhemp (including Group 2, 5 & 9 resistant biotypes)

* Suppression

** Rate for *Chateau* in potato only.

DO NOT apply on soils with > 5% organic matter, or fine soils. Soils such as clay, clay loam, silty clay or silty clay loam are considered fine textured soils. DO NOT apply to soils composed of more than 90% sand and gravel.

The duration of residual control may be reduced at lower rates. Spray within 6 hours of mixing.

Application Information:

- **Water Volume:** Minimum application volume is not indicated on the label. Use appropriate water volumes to ensure good spray coverage.
- **Nozzles and Pressure:** Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE medium* droplets.
- **Screens:** The use of 50 mesh screens is recommended.
- **DO NOT** perform any tillage operations after application otherwise weed control will be reduced. When applied prior to seeding crops must be direct seeded with minimum disturbance systems.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
flumioxazin	PRE (surface) with residual soil activity, Pre-harvest	PPO Inhibitor/ Membrane disruptor	<i>PRE:</i> Upward in plant (Apoplast) <i>Preharvest:</i> Little movement due to rapid cell leakage (Symplast)	Broadleaf only	14

Effects of Growing Conditions:

Rainfall is required to activate flumioxazin in the soil. Crop injury may occur when soils are wet and cool following application or soils are poorly drained. Severe injury may occur with flooded soils. Newly emerging foliage can be temporarily injured by heavy rain splashing treated soil on leaves. Heavy crop residues may reduce weed control.

Irrigation: If rainfall is not received after application, 5 to 10 mm of irrigation may be applied to improve weed control activity. **DO NOT** apply irrigation to wheat after emergence until the main head is fully emerged.

Tank Mixes:

The following mixes are for *Valtera* only.

Herbicides:

- **Soybean, Wheat or Bare Ground:**
 - Glyphosate (IPA or K salts) 180 to 486 g ae per acre. (spring or fall)
Note: **DO NOT** mix when applying prior to soybean with *Dual II Magnum* or *Frontier/Outlook* herbicides or injury could occur.
- **Field pea and chickpea (spring or fall) and lentil (fall only):**
 - Glyphosate (IPA or K salts) 180 to 360 g ae per acre.
- **Dry Bean Desiccation only:**
 - Glyphosate (IPA or K salts) at preharvest rates.

Fertilizers: None registered.

Fungicides: None registered.

Insecticides: None registered.

Note: The above mixes are those listed on the *Valtera* label only.

Nufarm Agriculture also supports the following mixes that are not on the *Valtera* label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:**
 - Soybean, Spring wheat: *BlackHawk*
 - Field pea, Spring wheat: *GoldWing*

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Rain or irrigation shortly after application is required for activation. If rainfall does not occur, irrigation with at least 5 mm of water is recommended before ground crack occurs.
- **Re-entry Interval:** **DO NOT** re-enter treated fields for 12 hours.
- **Grazing Restrictions:** **DO NOT** graze or cut crops for livestock feed from treated fields.
- **Pre-harvest Interval:**
 - **Desiccation:** Leave 5 days between application and harvest. Leave 7 days to harvest if mixing with glyphosate.

- **Re-cropping Interval:** Soybeans, chickpea, and field pea, may be seeded immediately after treatment or in the spring following a fall application. Lentils may be seeded in the spring following a fall application. Spring wheat may be seeded into minimum and no-till fields 7 days after a spring *Valtera* application or anytime in the spring after a fall application. Winter wheat may be seeded 7 days after dry bean desiccation or in the fall following spring application. Alfalfa, barley, canola, field corn, sorghum, dry edible beans**, and sunflower may be seeded the season after spring application. All other crops require a minimum of 12 months and a successful bioassay prior to indicate safe seeding.
** **Note:** Not all varieties of dry beans have been tested for recrop tolerance. Test new varieties of dry beans on a small area before attempting large acreages.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** Store in a cool, dry place. May be frozen.
- **Buffer Zones:**

Crops	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Potato, Dry bean desiccation	2	1	5
Chickpea, field pea, soybean, Spring wheat	3	1	10
Bare Ground uses	5	2	25

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13. See product label for further information.

Hazard Rating:



Caution – Poison

For an explanation of the symbols used here see pages 7 and 8.

Varro

**Herbicide Group
2 - thien carbazone**
(Refer to page 45)

Company:

Bayer (PCP#29070)

Formulation:

10 g/L thien carbazone-methyl formulated as a suspension concentrate.

- Container size - 2 x 8 L

Crops and Staging:

Spring wheat (including durum):

- 1 to 6 main stem leaf stage to a maximum of 3 tillers, and before the first node can be felt in the stem. Under drought conditions, do not apply if there is >35 days between seeding and spraying, as drought hastens crop development.

Winter wheat:

- Spring or fall application from 1 to 6 main stem leaf stage and before the first node can be felt in the stem. DO NOT apply after the presence of the first node as crop injury may occur.

Weeds and Staging:

Grass weeds controlled from 1 to 6 main stem leaves and prior to the emergence of the 3rd tiller unless otherwise indicated:

- Barnyard grass
- Japanese brome[†] **
- Volunteer canaryseed *
- Foxtail (green and yellow[†])
- Persian darnel[†]
- Wild oats

Broadleaf weeds controlled at the 1 to 6 leaf stage unless otherwise indicated:

- Cleavers (1 to 6 whorls)
- Round-leaved mallow[†]
- Volunteer canola (except Clearfield varieties)
- Hemp-nettle
- Russian thistle (up to 10 cm)[†]
- Wild buckwheat
- Lamb's-quarters[†]
- Shepherd's-purse
- Wild mustard
- Pale smartweed
- Stinkweed
- Pigweed, redroot

* Up to the emergence of the 2nd tiller.

** Prior to tillering.

† Suppression only.

Rates:

0.2 L per acre

(One 8 L container will treat 40 acres)

Add ammonium sulphate on spring wheat only for improved weed control. Add 200 g active ammonium sulphate per acre (202 g per acre of 99% dry; 0.5 L per acre of 40% liquid or 0.4 L per acre of 49% solution) to the tank before adding other components.

DO NOT add ammonium sulphate to applications on durum wheat.

For improved weed control in durum wheat add either *Agral 90* or *AgSurf* at 0.25 L per 100 L.

Application Information:

- **Water Volume:**
 - **Ground:** 20 to 40 L per acre. Use higher water volumes for dense canopies.
 - **Aerial:** Minimum 11.3 L per acre.
- **Nozzles and Pressure:**
 - **Ground:** For conventional flat fan nozzles use a pressure of 30 to 50 PSI (207 to 345 kPa). Angle nozzles forward 45 degrees for better coverage. Low drift nozzles may require higher pressures for proper performance.
 - **Aerial:** Minimum 43 PSI (300 kPa).

For either ground or aerial, use a combination of nozzles and pressure designed to deliver thorough, even coverage with **ASABE medium** droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
thiencarbazone	POST (foliar)	ALS Amino Acid Synthesis Inhibitor	Toward areas of growth (Symplast)	Broadleaf & grass	2

Effects of Growing Conditions:

DO NOT apply to crops or weeds that are stressed (frost, low fertility, drought or flooding, disease or insect damage) as crop injury or reduced weed control may result. Under drought conditions DO NOT apply to spring or durum wheat if the time from seeding to spraying exceeds 35 days or if temperatures will be 3°C or lower within 3 days of application (before or after).

Tank Mixes:

Add ammonium sulphate to the tank first then *Varro* then the tank mix partner.

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

- **Wheat (including spring, durum, winter):**
 - *Infinity*
 - *Thumper*

- **Spring Wheat (including durum):**
 - 2,4-D ester (129 g ae per acre)
 - *Buctril M*
 - *Infty FX*
 - MCPA ester (0.23 L per acre – 600 g/L form)
- **Spring Wheat (NOT including durum):**
 - *Curtail M* (0.61 L per acre)*
 - *Frontline XL*
 - *Refine SG*
 - *Refine SG* + 2,4-D ester (rates above)
 - *Refine SG* + MCPA ester (rates above)

Fungicides: None registered.

Insecticides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Varro* label only.

Bayer also supports the following mixes on spring wheat and durum that are not on the *Varro* label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:** *Attain XC, Barricade II, Momentum, OctTain, Paradigm, Pixxaro, Prestige XC*, Refine M/Broadside, Retain SG, Stellar, Travallas*
- * When tank-mixing *Varro* with *Prestige XC* or *Curtail M* in spring wheat (NOT durum) always add ammonium sulphate.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 11.

Restrictions:

- **Rainfall:** Within 1 hour may reduce control.
- **Re-entry Interval:** DO NOT enter treated field for 12 hours.
- **Grazing Restrictions:** Must not be grazed within 7 days or cut for livestock feed within 30 days of treatment.
- **Pre-harvest Interval:** DO NOT harvest grain or straw within 60 days of application for spring and durum wheat or within 72 days of application to winter wheat.
- **Re-cropping Interval:** Alfalfa, barley, canaryseed, canola, chickpea, dry bean, field corn, flax, lentil, mustard, oat, pea, soybean, sunflower, timothy, and wheat (durum, spring) may be seeded the year following application.
- **Aerial Application:** May be applied by air.
- **Storage:** Store in a cool, dry place. Keep from freezing. Shake well before using.
- **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	1	0	1
Fixed wing aircraft	1	0	30
Helicopter	1	0	30

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 12 and 13. If mixing with other pesticides, combine this method with the method indicated for the tank mix partner.

Hazard Rating:



Warning – Eye and Skin Irritant.

For an explanation of the symbols used here see pages 7 and 8.

Velocity m3

Herbicide Group
2 - thiencazone
6 - bromoxynil
27 - pyrasulfotole
(Refer to page 45)

Company:

Bayer (PCP#29584)

Formulation:

5 g/L thiencazone-methyl, 31.3 g/L pyrasulfotole and 175 g/L bromoxynil formulated as a suspension concentrate

- Container size - 8.1 L and 129.6 L

Crops and Staging:

Spring wheat (including durum):

- 1 to 6 main stem leaf stage to a maximum of 3 tillers, and before the first node can be felt in the stem. Under drought conditions, do not apply if there is >35 days between seeding and spraying, as drought hastens crop development.

Winter wheat:

- Spring or fall from 1 to 6 leaf stage and before the first node can be felt in the stem. DO NOT apply after the first node is detectable in the stem as crop injury may occur.

Weeds and Staging:

Grass weeds controlled from 1 to 6 main stem leaves and prior to the emergence of the 3rd tiller:

- | | | |
|---|-------------------------------|-------------------------------|
| ◦ Barnyard grass | ◦ Canaryseed | ◦ Wild oat |
| ◦ Foxtail (green and yellow) [†] | ◦ Persian darnel [†] | ◦ Japanese brome [†] |

Broadleaf weeds controlled at the 1 to 6 leaf stage unless otherwise indicated:

- | | | |
|---|--|---|
| ◦ Canada fleabane
(seedlings 1 to 10 cm)* | ◦ Kochia (up to 10 cm) | ◦ Shepherd's-purse |
| ◦ Canada thistle (up to 30 cm) [†] | ◦ Lamb's-quarters | ◦ Sow-thistle (annual, perennial [†]) |
| ◦ Common chickweed | ◦ Narrow-leaved hawk's-beard
(up to 10 cm and prior to bolting) | ◦ Spreading atriplex (1 to 10 leaf) ^{†*} |
| ◦ Cleavers (1 to 3 whorls) | ◦ Pale smartweed | ◦ Stinkweed |
| ◦ Cleavers (4 to 6 whorls)* | ◦ Pigweed, redroot | ◦ Stork's-bill (1 to 8 leaf)** |
| ◦ Dandelion (up to 25 cm diameter) [†] | ◦ Ragweed (common, giant ^{†*}) | ◦ Volunteer canola (all varieties) |
| ◦ Flixweed (up to 10 cm) | ◦ Round-leaved mallow | ◦ Wild buckwheat |
| ◦ Hemp-nettle | ◦ Russian thistle (up to 10 cm) | ◦ Wild mustard |

[†] Suppression only.

* Add ammonium sulphate as per the "Rates:" section below.

** Only when mixed with 2,4-D ester + ammonium sulphate (see Tank Mixes).

Rates:

0.405 L per acre

(One 8.1 L container treats 20 acres, 129.6 L drum will treat 320 acres)

Add ammonium sulphate on spring wheat only for improved weed control or when tank mixing with 2,4-D or MCPA. Add 200 g active ammonium sulphate (202 g per acre of 99% dry; 0.5 L per acre of 40% liquid or 0.4 L per acre of 49% liquid).

If using an ammonium sulphate product with a different concentration, adjust the rate accordingly.

DO NOT add ammonium sulphate to applications on durum wheat.

DO NOT apply *Velocity m3* or other products containing thiencazone, pyrasulfotole or bromoxynil more than once in the same year.

Application Information:

- **Water Volume:**
 - **Ground:** 20 to 40 L per acre. Use higher water volumes for dense canopies.
 - **Aerial:** Minimum 11.4 L per acre.

- **Nozzles and Pressure:**

- **Ground:** For conventional flat fan nozzles use a pressure of 30 to 50 PSI (207 to 345 kPa). Angle nozzles forward 45 degrees for better coverage. Low drift nozzles may require higher pressures for proper performance.
- **Aerial:** Minimum 43 PSI (300 kPa).

For either ground or aerial, use a combination of nozzles and pressure designed to deliver thorough, even coverage with **ASABE medium** droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
thiencarbazone	POST (foliar)	ALS Amino Acid Synthesis Inhibitor	Toward areas of growth (Symplast)	Broadleaf & grass	2
bromoxynil	POST (foliar)	PSII Inhibitor/ Membrane disruptor	Little (apoplast)	Broadleaf only	6
pyrasulfotole	POST (foliar)	HPPD Pigment Inhibitor	Some – both foliar & root (Apoplast) – Somewhat systemic (has soil residues)	Broadleaf only	27

Effects of Growing Conditions:

DO NOT apply to crops or weeds that are stressed (frost, low fertility, drought or flooding, disease or insect damage) as crop injury or reduced weed control may result.

DO NOT apply to spring or durum wheat under conditions where the time from seeding to spraying exceeds 35 days or if temperatures will be 3°C or lower within 3 days of application (before or after).

Tank Mixes:

Herbicides:

- 2,4-D ester (113 g ae per acre) + ammonium sulphate* (see Rates).
- * **add ammonium sulphate on spring wheat (NOT durum) only.**

Bayer supports the following mixes that are not on the Velocity m3 label. Apply mixes according to the most restrictive use limitations for either product:

- **Herbicides:** Lontrel, MCPA Ester* (94.5 to 189 mL - 600 g/L forms).
- * **When adding MCPA Ester to Velocity m3 tank-mix, ammonium sulphate must be added for application to spring wheat only (see "Rates:" section above).**

Fungicides: Tilt

Insecticides: Decis, Sevin XLR.

Restrictions:

- **Rainfall:** Within 1 hour may reduce control.
- **Re-entry Interval:** DO NOT enter treated field for 24 hours.
- **Pre-harvest Interval:** DO NOT harvest grain or straw within 60 days of application to spring and durum wheat or within 72 days of application to winter wheat.
- **Grazing Restrictions:** Must not be cut for livestock feed within 30 days or grazed by livestock within 25 days of treating the crop.
- **Re-cropping Interval:** Alfalfa, barley, canaryseed, canola, field corn (Manitoba only), flax, soybean (Manitoba only), tame oat, and wheat (durum, spring) may be seeded the year following application. Field pea may be grown the following year in all black, grey-wooded and dark brown soil zones. DO NOT plant field pea the season following Velocity m3 use in the brown soil zone where organic matter content is below 2.5% and where soil pH is above 7.5. Lentil may be seeded the second season after application.
- **Aerial Application:** May be applied by air.
- **Storage:** Store in a cool, dry place. Keep from freezing. This product is combustible. DO NOT store near heat or open flame.

• **Buffer Zones:**

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	1	1	5
Fixed wing airplane	10	1	375
Helicopter	10	1	225

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general sprayer cleaning section on pages 12 and 13.

Hazard Rating:

 Warning – Poison

 Danger – Corrosive to eyes.

Skin Irritant

Potential Skin Sensitizer

For an explanation of the symbols used here see pages 7 and 8.

Velpar DF CU

Herbicide Group
5 - hexazinone
(Refer to page 45)

Company:

Tessenderlo Kerley Inc. (PCP#25225)

Formulation:

75% hexazinone formulated as a water dispersible granule.

- Container size - 2 kg

Crops and Staging:

Established alfalfa for forage and seed (established 18 months or longer). Apply in late fall prior to freeze-up when alfalfa is dormant or in early spring before alfalfa growth resumes. If burning or irrigation is to be carried out, do not apply until these operations have been completed.

Crop injury may occur in fields where alfalfa root growth has been restricted by hard pans or other physical barriers to root growth.

Weeds, Rates and Staging:

Application stage is dictated by the crop dormancy listed above.

Apply a minimum of 0.272 kg per acre to control:

- Dandelion
- Sow-thistle
- Quackgrass

Apply 0.544 kg per acre to control:

- *The weeds above plus:*
 - Narrow-leaved hawk's-beard
 - Scentless chamomile

Use the lower rate on medium-textured soils with low organic matter.

DO NOT apply *Velpar DF CU* to:

- soil that is frozen
- Soil with less than 1% organic matter content
- Soil that is gravely/rocky, sandy or has exposed subsoil

Application Information:

- **Water Volume:** 81 L per acre.
- **Nozzles and Pressure:** 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE coarse* droplets.

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
hexazinone	PRE (surface) soil active	PSII Inhibitor/ Membrane disruptor	Upward soil applied (Apoplast)	Broadleaf & grass	5

Effects of Growing Conditions:

Adequate soil moisture is required for activation of the product.

Tank Mixes:

None registered.

Restrictions:

- **Rainfall:** Rainfall is beneficial for activation of the product.
- **Re-entry Interval:** DO NOT re-enter treated fields for 48 hours.
- **Grazing Restrictions:** Leave 30 days between application and grazing harvesting for feed (hay or greenfeed).
- **Re-cropping Interval:** Leave 2 years of between treating alfalfa and the seeding of a crop. A field bioassay is required after 2 years to determine which crops are safe to grow.
- **Aerial Application:** DO NOT apply by air.
- **Storage:** May be frozen.
- **Buffer Zones:**
Buffers are not required for hand-held and backpack applications.

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	1	1	5

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

No specific cleaning procedures are indicated on the label. Based on products with similar chemistry, 'Method B' found in the general sprayer cleaning section on pages 12 and 13 or a commercial spray sprayer cleaning product, may provide adequate cleaning. Contact the manufacturer for more information.

Hazard Rating:



Danger – Corrosive to eyes



Caution – Poison



Caution – Skin Irritant



Warning – Contains the allergen milk

For an explanation of the symbols used here see pages 7 and 8.

Viper ADV

Herbicide Group
2 - imazamox
6 - bentazon
(Refer to page 45)

Company:

BASF Canada (PCP#30626)

Formulation:

20 g/L imazamox and 429 g/L bentazon formulated as a solution.

- Container size - 2 x 8.1 L, 129 L

Requires the addition of:

BASF 28% UAN (28-0-0) is required, but sold separately.

- Container size - 2 x (2 x 8 Liters); 128 L drums

Crops and Staging:

Field pea: 3 to 6 above-ground nodes (3 to 6 true leaves).

Dry bean (black, cranberry, great northern, navy, pinto, pink, red Mexican): *Viper ADV* plus additional *Basagran Forte* (see tank mix section) from the fully expanded first trifoliolate leaf to the second trifoliolate fully expanded.

Even though *Viper ADV* is registered for all the dry bean types above, tolerance may vary between varieties (esp. navy). Test new varieties on a small area for tolerance before widespread use.

Soybean: Emergence to 3 expanded trifoliolate leaves.

Established clover (alsike, red) for seed production only: Apply prior to flowering but before the crop canopy closes.

Note: Applications under hot, humid conditions may result in temporary leaf yellowing, leaf flecking, bronzing or burning. The crop usually outgrows this condition within 10 days and new tissues will not be affected.

Weeds and Staging:

Grasses - 1 to 4 main stem leaves or until early tillering.

- Barnyard grass
- Green foxtail
- Japanese brome*
- Persian darnel
- Volunteer barley
- Volunteer canaryseed
- Tame oat
- Volunteer wheat (including durum, not CLEARFIELD varieties)
- Wild oat
- Yellow foxtail

Broadleaf Weeds - cotyledon to 4 leaf stage.

- Cleavers*†
- Cow cockle
- Green smartweed
- Kochia*†
- Lamb's-quarters
- Pigweed (prostrate**†, redroot)
- Round-leaved mallow*
- Russian thistle
- Shepherd's-purse
- Stinkweed
- Sow-thistle (spiny annual)**†
- Stork's-bill**†
- Volunteer canola (including CLEARFIELD varieties)
- Volunteer lentils (including CLEARFIELD lentils)
- Wild buckwheat*
- Wild mustard†

* Suppression only.

† Including Group 2 resistant biotypes.

** *Viper ADV* + *Basagran Forte* in dry beans only.

Rates:

400 mL per acre

(One case of *Viper ADV* treats 40 acres)

Add 28 % BASF UAN (sold separately) at 0.81 L per acre.

Failure to include UAN will result in significantly reduced product performance. DO NOT use any other adjuvants as injury may result.

DO NOT apply *Viper ADV* more than once or follow *Viper ADV* with any related products (*Basagran*, *Odyssey*, *Solo*) in the same year.

DO NOT apply to any crop other than those registered as severe injury will result. Refer to the product label for complete mixing instructions for this product.

A general guide to mixing can be found on page 11.

Application Information:

- **Water Volume:** Apply in 40 L per acre. High water volumes are required for adequate coverage, particularly when weed densities are high or weed staging is large.
- **Nozzles and Pressure:** Use 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage a of **ASABE medium** droplets.
- **Screens:** Use 50 mesh or coarser on both nozzle and primary plumbing screens

How it Works:

Refer to How Do Herbicides Work on page 49 for an explanation of the concepts used in the table below.

Active ingredient	Timing	Target	Movement	Spectrum	WSSA Group
imazamox	POST (foliar)	ALS Amino Acid inhibitor	Symplast	Broadleaf & grass	2
bentazon	POST (foliar)	PSII Inhibitor/Membrane disrupter	Little (Apoplast)	Broadleaf only	6

Effects of Growing Conditions:

DO NOT spray if temperatures of +5°C or less are forecast within 3 days of application. Under cool or dry conditions, control of some weeds may be severely reduced. DO NOT apply to crops stressed from hail damage, flooding, drought, hot, humid weather, widely fluctuating temperatures, prolonged cold or injury from previous herbicides, as crop injury may result.

Tank Mixes:

Dry bean (types above):

- *Basagran Forte* (145 mL per acre) plus UAN as above.

Restrictions:

- **Rainfall:** Rain within 6 hours may reduce control.
- **Re-entry Interval:** DO NOT enter treated fields for at least 12 hours.
- **Grazing Restrictions:** DO NOT graze or cut for feed.
- **Pre-harvest Interval:** DO NOT apply within 60 days of harvest.
- **Re-cropping Interval:** Winter wheat may be seeded 3 months after application. Barley, canaryseed, canola, chickpea, field corn, field pea, flax, lentil, oat, sunflower, and spring wheat (including durum) may be seeded the first season after application and tame mustard (condiment types only) the second season after application. The company recommends that a field bioassay (a test strip grown to maturity) be conducted the year before growing any crops other than those listed above. Contact manufacturer for additional information on recropping intervals.
- **Storage:** DO NOT freeze. Store in a cool, dry place above 5°C.
- **Buffer Zones:** Avoid spraying in situations where drift may occur. Leave at least 11 metres between the outside edge of the sprayed area and sensitive non-target areas such as shelterbelts, hedgerows, wetlands, woodlots, vegetated ditch banks, ponds, streams, and sloughs. Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

Sprayer Cleaning:

Refer to 'Method B' in the general sprayer cleaning section on pages 12 and 13.

Hazard Rating:



Warning – Poison



Warning – Contains the allergen soy.



Warning – Eye and Skin Irritant.

For an explanation of the symbols used here see pages 7 and 8.

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