Summary of Agriculture Development Fund (ADF) Crops Projects of 2023

- 49 crops projects were funded by ADF for a total of $10,349,278
- Operational funding was provided to the Crop Development Center for a total of $7,259,342.
- 14 Industry partners co-funded a total of $4,624,629.

Institution	Number of Approved Projects	Total Amount Funded
Agriculture and Agri-Food Canada	12	$1,494,733
Crop Development Centre[1]	1	$7,259,342
Saskatchewan Polytechnic	1	$280,000
National Research Council Canada	2	$689,956
Prairie Agricultural Machinery Institute - PAMI	1	$100,370
Saskatchewan Food Industry Development Centre	1	$210,750
University of Manitoba	1	$113,250
University of Regina	1	$130,625
University of Saskatchewan	30	$7,329,594
Total	**50**	**$17,608,620**

[1] Operational funding for the Crop Development Centre

Commodity	Number of Approved Projects	Total Amount Funded
Cereals	10	$1,741,167
Crops related	5	$911,324
Environment	5	$1,243,576
Oilseeds	9	$1,616,114
Vegetables	1	$251,350
Operational Funding	1	$7,259,342
Pulses	19	$4,585,747
Total	**50**	**$17,608,620**

Crops Project Co-funders	Number of Approved Projects	Total Amount Funded
Alberta Wheat Commission	4	$65,000
Alberta Barley Commission	1	$44,730
Alberta Canola Producers Commission	1	$50,000
Manitoba Crop Alliance	10	$146,200
Manitoba Canola Growers	2	$23,000
Saskatchewan Barley Development Commission	2	$100,630
Saskatchewan Canary Seed Development Commission	1	$30,000
Saskatchewan Canola Development Commission	6	$473,370
Saskatchewan Forage Seed Development Commission	2	$5,100
Prairie Oat Growers Association	2	$7,500
Saskatchewan Cattlemen's Association	2	$83,478
Saskatchewan Pulse Growers	14	$1,642,919
Saskatchewan Wheat Development Commission	8	$596,682
Western Grains Research Foundation	15	$1,361,038
Total	**73**	**$4,624,629**

Agriculture and Agri-Food Canada

The Prairie Crop Disease Monitoring Network (PCDMN): fostering further network development *(20220064)*

Principal Investigator: Thomas Turkington, Agriculture and Agri-Food Canada
Objectives:

- Further development and formalization of the PCDMN network including annual in-person and/or online meetings.
- Further development & refinement of survey protocols as well as continued work on disease information & awareness initiatives.
- PCDMN Quick Disease Reporter Tool refinement, and development of disease assessment/risk tools and blackleg pathogen mapping.
- Technology transfer (field days, crop tours, fall/winter meetings, PCDMN webinars, etc.).

Co-funded by: Manitoba Crop Alliance, Manitoba Canola Growers Association, Saskatchewan Canola Development Commission, Prairie Oat Growers Association, Saskatchewan Pulse Growers Association, Saskatchewan Wheat Development Commission, Western Grains Research Foundation
ADF Funding: $136,783

The effect of liming on soil phosphorus use efficiency and cycling *(20220077)*

Principal Investigator: Barbara Cade-Menun, Agriculture and Agri-Food Canada
Objectives:

- Characterize changes in soil P availability and P use efficiency in field plots limed to potentially control root rot
- Characterize soil P forms, soil P pools and soil microbial P dynamics in field plots limed to potentially control root rot
- Greenhouse study with different liming agents, P fertilizer types/rates and crop rotations to optimize P use efficiency
- Develop management tools/practices to control root diseases without impacting P use efficiency
- Field tests of lime application methods

Co-funded by: Saskatchewan Pulse Growers Association
ADF Funding: $130,790

Insect response to climate change and ag inputs across the prairies *(20220112)*

Principal Investigator: Meghan Vankosky, Agriculture and Agri-Food Canada
Objectives:

- Understand insect pest population dynamics and forecast pest populations
- Assess the current status of insecticide resistance in western Canada
- Develop new insect information resources

Co-funded by: Alberta Wheat Development Commission, Alberta Canola Producers Commission, Manitoba Crop Alliance, Manitoba Canola Growers Association, Saskatchewan Canola Development Commission, Prairie Oat Growers Association, Saskatchewan Pulse Growers Association, Saskatchewan Wheat Development Commission, Western Grains Research Foundation
ADF Funding: $399,876

Evaluating bio-accessibility and bioavailability of anthocyanins and ferulic acid of co-pigmented purple wheat *(20220140)*

Principal Investigator: Elsayed Abdelaal, Agriculture and Agri-Food Canada
Objectives:

- To investigate effects of simulated human digestive system on anthocyanins and phenolic acids of co-pigmented purple wheat
- To assess bio-accessibility of anthocyanins and ferulic acid in co-pigmented purple wheat products
- To assess bioavailability of anthocyanins and ferulic acid in co-pigmented purple wheat products

ADF Funding: $86,000

Functional use of core pathogenicity genes to develop mitigation strategies against blackleg of canola and FHB of wheat *(20220148)*

Principal Investigator: Hossein Borhan, Agriculture and Agri-Food Canada
Objectives:

- Define the core effector (pathogenicity) genes of *F. graminearum* and *L. maculans*
- Develop core effector deletion libraries from *F. graminearum* and *L. maculans*
- Assess functional diversity of core effectors of *F. graminearum* and *L. maculans*
- Identify conserved pathogen effectors as inducers of broad-spectrum resistance

Co-funded by: Manitoba Crop Alliance, Saskatchewan Canola Development Commission, Western Grains Research Foundation
ADF Funding: $194,000

Dry onions and sweet potato: agronomic refinements and economic performance for large-scale irrigated production in Saskatchewan *(20220175)*

Principal Investigator: Jazeem Wahab, Agriculture and Agri-Food Canada
Objectives:

- Onion and sweet potato - Cultivar evaluation
- Onion – Best Management Practices
- Sweet potato - Best Management Practices
- Onion and Sweet potato - Economics
- Onion and Sweet potato - Technology transfer

ADF Funding: $251,350

Priming plant defense as an integrated pest management tool to control clubroot and blackleg diseases of canola *(20220176)*

Principal Investigator: Hossein Borhan, Agriculture and Agri-Food Canada
Objectives:

- To evaluate the effect, durability, and best application method of priming agents.
- To unravel *Brassica napus* downstream defense pathways induced by defense priming agents

ADF Funding: $167,000

Imaging for improving Fusarium-damaged kernel and deoxynivalenol resistance in Canadian wheat *(20220188)*

Principal Investigator: Samia Berraies, Agriculture and Agri-Food Canada
Objectives:

- To increase the resolution for *Fusarium* damaged kernel (FDK) assessment with imaging
- To associate deoxynivalenol (DON) accumulation to the different classes of FDK and develop a statistical model to predict DON
- To validate QTL associated with FDK classes and DON resistance in hexaploid and durum genetic populations

Co-funded by: Alberta Wheat Commission, Manitoba Crop Alliance, Saskatchewan Wheat Development Commission, Western Grains Research Foundation
ADF Funding: $149,634

Impacts of 4R stewardship on N2O emission, nutrient use efficiency and yield of major crops of Saskatchewan *(20220214)*

Principal Investigator: Haben Asgedom Tedla, Agriculture and Agri-Food Canada
Objectives:

- Identify research gaps and future needs of 4Rs for major crops of Saskatchewan cropping systems
- Evaluate the performance of machine and deep learning algorithms in predicting N2O and NUE

ADF Funding: $55,600

Identifying novel genetic factors contributing to durable disease resistance in canola *(20220217)*

Principal Investigator: Isobel Parkin, Agriculture and Agri-Food Canada
Objectives:

- Determine epialleles contributing to adaptation to prairie conditions
- Assess the role of methylation in quantitative resistance to blackleg and clubroot in canola
- Pyramid novel epialleles for enhanced disease tolerance

Co-funded by: Saskatchewan Canola Development Commission, Western Grains Research Foundation
ADF Funding: $147,400

Evaluation of the root-associated fungus *Olpidium brassicae* and its interactions with *Plasmodiophora brassicae* *(20220223)*

Principal Investigator: Jennifer Town, Agriculture and Agri-Food Canada
Objectives:

- Characterize changes in the microbiome of the root and rhizosphere of canola during clubroot infection
- Examine the relationship between *O. brassicae* colonization and *P. brassicae* infection and disease severity
- Sequence the genome for *O. brassicae* strain ‘d3f1’
- Conduct a meta-analysis of *O. brassicae* distribution during canola production in Saskatchewan and Alberta

Co-funded by: Saskatchewan Canola Development Commission, Western Grains Research Foundation
ADF Funding: $83,600

Testing new open pollinated varieties of fall rye and advancing elite winter durum populations for the Canadian prairies *(20220287)*

Principal Investigator: Raja Ragupathy, Agriculture and Agri-Food Canada

Objectives:

- To evaluate the yield performance and agronomic superiority of fall rye half sib progenies, and advance the populations
- To perform extensive grain quality and disease testing of 25 winter durum populations already selected, along with checks
- Generation advancement of winter durum populations (F_2 to F_6) and to initiate new informed crosses
- To characterize the novel haplotypes underlying cold tolerance in fall rye, winter durum and winter wheat using arrays
- To initiate consultation with various stakeholders of the wheat value chain, regarding the new crop (winter durum)

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

ADF Funding: $236,098

Crop Development Centre – University of Saskatchewan

Crop Development Centre operating budget *(20220171) *Operational Funding**

Principal Investigator: Curtis Pozniak, Crop Development Centre – University of Saskatchewan

Objectives:

- To access financial resources to support Crop Development Centre (CDC) management and technical services to CDC research and breeding

ADF Funding: $7,259,342

Saskatchewan Polytechnic

Supporting the next generation of wild rice producers through indigenous inclusion in the plant protein-based economy *(20220197)*

Principal Investigator: Blaine Chartrand, Saskatchewan Polytechnic

Objectives:

- Wild rice germplasm protection
- Establish wild rice breeding strategies in Saskatchewan
- Improvement of wild rice yield and quality
- Understand environmental parameters and microbiome profiles in the wild rice lake ecosystems of northern Saskatchewan
- Build program in wild rice improvement through a Saskatchewan Polytechnic-University of Saskatchewan partnership

ADF Funding: $280,000

National Research Council Canada

Improving barley salinity tolerance and functional quality by characterizing root, GABA, and gene expression responses *(20220191)*

Principal Investigator: Pankaj Bhowmik, National Research Council of Canada
Objectives:

- Evaluate salinity tolerance in a diverse collection of barley germplasm using high throughput root and shoot phenotyping
- Characterize salinity tolerant and sensitive barley genotypes to identify preferred traits for improving salinity tolerance
- Assess performance of salinity tolerant and sensitive barley genotypes in field environments imposing salinity stress
- Perform genome wide association mapping of salinity tolerance
- Create GABA-T null mutants using CRISPR gene editing
- Development of high GABA functional food from barley bran

Co-funded by: Alberta Barley Commission, Manitoba Crop Alliance, Saskatchewan Barley Development Commission, Western Grains Research Foundation
ADF Funding: $248,500

Mining a double haploid mutant population for improved agronomic and seed composition traits in canola (*Brassica napus* l.) *(20220321)*

Principal Investigator: Sateesh Kagale, National Research Council of Canada
Objectives:

- Characterization of a double haploid mutant population of canola to identify promising lines with desirable seed composition traits
- Field evaluation of agronomic traits and validation of seed composition traits in promising mutant lines
- Advanced proteomic analysis of canola seeds to identify napin or cruciferin rich mutant variants
- Discovery of favorable alleles underlying seed traits to support marker development and introgression into breeding programs

ADF Funding: $441,456

Prairie Agricultural Machinery Institute

Analysis of the carbon intensity of current crop production methods and adaptation potential for the future *(20220329)*

Principal Investigator: Lorne Grieger, Prairie Agricultural Machinery Institute
Objectives:

- Determine baseline product carbon footprints for cereals and canola using typical Saskatchewan crop production practices
- Measure actual energy inputs for discreet operations of seeding, spraying, harvest, and post-harvest operations
- Assess potential changes to current production methods to reduce product carbon footprint

ADF Funding: $100,370

Saskatchewan Food Industry Development Centre

Valorization of pulse starches to produce higher alcohols using simultaneous saccharification and fermentation (SSF) *(20220241)*

Principal Investigator: Mahesh Sivakumar, Saskatchewan Food Industry Development Centre

Objectives:

- To conduct proximate analysis of pea starch, test saccharification efficiency and determine further processing, if needed
- To optimize higher alcohols (Acetone-Butanol-Ethanol, ABE) production by simultaneous saccharification and fermentation
- To conduct pilot-scale production of ABE
- To conduct compositional analyses of post-fermentation biomass
- To develop process modelling, process optimization, debottlenecking, and sustainability

ADF Funding: $210,750

University of Manitoba

ROCET – rapid, on-farm, cost-efficient electrochemical testing for contaminants in grain *(20220111)*

Principal Investigator: Sabine Kuss, University of Manitoba

Objectives:

- Electrochemical detection of relevant grain contaminants
- Validation of optimized electrochemical method
- Development of a prototype sensor device

Co-funded by: Saskatchewan Pulse Growers Association, Saskatchewan Wheat Development Commission

ADF Funding: $113,250

University of Regina

Field-based assessments of the efficacy of *P. Syringae pv. tagetis* for controlling Canada thistle on organic farms *(20220244)*

Principal Investigator: John Stavrinides, University of Regina

Objectives:

- Evaluate whether organic bacterial culturing has any impact on bacterial pathogenicity
- Determine the concentration of surfactant and bacteria that maximizes infection of Canada thistle
- Establish the plant host range of strain 4091
- Conduct controlled field trials with leading formulations to assess infection rate and impact on reemergence

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

ADF Funding: $130,625

University of Saskatchewan

Exploring the diversity of *Fusarium solani* and *F. Oxysporum* infecting pulse crops *(20220029)*

Principal Investigator: Sabine Banniza, University of Saskatchewan
Objectives:

- Molecular assignment of pulse root isolates of *Fusarium solani* to clades in the *F. solani* complex
- Host range determination of *F. solani* isolates from different pulse crops on pulse crops and other rotational crops
- Molecular assignment of pulse root isolates of *Fusarium Oxysporum* to species or clades within the *F. Oxysporum* complex
- Host range determination of *F. Oxysporum* isolates from different pulse crops on pulse crops and other rotational crops

Co-funded by: Saskatchewan Pulse Growers Association, Western Grains Research Foundation
ADF Funding: $225,950

Straw harvesting strategies to provide feedstock while maintaining soil and environmental quality *(20220032)*

Principal Investigator: Jeff Schoenau, University of Saskatchewan
Objectives:

- To determine how straw harvesting affects yield, soil properties, and environmental and economic implications

Co-funded by: Manitoba Crop Alliance, Saskatchewan Forage Seed Development Commission, Saskatchewan Cattlemen's Association
ADF Funding: $102,789

Vegan soft cheese and yogurt replacement products from pulses *(20220036)*

Principal Investigator: Martin Reaney, University of Saskatchewan
Objectives:

- Develop a process for separation of pulse fiber, protein curd, starch, and pulse whey
- Mass balance of pulse processing
- Protein curd fraction nutritional quality and content
- Protein curd fraction texture and flavour properties
- Production of vegan soft cheese analogs
- Production of vegan yogurt analogs

ADF Funding: $260,000

Development of economical salinity remediation strategies for agriculture water using innovative desalination minerals *(20220060)*

Principle Investigator: Wonjae Chang, University of Saskatchewan

Objectives:

- Data collection and analysis of livestock field conditions for salinity remediation strategies (SRS) development (field investigation)
- SRS development: novel, mayenite-based permeable reactive barriers for desalination (sulfate-fixing barrier)
- SRS development: passive, mayenite-based desalination cells attached to watering systems (sulfate-fixing cells)
- SRS development: active, mayenite-based desalination reactors for pasture watering areas (mobile sulfate-fixing reactor)
- SRS development: on-site performance of mobile desalination reactor in combination with barriers and cells (field experiment)
- SRS assessment: cost optimization and engineering performance analyses

ADF Funding: $550,853.00

Reduction of off-flavors and improvement of color of plant proteins: potentials and feasibility of ozone treatment processes *(20220083)*

Principal Investigator: Jafar Soltan, University of Saskatchewan

Objectives:

- Studying the effect of ozone on off-flavors and /off-notes from plant proteins
- Enhancing color of plant proteins
- Studying the effect of ozone on functional properties of plant proteins
- Conducting techno-economic analysis and recommendation

Co-funded by: Saskatchewan Pulse Growers Association

ADF Funding: $45,000

Up-cycling of plastic waste using ethanol and biodiesel *(20220097)*

Principal Investigator: Martin Reaney, University of Saskatchewan

Objectives:

- Test glyceroxide catalyst transesterification of ester linked polymers
- Recover diethyl terephthalate, monoethyl terephthalate and ethylene glycol from transesterified PET
- Recover ethyl lactate from polylactate
- Recover diethyl carbonate and bisphenol A from a polycarbonate plastic

ADF Funding: $360,000

Examining potential threats from pea seed born mosaic virus and developing PSbMV-based tools to study legume seed development *(20220102)*

Principal Investigator: Sean Prager, University of Saskatchewan

Objectives:

- Examine PSbMV adaptation to important legumes of Saskatchewan upon repeated infection cycles
- Determine the mechanisms and durability of resistance against PSbMV exhibited by legumes grown in Saskatchewan
- Evaluate the disease severity caused by PSbMV-lineages in pea and understand the pea defense response against PSbMV
- Design efficient tools for the detection/prediction of severe PSbMV variants in the legumes of the prairies
- Develop a PSbMV-based viral vector for studies of legume seeds & to express components of the CRISPR-Cas9 system

Co-funded by: Saskatchewan Pulse Growers Association

ADF Funding: $226,500

Livestock re-integration in cropping systems for soil health improvement *(20220120)*

Principal Investigator: Maryse Bourgault, University of Saskatchewan

Objectives:

- Determine the degree of forage and/or livestock integration needed to increase soil health and cropping systems productivity
- Identify the range and magnitude of potential trade-offs in yield, soil health, water use and profitability over time
- Evaluate the effects of forages and livestock grazing separately and combined on soil health indicators

Co-funded by: Saskatchewan Cattlemen's Association

ADF Funding: $433,964

Identifying microbial inocula to increase salt tolerance in barley *(20220151)*

Principal Investigator: Jonathan Bennett, University of Saskatchewan

Objectives:

- Identify soil microbes from saline grassland soils that increase barley growth and salinity tolerance
- Determine whether the inocula are effective when applied to multiple barley varieties and at varying salinities
- Determine if the inoculation improves barley growth and yield in saline and non-saline soils in the field

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

ADF Funding: $411,699

Development of a nutritionally balanced pulse-oilseed protein-based milk *(20220155)*

Principal Investigator: Michael Nickerson, University of Saskatchewan

Objectives:

- Characterize all protein and oil ingredients
- To examine enzymatic hydrolysis as a means to improve protein solubility and emulsification in protein blends
- To examine the role of stabilizers for enhancing emulsification
- Development of plant-based milks – at the bench top
- To examine the effect of homogenization and high temperature on product quality
- Scale up plant-based milk production, followed by quality testing

ADF Funding: $305,000

Increasing the efficiency of canary seed breeding and enhancing herbicide tolerance *(20220189)*

Principal Investigator: Pierre Hucl, University of Saskatchewan

Objectives:

- Evaluate effectiveness of pre-emergent application of 'Fierce' and 'Focus' herbicides
- Evaluate canary seed germplasm for response to the herbicides 'Everest' (flucarbazone)
- To determine the efficacy of the gametocide E4FO in canary seed

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

ADF Funding: $96,527

Combining higher anthocyanin levels, enhanced quality, and improved disease resistance in the purple wheat *(20220190)*

Principal Investigator: Pierre Hucl, University of Saskatchewan

Objectives:

- Further enhancement of purple wheat baking quality
- Increasing broad-spectrum disease resistance in purple wheat
- Assess anthocyanin levels in baked products of elite high anthocyanin experimental lines

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

ADF Funding: $99,983

An accelerated disease phenotyping system to select wheat germplasm resistant to FHB and stripe rust *(20220194)*

Principal Investigator: Randy Kutcher, University of Saskatchewan

Objectives:

- Build a digitalized rapid disease phenotyping (dRDP) system under environment-controlled conditions
- Develop an FHB phenotyping protocol using the dRDP system
- Develop a stripe rust adult plant resistance phenotyping protocol using the dRDP system

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

ADF Funding: $173,823

Development of molecular tools for *Fusarium avenaceum* root rot resistance in lentil with different seed coat pigmentation *(20220202)*

Principal Investigator: Sabine Banniza, University of Saskatchewan

Objectives:

- Development of a MAGIC population derived from eight diverging parents
- Assess Aphanomyces root rot (ARR) and Fusarium root rot (FRR) resistance and seed coat colour in a lentil MAGIC population
- Map quantitative trait loci (QTLs) associated with ARR and FRR resistance and seed coat colour in the MAGIC population
- Development of molecular markers associated with ARR and FRR resistance and validation in other lentil germplasm

Co-funded by: Saskatchewan Pulse Growers Association

ADF Funding: $421,016

Development of applications of legume protein enriched fraction derivatives: combinations of proteolysis and conjugation *(20220206)*

Principal Investigator: Takuji Tanaka, University of Saskatchewan

Objectives:

- Establishment of protein conjugation conditions through transglutaminase reactions
- Optimization of conjugated products of chickpea and pea proteins at the pre-pilot scale level
- Large scale processing of hydrolyzed and conjugated-hydrolyzed products
- Preparations of prototype products

ADF Funding: $218,000

Commercializing green extraction technology of phytosterols from canola oil waste stream *(20220209)*

Principal Investigator: Anas El-Aneed, University of Saskatchewan

Objectives:

- Optimize large scale extraction of phytosterols from canola oil deodorizer distillate
- Develop a financial model and business plan

ADF Funding: $153,625

Use of infrared heating to improve functional and nutritional attributes of pea flours in prototype food products *(20220226)*

Principal Investigator: Yongfeng Ai, University of Saskatchewan

Objectives:

- To process peas using infrared (IR) heating under different conditions to prepare modified pea flours
- To examine the performance of the raw and IR-modified pea flours in extruded puffed food products
- To evaluate the performance of the raw and IR-modified pea flours in pulse-based, gluten-free pasta products
- To determine the functional and nutritional properties of the raw and IR-modified pea flours

ADF Funding: $208,500

Flax-chickpea intercropping for disease management – fungicide regime and variety selection *(20220230)*

Principal Investigator: Randy Kutcher, University of Saskatchewan
Objectives:

- To evaluate disease severity and the benefits of fungicide in chickpea-flax intercropping
- To evaluate the combinations of intercropped chickpea and flax varieties for their effects on disease management, yield, and seed

Co-funded by: Saskatchewan Pulse Growers Association
ADF Funding: $208,150

Developing soybean cultivars for profitable, sustainable prairie cropping systems *(20220262)*

Principal Investigator: Tom Warkentin, University of Saskatchewan
Objectives:

- To develop soybean cultivars for profitable, sustainable prairie crop rotations

Co-funded by: Saskatchewan Pulse Growers Association
ADF Funding: $270,250

Marker-assisted pre-breeding for alternative semi-dwarfing genes and anther extrusion in durum and bread wheat *(20220267)*

Principal Investigator: Curtis Pozniak, Crop Development Centre – University of Saskatchewan
Objectives:

- To generate elite CWAD and CPSR lines with *Rht24* and high anther extrusion (AE) sources using marker assisted selection
- To improve and deploy breeder-friendly, efficient markers for *Rht24* and AE to support marker assisted selection (MAS)
- Investigate associations between *Rht24* and AE with Fusarium head blight (FHB) resistance traits
- Localize alternative dwarfing gene(s) from Tetraploid FHB resistance sources

Co-funded by: Alberta Wheat Commission, Manitoba Crop Alliance, Saskatchewan Wheat Development Commission, Western Grains Research Foundation
ADF Funding: $195,001

Increasing protein-yield in pea using nested association mapping *(20220273)*

Principal Investigator: Tom Warkentin, University of Saskatchewan
Objectives:

- Develop a Pea Nested Association Mapping (Pea-NAM) inbred line population segregating for seed protein concentration and yield
- Genotype and phenotype the Pea-NAM population for seed protein concentration, yield and agronomic traits
- Identification of trait-associated markers using association mapping
- Evaluation and validation of genome prediction models using the NAM population

Co-funded by: Saskatchewan Pulse Growers Association, Western Grains Research Foundation
ADF Funding: $278,875

Valorization of canola meal by developing canola meal extract as a microbial media for fermentation *(20220278)*

Principal Investigator: Bishnu Acharya, University of Saskatchewan
Objectives:

- Development of a sustainable extraction process for producing canola meal (CM) based microbial media for fermentation
- Lab-scale demonstration on supplementation of canola meal extracts in microbial media
- Pilot-scale demonstration and financial analysis

Co-funded by: Saskatchewan Canola Development Commission
ADF Funding: $201,333

Development of SNP markers for marker-assisted selection of pea for water use efficiency and micronutrients *(20220280)*

Principal Investigator: Tom Warkentin, University of Saskatchewan
Objectives:

- Rapid determination of water use efficiency of a pea diversity panel (GWAS-2)
- Rapid determination of micronutrient profile of a pea diversity panel (GWAS-2)
- Association mapping of water use efficiency and micronutrient profile of pea
- Conversion of trait-associated markers to breeder-friendly KASP assays

Co-funded by: Saskatchewan Pulse Growers Association, Western Grains Research Foundation
ADF Funding: $155,747

Commercially ready vegan protein-based entrapment systems for probiotics for inclusion in plant-based foods *(20220297)*

Principal Investigator: Darren Korber, University of Saskatchewan
Objectives:

- Formulate probiotic entrapment matrix using a pea protein isolate
- Scale-up large quantities of probiotic culture in the pilot plant
- Optimization of scale-up spray drying conditions in the pilot plant to produce entrapped matrices
- Integrate entrapped ingredients into plant-based foods

Co-funded by: Saskatchewan Pulse Growers Association
ADF Funding: $262,500

Pulse protein-based whipped cream with healthy vegetable fat as a high-value dairy alternative *(20220302)*

Principal Investigator: Supratim Ghosh, University of Saskatchewan
Objectives:

- Establish a healthy vegetable oil composition mimicking dairy fat in crystallization while improving nutritional quality
- Develop pulse protein-stabilized concentrated vegetable oil-in-water emulsions mimicking heavy dairy cream
- Whip the plant-based cream emulsion to create the plant-based whipped cream
- Improve the whipping time, whippability and stability of the plant-based whipped cream to match the dairy whipped cream
- Demonstrate food application of plant-based fresh and frozen whipped cream

ADF Funding: $210,000

Genetic tools to ensure Saskatchewan dry beans are protected from anthracnose *(20220303)*

Principal Investigator: Kirstin Bett, University of Saskatchewan

Objectives:

- Identify markers to facilitate marker-assisted selection for resistance to anthracnose for western Canadian beans
- Identify suitable sources of *Co-4*^{2} and develop a strategy to incorporate this gene into susceptible market classes

Co-funded by: Saskatchewan Pulse Growers Association

ADF Funding: $129,361

The feasibility of agricultural biomass power generation in Saskatchewan *(20220308)*

Principal Investigator: Bishnu Acharya, University of Saskatchewan

Objectives:

- Accessing properties of biomass available in Saskatchewan for developing fuel for power generation
- Determining combustion properties and operational issues for burning biomass in coal fired power plant
- Technoeconomic analysis and life cycle assessment of biomass power generation in Saskatchewan

ADF Funding: $175,000

Development, characterization, and food use of novel whole-cell flours from Canadian pulses *(20220338)*

Principal Investigator: Yongfeng Ai, University of Saskatchewan

Objectives:

- To create whole-cell flours from Canadian pulses using two methods
- To characterize structure, proximate compositions, and functional properties of the whole-cell and conventional pulse flours
- To determine the nutritional profiles of the whole-cell and conventional pulse flours
- To evaluate the performance of the whole-cell and conventional pulse flours in exemplary food products

ADF Funding: $359,400

Breeding high value lentils for future consumer trends *(20220352)*

Principal Investigator: Albert Vandenberg, University of Saskatchewan

Objectives:

- Develop and refine reliable hydroponic genetic screening system for assessing Group 5 (metribuzin) tolerance in lentil
- Develop a reliable hydroponic genetic screening system for tolerance improve Group 14 (saflufenacil and trifludimoxasin) tolerance in lentil
- Develop and refine a field-based screening system for early generation selection of segregating lentil germplasm using metribuzin
- Develop a field-based screening system for early generation selection of segregating lentil germplasm using Group 14 herbicides (saflufenacil and trifludimoxasin)
- Genetic fingerprinting of tolerant genotypes

ADF Funding: $225,000

3F2B - fast forward faba bean breeding *(20220354)*

Principal Investigator: Albert Vandenberg, University of Saskatchewan

Objectives:

- Reducing seed size, improving seed shape and pod characteristics of faba bean
- Improving resistance to chocolate spot in faba bean
- Improving protein and starch profiles of faba bean seeds
- Reducing the maturity of faba bean for the northern regions and southern regions of Saskatchewan

ADF Funding: $250,000