

Summary of ADF Projects, 2014
Livestock Research Funding

27 livestock-related research projects	\$4,188,288
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Breakdown by Commodity

Beef	\$1,832,766
Swine	\$1,123,733
Dairy	\$471,801
Poultry	\$334,488
Forages	\$282,500
Other/General	\$143,000
	<hr/> \$4,188,288

Breakdown by Organization

University of Saskatchewan	\$1,396,371
VIDO	\$890,294
Western Beef Development Centre - PAMI	\$746,988
WCVM	\$580,150
Prairie Swine Centre	\$383,985
Agriculture and Agri-Food Canada	\$108,000
Sask. Alfalfa Seed Producers Development Commission	\$82,500
	<hr/> \$4,188,288

Beef

Identification of Protective T-cell Antigens of Mycoplasma bovis (file #20130050)

Objectives:

- The overall objective is to identify M. bovis antigens that can be used in a protective vaccine against M. bovis diseases in feedlot cattle. We will do that by studying the cattle immune responses to different proteins in-vivo and in-vitro. The proteins that give the best immune response will be used in a vaccination followed by a challenge of cattle with M. bovis.

Funding: \$288,166

Organization: Vaccine and Infectious Disease Organization (VIDO)

Contact: Jose Perez-Casal, (306) 966-8870

Marker Assisted Management to Simultaneously Increase Carcass Yield and Marbling in Beef Cattle (file #20130051)

Objectives:

The project will identify combined effects of genes so that genetic selection for marbling can occur in combination with selection for lean meat yield. This project aims to take several candidate genes, while conducting characterization and association analyses on five novel cattle genes, and incorporate these into one management tool to increase carcass yield and marbling.

Funding: \$150,000

Organization: University of Saskatchewan

Contact: Fiona Buchanan, Animal and Poultry Science, (306) 966-4160

Vaccine Development for Johne's Disease (file # 20130064)

Objectives:

The overall objective of the project is to study the interaction of Mycobacterium avium subsp. Paratuberculosis (MAP), the causative agent of Johne's Disease in cattle, within appropriate regions of the digestive system of the cow. Understanding this interaction will enable rationale development of a vaccine. The specific objectives are:

- To measure the immune responses of a cow challenge with field isolates of MAP in different regions of the gut.
- To investigate the ability of different presentations of MAP, including with vaccine adjuvants, to influence the nature of this immune response.
- To determine which of these immune responses is of greatest benefit in protecting cattle from MAP infection.

Funding: \$211,500

Organization: Vaccine and Infectious Disease Organization (VIDO)

Contact: Scott Napper, (306) 966-1546

Identifying Strains of Treponema spp Obtained from Feedlot and Dairy Cattle as Potential Vaccine Candidates (file # 20130100)

Objectives:

The project will provide an initial step towards the development of a potential vaccine for overall digital dermatitis. They will:

- Determine Treponema species isolated from digital dermatitis lesions from dairy and feedlot cattle.
- Determine antigens common to the isolated Treponema species.
- Describe the transmission of digital dermatitis from the dairy sector into the feedlot sector.

Funding: \$188,050

Organization: Western College Of Veterinary Medicine

Contact: Christopher Luby, Large Animal Clinical Sciences, (306) 966-7155

Management and Marketing Practices of Beef Operations and Young Ranchers (file # 20130158)

Objectives:

The project aims to identify innovative and sustainable farming systems and practices as well as highlighting where those young producers are on the innovative continuum. The outcomes of this project may help to improve management practices of these young cattle farmers and to keep them in the industry.

The project will:

- Investigate and characterize management practices of young ranchers (35 or under).
- Investigate and characterize marketing practices of young ranchers (35 or under).
- Determine labour, land and capital requirements and structure of young cow-calf ranchers.
- Determine opportunities and challenges facing young ranchers.
- Determine areas of need for young ranchers to be successful.

Funding: \$87,670

Organization: Western Beef Development Centre

Contact: Kathy Larson, (306) 930-9354

Assessing Mycoplasma bovis Strains for Genotype Differences and Antimicrobial Susceptibility Profiles (file # 20130170)

Objectives:

This project aims to detect differences in the m. bovis strains that are present in the beef cattle today, determine if there is any antimicrobial resistance and also if differences in the bacterial strains depending on where in the animal the bacteria can be found (lungs, joints, etc.).

They will conduct a DNA re-sequencing study to identify regions that could be used to discriminate strains of M. bovis and provide markers for antimicrobial resistance genes.

The critical part of this project is the work to identify markers for antimicrobial resistance, and evaluation of temporal changes in antimicrobial resistance patterns. Antibiotic use in agriculture is increasingly coming under fire.

Funding: \$88,000

Organization: University of Saskatchewan

Contact: Murray Jelinski, Large Animal Clinical Sciences, (306) 966-7166

An Evaluation of Hair Cortisol as an Objective Method for Evaluating Long Term Stress and Pain in Beef Cattle (file # 20130175)

Objectives:

This project aims to evaluate hair cortisol as a method to determine stress and pain in beef cattle. The project may provide a practical way to objectively measure stress in cattle and provide a way to more accurately assess behavioural responses related to management procedures. This project will provide objective measure of the welfare of livestock and compare to certain overt behaviors that have been used to assess pain.

The results will provide an assessment of stress during certain production practices and compare to the behavioural responses seen. This approach will provide an objective measurement of long-term stress in cattle that requires minimal handling and a non-invasive technique.

Funding: \$91,000

Organization: Western College Of Veterinary Medicine

Contact: John Campbell, Large Animal Clinical Sciences, (306) 966-7158

Application of DNA-based paternity testing in multi-sire breeding programs to improve economic value of cattle operations (file # 20130223)

Objectives:

The overall aim of the project is to use DNA parentage testing to determine the sire's economic contribution to a commercial cow-calf operation through progeny outputs and economic value.

They will validate DNA-based paternity testing and demonstrate to producers a practical application of new technology. Producers could then decide if the cost of the test is offset by information gained from parentage testing in a multi-sire pasture.

The results of this project will provide new knowledge on:

- The application and efficacy of paternity testing on commercial cow-calf operations with multi-sire breeding pastures;
- New information on progeny outputs of individual bulls (calf income[\$\$]/sire);
- Identification of sire physical and reproductive traits that may be related to calf output in multiple-sire herds; and
- The cost-benefit relationship of parentage testing calves from multi-sire breeding herds.

Funding: \$227,410

Organization: Western Beef Development Centre - PAMI

Contact: Bart Lardner, (306) 682-3139

Improving Reproductive Efficiency in Young Beef Cows (file # 20130225)

Objectives:

The project aims to evaluate the economic efficiency of supplementing young beef cows during breeding to increase pregnancy rates and herd retention.

They will determine the reproductive response and calf performance as a result of supplementation as well as to calculate the cost benefit of increased conception and pregnancy in 1st and 2nd calf heifers. The project identifies a major area of production loss for beef cattle producers and aims to identify management solutions and the associated costs to overcome it.

Funding: \$231,908

Organization: Western Beef Development Centre - PAMI

Contact: Bart Lardner, (306) 682-3139

Managing Vibriosis in Saskatchewan Beef Herds (file # 20130242)

Objectives:

The goal of this project is to improve the control and reduce the impact of Bovine Genital Campylobacteriosis (BGC) or vibriosis through achievement of the following specific objectives:

- Clinical evaluation of treatments for bulls infected with BGC.
- Compare the efficacy of long-acting oxytetracycline, vaccination or combination of vaccination and oxytetracycline on the treatment of bulls with BGC.

Funding: \$90,000

Organization: Western College of Veterinary Medicine

Contact: Cheryl Waldner, Large Animal Clinical Sciences, (306) 966-7168

Understanding the effects of ergot-contaminated feed in Saskatchewan beef cow-calf operations (file # 20130258)

Objectives:

To examine if prolonged feeding of low concentrations of ergot results in cumulative effects that results in delayed pathophysiologic manifestations. The working hypothesis is that low levels of ergot contamination of ration affect lactation of beef cows by altering prolactin levels without inducing clinical signs of the disease. This project will examine if subclinical contamination of beef feed affects weaning weight of calf crop. At this stage, lack of a good dose-response relationship makes it difficult to come up with sound guidelines for permissible ergot contamination in feed grain.

Funding: \$97,100

Organization: Western College of Veterinary Medicine

Contact: Jaswant Singh, Veterinary Biomedical Sciences, (306) 966-7410

Genetic testing for rickettsiales bacteria in winter ticks on cattle (file # 20130269)

Objectives:

This project will look at risk of disease transmission between species by ticks, and to look at incidence of diseases of interest such as Anaplasmosis, erlichiosis and other tick-borne diseases in winter ticks and in different areas of the province. They will:

- Determine the prevalence of different species of rickettsiales bacteria in *D. albipictus* (winter ticks) from different localities across the Canadian prairies and hosts [cattle, horses and cervids].
- Compare the population genetics of winter ticks infesting cattle, horses and cervids in the same geographical areas to establish if they share a common gene pool. This will provide insight as to whether there is the potential for cross transmission of rickettsiales bacteria from ticks feeding on different host species.

Funding: \$81,962

Organization: University of Saskatchewan

Contact: Neil Chilton, Biology, (306) 966-4407

Swine

Determining the Fertility of Breeding Boars (file # 20130128)

Objectives:

The goal of this proposal is to identify markers of fertility to allow pre-screening of boars before selection into a breeding program. The project will accurately assess the breeding ability of individual boars. They propose to correlate objective measurements of boar sperm function with the fertility of those boars in order to develop a multi-factor predictive equation to accurately assess the fertility potential of individual boars.

- Successful identification of sub or non-fertile boars would enable swine genetic companies and nucleus and multiplier companies to eliminate costly reproductive losses and improve the overall productivity and profitability of the swine industry.

Funding: \$210,453

Organization: University of Saskatchewan

Contact: Mary Buhr, Agriculture and Bioresources, (306) 966-4050

Protecting the Saskatchewan swine industry from economic hardship associated with emergent swine dysentery (file # 20130138)

Objectives:

The project objectives are to further research emerging swine dysentery and look at three *Brachyspira* species that are specifically identified in Saskatchewan pigs. The project aims to evaluate the pathogenicity of three *Brachyspira* species to determine if they contribute to production limiting diarrhea and determine the physiological mechanism and virulence factors for future vaccine work.

Funding: \$59,667

Organization: University of Saskatchewan

Contact: Matthew Loewen, Veterinary Biomedical Sciences, (306) 966-4005

Strategies to mitigate the negative effects of deoxynivalenol (DON) in nursery pigs (file #20130162)

Objectives:

This project will test the use of whey or plasma to mitigate the effects of DON mycotoxin contaminated grain in feeds. This use of whey may be a more cost efficient way of feeding DON contaminated grains. As there are increases in the incidence of cereal grains being contaminated with *Fusarium*, use of these grains may be optimized allowing for a relief on the cost of feed portion of production.

Funding: \$172,235

Organization: Prairie Swine Centre

Contact: Denise Beaulieu, (306) 667-7441

Development of novel therapeutics and a next generation PRRSV vaccine (file # 20130181)

Objectives:

This project proposes to develop a novel vaccine that is safe, cross-protective and capable of stimulating both innate and adaptive immunity. Such a vaccine will be effective against both North American and European Genotypes, as well as so-called “hot strains,” which continue to emerge and potentially threaten the Canadian swine industry.

Funding: \$390,628

Organization: Vaccine and Infectious Disease Organization (VIDO)

Contact: Volker Gerdt, (306) 966-1513; Marko Kryworuchko, (306) 999-7433; Alexander Zakhartchouk, (306) 966-1570

Novel Nano-Molecules to Reduce Antimicrobial Use to Reduce Gut Bacterial Burden (file #20130182)

Objectives:

The project is directed to eventually develop nanoparticle-based technologies to reduce microbial colonization of the gut and the food derived from the animals. The project will identify the mechanisms by which *Salmonella* spp and *Campylobacter jejuni* adhere to the gut epithelium, in particular discover the interaction between bacterial Arginine-Glycine-Aspartine (RGD-peptides) and the $\alpha v\beta 3$ -integrin of the gut epithelium.

- After establishing the above objective will develop RNT-based nanotechnologies for blocking the interaction between the RGD-peptide and the $\alpha v\beta 3$ -integrin and subsequent prevention of colonization of the gut.

Funding: \$79,000

Organization: Western College of Veterinary Medicine

Contact: Baljit Singh, (306) 966-7408

Investigating Temperature Requirements of Group-housed Sows Fed High Fibre Diets to Reduce Energy Costs (file # 20130263)

Objectives:

The general objective of this project is to investigate management practices that will allow pig producers to benefit from potential advantages of housing sows in groups. The specific objectives are:

- To determine the environmental temperature preferred by sows fed diets with high fermentable fibre in terms of metabolic rate, body temperature, and thermoregulatory behaviour.
- To assess the energy savings from ventilation and supplemental heat requirements when housing sows in groups at reduced environmental temperatures.
- To evaluate the impact on general activity and aggression, body condition, and weight gain of sows fed high-fibre diet and housed in groups at their preferred environmental temperature.

Funding: \$211,750

Organization: Prairie Swine Centre

Contact: Bernardo Predicala, (306) 667-7444

Dairy

Replacement of Barley Starch with Whey Permeate to Attenuate Rumen Acidosis and Optimize Nitrogen Utilization in Dairy Cows (file # 20130231)

Objectives:

The broad objective of this project is to determine how the partial substitution of barley starch with whey permeate alters ruminal fermentation, animal health, and animal productivity in high-producing dairy cows fed barley-based diets. The specific objectives are:

- To delineate the effects of partial substitution of starch from barley with whey permeate (a source of lactose) on ruminal acidosis, transport of short-chain fatty acids across the rumen wall, urea recycling to the digestive tract, ruminal microbial protein production, and omasal nutrient flow.
- To delineate the interactions between partial replacement of barley starch with whey permeate and dietary rumen-degradable protein level on ruminal acidosis, transport of short-chain fatty acids across the rumen wall, urea recycling to the digestive tract, ruminal microbial protein production, and omasal nutrient flow.

Funding: \$240,901

Organization: University of Saskatchewan

Contact: Timothy Mutsvangwa, Animal and Poultry Science, (306) 966-1695

Does feeding oscillating dietary crude protein concentrations improve the productive efficiency of dairy cows and minimize feed (file # 20130233)

Objectives:

The broad objective of this proposed research is to determine if feeding diets with oscillating dietary CP concentrations can decrease the quantity of dietary N that is required for optimum performance in dairy cows, thus minimizing feeding costs and limiting N excretion into the environment. The specific objectives are:

- To determine the effects of feeding oscillating dietary CP concentrations on milk production and composition, ruminal fermentation, site and extent of nutrient digestion, and N retention and excretion in lactating dairy cows (Experiment 1).
- To determine the effects of feeding oscillating dietary CP concentrations with a low or high RDP source on milk production and composition, ruminal fermentation, site and extent of nutrient digestion, and N retention and excretion in lactating dairy cows (Experiment 2).

Funding: \$230,900

Organization: University of Saskatchewan

Contact: Timothy Mutsvangwa, Animal and Poultry Science, (306) 966-1695

Poultry

Controlling Yolk Sac Infections and Reovirus Infections to Improve Chick Quality in the Broiler Chicken Industry in Saskatchewan (file # 20130073)

Objectives:

- To study the pathogenesis and characterization of Enterococcus species in chicken embryos and neonatal broiler chickens and control of the emergence of Enterococcal species in the Saskatchewan broiler chicken industry.
- To identify the prevalence, diagnosis and molecular characterization of Reovirus infection in the Saskatchewan broiler chicken industry and to implement proper control measures.

Funding: \$230,000

Organization: University of Saskatchewan

Contact: Susantha Gomis, Veterinary Pathology, (306) 966-7299

Prebiotic potential of camelina meal from polyhydroxybutyrate (PHB)-producing lines (file # 20130161)

Objectives:

The project aims to establish the prebiotic potential of PHB from camelina meal to improve growth performance and health by determining an effective prebiotic dose range of PHB, and PHB-containing camelina meal in feed and efficacy of PHB against Gram-negative pathogen challenge (e.g. Salmonella).

Funding: \$104,488

Organization: University of Saskatchewan

Contact: Andrew Van Kessel, Animal and Poultry Science, (306) 966-4136

Forages

Development of New Strategies for Control of Parasites and Disease in Alfalfa Leafcutter Bee Populations (file # 20130059)

Objectives:

Research on alfalfa leafcutter bee chalcid parasite control strategies:

- Evaluation of essential oil compounds to determine safety to alfalfa leafcutter bees and efficacy as repellents / confusants in order to disrupt chalcid parasite mating and re-parasitism.
- Evaluation of volatile organic compounds to determine safety to alfalfa leafcutter bees and efficacy as attractants for use in a chalcid parasite trapping system to be developed for deployment in bee incubators and field shelters.
- Evaluation of the potential for using the "male-killing" bacteria *Arsenophonus nasionae* to infect female chalcid parasites and cause significant mortality in male parasite embryos.

Research on alfalfa leafcutter bee disease control strategies:

- Evaluation of anti-microbial compounds for efficacy in controlling chalkbrood disease and other microflora through treatment of bee cells and bee equipment.
- Evaluation of the potential for using the alfalfa leafcutter bee to carry a biological control agent which is antagonistic to chalkbrood disease (pollinator bio-control vector technology) and development of a system to deliver the agent to female alfalfa leafcutter bees for incorporation into pollen / nectar provisions.

Funding: \$82,500

Organization: Saskatchewan Alfalfa Seed Producers Development Commission

Contact: Wayne Goerzen, (306) 651-7275

New forage legumes for sustainable summer pasture mixtures in Saskatchewan (file # 20130215)

Objectives:

- The project will evaluate forage yield, forage quality, legume persistence and beef cattle gain of AC Yellowhead alfalfa or sainfoin in mixtures of Russian wildrye grass, or hybrid brome grass at two locations, Swift Current (Brown soil zone) in the semiarid prairie or Lanigan (Thin Black soil zone) in the Parkland region of Saskatchewan. Replicated pastures will be seeded in 2 acre paddocks and grazed by yearling steers in August and September. Bypass protein and N absorption and efficiency will be conducted with rumen-fistulated heifers if a graduate student can be staffed for the project.
- A supplementary small research plot study will be conducted on binary mixtures of Yellowhead alfalfa, AC Mountainview sainfoin, white prairie clover, purple prairie clover or Canada milkvetch with Russian wildrye, hybrid brome grass, and meadow brome grass at Swift Current, Saskatoon and Lanigan. All mixtures will be harvested on August 1 or September 1 and forage yield, nutritive value and botanical composition will be determined. The results of the supplementary study will be useful to extrapolate the grazing experiment results to another soil zone (Dark Brown soil).

Funding: \$200,000

Organization: Western Beef Development Centre - PAMI

Contact: Paul Jefferson, (306) 682-3139 x 272

Other Projects

Defining Attributes of an Animal Health Outbreak Informatics Management System and Comparing Disease Investigation Methodologies (file # 20130024)

Objectives:

The project intends to develop a new system of data collection that reflects provincial and industry roles in federally reportable disease and validation of current methods of information collection compared with new enhanced systems. Ultimately better information will be collected which will assist with epidemiology and other facets of disease management and control.

- The primary objective of this study is to identify the key features required in an animal disease information database by surveying identified stakeholder groups.

Funding: \$19,800

Organization: Western College Of Veterinary Medicine

Contact: Tasha Epp, Large Animal Clinical Sciences, (306) 966-6542

A Double Blind Randomized Controlled Clinical Trial to Test the Efficacy of an EAE Vaccine in Endemically Affect Sheep Flocks (file # 20130275)

Objectives:

The project aims to determine if use of the commercial Enzootic abortion in Ewes (EAE) vaccine is a cost effective method of controlling abortion in Saskatchewan sheep flocks endemically affected with EAE.

They will:

- To determine if use of a commercial EAE vaccine significantly reduces the rate of abortion in an endemically affected flock.
- To determine if use of the vaccine is cost effective in reducing abortions.
- To determine how the vaccine performs specifically in ewe lambs that may have been exposed to the disease in early life.
- To determine how quickly the effect of vaccination become apparent in an endemically affected flock.

Funding: \$15,200

Organization: Western College Of Veterinary Medicine

Contact: Chris Clark, Large Animal Clinical Sciences, (306) 966-7165

Disease-free Semen Cryopreservation in Bison and Its Fertility Potential (file # 20130288)

Objectives:

The ultimate goal of this study is to provide foundations for the development of a disease-free artificial breeding program in bison. The main objective is to cryopreserve bison semen with success at par with dairy and beef semen. The specific objectives are:

- To refine the existing cryopreservation procedure for bison semen developed in our lab.
- To produce “clean semen” without using animal-protein (egg yolk or milk) in the extender.
- To test the fertilizing potential of frozen bison semen.

Funding: \$108,000

Organization: Agriculture and Agri-Food Canada

Contact: Muhammad Anzar, Saskatoon Research Centre, (306) 956-2900