Summary of Agriculture Development Fund (ADF) Livestock and Forages Projects for 2023

- **34** livestock and forage projects were funded by ADF for a total of **$6,022,502.00**
- **7** Industry partners co-funded a total of **$298,530.00.**

Institution	Number of Approved Projects	Total Amount Funded
Agriculture and Agri-Food Canada	3	$434,237
Alberta Invasive Species Council	1	$100,000
Lakeland College	1	$105,000
Prairie Swine Centre, Inc.	5	$863,000
University of Regina	1	$159,030
University of Saskatchewan	23	$4,361,235
Total	**34**	**$6,022,502**

Commodity	Number of Approved Projects	Total Amount Funded
Beef	8	$1,920,558
Beef/Dairy	2	$240,833
Dairy	1	$135,600
Environment	2	$184,630
Forages	7	$880,760
Honeybees	1	$269,900
Poultry	1	$170,000
Sheep	1	$102,911
Swine	12	$2,117,310
Total	**34**	**$6,022,502**

Livestock and Forages Project Co-funders	Number of Approved Projects	Total Amount Funded
Results Driven Agriculture Research (RDAR)	1	$23,529
Saskatchewan Canola Development Commission	1	$91,500
Saskatchewan Forage Seed Development Commission	2	$25,500
Alberta Milk	1	$17,000
SaskMilk	5	$50,000
Saskatchewan Alfalfa Seed Producers Development Commission	1	$25,000
Saskatchewan Cattlemen's Association	3	$56,001
Total	**12[1]**	**$288,530**

[1]-A total of 12 projects received co-funding support. Some projects were co-funded by more than one co-funder.

Agriculture and Agri-Food Canada

High levels of vitamins to gestating sows to improve the transfer of vaccine-specific immunoglobulins against e. Coli to piglets *(20220075)*

Principal Investigator: Danyel Bueno Dalto, Agriculture and Agri-Food Canada
Objectives:

- Evaluate the effect of feeding high levels of vitamins to gestating sows on their immune response to vaccination against E. coli
- Evaluate the transfer of maternal immunoglobulins to piglets and piglets immune response against E. coli
- Evaluating the effect of feeding high levels of vitamins to gestating sows on the metabolism of vitamins during gestation
- Evaluating the effect of treatments on sows reproductive performance and their respective litter's growth and health

ADF Funding: $89,500

Benchmarking western Canadian dairy-beef calf management practices and their impacts on calf health and economics: phase 1 of 2 *(20220201)*

Principal Investigator: Karen Schwartzkopf-Genswein, Agriculture and Agri-Food Canada
Objectives:

- Characterize management of dairy-beef calves at the dairy farm, dairy-beef operations, and feedlots in western Canada
- Identify risk factors associated with animal health, welfare, performance, antimicrobial use, economics, and carbon footprint
- Evaluate the costs associated with each operation type
- Develop recommended production benchmarks for dairy-beef calf production

Co-funded by: SaskMilk
ADF Funding: $50,000

Effects of transport and rest duration on cull cow welfare and meat quality *(20220246)*

Principal Investigator: Karen Schwartzkopf-Genswein, Agriculture and Agri-Food Canada
Objectives:

- Determine the effect of varying rest stop length (0, 8, and 24 h) on indicators of cull cow welfare, carcass merit, and meat
- Determine the effect of post-rest transport duration (4 vs 15) on indicators of cull cow welfare, carcass merit, and meat qua
- Determine effect of rest stop quality (pen size and density, bedding type and amount, feed/er and water trough type and dimension

ADF Funding: $294,737

Alberta Invasive Species Council

Moving forward with common tansy biological control *(20220238)*

Principal Investigator: Megan Evans, Alberta Invasive Species Council

Objectives:

- Testing and petitioning of common tansy stem weevil, *Microplontus millefolii*, and prepare for first field releases in Canada
- Assessment of stem-mining moth *Platyptilia ochrodactyla* as a biological control agent for common tansy in Canada
- Assessment of leaf beetle C*hrysolina eurina* as a biological control agent for common tansy in Canada

ADF Funding: $100,000

Lakeland College

Swath utilization efficiency and residue characteristics in diverse forage systems under winter-swath and spring-residue grazing *(20220195)*

Principal Investigator: Obioha Durunna, Lakeland College

Objectives:

- Determine residue characteristics and forage utilization efficiency (grazing efficiency) in cereal monocultures (oats) and forage
- Determine animal performance from both systems using calves and cows for winter swath and spring residue grazing, respectively
- Determine costs for oats monoculture and forage blend systems and other outcomes associated with these systems to beef producers

ADF Funding: $105,000

Prairie Swine Centre Inc.

Improving the feed efficiency of pork production through the use of thermal profiles *(20220026)*

Principal Investigator: Jennifer Brown, Prairie Swine Centre Inc.

Objectives:

- Confirming the relationship between thermal profile and residual intake and gain in growing pigs
- Determine the relationship between thermal profile and the stress response of pigs
- Evaluate a nutritional supplement (DeStress) as a tool to promote feed consumption at weaning and improve stress resilience
- Evaluate the impact of dietary heat increment on thermal profiles and feed efficiency

ADF Funding: $215,500

Evaluating and optimizing peri-weaning management to improve performance, welfare, and resilience of piglets *(20220039)*

Principal Investigator: Daniel Columbus, Prairie Swine Centre, Inc.

Objectives:

- Determine the effect of weaning age on piglet development, health, and performance
- Determine effect of creep feed strategies on pre- and post-weaning piglet development, health, and performance
- Determine effect of creep feed strategies in both low and normal birth weight pigs
- Determine effective strategies to optimize weaning age to improve both piglet and sow performance
- Provide recommendations on optimal peri-weaning practices

ADF Funding: $90,000

Mitigating effects of don intake with increased dietary nutrient content *(20220040)*

Principal Investigator: Daniel Columbus, Prairie Swine Centre, Inc.

Objectives:

- To determine the effect of increased dietary nutrient content in DON-contaminated diets
- To determine the effect of a DON-mitigant alone or in combination with nutrient adjustment
- To optimize feeding strategy for growing pigs fed DON-contaminated diets

ADF Funding: $30,000

Optimizing temperature requirements of pigs to reduce energy use in swine production *(20220274)*

Principal Investigator: Bernardo Predicala, Prairie Swine Centre, Inc.

Objectives:

- Evaluate reproductive performance of sows raised at their preferred environmental temperature
- Determine the environmental temperature preferred by grower-finisher pigs
- Assess the impact on energy cost and productivity of grower-finisher pigs when raised at their preferred temperature
- Conduct environmental footprint assessment and feasibility analysis, and develop recommendations for commercial application

ADF Funding: $210,000

Precision detection of real-time health and welfare conditions of pigs using advanced artificial intelligence (AI) technologies *(20220292)*

Principal Investigator: Bernardo Predicala, Prairie Swine Centre, Inc.

Objectives:

- Develop AI algorithms for detection of pigs' health and welfare condition at various production stages
- Develop an AI algorithm to accurately detect farrowing onset and identify farrowing distress situations
- Test and validate the newly developed AI algorithms in in-barn tests
- Perform cost analysis and develop recommendations for commercial application of the developed AI technologies

ADF Funding: $317,500

University of Regina

Water quality test kits for landowners *(20220142)*

Principal Investigator: Kerri Finlay, University of Regina

Objectives:

- Develop water quality test kits for agricultural ponds in Saskatchewan
- Validate data obtained by landowners with that measured by professional labs
- Develop an app that provides assessment of water quality in real time

ADF Funding: $159,030

University of Saskatchewan

Post-weaning management for beef x dairy cross calves in western Canada: phase 2 of 2 *(20220012)*

Principal Investigator: Gregory Penner, University of Saskatchewan

Objectives:

- Compare performance and cost for Holstein x Holstein steers and beef x Holstein steers and heifers to weaning
- Evaluate if frame score and rib-eye dimensions can predict final carcass characteristics
- Compare performance and cost for Holstein x Holstein steers and beef x Holstein steers heifers during the growing phase
- Compare finishing performance and cost for Holstein x Holstein steers and beef x Holstein steers heifers
- Compare carcass characteristics for Holstein x Holstein steers and beef x Holstein steers heifers
- Organize and lead a beef x dairy workshop for producers

Co-funded by: SaskMilk

ADF Funding: $190,833

Establishing evidence-based vaccination schedules for sheep producers *(ADF# 20220014)*

Principal Investigator: Fabienne Uehlinger, University of Saskatchewan

Objectives:

- Compare serum CPtD ETX antibody concentrations between ewes receiving booster CPtD vaccinations 6- and 2-weeks pre-lambing
- Elucidate the effect of not administering a pre-lambing CPtD booster vaccination on ewe serum CPtD ETX antibody concentration
- Compare colostrum quality in ewes receiving no booster CPtD vaccination and ewes booster vaccinated 6- or 2-weeks pre-lambing
- Evaluate effect of no or variably timed pre-lambing booster vaccination on TPI and CPtD ETX antibody concentrations in lambs
- Assess and compare serum CPtD ETX antibody responses in lambs vaccinated at different ages in the neonatal period
- Record morbidity and mortality in lambs from birth to 12 weeks of age and in ewes pre-lambing

ADF Funding: $102,911

Combined herbicide and fertilizer application for absinth control *(20220052)*

Principal Investigator: Jonathan Bennett, University of Saskatchewan

Objectives:

- Determine if fertilizer can augment herbicide control of absinth and improve legume recovery
- Determine if a short rest following herbicide can increase legume recovery while improving absinth control
- Determine if fertilizer plus 2,4-D provides cost effective control relative to residual herbicides and improves legume regrowth

ADF Funding: $207,010

Role of serotonin in acute interstitial pneumonia in feedlot cattle *(20220057)*

Principal Investigator: Emily Snyder, University of Saskatchewan

Objectives:

- Establish normal blood serotonin range for feedlot heifers in the last 100 days on feed
- Establish normal blood serotonin range for feedlot steers in the last 100 days on feed
- Determine if changes in rumen pH correlate with changes in blood serotonin levels in cattle in the last 100 days on feed
- Compare blood serotonin level in cattle diagnosed with AIP/presumed AIPs to those with non-AIP disease
- Compare blood serotonin level in cattle diagnosed with AIP/presumed AIPs to healthy matched penmates
- Compare blood serotonin level in cattle diagnosed with AIP/presumed AIPs to those with non-AIP disease

Co-funded by: Saskatchewan Cattlemen's Association

ADF Funding: $112,198

The decomposition of manure in aquatic ecosystems *(20220065)*

Principal Investigator: Scout Butler-Siemens, University of Saskatchewan

Objectives:

- In Canada, there is no literature available which specifies which macroinvertebrate species utilize manure as a nutrient source, even though it is well known that they play a large physical role in the breakdown and decomposition of organic material deposited into water bodies. The primary objective of this experiment is to determine which macroinvertebrates colonize manure in an aquatic system and how it alters rates of decomposition of manure deposited into water
- The second objective is to identify the implications of anthelmintic use in beef cattle on manure breakdown and colonization by macroinvertebrates in aquatic ecosystems

ADF Funding: $25,600

Litter accumulation and productivity in Saskatchewan native rangelands *(20220104)*

Principal Investigator: Eric Lamb, University of Saskatchewan

Objectives:

- Collate existing native range litter data and identify critical data gaps
- Fill data gaps by extrapolating where possible from Alberta reference data

ADF Funding: $43,600

A bivalent subunit vaccine for porcine epidemic diarrhea (PED) *(20220105)*

Principal Investigator: Qiang Liu, University of Saskatchewan

Objectives:

- Vaccine design and plasmid construction
- Vaccine antigen expression and purification
- Vaccine immunogenicity evaluation
- PEDV virus propagation and purification
- Vaccine protective efficacy testing

ADF Funding: $369,000

A pipeline for testing and validating non-antibiotic tools to mitigate diarrhea in grower-finisher pigs *(20220106)*

Principal Investigator: Matheus Costa, University of Saskatchewan

Objectives:

- Evaluate non-antibiotic PREVENTIVE interventions against grower-finisher diarrhea
- Evaluate non-antibiotic THERAPEUTIC interventions against grower-finisher diarrhea
- Establish TP4P

ADF Funding: $200,000

Development of injectable and oral vaccines for Johne's disease in cattle *(20220115)*

Principal Investigator: Antonio Facciuolo, University of Saskatchewan

Objectives:

- Evaluate the efficacy of an injectable vaccine route to provide long term immunity to MAP infection in the small intestine
- Determine if an oral (enteric) vaccine can effectively reduce intestinal MAP infection
- Determine if a vaccine administered after MAP infection can control JD
- Identify specific MAP proteins contributing to control of MAP infection

Co-funded by: SaskMilk

ADF Funding: $327,750

Non-antibiotic treatment for swine dysentery *(20220136)*

Principal Investigator: Matheus Costa, University of Saskatchewan

Objectives:

- Optimize the nitric-oxide inhibitor dose to treat swine dysentery
- Evaluate the use of a nitric-oxide inhibitor for metaphylaxis of swine dysentery
- Investigate the effect of other farm-friendly nitric-oxide inhibitors other than the currently evaluated nitric oxide inhibitor

ADF Funding: $150,000

Development of an effective multivalent vaccine to control footrot in cattle *(20220141)*

Principal Investigator: Jose Perez-Casal, University of Saskatchewan

Objectives:

- Identification of the microorganisms isolated from foot rot lesions and preparation of a bacterin vaccine
- Testing vaccine formulations for duration of immune responses
- Develop a challenge model for footrot
- Proof of concept trial to test vaccine efficacy

Co-funded by: SaskMilk

ADF Funding: $243,017

Harnessing trained immunity-inducing biomolecules to protect pigs against multiple viral and bacterial infections *(20220149)*

Principal Investigator: Jeffrey Chen, University of Saskatchewan

Objectives:

- Identify mycobacteria (BCG)-derived biomolecule(s) directing trained immunity in pigs
- Define porcine immune cells exhibiting trained immunity from pigs given TIIBs by injection versus orally
- Test protection afforded by BCG-derived TIIBs against infection and disease caused by L. *intracellularis* and ASFV in pigs

ADF Funding: $204,310

Cost-effective and evidence-based antibiotic control of AFB and spread of AMR in beekeeping industry in Saskatchewan *(20220166)*

Principal Investigator: Elemir Simko, University of Saskatchewan

Objectives:

- Development and evaluation of rapid quantitative assays for AFB spores
- Longitudinal epidemiological investigation of spread of AFB antimicrobial resistance in Saskatchewan
- Whole genome sequencing and molecular epidemiology of the spread of rAFB-OTC isolates

ADF Funding: $269,900

Biomarker-based fecal diagnostic test for early disease control and performance improvement in the broiler chicken industry *(20220260)*

Principal Investigator: Susantha Gomis, University of Saskatchewan
Objectives:

- Identification of metabolic biomarkers in feces of broiler chickens for early detection of bacterial infections
- Identification of metabolic biomarkers in feces of broiler chickens for early detection of viral infections

ADF Funding: $170,000

Developing economic thresholds and sequential sampling plans for lesser clover leaf weevil in red clover *(20220261)*

Principal Investigator: Sean Prager, University of Saskatchewan
Objectives:

- Develop an economic threshold for lesser clover leaf weevil (LCLW) in red clover seed production
- Determine developmental rates of LCLW in the field and laboratory
- Develop a sequential sampling plan for management of Lesser clover Leaf weevil in red clover seed production

Co-funded by: Saskatchewan Forage Seed Development Commission
ADF Funding: $180,600

Developing alfalfa cultivar blends for forage production based on sub-species, fall dormancy, and root type *(20220271)*

Principal Investigator: Bill Biligetu, University of Saskatchewan
Objectives:

- Evaluate novel alfalfa cultivars blends with differing fall dormancy for forage production and persistence
- Evaluate alfalfa cultivar with differing root types and flower colors for forage production and persistence

Co-funded by: Saskatchewan Alfalfa Seed Producers Development Commission
ADF Funding: $25,025

Growth-promoting implant strategies to enhance neonatal to wean-calf health, performance, and profit *(20220277)*

Principal Investigator: Bart Lardner, University of Saskatchewan
Objectives:

- Determine effects of growth-promotants administered during pre-weaning phase on growth, health, and vaccine response of calves
- Assess the benefits of two growth promotant protocols during the pre-weaning phase
- Compare costs and returns of implanted and non-implanted calves based on stress during weaning, health, and performance

ADF Funding: $175,200

Analysis of antibody concentration in beef calves born to dams administered inactivated or modified-live viral vaccines *(20220290)*

Principal Investigator: Philip Griebel, University of Saskatchewan

Objectives:

- Collect blood samples from beef cows when being pregnancy tested
- Determine virus neutralizing antibody titres in serum samples collected from cows during fall pregnancy testing
- Collect blood samples from beef calves at time of spring turn-out (4 to 8 weeks of age)
- Collect blood samples from calves when weaned (5 to 6 months of age)
- Determine virus neutralizing antibody titres in serum samples collected from beef calves at spring turnout and fall weaning
- Data Analyses

Co-funded: Results Driven Agriculture Research, Saskatchewan Cattlemen's Association

ADF Funding: $31,790

Accelerating the development of forage wheat varieties for improved forage quality and biomass yield *(20220294)*

Principal Investigator: Bill Biligetu, University of Saskatchewan

Objectives:

- Registration of a new forage wheat cultivar
- Screen cultivars representing different classes of spring wheat for digestibility and biomass yield for forage wheat cultivar
- Develop and utilize near-infrared reflectance (NIRs) platform for screening forage quality in forage wheat lines
- Advancement of new forage wheat lines

ADF Funding: $219,525

Control and characterization of influenza a virus in pigs: regional vaccine development *(20220305)*

Principal Investigator: Susan Detmer, University of Saskatchewan

Objectives:

- To examine current efficacy of autogenous vaccinations on farms to control endemic influenza infections in pigs
- To examine cross-reactivity of antibodies from monovalent and multivalent vaccine stimulation
- To examine vaccine efficacy against live virus challenge in a controlled environment
- To examine vaccine antibody transfer through colostrum and efficacy against live virus challenge in weaned pigs

ADF Funding: $150,000

Determination of micronutrient availability resulting in improved precision formulation with canola meal in animal feeds *(20220307)*

Principal Investigator: Rex Newkirk, University of Saskatchewan

Objectives:

- Evaluate the availability of selenium in canola meal in layer feed
- Evaluate the availability of choline in canola meal in broiler feed
- Increase local and international market competitively of canola meal
- Increase the profitability of the livestock industry by precision formulation

Co-funded by: Saskatchewan Canola Development Commission

ADF Funding: $91,500

Use of newly developed blend protein pellet on rumen parameters and milk fat in dairy cows *(20220311)*

Principal Investigator: Peiqiang Yu, University of Saskatchewan

Objectives:

- To systematically evaluate energy values of the newly developed value-added blended crumble pellet fat stimulated feed product (we give name: BPF1A) based on newly released 2022 NRC model in comparison with commercial protein feeds/products
- To determine in vitro degradability of BPF1A using Daisy II system in comparison with commercial protein feeds/products
- To investigate in situ ruminal degradation and kinetics of BPF1A in beef cattle in comparison with commercial protein feeds/products
- To reveal protein and carbohydrate molecular structure profiles of rumen incubation residue using advanced vibrational spectroscopy
- To study interactive association between molecular structure profile of rumen residues and rumen degradability
- To carry out in vivo dairy production performance trial with BPF1A to replace commercial protein feeds/products at four different levels
- To carry out economic study (cost and benefit) on using BPF1A for dairy producers and feed industries based on dairy production trial
- To train HQP (PDF, graduate students) for Prairie agricultural industry which is also a high priority in this proposal

Co-funded by: SaskMilk and Alberta Milk

ADF Funding: $135,600

Maximizing wheat straw use in the diet of beef cattle with canola or flax screenings supplementation *(20220317)*

Principal Investigator: Gabriel Ribeiro, University of Saskatchewan

Objectives:

- To evaluate the changes in nutrient digestibility for straw, silages, and green feed when exposed to alkali treatment
- To evaluate how time course and temperature affect the alkali treatment response
- Effect of treating differing crop residue types on feed intake and nutrient utilization by beef cattle
- To determine if alkali treatment of screenings reduces seed viability after digestion
- Evaluate the impact of winter-feeding beef cows a wheat straw-based diet supplemented with canola or flax screenings
- Evaluate the impact of backgrounding beef steers on a wheat straw-based diet supplemented with canola or flax screenings
- Evaluate the impact of finishing beef steers on a wheat straw-based diet supplemented with canola or flax screenings
- Evaluate the impact of beef cows, backgrounding and finishing wheat straw-based diets using the artificial rumen (RUSITEC)

ADF Funding: $735,866