

## Summary of Agriculture Development Fund (ADF) Livestock and Forages Projects for 2024

- 30 livestock and forage projects were funded by ADF for a total of **\$6,846,792**.
- 5 Industry partners co-funded a total of **\$478,597**.

Institution	Number of Approved Projects	Total Amount Funded
Agriculture and Agri-Food Canada	2	\$275,000
Olds College	1	\$150,653
Prairie Diagnostic Services Inc.	1	\$245,000
Prairie Swine Centre Inc.	2	\$391,000
University of Regina	1	\$208,696
University of Saskatchewan	19	\$4,499,608
VIDO	4	\$1,076,835
<b>Total</b>	<b>30</b>	<b>\$6,846,792</b>

Commodity	Number of Approved Projects	Total Amount Funded
Beef	7	\$1,126,761
Environment/Water quality	2	\$889,463
Forages	1	\$129,854
Forages/Breeding	4	\$1,315,181
Forages/Pasture	3	\$543,235
Poultry	3	\$699,000
Pulses	1	\$187,298
Swine	9	\$1,956,000
<b>Total</b>	<b>30</b>	<b>\$6,846,792</b>

Livestock and Forages Project Co-funders	Number of Approved Projects	Total Amount Funded
Saskatchewan Canola Development Commission	1	\$93,645
Saskatchewan Cattlemen's Association	5	\$215,431
Saskatchewan Forage Seed Development Commission	2	\$30,869
Saskatchewan Pulse Growers	1	\$93,652
Saskatchewan Wheat Development Commission	1	\$45,000
<b>Total</b>	<b>8<sup>1</sup></b>	<b>\$478,597</b>

<sup>1</sup>A total of 8 projects received co-funding support. Some projects were co-funded by more than one co-funder.

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

### **Maternal nutrition, winter feeding, and calf immune fitness in beef cattle (20230044)**

Principle Investigator: Nilusha Malmuthuge, Agriculture and Agri-Food Canada

Objectives:

- Assess the impact of extended grazing (EG) with or without supplement on priming of immune responses in pre-weaned calves.
- Evaluate the activation of stress receptors in pregnant cows during EG and in pre-weaned calves.
- Assess impact of EG with or without supplement on Calf and dam performances.
- Understand the impact of EG with or without supplement on the activation of immune memory.

ADF Funding: \$90,000.00

## **Evaluating manure management and treatment strategies in potential African Swine Fever outbreak in Canada (20230209)**

Principle Investigator: Philip Soladoye, Agriculture and Agri-Food Canada

Objectives:

- Conduct exhaustive survey to explore manure management options generally employed in Canada and other ASF-infected jurisdictions.
- Evaluate and compare the efficacy, practicality, and economic feasibility of several ASF infected manure management strategies.
- Explore value added opportunity for manure slurry using thermal hydrolysis technology.

ADF Funding: \$185,000.00

## **Olds College**

### **Integrated breeding approaches to enhance grain and forage yield and quality of the triticale crop for Western Canada (20230143)**

Principle Investigator: Mazen Aljarrah, Olds College

Objectives:

- Develop the next generation of awnless triticale genotypes, suitable for green forage and swath-grazing practices.
- Apply molecular marker techniques to improve the genetic resistance to Fusarium head blight (*F. graminearum*) and ergot (*Claviceps spp.*).
- Determine the potential of the new triticale varieties for forage and feeding value for poultry, swine, and cattle.
- Breeding high grain and forage yielding triticale lines that are climate resilient and adapted to the variable growing condition.
- Work to develop and diversifying the triticale grain market.

Co-funded by: Saskatchewan Cattlemen's Association, Saskatchewan Wheat Development Commission

ADF Funding: \$150,653.00

### **Prairie Diagnostic Services**

#### **Validation of a rapid metagenomic diagnostic workflow to support *Salmonella* control and surveillance programs in egg farming (20230106)**

Principle Investigator: Musangu Ngeleka, Prairie Diagnostic Services Inc.

Objectives:

- Establish a regional *Salmonella* sequences reference database.
- Validation and implementation of a novel *Salmonella* metagenomic diagnostic workflow in a laboratory setting.
- Laboratory diagnostic tests inventory, stakeholder engagement, and knowledge translation to inform policy changes.

ADF Funding: \$245,000.00

### **Prairie Swine Centre**

#### **Finding the optimal loose lactation system and management for Canadian pig production (20230250)**

Principle Investigator : Jen-Yun Chou, Prairie Swine Centre Inc.

Objectives:

- Evaluate sow and piglet performance in two loose lactation systems vs a conventional farrowing crate.
- Investigate the efficiency of loose lactation using a weaning age of 4 weeks and compare with 3-week weaning in Study 1.
- Determine if nesting materials and greater movement improve maternal behavior in sows.
- Understand how farrowing system and nesting materials influence piglets' adaptation postweaning.
- Explore the benefits and challenges of loose farrowing for farrowing staff.

ADF Funding: \$196,000.00

### **Improving Sow Management and Performance Using Precision Feeding Records (20230295)**

Principle Investigator: Jennifer Brown, Prairie Swine Centre Inc.

Objectives:

- Compare sow and gilt performance in group and stall housed herds.
- Evaluate relationships between ESF feeding patterns, sow performance and social dynamics.
- Evaluate three interventions designed to improve gilt acclimation and performance in ESF systems.
- Economic analysis of cost vs returns in group and stall housing.

ADF Funding: \$195,000.00

## **University of Regina**

### **Sensitive detection, source tracking, and typing of viruses, bacteria, and antibiotic resistance through progression of BRD (20230329)**

Principle Investigator: Andrew Cameron, University of Regina

Objectives:

- Culture-independent identification of co- infecting bacteria, viruses, and antibiotic resistance genes in BRD.
- Epidemiological study to compare the detection of bacteria, viruses, and antibiotic resistance genes to morbidity and mortality.
- Identify novel and emerging viral pathogens in feedlots.
- Apply DNA Capture Sequencing technology to water bowl samples for infectious disease surveillance.

Co-funded by: Saskatchewan Cattlemen's Association

ADF Funding: \$208,696.00

## **University of Saskatchewan**

### **Development of new red clover cultivars for western Canada (20230015)**

Principle Investigator: Bill Biligetu, University of Saskatchewan

Objectives:

- Evaluate seed yield potential of new red clover breeding lines in multiple red clover seed producing regions.
- Characterize diverse germplasm resources of red clover using genotype-by-sequencing (GBS) and Unmanned Aerial Vehicle (UAV).
- Assess genetic relationship of 'Common' red clover seeds to test genetic relatedness to single and double cut.
- Development of new red clover populations.

Co-funded by: Saskatchewan Forage Seed Development Commission

ADF Funding: \$304,433.00

### **Genetic, genomic, and agronomic approaches to improve a non-bloat legume – Cicer milkvetch productivity and adoption in western (20230016)**

Principle Investigator: Bill Biligetu, University of Saskatchewan

Objectives:

- Improve seed germination and stand establishment of cicer milkvetch.
- Development of a high-quality reference genome for cicer milkvetch.
- Genetic diversity analysis of cicer milkvetch populations.
- Genomic selection for seedling vigor.
- Agronomic studies to improve cicer milkvetch use in novel forage mixtures.

ADF Funding: \$365,595.00

### **Development of an enhanced early life program (EELP) to improve health and productivity of beef cattle (20230046)**

Principle Investigator: Nathan Erickson, Western College of Veterinary Medicine

Objectives:

- To identify optimal prime-boost vaccination programs that prime effective immunity (antibody responses, immune memory cells).
- To assess the impact of weaning method and viral challenge on calf immune fitness when an optimized vaccine protocol is used.
- To understand the impact of EELP (optimized vaccination, weaning) on production efficiency and economic benefits.

ADF Funding: \$157,672.00

### **Known unknowns: macrolide resistance at beef cattle feedlots (20230048)**

Principle Investigator: Antonio Ruzzini, Western College of Veterinary Medicine

Objectives:

- Characterization of a new family of macrolide esterases.
- Screen for new enzymes capable of hydrolyzing macrolides with 15-membered rings.

ADF Funding: \$240,000.00

### **Evaluation of stocking rate, grazing duration and recovery times on native grassland (20230063)**

Principle Investigator: Breeanna Kelln, University of Saskatchewan

Objectives:

- Identify effect of stocking rate, grazing duration on beef cattle diet selection, forage preference, and grazing behavior.
- Identify the effect of stocking rate, grazing duration, and rest recovery on forage production & livestock performance.
- Conduct an economic analysis of grazing practices to generate best management practices for grazing native grassland to increase.

ADF Funding: \$109,737.00

### **Cereal-pea polyculture for silage: effect on forage production, ruminal fermentation, GHG emission and economics (20230078)**

Principle Investigator: Breeanna Kelln, University of Saskatchewan

Objectives:

- Compare monoculture, binary and polyculture cereal-pea blends for silage production.
- Identify silage blends that increase silage digestibility, microbial protein synthesis and reduce methane production.
- Conduct a competitive and economic analysis of cereal-pea monoculture, binary and polyculture silage blends.
- Provide agronomic recommendations to producers to benefit silage productivity, livestock performance, and farm profitability.

ADF Funding: \$129,854.00

### **Addressing high sulfate water for cattle and sheep (20230110)**

Principle Investigator: Gregory Penner, University of Saskatchewan

Objectives:

- Risk for polioencephalomalacia in cattle: Is it feed, water, or the combination?
- Risk for polioencephalomalacia in cattle: Does water temperature affect risk?
- Risk for polioencephalomalacia in cattle: What plants and plant parts accumulate S and is this affected by S and Se?
- What dose of inorganic copper is required to maintain adequate liver copper?
- What dose of chelated copper is required to maintain adequate liver copper?
- Establishing water quality standards for breeding, pregnancy, and lactation.
- Understanding the impact of water sulfate concentration and copper supplementation post-weaning growth.

Co-funded by: Saskatchewan Cattlemen's Association

ADF Funding: \$596,463.00

### **Improving forage barley and oat varieties through novel traits and UAV-based phenotyping (20230113)**

Principle Investigator: Aaron Beattie, University of Saskatchewan

Objectives:

- Develop UAV-based predictions of forage yield and quality.
- Evaluate the effect of the orange lemma trait on forage barley quality.
- Produce improved forage barley and oat varieties.

ADF Funding: \$494,500.00

### **Genomic association analysis of forage efficiency in beef cows (20230131)**

Principle Investigator: Mika Asai-Coakwell, University of Saskatchewan

Objectives:

- Identification of cow-calf producers with detailed records of calving and ability to score efficiency/productivity on their cow.
- Identification of genomic regions associated with forage efficiency in Canadian beef cows.
- Screening cattle population for forage efficiency associated SNP.
- To train one graduate student in bovine genetics and genomics.

Co-funded by: Saskatchewan Cattlemen's Association

ADF Funding: \$147,992.00

### **Impacts of cow-calf operations on water resources (20230138)**

Principle Investigator: Terry Fonstad, University of Saskatchewan

Objectives:

- Characterize the quality of runoff from various sizes of beef cattle wintering and calving sites in Saskatchewan.
- Determine the site variables and their effect on the quality of run off from cow-calf overwintering sites.
- Determine the various options available to control runoff from beef cattle wintering and calving sites to comply with the Act.
- Determine a safe distance from water resources based on a site with these variables.
- Evaluate the effectiveness of several implemented beneficial management practices (BMPs) in Saskatchewan.

ADF Funding: \$293,000.00

### **Evaluation of perennial forages under grazing for enhanced environmental sustainability and animal health (20230145)**

Principle Investigator: Bart Lardner, University of Saskatchewan

Objectives:

- Characterize forage persistence & associated traits of cicer milkvetch (CMV) and alfalfa as monoculture/mixtures under grazing.
- Evaluate performance of an experimental grazing tolerant alfalfa population and CMV-alfalfa mixtures under grazing.
- Evaluate grazing animal performance and bloat incidence from grazing legume forage pasture systems.
- Assess the effect of including CMV in mixture with novel graze tolerant alfalfa on enteric CH<sub>4</sub> emissions.
- Determine soil characterization and economic analysis of forage systems.
- Development of new CMV populations adapted for grazing tolerance.

ADF Funding: \$319,600.00

### **A decade on: How have the 35 ranchers under 35 fared? (20230148)**

Principle Investigator: Kathy Larson, University of Saskatchewan

Objectives:

- Determine RMP and BMP adoption among the original U35 operations.
- Determine use of business risk management programs among original U35 operations.
- Assess associations between financial performance of original U35 and rancher/ranch attributes and practices.
- Review the strategies used to capture/manage previously stated opportunities/threats.
- Develop policy recommendations to support young cattle producers.

Co-funded by: Saskatchewan Cattlemen's Association

ADF Funding: \$69,566.00

### **Reduction of odour and bioaerosol emissions in swine barns using cold plasma (20230155)**

Principle Investigator: Lifeng Zhang, University of Saskatchewan

Objectives:

- Evaluate and demonstrate the performance of cold plasma in reducing odour and bioaerosol concentrations in a lab-scale setup.
- Evaluate the effectiveness of cold plasma in reducing odour and bioaerosol concentrations in a pilot-scale pig production room.
- Evaluate the effectiveness of cold plasma in reducing odour and bioaerosol concentrations in a large-scale pig production room.

ADF Funding: \$280,000.00

### **A novel vaccination strategy to control *Enterococcus* - *E. coli* disease syndrome in broiler chickens at the hatchery (20230167)**

Principle Investigator: Susantha Gomis, University of Saskatchewan

Objectives:

- To control *E. coli* disease syndrome in broilers by a live *E. coli* vaccine delivered by a novel intrapulmonary delivery technique.
- Utilizing the concept of gut-lung-axis (GLA) in broilers for intrapulmonary (IPL) vaccine delivery to control *E. coli* infections.

ADF Funding: \$190,000.00

### **Dust filtration device for improving air quality in poultry and swine barns (20230184)**

Principle Investigator: Huiqing Guo, University of Saskatchewan

Objectives:

- To develop and evaluate a dust removal device to attach to the existing recirculation fans in poultry and swine barns.

ADF Funding: \$82,000.00

### **Improving consistency of swine dysentery vaccine (20230229)**

Principle Investigator: Matthew Loewen, University of Saskatchewan

Objectives:

- Increase the solubility of the Pr2 vaccine subunit to produce a consistent immune response.

ADF Funding: \$108,000.00

### **New perennial forages selected for improved yield, environment resilience, nutritional value, and carbon hoofprint (20230326)**

Principle Investigator: Gabriel Ribeiro, University of Saskatchewan

Objectives:

- Determine the yield and nutritional quality of three new perennial grasses, one new alfalfa variety, and their grass-legume mixtures.
- Screen new forage varieties and mixtures for improved digestibility, ruminal fermentation profile, and low methane production.
- Evaluate 4 treatments selected based on batch culture results in the Rusitec system (ruminal in vitro semi-continuous culture).

Co-funded by: Saskatchewan Forage Seed Development Commission

ADF Funding: \$113,898.00



### **Development of a co-extruded canola meal and pea starch product to replace dietary soybean meal (20230364)**

Principle Investigator: Rex Newkirk, University of Saskatchewan

Objectives:

- Optimization of pelleting and extrusion parameters.
- Determination of chemical composition and digestibility of a processed air classified pea starch / canola meal product.
- Determination of the impact of an air classified pea starch / canola meal product on growth performance and feeding behavior.
- Determination of the effects of an air classified pea starch / canola meal product on egg production.
- Economic evaluation of the new processed product using least cost formulation modeling.

Co-funded by: Saskatchewan Canola Development Commission, Saskatchewan Pulse Growers

ADF Funding: \$187,298.00

### **Pathogen survival in mortalities management (20230386)**

Principle Investigator: Terry Fonstad, University of Saskatchewan

Objectives:

- Determine the low temperature conditions required for viral pathogen (AI, PEDv, ASF) destruction in the laboratory.
- Measure virus survival in mortalities, compost, and manure in a laboratory setting.
- Verify that mortalities composting strategies are creating the conditions required for pathogen destruction in SK climates.

ADF Funding: \$310,000.00

### **VIDO**

### **Development of a customized RNA vaccine platform for rapid response to animal disease outbreaks (20230005)**

Principle Investigator: Aneesh Thakur, VIDO

Objectives:

- Formulation of saRNA vaccines targeting antigenic proteins of influenza A virus.
- Formulation and characterization of thermostable candidate saRNA vaccines.
- Evaluate the immunogenicity of the candidate saRNA vaccines.
- Analyze the protective efficacy of the saRNA vaccines following influenza challenge.

ADF Funding: \$264,000.00

### **Bioengineered yeast to provide antimicrobial peptides and functional amino acids to preserve and improve gut health in piglets (20230031)**

Principle Investigator: Heather Wilson, VIDO

Objectives:

- Bioengineer *Saccharomyces cerevisiae* to deliver antimicrobial peptides, zinc, and essential amino acids.
- Characterize effect of feeding siYz-AMP/EAA yeast strain on pig growth and intestinal health.
- Characterize effect of supplementing feed with siYz-AMP/EAA yeast on protection against Salmonella challenge.

ADF Funding: \$300,000.00

### **Oral vaccine for pigs against PRRSV and PEDV (20230056)**

Principle Investigator: Heather Wilson, VIDO

Objectives:

- Bioengineer *Saccharomyces cerevisiae* yeast to use as an oral vaccine against pig viral diseases PEDV and PRRSV.
- Define optimal dose/timing of oral vaccine to trigger immunity to PEDV and PRRSV.
- Perform vaccine protection studies against PEDV and PRRSV.

ADF Funding: \$300,000.00

### **Development of an efficacious *Histophilus somni* subunit vaccine for beef cattle (20230112)**

Principle Investigator: Jose Perez-Casal, VIDO

Objectives:

- Characterize various strains of *H. somni* isolated from healthy cattle and fatal cases of various forms of *Histophilosis*
- Purify antigens previously reported to confer protection.
- Calibrate IV challenge model.
- Test formulations for humoral and cell-mediated immune responses in young beef steers.
- Conduct Proof-of concept studies.

Co-funded by: Saskatchewan Cattlemen's Association

ADF Funding: \$212,835.00