Table 1. Guidelines For Tolerances Of Seed-Borne Diseases In Pulse Seed Intended For Planting

(These are guidelines only and should be considered with farming practices and level of disease risk for the situation.)

CHICKPEA		
Disease Pathogen	**Tolerance And Factors Affecting The Level**	**Seed Treatments Available[1,2]**
ASCOCHYTA *(Ascochyta rabiei)*	Use seed with less than or equal to 0.3% ascochyta infection[3]. Even though a seed test may indicate 0% infection, the seed lot may still contain infected seed, and seed treatment is recommended. Seed-to-seedling transmission of ascochyta blight is high in chickpea. The disease is very aggressive and can spread quickly in a field once established if weather conditions are favourable. Guidelines for ascochyta blight control in chickpea are available on Sasktchewan.ca under Crop Protection.	Apron Advance® *(active ingredients: fludioxonil[C] metalaxyl-M [S] and thiabendazole)* Apron Maxx RTA® / Apron Maxx RFC® *(active ingredients: fludioxonil [C] and metalaxyl-M [S])* Crown® *(active ingredients: carbathiin [S] and thiabendazole [S,C])* Cruiser Maxx Pulses® *(active ingredients: thiamethoxam insecticide, fludioxonil C and metalaxyl-M [S] fungicides)* Trilex AL® *(active ingredients: trifloxystrobin[C] and metalaxyl[S])*
SEED ROTS and DAMPING OFF (Pythium and Phytophthora species)	These are soil-borne diseases and are not tested for at seed testing labs. The use of seed treatment is strongly recommended for kabuli varieties since they are very susceptible to these diseases.	Allegiance FL® (active ingredient: metalaxyl S) Apron Advance® (active ingredients: fludioxonil C metalaxyl-M S and thiabendazole) Apron Maxx RTA/RFC® (active ingredients: fludioxonil C, metalaxyl-M S) Belmont 2.7 FS® (active ingredient: metalaxyl S) Cruiser Maxx Pulses® (active ingredients: thiamethoxam insecticide, fludioxonil C and metalaxyl-M S fungicides) Trilex AL® (active ingredients: trifloxystrobinC and metalaxylS)
SEED ROTS and SEEDLING BLIGHTS (Botrytis, Sclerotinia, Rhizoctonia, and Fusarium species)	Sclerotinia, Rhizoctonia and Fusarium are primarily soil-borne. Botrytis and Fusarium are also often seed-borne and can be tested for at seed testing labs. Up to 10 % infection (Sclerotinia + Botrytis) may be tolerable, but will result in significant seedling blight if a seed treatment is not used. The importance of seed-borne Fusarium in seed rot and seedling blight in pulses is not known. Some labs will notify growers if greater than 5% Fusarium infection occurs. If present, add the Fusarium value to the Sclerotinia + Botrytis value above (not to exceed 10%).	Agrox FL® (active ingredient: captanC) Apron Advance® (active ingredients: fludioxonil C metalaxyl-M S and thiabendazole) Apron Maxx RTA® / Apron Maxx RFC® (active ingredients: fludioxonil C and metalaxyl-M S) Crown® (active ingredients: carbathiin S, thiabendazole S,C) Cruiser Maxx Pulses® (active ingredients: thiamethoxam insecticide, fludioxonil C and metalaxyl-M S fungicides) Trilex AL® (active ingredients: trifloxystrobinC and metalaxylS)

LENTIL		
Disease Pathogen	**Tolerance And Factors Affecting The Level**	**Seed Treatments Available[1,2]**
ASCOCHYTA (Ascochyta lentis)	Up to 5% ascochyta infection may be tolerable in the Brown and Dark Brown soil zones of Saskatchewan, if weather patterns are normal. A seed treatment should be used if infection levels are close to or exceed 5%. Seed should be avoided if infection levels exceed 10%. High infection levels are usually indicative of other quality issues. Use seed with 0% ascochyta infection if planting in the Black soil zone of Saskatchewan.	Apron Maxx RTA® / Apron Maxx RFC®(active ingredients: fludioxonil C and metalaxyl-M S) Crown® (active ingredients: carbathiin S and thiabendazole S,C) Cruiser Maxx Pulses® (active ingredients: thiamethoxam insecticide, fludioxonil C and metalaxyl-M S fungicides) Cruiser Maxx Pulses® (active ingredients: thiamethoxam insecticide, fludioxonil C and metalaxyl-M S fungicides) Trilex AL® (active ingredients: trifloxystrobinC and metalaxylS)
ANTHRACNOSE (Colletotrichum truncatum)	Anthracnose is not highly seed-borne and levels are rarely over 1%. Infected lentil stubble serves as a greater inoculum source. Do not use anthracnose-infected seed if it is being planted in a field where lentil has never been grown.	None.
SEED ROTS and DAMPING OFF (Pythium species)	Pythium is soil-borne and not tested for at seed testing labs. Most lentil varieties contain tannin in the seed coat, which has fungicidal properties against Pythium. Seed treatment is recommended only for low tannin lentils.	Allegiance FL® (active ingredient: metalaxyl S) Apron Advance® (active ingredients: fludioxonil C metalaxyl-M S and thiabendazole) Apron Maxx RTA® / Apron Maxx RFC®(active ingredients: fludioxonil C and metalaxyl-M S) Belmont 2.7 FS® (active ingredient: metalaxyl S) Cruiser Maxx Pulses® (active ingredients: thiamethoxam insecticide, fludioxonil C and metalaxyl-M S fungicides) Trilex AL® (active ingredients: trifloxystrobinC and metalaxylS) Vitaflo 280® (active ingredients: carbathiin S, thiram C)

SEED ROTS and SEEDLING BLIGHTS (Botrytis, Sclerotinia, Rhizoctonia, and Fusarium species)	Sclerotinia, Rhizoctonia and Fusarium are primarily soil-borne. Botrytis and Fusarium are also often seed-borne and can be tested for at seed testing labs. Up to 10% infection (Sclerotinia + Botrytis) may be tolerable, but will result in significant seedling blight if a seed treatment is not used. The importance of seed-borne Fusarium in seed rot and seedling blight in pulses is not known. Some labs will notify growers if greater than 5% Fusarium infection occurs. If present, add the Fusarium value to the Sclerotinia + Botrytis value above (not to exceed 10%).	Agrox FL® (active ingredient: captanC) Apron Advance® (active ingredients: fludioxonil C metalaxyl-M S and thiabendazole) Apron Maxx RTA® / Apron Maxx RFC®(active ingredients: fludioxonil C and metalaxyl-M S) Crown® (active ingredients: carbathiin S, thiabendazole S,C) Cruiser Maxx Pulses® (active ingredients: thiamethoxam insecticide, fludioxonil C and metalaxyl-M S fungicides) Trilex AL® (active ingredients: trifloxystrobinC and metalaxylS) Vitaflo 280® (active ingredients: carbathiin S, thiram C)
FIELD PEA		
Disease Pathogen	**Tolerance And Factors Affecting The Level**	**Seed Treatments Available[1,2]**
ASCOCHYTA (Mycosphaerella pinodes, Ascochyta pinodella, Ascochyta pisi)	Up to 10% ascochyta infection should not significantly affect plant establishment and yield, as long as the seed has good germination, and spring conditions promote quick germination and good seedling vigour. Seed to seedling transmission of ascochyta in pea under field conditions is considered low. In areas where pea production is common, the primary means of infection is air-borne spores from the over-wintering stage of Mycosphaerella pinodes on pea residues.	Apron Advance® (active ingredients: fludioxonil C metalaxyl-M S and thiabendazole) Apron Maxx RTA® / Apron Maxx RFC®(active ingredients: fludioxonil C and metalaxyl-M S) Trilex AL® (active ingredients: trifloxystrobinC and metalaxylS) Vitaflo 280®(active ingredients: carbathiin S, thiram C)
SEED ROTS and DAMPING OFF (Pythium sp. and Phytophthora sp.)	These are soil-borne diseases and are not tested for at seed testing labs. Seed treatment in field pea may be beneficial when planting under cool, moist soil conditions, or if using damaged or cracked seed.	Allegiance FL® (active ingredient: metalaxyl S) Apron Advance® (active ingredients: fludioxonil C metalaxyl-M S and thiabendazole) Apron Maxx RTA® / Apron Maxx RFC®(active ingredients: fludioxonil C and metalaxyl-M S) Belmont 2.7 FS® (active ingredient: metalaxyl S) Cruiser Maxx Pulses® (active ingredients: thiamethoxam insecticide, fludioxonil C and metalaxyl-M S fungicides) Trilex AL® (active ingredients: trifloxystrobinC and metalaxylS) Vitaflo 280® (active ingredients: carbathiin S, thiram C) Thiram 75WP® (active ingredient: thiram C)

SEED ROTS and SEEDLING BLIGHTS (Botrytis, Sclerotinia, Rhizoctonia, and Fusarium species)	Sclerotinia, Rhizoctonia and Fusarium are primarily soil-borne. Botrytis and Fusarium are also often seed-borne and can be tested for at seed testing labs. Up to 10% infection (Sclerotinia + Botrytis) may be tolerable, but will result in significant seedling blight if a seed treatment is not used. The importance of seed-borne Fusarium in seed rot and seedling blight in pulses is not known. Some labs will notify growers if greater than 5% Fusarium infection occurs. If present, add the Fusarium value to the Sclerotinia + Botrytis value above (not to exceed 10%).	Agrox FL® (active ingredient: captanC) Agrox CD®, Agrox B-2® (active ingredients: captanC fungicide and diazinon insecticide) Apron Advance® (active ingredients: fludioxonil C metalaxyl-M S and thiabendazole) Apron Maxx RTA® / Apron Maxx RFC®(active ingredients: fludioxonil C and metalaxyl-M S) Cruiser Maxx Pulses® (active ingredients: thiamethoxam insecticide, fludioxonil C and metalaxyl-M S fungicides) Thiram 75WP® (active ingredients: thiram C) Trilex AL® (active ingredients: trifloxystrobinC and metalaxylS) Vitaflo 280® (active ingredients: carbathiin S, thiram C)

1. This table has been updated for 2013. New seed treatments are continually being registered. Contact the Agriculture Knowledge Centre at 1-866-457-2377, your local agri-retailer, or industry representative for updated information on seed treatments registered in pulses. Saskatchewan Ministry of Agriculture's Guide to Crop Protection is available on Saskatchewan.ca (search for Guide to Crop Protection for quickest results). Always refer to the product label before applying product to the seed.
2. The level of seed-borne infection is not the only factor to consider in whether or not to apply a seed treatment, as most seed treatments are also effective against soil-borne pathogens. Refer to product label for details.
3. Saskatchewan Crop Insurance Corporation will not support claims for ascochyta loss that are made on chickpea fields that had over 0.3 per cent seed infection and no seed treatment was used. Refer to the SCIC website.
4. Cruiser Maxx Pulses® is only available to commercial seed treaters.
   C Active ingredient has contact mode of action.
   S Active ingredient has systemic mode of action.

For more information:
Contact the Agriculture Knowledge Centre at 1-866-457-2377
Refer to the Commercial Seed Analysts Association of Canada Inc. website at http://www.seedanalysts.com.