

## Agriculture Development Fund (ADF) Crops Projects 2024

- 56 crops projects were funded by ADF for a total of \$12,207,345.
- 12 Industry partners co-funded a total of \$4,255,474.

| Institution                                     | Number of Approved Projects | Total Amount Funded  |
|---|-----------------------------|----------------------|
| Agriculture and Agri-Food Canada                | 12                          | \$ 1,840,026         |
| Canadian Grain Commission                       | 1                           | \$ 123,750           |
| National Research Council Canada                | 3                           | \$ 870,297           |
| Prairie Agricultural Machinery Institute - PAMI | 1                           | \$ 60,000            |
| Saskatchewan Food Industry Development Centre   | 1                           | \$ 282,400           |
| Saskatchewan Polytechnic                        | 2                           | \$ 385,000           |
| University of Alberta                           | 2                           | \$ 408,750           |
| University of Manitoba                          | 2                           | \$ 416,063           |
| University of Regina                            | 3                           | \$ 373,000           |
| University of Saskatchewan                      | 29                          | \$ 7,448,059         |
| <b>Total Government Support</b>                 | <b>56</b>                   | <b>\$ 12,207,345</b> |

| Commodity                       | Number of Approved Projects | Total Amount Funded  |
|---------------------------------|-----------------------------|----------------------|
| Cereals                         | 14                          | \$ 3,562,207         |
| Crops related                   | 13                          | \$ 2,707,027         |
| Environment                     | 3                           | \$ 227,050           |
| Environment/Water quality       | 1                           | \$ 49,000            |
| Oilseeds                        | 11                          | \$ 2,567,371         |
| Pulses                          | 14                          | \$ 3,094,690         |
| <b>Total Government Support</b> | <b>56</b>                   | <b>\$ 12,207,345</b> |

| Crops Project Co-funders                        | Number of Approved Projects | Total Amount Funded |
|---|-----------------------------|---------------------|
| Alberta Grains                                  | 4                           | \$ 128,981          |
| Manitoba Canola Growers                         | 1                           | \$ 20,000           |
| Manitoba Crop Alliance                          | 9                           | \$ 330,972          |
| Prairie Oat Growers Association                 | 1                           | \$ 5,000            |
| Results Driven Agriculture Research (RDAR)      | 1                           | \$ 86,250           |
| Saskatchewan Barley Development Commission      | 1                           | \$ 26,918           |
| Saskatchewan Canola Development Commission      | 3                           | \$ 181,900          |
| Saskatchewan Flax Development Commission        | 1                           | \$ 95,211           |
| Saskatchewan Forage Seed Development Commission | 1                           | \$ 1,304            |
| Saskatchewan Pulse Growers                      | 10                          | \$ 1,286,076        |
| Saskatchewan Wheat Development Commission       | 10                          | \$ 830,710          |
| Western Grains Research Foundation              | 12                          | \$ 1,273,402        |
| <b>Total Industry Support</b>                   | <b>24<sup>1</sup></b>       | <b>\$ 4,255,474</b> |

<sup>1</sup>-A total of 24 projects received co-funding support. Some projects were co-funded by more than one co-funder.

## **Agriculture and Agri-Food Canada**

### **Metabolites responsible for antagonistic activity of biocontrol candidates for controlling Aphanomyces root rot in pulses (20230035)**

Principle Investigator: Krista Gill, Agriculture and Agri-Food Canada

Objectives:

- Determine the secondary metabolites produced by 10 biocontrol candidate bacteria with antagonistic activity against *A. euteiches*.
- Evaluate the efficacy of bacterial secondary metabolites against *A. euteiches* in vitro and in greenhouse trials with field pea.
- Biological formulation development of top 4 biocontrol candidates.

Co-funded by: Saskatchewan Pulse Growers, Western Grains Research Foundation

ADF Funding: \$101,350

### **Comparing irrigation scheduling tools in Saskatchewan (20230089)**

Principle Investigator: Erin Karppinen, Agriculture and Agri-Food Canada

Objectives:

- To compare the irrigation requirements of different scheduling tools and associated impact on crop yield, quality, and WUE.
- Evaluate the return on investment associated with different irrigation scheduling methods.
- Increase knowledge of and promote adoption of irrigation scheduling tools.

ADF Funding: \$65,235

### **Genetic targeting of grain quality and disease resistance in barley (20230098)**

Principle Investigator: Elizabeth Brauer, Agriculture and Agri-Food Canada

Objectives:

- Improve efficiency of genome editing protocols in barley by optimizing current methods on Canadian germplasm.
- Modify genetic targets and determine their impact on grain dormancy and disease resistance.
- Development of molecular markers for functionally relevant genes.

ADF Funding: \$147,950

### **A comprehensive survey to detect the presence of important foliar and root diseases of faba bean across the prairies (20230150)**

Principle Investigator: Ahmed Abdelmagid, Agriculture and Agri-Food Canada

Objectives:

- Providing accurate, up-to-date information on the distribution, incidence, and severity of diseases affecting faba bean across the prairies.
- To identify the important plant pathogens affecting faba bean across the prairies.
- To test the aggressiveness and pathogenicity of the isolated fungal pathogens from faba bean collected from the prairies.
- To establish a collection of faba bean fungal pathogens.
- Identifying certain agronomic factors that may influence faba bean pathogen prevalence.

Co-funded by: Saskatchewan Pulse Growers

ADF Funding: \$132,000

### **Understanding, mitigating, and managing PPO inhibitor (Group 14)-resistant kochia (20230188)**

Principle Investigator: Charles Geddes, Agriculture and Agri-Food Canada

Objectives:

- Determine cross-resistance to PPO-inhibiting (Group 14) herbicides in PPO inhibitor-resistant kochia confirmed in SK.
- Determine cross- or multiple-resistance to other herbicide modes of action in PPO inhibitor (Group 14)- resistant kochia.
- Determine the mechanism conferring resistance to PPO-inhibiting (Group 14) herbicides in kochia.
- Continue monitoring kochia survey samples for PPO inhibitor (Group 14) resistance across the Canadian Prairies.
- Assess efficacy of alternative herbicides to manage multiple herbicide-resistant kochia prior to crop seeding.
- Determine the mid/long-term utility and sustainability of strategic tillage for kochia management.
- Assess the impact of timing and implement/depth of soil disturbance on kochia emergence, density, and the soil seedbank.
- Determine the mid/long-term impact of winter cereals and perennials in crop rotations on multiple herbicide-resistant kochia.

Co-funded by: Manitoba Crop Alliance, Prairie Oat Growers Association, Saskatchewan Canola Development Commission, Saskatchewan Pulse Growers, Saskatchewan Wheat Development Commission, Western Grains Research Foundation

ADF Funding: \$240,750

### **Development of crop coefficient for wheat and potato to improve yield, quality, water use efficiency and ensure sustainability (20230197)**

Principle Investigator: Hakibu Tanko, Agriculture and Agri-Food Canada

Objectives:

- Determine crop evapotranspiration (ET<sub>c</sub>) and develop local crop coefficients (K<sub>c</sub>) for wheat at various stages of development.
- Determine crop evapotranspiration (ET<sub>c</sub>) and develop local crop coefficients (K<sub>c</sub>) for potato at various stages of development.

ADF Funding: \$243,700

### **Developing novel low tannin, early maturing fenugreek germplasm for the Prairies (20230203)**

Principle Investigator: Isobel Parkin, Agriculture and Agri-Food Canada

Objectives:

- Development of two recombinant inbred line (RIL) populations.
- Field phenotyping of selected diverse fenugreek lines and the RIL populations.
- Conduct GWAS and QTL analyses for agronomically important traits - develop linked molecular markers.
- Select lines and initiate crosses for cultivar development.

Co-funded by: Saskatchewan Pulse Growers

ADF Funding: \$199,750

### **Enhancing organic wheat production: early seeding and improved weed management (20230210)**

Principle Investigator: Kui Liu, Agriculture and Agri-Food Canada

Objectives:

- Determine early seeding on yield and quality of spring wheat in organic cropping systems.
- Assess the effectiveness of living mulch and interrow cultivation on weed control in early seeded organic wheat systems.

ADF Funding: \$195,000.00

### **A companion crop for biennial caraway (20230226)**

Principle Investigator: William May, Agriculture and Agri-Food Canada

Objectives:

- To determine the most suitable companion crop for the biennial caraway.
- To determine the impact of different companion crops on disease severity in biennial caraway.

ADF Funding: \$127,001

### **Mapping QTLs for scald resistance in doubled-haploid (two-row, malting barley) populations involving resistant source 'Revanche' (20230263)**

Principle Investigator: James Tucker, Agriculture and Agri-Food Canada

Objectives:

- Association mapping of scald resistance loci.

ADF Funding: \$89,100

### **Integrating genomic selection with doubled haploid technology to accelerate the genetic gains in Canadian wheat (20230269)**

Principle Investigator: Yuefeng Ruan, Agriculture and Agri-Food Canada

Objectives:

- Develop genomic selection models of doubled haploid (DH) populations of CWRS and CWAD wheat classes for DH genomic selection.
- Explore the utilization of genomic selection with doubled haploid technology to accelerate the genetic gains in CWRS wheat.
- Explore the utilization of genomic selection with doubled haploid technology to accelerate the genetic gains in CWAD wheat.

Co-funded by: Saskatchewan Wheat Development Commission, Western Grains Research Foundation

ADF Funding: \$244,840

### **Reclamation of saline-sodic soils for improved agricultural productivity (20230335)**

Principle Investigator: Evan Derald, Agriculture and Agri-Food Canada

Objectives:

- Identify best management practices for the reclamation of Saline-Sodic Soils under drained conditions.
- Evaluate the return on investment associated with researched methodologies.

ADF Funding: \$53,350

### **Canadian Grain Commission**

#### **Improving ergot assessment and management in wheat (20230270)**

Principle Investigator: Sean Walkowiak, Canadian Grain Commission

Objectives:

- Evaluation of sampling and assessment methods for ergot sclerotia and ergot alkaloids in wheat.
- Assessment of causes for ergot increases and identification of tools for improved management and breeding.

Co-funded by: Manitoba Crop Alliance, Saskatchewan Wheat Development Commission

ADF Funding: \$123,750

### **National Research Council Canada**

#### **Improving wild low bush blueberry (*Vaccinium angustifolium* Ait.) for Saskatchewan Boreal Forest (20230304)**

Principle Investigator: Pankaj Bhowmik, National Research Council Canada

Objectives:

- Evaluate tissue culture response and berry quality in a diverse collection of low- bush blueberry germplasm.
- In vitro ploidy manipulation for the low bush blue Berry improvement with desirable morphological and physiological traits.
- Characterize phenotypic variation of the in vitro Cultured plantlets.

ADF Funding: \$260,155

#### **Field trial and ingredient testing for the assessment of protein quality and flavour profile of the low lipoxygenase pea lines (20230305)**

Principle Investigator: Pankaj Bhowmik, National Research Council Canada

Objectives:

- To evaluate low lipoxygenase (LOX) pea lines in the field.
- To examine the impact of low LOX pea lines on Ingredient properties.

Co-funded by: Saskatchewan Pulse Growers

ADF Funding: \$110,500

#### **PEACE (Pea Climate-Efficient): Developing climate-resilient, low carbon footprint field pea as a preferred rotation crop (20230316)**

Principle Investigator: Sateesh Kagale, National Research Council Canada

Objectives:

- Harnessing genetic diversity for disease resistance, abiotic stress tolerance, and improved protein quality traits in pea.
- Phenotyping of the CSPGR in controlled and field environments to identify root rot resistant and drought tolerant genotypes.
- Adaptive breeding through genomic selection.
- Gene editing to validate candidate genes and develop peas with novel traits such as improved yield and stress tolerance.
- Legal, social, and economic gaps in knowledge of the genomics-informed potential of climate efficient pea.

ADF Funding: \$499,642

**Prairie Agricultural Machinery Institute – PAMI**

**Electrification of the Biomass Feedstock Recovery Process (20230379)**

Principle Investigator: Charley Sprenger, Prairie Agricultural Machinery Institute - PAMI

Objectives:

- Identify biomass feedstock recovery requirements and constraints.
- Conduct a life cycle analysis for an electric biomass feedstock recovery program.
- Determine the economic and technical feasibility of an electric biomass feedstock recovery system.

ADF Funding: \$60,000

**Saskatchewan Food Industry Development Centre**

**A new lease on life for oat hulls – fermentation-based lifeline for disruptive food innovations (20230006)**

Principle Investigator: Pooba Ganeshan, Saskatchewan Food Industry Development Centre Inc.

Objectives:

- Co-culture optimization of Rhizopus oligosporous and lactic acid bacteria with oat hulls.
- Small scale SSF with oat hulls soaked in lactic acid pH 4.0.
- SSF with oat hulls at 10 Kg scale to further optimize conditions.
- Pilot scale SSF at 150 Kg scale.
- Techno-economic analysis of oat hulls SSF.
- Incorporation of SSF-derived oat hulls into food products.

ADF Funding: \$282,400

**Saskatchewan Polytechnic**

**Development of RTM home panels utilizing hemp, flax and wood fibers, and recycled plastics for Indigenous communities in SK (20230239)**

Principle Investigator: Satyanarayan Panigrahi, Saskatchewan Polytechnic

Objectives:

- Increase the environmental sustainability of SIPs through the use of more eco-friendly materials and manufacturing processes.
- Assess feasibility & benefits of using Agri waste in SIPs for economic & environmental sustainability of Agri industry.
- Reduce production costs of SIPs while maintaining or improving performance compared to AC Reality's current SIPs.

ADF Funding: \$210,000

**Development of reusable clamshell food container using hemp fiber reinforced bioplastic-composite (20230353)**

Principle Investigator: Bobbi Bates, Saskatchewan Polytechnic

Objectives:

- Demonstrate bioplastic composites, using Ag waste, contributes to value-added production & sustainable farming practices.
- Demonstrate that a supply chain for crude hemp fiber, and refined fiber can be established.
- Develop & test a durable, hemp fiber-reinforced, bioplastic composite food clamshell specimen that meets food safety standards.
- Assess the economics and sustainability of industrial production of the bioplastic composite clamshell container.
- Contextualize project results within wider research activities relating to crop-residue based bioplastics products.

ADF Funding: \$175,000

**University of Alberta**

**Fungicide sensitivity and identification of novel tan spot resistance in durum wheat landraces for Canadian variety improvement (20230343)**

Principle Investigator: Stephen Strelkov, University of Alberta

Objectives:

- Increase knowledge of host resistance mechanisms and identify new sources of tan spot resistance.
- Obtain an updated picture of the race structure of *Pyrenophora tritici repentis* in Alberta and Saskatchewan.
- Expand the tan spot differential set to accommodate new races.
- Evaluate current pathogen population for fungicide sensitivity.

Co-funded by: Alberta Grains, Results Driven Agriculture Research, Saskatchewan Wheat Development Commission

ADF Funding: \$172,500

**University of British Columbia**

**TILL-D: A sequence-configured *Aegilops tauschii* TILLING resource for wheat improvement (20230019)**

Principle Investigator: Gurcharn Singh Brar, University of British Columbia

Objectives:

- Selfing 2,656 M3 mutants of *Ae. tauschii* accession TA2450 to M5 generation.
- Sequencing ~2,000 M5 mutants using illumina Novoseq platform at 10x depth.
- Identification, characterization, and validation of mutations.

Co-funded by: Alberta Grains, Manitoba Crop Alliance, Saskatchewan Wheat Development Commission, ADF Funding: \$225,000

## University of Manitoba

### **Wheat midge: Enhanced wheat resistance traits to protect the *Sm1* gene (20230204)**

Principle Investigator: Alejandro Costamagna, University of Manitoba

Objectives:

- Pyramiding wheat midge resistance traits in spring wheat.
- Explore resistance traits (OD, EA, Sm1) and their links to surface and Volatile chemicals to understand their modes of action.
- Examine the effect of methyl salicylate on wheat midge behaviour and host-pest interaction.

Co-funded by: Manitoba Crop Alliance, Saskatchewan Wheat Development Commission, Western Grains Research Foundation

ADF Funding: \$191,063

### **Marker development and establishment of qPCR-based screening for verticillium stripe disease in Canola (20230249)**

Principle Investigator: Harmeet Singh Chawla, University of Manitoba

Objectives:

- qPCR-based screening of 250 *Brassica napus* genotypes.
- GWAS for Verticillium stripe resistance.
- Development of KASP marker around the identified polymorphisms.

Co-funded by: Manitoba Canola Growers, Saskatchewan Canola Development Commission, Western Grains Research Foundation

ADF Funding: \$225,000

## University of Regina

### **Development of a low-cost clay water filter for disinfection of livestock drinking water (20230179)**

Principle Investigator: Gordon Huang, University of Regina

Objectives:

- Develop a low-cost clay water filter for disinfection of livestock drinking water.
- Evaluate the performance of the clay water filter under field conditions.
- Integrate the developed clay water filter with existing water feeding system.
- Conduct cost-benefit analysis for clay water filter system based on multi-scale applications.

ADF Funding: \$49,000

### **Assessing the aggressiveness and host range of fungal pathogens isolated from Saskatchewan quinoa crops (20230307)**

Principle Investigator: Chris Yost, University of Regina

Objectives:

- Measure the disease severity of *Stemphylium* and *Phoma* pathogenic isolates on newly developing Quinoa varieties.
- Evaluate disease aggressiveness of *Stemphylium* isolates through correlation to genomics data.
- Determine the host range of the *Stemphylium* and *Phoma* quinoa pathogens on crops plants grown in western Canada.

ADF Funding: \$99,000



### **Exploring agricultural plastic waste conversion for sustainable circular economies (20230319)**

Principle Investigator: Denise Stilling, University of Regina

Objectives:

- To assess collection (supply chain logistics) & initial processing (cleaning/separating, size reducing, treating & forming).
- To manufacture and assess material & mechanical properties of composites (APW and other waste streams).
- To conceptualize, design, engineer & prototype potential commercial product(s) using Phase 1 discovered properties.
- To select appropriate product(s) using market assessments and mfg. capacity for commercial viability.
- To improve product and develop manufacturing plans.
- To prepare for commercialization by developing a business plan.

ADF Funding: \$225,000

### **University of Saskatchewan**

#### **Exploring biochemical diversity in faba beans and their seed coats for added value potential (20230003)**

Principle Investigator: Randall Purves, University of Saskatchewan

Objectives:

- To characterize/identify metabolites in grain type faba bean seeds and seed coats, including those from mutant germplasm.
- To identify key metabolite differences among grain type faba seeds, and correlate with assays to answer biochemical questions.
- Characterize/identify metabolites from vegetable type faba bean seeds and crosses from collaborator Vandenberg's research.
- To identify key differences in metabolite profiles among all faba beans seeds/seed coats and correlate with assays.

ADF Funding: \$209,000

#### **Improving weed management for Saskatchewan growers (20230034)**

Principle Investigator: Christian Willenborg, University of Saskatchewan

Objectives:

- Seek new chemical and ecological options to improve weed management for the benefit of Saskatchewan growers, including minor use registrations where needed.
- Develop new weed management tactics and integrated methods to help mitigate the development of herbicide resistant weeds.
- Support the training of new undergraduate and graduate students in various aspects of weed management.

ADF Funding: \$492,683

### **Total utilization of oilseed hull: Canola, flaxseed, and borage (20230042)**

Principle Investigator: Martin Reaney, University of Saskatchewan

Objectives:

- Determine the effect of borage hull removal on the value of borage oil yield and borage meal protein.
- Flaxseed hull as a source of polysaccharide.
- Flaxseed hull as a source of lignan.
- Flaxseed hull oil utilization studies.
- Characterize hull fractions from dehulling using commercial processing technology.
- Canola lignin/amino acid utilization studies.
- Canola hull insoluble fiber utilization.
- Canola hull oil utilization studies.
- Synchrotron based imaging of whole, tempered, and dehulled seed.

ADF Funding: \$360,000

### **Developing irrigation economic models to improve producer outcomes and sustainable agricultural water management in Saskatchewan (20230060)**

Principle Investigator: Patrick Lloyd-Smith, University of Saskatchewan

Objectives:

- Construct a database integrating parcel-level farmland sales data with economic, agronomic, and water allocation information.
- Survey agricultural producers and stakeholders on irrigation adoption barriers, water management, and economics.
- Conduct a water market readiness assessment for Saskatchewan.
- Synthesize lessons learned from the implementation of more flexible water allocation mechanisms in other jurisdictions.
- Develop and apply irrigation economic models of producer behaviour to evaluate alternative water management policies.

ADF Funding: \$200,000

### **Land application of spent filtration earth from canola oil production to improve soil properties (20230064)**

Principle Investigator: Jeff Schoenau, University of Saskatchewan

Objectives:

- Determine effects on soils and crops from application of spent filtration clay that is a by-product of canola crushing.
- Reveal rates of spent filtration earth and co-amendments that optimize performance in Saskatchewan soils.

Co-funded by: Saskatchewan Canola Development Commission

ADF Funding: \$118,200

### **Effect of calcium containing soil amendments on soil conditions, plant growth and greenhouse gas emissions (20230071)**

Principle Investigator: Jeff Schoenau, University of Saskatchewan

Objectives:

- Determine effects of calcium containing soil amendments on crop growth, soil properties and GHG emissions.

Co-funded by: Saskatchewan Forage Seed Development Commission, Western Grains Research Foundation

ADF Funding: \$55,500

### **Improvement of phosphorus use efficiency and abiotic stress tolerance in chickpea (20230115)**

Principle Investigator: Bunyamin Tar'an, University of Saskatchewan

Objectives:

- To evaluate phosphorus (P) use efficiency (PUE) and drought stress tolerance in chickpea.
- To identify genomic regions associated with root traits associated with P-use efficiency and drought tolerance.
- To develop breeding lines with improved PUE and drought stress tolerance.

ADF Funding: \$489,613

### **Enhancing genetic gain for yield, biotic and abiotic stress tolerance in flax (20230116)**

Principle Investigator: Bunyamin Tar'an, University of Saskatchewan

Objectives:

- Enhance flax yield potential by increasing additive genetic variance, increasing selection intensity, and reducing time interval.
- Develop screening protocol for tolerance to high temperatures.
- Identify interspecific flax genotypes with tolerance to a) heat stress and b) resistance to pasmo.
- Identify genetic components associated with a) heat tolerance and b) resistance to pasmo in interspecific population of flax.
- Development of breeding lines with improved yield potential and tolerance to high temperature and improved resistance to pasmo.

Co-funded by: Manitoba Crop Alliance, Saskatchewan Flax Development Commission, Western Grains Research Foundation

ADF Funding: \$317,371

### **Digital phenotyping to accelerate wheat breeding (20230164)**

Principle Investigator: Steven Shirliffe, University of Saskatchewan

Objectives:

- The overall objective of this research project is to utilize image-based phenotypes to increase the efficiency of plant breeding.
- Develop methodology to digitally phenotype, early generation wheat hill-plots to predict yield and harvest index (HI).
- Develop and utilize digital phenotypes for specific traits within wheat breeding programs. Phenotypes targeted: canopy senescence (quick dry down), crop lodging and straw strength, and drought tolerance.

Co-funded by: Alberta Grains, Manitoba Crop Alliance, Saskatchewan Wheat Development Commission, Western Grains Research Foundation

ADF Funding: \$315,353

**Development of a commercial wet fractionation process for producing novel oat protein ingredients (20230166)**

Principle Investigator: Michael Nickerson, University of Saskatchewan

Objectives:

- Develop a fractionation method for maximizing protein content and yields.
- Investigate the effect of pretreatments (enzymes, microwave, and radiofrequency) to improve the extraction of oat protein.
- Evaluation of the composition and functionality of protein ingredients produced using the optimized fractionation processes.
- Scale up the benchtop fractionation process to the pilot scale, followed by ingredient evaluation.

ADF Funding: \$244,000

**Crop rotation: Using selection targets to improve lentil and wheat performance in a changing climate (20230170)**

Principle Investigator: Kirstin Bett, University of Saskatchewan

Objectives:

- Reducing nitrous oxide emissions by wheat through biological nitrification inhibition.
- Tracing N movement from lentil to wheat using <sup>15</sup>N.
- Multi-crop breeding for reduced N requirements in wheat.
- Activating climate-smart cultivars and microbiomes.
- Activating genomic knowledge for climate-smart plant breeding.
- Increasing adoption of climate-smart crop rotations and better understanding their benefits.

ADF Funding: \$625,000

**Production of fuel pellets from agricultural residues as bio-coal for conversion to biofuels using gasification and combustion (20230175)**

Principle Investigator: Ajay Dalai, University of Saskatchewan

Objectives:

- Steam explosion and microwave torrefaction of agricultural residues to produce treated precursors.
- Co-pelletization of raw precursor, treated precursor, and bio-additives to produce moisture-resistance (hydrophobic) biopellets.
- Combustion and gasification of bio-pellets in a pilot-scale combustion unit and a gasifier set-up to produce heat and syngas.
- Technoeconomic and life-cycle analyses of torrefaction, palletization, combustion and gasification of bio-pellets.

ADF Funding: \$385,000

**Sustainable agricultural waste management through the development of fire-resistant ducts using natural fibers (20230187)**

Principle Investigator: Venkatesh Meda, University of Saskatchewan

Objectives:

- Develop appropriate use natural fibers with industrial partners (ABC Canada Technology, TALCO, BIOLIN and IMC).
- Develop sustainable value-added biofiber and waste management practices.
- Identify suitable natural fibers and crops for fire-resistant ducts.

ADF Funding: \$150,000

### **Development of a rapid screening technique for *Aphanomyces* root rot in pea and lentil (20230222)**

Principle Investigator: Sabine Banniza, University of Saskatchewan

Objectives:

- Protocol development for large-scale zoospore production.
- Assess different set-ups for *Aphanomyces* root rot screening.
- Compare screening in pots with newly developed root rot screening technique.
- Compare visual with digital disease severity assessments.

Co-funded by: Saskatchewan Pulse Growers, Western Grains Research Foundation

ADF Funding: \$65,733

### **Development of advanced lentil lines with partially resistance against race 0 of *Colletotrichum lentis* causing anthracnose (20230224)**

Principle Investigator: Sabine Banniza, University of Saskatchewan

Objectives:

- Development of SNP markers to differentiate resistance alleles of five known anthracnose resistance loci.
- Identification of genome-wide polymorphic sites between LR-66-590 and an elite red and a green lentil variety.
- Development of lines with homozygous resistance alleles from *L. ervoides* in a primarily elite *L. culinaris* genetic background.
- Phenotyping of selected BC3F3 for resistance to race 0 of *C. lentis*.

Co-funded by: Saskatchewan Pulse Growers

ADF Funding: \$316,494

### **Implementing a low cost ROPS program to reduce Saskatchewan farm fatalities (20230245)**

Principle Investigator: James Wassermann, University of Saskatchewan

Objectives:

- Determine SK farmers ROPS needs and rollout a pilot project to build ROPS.
- Establish the national office of the Canadian ROPS Program in Saskatchewan.
- To provide Saskatchewan Leadership in a National Low Cost Agricultural Rollover Protective Structure (ROPS) Project.

ADF Funding: \$50,800

### **Assessing seed to seedling transmission of *Xanthomonas translucens* causing BLS of cereals to establish inoculum thresholds (20230264)**

Principle Investigator: Randy Kutcher, University of Saskatchewan

Objectives:

- Determine seed to seedling transmission rate of *Xanthomonas translucens* (Xt) under field conditions to establish risk threshold levels.
- Effect of temperature and seed treatments on multiplication of Xt and symptom expression in seed with varying infection levels.

Co-funded by: Alberta Grains, Manitoba Crop Alliance, Saskatchewan Barley Development Commission, Saskatchewan Wheat Development Commission, Western Grains Research Foundation

ADF Funding: \$179,457

### **Crops with benefits: using rotations to reduce greenhouse gas emissions (20230271)**

Principle Investigator: Kate Congreves, University of Saskatchewan

Objectives:

- Quantify year-round greenhouse gas emissions for a wheat-canola vs a wheat-canola-pea rotation.
- Quantify the combined benefits of diversified rotations alongside advanced N management designed to further reduce greenhouse gas emissions.

Co-funded by: Saskatchewan Pulse Growers

ADF Funding: \$421,246

### **Temperature, soybean protein and seed filling (20230284)**

Principle Investigator: Rosalind Bueckert, University of Saskatchewan

Objectives:

- Cool temperature effects on seed and pod growth.
- Cool temperature effects on soybean seed quality.
- Cool temperature effects on plant and organ nitrogen content.

ADF Funding: \$20,125

### **Develop a green, non-thermal and sustainable process for improving functionalities of pulse proteins (20230288)**

Principle Investigator: Lifeng Zhang, University of Saskatchewan

Objectives:

- Develop a lab-scale processor using green and emerging non-thermal technology for modifying plant-based protein ingredients.
- Characterize techno-functional and nutritional properties of plant-based proteins treated by cold plasma technology.
- Investigate the potential usage of cold plasma as a de-flavoring process to improve the sensory qualities.
- Develop a pilot-scale continuous operation device combining cold plasma and fluidized bed technologies for protein treatment.

Co-funded by: Saskatchewan Pulse Growers

ADF Funding: \$217,500

### **Development of faba bean and oat-based texturized vegetable proteins as meat analogues (20230290)**

Principle Investigator: Michael Nickerson, University of Saskatchewan

Objectives:

- Production and characterization of faba bean – oat texturized vegetable protein (TVP).
- Prototype development.

ADF Funding: \$210,000

### **PeaTILL – A TILLING population for improvement of yield, seed protein concentration and resistance to root rots in pea (20230292)**

Principle Investigator: Tom Warkentin, University of Saskatchewan

Objectives:

- Develop a fast neutron bombardment -based TILLING population of pea, i.e., PeaTILL for trait development in pea.
- Evaluation of PeaTILL for targeted traits, i.e., agronomic, yield, seed protein concentration and root rot resistance.
- Phenotyping of the core set of PeaTILL for targeted traits in multiple locations and environments.
- Genotyping of the core set of PeaTILL for identification of the genetic basis of trait improvement.

Co-funded by: Saskatchewan Pulse Growers

ADF Funding: \$294,113

### **Soybean leaf area and leaf nitrogen (20230294)**

Principle Investigator: Rosalind Bueckert, University of Saskatchewan

Objectives:

- Light interception.
- Leaf nitrogen.
- Plots for digital phenotyping.

ADF Funding: \$165,485

### **Building a better nitrogen pantry in pea (20230302)**

Principle Investigator: Rosalind Bueckert, University of Saskatchewan

Objectives:

- Light interception and leaf (Stipule) area in the field.
- Leaf and stem nitrogen.
- Length, area, volume metrics.

ADF Funding: \$195,385

### **Valorization of oat hulls for materials, chemicals and functional food ingredients (20230328)**

Principle Investigator: Bishnu Acharya, University of Saskatchewan

Objectives:

- Pilot scale fractionation of oat hulls.
- Demonstrate the application of oat-hulls based hemicellulose as a naturally derived food ingredient.
- Demonstrate the application of oat-hulls based lignin as a slow-release fertilizer and binder in canola pellets.
- Demonstrate the application of oat-hulls based cellulose pulp in packaging material and drilling fluids.

ADF Funding: \$292,500

### **Improving accessibility of FHB resistance in wheat (20230332)**

Principle Investigator: Curtis Pozniak, Crop Development Centre, University of Saskatchewan

Objectives:

- De novo domestication of FHB resistant wheat wild relatives.
- Exploring FHB susceptibility factors.
- Uncovering FHB-*Rht-B1* relationships.

Co-funded by: Manitoba Crop Alliance, Saskatchewan Wheat Development Commission, Western Grains Research Foundation

ADF Funding: \$242,501

### **Improving food application of prairie crop-based oleosomes by modifying their structure and functionality (20230356)**

Principle Investigator: Supratim Ghosh, University of Saskatchewan

Objectives:

- Aqueous extraction of oleosomes from Saskatchewan-based oilseeds with improved stability and functionality.
- Modification of oleosome rheology to improve food application.
- Develop oleogels from highly stable oleosomes to replace saturated fat in food application.
- Investigate the melting characteristics of oleosome-based oleogels.
- Scale-up production of modified oleosome and oleosome-templated oleogel in a commercial processing facility.
- Demonstrate food application of oleosomes.

ADF Funding: \$235,000

### **Genomic assisted breeding for heat and drought tolerance in wheat (20230367)**

Principle Investigator: Curtis Pozniak, Crop Development Centre, University of Saskatchewan

Objectives:

- Optimization of a rapid genotyping platform to support genomic selection in wheat.
- Development of digital phenotyping platforms for heat/drought selection in wheat.
- Development of predictive selection models for heat/drought in wheat.

Co-funded by: Manitoba Crop Alliance, Saskatchewan Wheat Development Commission, Western Grains Research Foundation

ADF Funding: \$355,000

### **Total utilization of canola by-products after oil extraction (20230369)**

Principle Investigator: Rex Newkirk, University of Saskatchewan

Objectives:

- To characterize the by-products of canola oil extraction produced by emerging technologies.
- To develop fractionation methods for the separation of functional components such as protein, lignin, and phenols.
- To analyze and characterize the insoluble fibre fraction for their potential use in the fabrication of bio products.

ADF Funding: \$225,000