Theme: Dairy Farm Efficiency and Sustainability

PROJECT

Understanding the impact of cutting-edge genomic technologies on breeding strategies for optimum genetic progress in Canadian dairy cattle

This project will analyze and compare the benefits of novel tools (e.g. gene editing) and new technologies (e.g. genotyping by sequencing) with the aim to optimize Canadian dairy cattle breeding programs for future genetic improvement and profitability.

RESEARCH TEAM
Christine Baes, University of Guelph
Flavio Schenkel, Getu Hailu, Angela Canovas (University of Guelph)

PARTNERS
Agriculture and Agri-Food Canada
Lactanet

PROJECT

Accelerating genetic gain for novel traits in Canadian Holstein cows

The project aims to increase the size of the cow reference population to improve the accuracy and reliability of genomic estimated breeding values (EBVs) for novel traits and develop tools to increase the rate of genetic progress for Canadian Holstein cows.

RESEARCH TEAM
Flavio Schenkel, University of Guelph
Christine Baes, Angela Canovas, Janusz Jamrozik, Stephen LeBlanc, Filippo Miglior, Eduardo Ribeiro (University of Guelph), Xin Zhao (McGill University), Ronaldo Cerri (University of British Columbia)

PARTNERS
Agriculture and Agri-Food Canada
Lactanet

PROJECT

Optimizing health and production of cows milked in robotic systems

The project aims to identify the optimal nutritional and housing strategies for cows milked automatically to improve cow health, milk production and efficiency of robot use.

RESEARCH TEAM
Trevor DeVries, University of Guelph
Greg Penner, Tim Mutsvangwa (University of Saskatchewan), Karin Orsel, Ed Pajor (University of Calgary), Todd Duffield (University of Guelph), Richard Cantin, Débora Santschi, René Lacroix (Lactanet)

PARTNERS
Agriculture and Agri-Food Canada
Dairy Farmers of Canada
Lactanet (In-kind contribution)
### Project 1: Reducing the Water Footprint of Milk Production in Current and Future Climates

**Theme:** Dairy Farm Efficiency and Sustainability

**Project Title:** Reducing the water footprint of milk production in current and future climates

**The project will evaluate management practices and strategies with the aim to improve cows’ resilience to heat-stress, improve water-use efficiency on dairy farms, and reduce the water footprint of milk production.**

**Research Team**

- Andrew VanderZaag, Agriculture and Agri-Food Canada (AAFC)-Ottawa
- Robert Gordon, University of Windsor
- Roland Kroebel, Sean McGinn, Tim McAllister (AAFC-Lethbridge), Merrin Macrae (University of Waterloo), Tom Wright (Ontario Ministry of Agriculture, Food and Rural Affairs), Édith Charbonneau (Université Laval), Terra Jamieson (AAFC-Halifax), Ward Smith, Budong Qian, Ray Desjardins (AAFC-Ottawa), Keith Reid (AAFC-Guelph), Tim Nelson (Livestock Research Innovation Corporation), John McCabe (Nova Scotia Department of Agriculture)

**Partners**

- Agriculture and Agri-Food Canada
- Dairy Farmers of Canada

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### Project 2: Increasing the Production and Utilization of Alfalfa Forages in Canada

**Project Title:** Increasing the production and utilization of alfalfa forages in Canada

**The project aims to increase the nutritive value, yield, and persistence of alfalfa-based forages through breeding and crop management.**

**Research Team**

- Annie Claessens, AAFC-Quebec and Bill Biligetu, University of Saskatchewan
- Gaëtan Tremblay, Patrice Audy, Annick Bertrand, Julie Lajeunesse, Solen Rocher, Marie-Noëlle Thivierge, Gilles Bélanger (AAFC-Quebec), Shabtai Bittman, Derek Hunt (AAFC-Agassiz), Kathleen Glover, Yousef Papadopoulos (AAFC-Kentville), Daniel Ouellet (AAFC-Sherbrooke), Vern Baron (AAFC-Lacombe), Surya Acharya (AAFC-Lethbridge), Mike Schellenberg (AAFC-Swift Current), Édith Charbonneau, Caroline Halde (Université Laval), Ralph Martin (University of Guelph), Philippe Seguin (McGill University), Charles Brummer (University of California), Josef Hakl (Czech University), Huguette Martel (Ministère de l’Agriculture, des Pêcheries et de l’Alimentation du Québec)

**Partners**

- Agriculture and Agri-Food Canada
- Dairy Farmers of Canada

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### Project 3: Identifying Best Management Practices for High Quality Silage Production

**Project Title:** Identifying best management practices for high quality silage production

**The project will compile information from across Canada about management practices and chemical, microbial and digestibility analyses of silage with the aim to identify the most efficient techniques to produce nutritious feed for dairy cattle and improve farm productivity.**

**Research Team**

- Nancy McLean, Dalhousie University and Linda Jewell, AAFC-St. John's
- Kees Plaizier, Kim Ominski, Emma McGeough, Francis Zvomuya (University of Manitoba), Carole Lafrenière (Université du Québec en Abitibi-Témiscamingue), Shabtai Bittman (AAFC-Agassiz), Emmanuel Yiridoe (Dalhousie University), David Dykstra (New Brunswick Department of Agriculture, Aquaculture and Fisheries), Fred Waddy (MILK 2020)

**Partners**

- Agriculture and Agri-Food Canada
- Dairy Farmers of Canada
**PROJECT**

**The Mastitis Network: Continuing the advancement of milk quality in Canada**

The project aims to develop novel strategies and tools to prevent and treat mastitis and reduce the need for antimicrobials, ensuring animal health and welfare and high-quality milk production.

**RESEARCH TEAM**

Simon Dufour, Université de Montréal and Pierre Lacasse, AAFC-Sherbrooke

Mario Jacques, Jean-Philippe Roy (Université de Montréal), Herman Barkema, Eduardo Cobo, Vineet Saini (University of Calgary), Greg Keefe, J Trenton McClure (University of Prince Edward Island), Trevor DeVries, David Kelton (University of Guelph), Xin Zhao, Jennifer Ronholm, Lawrence Goodridge (McGill University), François Malouin, Richard Blouin (Université de Sherbrooke), Christopher Luby (University of Saskatchewan), Rachel Gervais (Université Laval), Robert Hancock (University of British Columbia), Graham Plastow (University of Alberta), Marcos Colazo (Alberta Agriculture and Forestry), Min Lin (Canadian Food Inspection Agency - University of Ottawa), Marvin Miller (University of Notre Dame), Pamela Adkins, John Middleton (University of Missouri)

**PROJECT**

**Unraveling the genetic susceptibility to Johne’s disease**

The project will identify genetic and epigenetic variations associated to Johne’s disease (JD) with the aim to better understand the dynamics of bacterial strains in JD positive cows and how they affect disease progression and JD prevalence at the herd level.

**RESEARCH TEAM**

Nathalie Bissonnette, AAFC-Sherbrooke and Kapil Tahlan, Memorial University of Newfoundland

David Kelton, Flavio Schenkel (University of Guelph), Eveline Ibeagha-Awemu (AAFC-Sherbrooke), Gilles Fecteau (Université de Montréal), Frank Biet (Institut national de la recherche agronomique - France)
**Theme:**

**Cow Health and Welfare**

**PROJECT**

**Extending cow longevity on dairy farms by improving calf management practices in the first year of life**

The project will investigate the impact of early life management practices on achieving calf genetic potential as measured by adult cow productivity, health, and longevity.

**RESEARCH TEAM**

Greg Keefe and J Trenton McClure, University of Prince Edward Island
Elsa Vasseur (McGill University), Luke Heider (University of Prince Edward Island), Débora Santschi (Lactanet)

**PARTNERS**

Agriculture and Agri-Food Canada
Dairy Farmers of Canada

**PROJECT**

**Providing opportunities for movement to dairy cows by redefining indoor and outdoor spaces and best management practices**

The project will develop, document and pilot-test solutions to increase the opportunity for movement for cows kept in tie-stalls, taking into account farmers’ workloads, the financial investments required, improvements to animal welfare, Canadian climate and environmental regulations.

**RESEARCH TEAM**

Elsa Vasseur, McGill University
Stéphane Godbout (Institut de recherche et de développement en agroenvironnement), Sébastien Fournel, Doris Pellerin (Université Laval), Yan Martel Kennes, Pierre Ruel (Centre de recherche en sciences animales de Deschambault; CRSAD), Jeff Rushen, Anne-Marie de Passillé (University of British Columbia), Steve Adam (Lactanet), Marianne Villetaz Robichaud (Université de Montréal)

**PARTNERS**

Agriculture and Agri-Food Canada
Dairy Farmers of Canada
CRSAD (In-kind contribution)
**Theme:** Milk Quality

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**PROJECT**

**Surveillance of antimicrobial use and resistance to improve stewardship practices and animal health on dairy farms**

The project will develop an on-farm surveillance system and a research platform for antimicrobial use and resistance with the aim to optimize antimicrobial stewardship practices.

**RESEARCH TEAM**

Javier Sanchez and Luke Heider, University of Prince Edward Island
J Trenton McClure, Greg Keefe (University of Prince Edward Island), Kapil Tahlan (Memorial University of Newfoundland), Simon Dufour, David Francoz, Jean-Phillipe Roy, André Ravel, Marie Archambault (Université de Montréal), David Kelton, Scott McEwen, Scott Weese, Jan Sargeant (University of Guelph), Christopher Luby, Cheryl Waldner (University of Saskatchewan), David Leger, Richard Reid Smith (Public Health Agency of Canada), Herman Barkema, Jeroen De Buck (University of Calgary)

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**PROJECT**

**Understanding the contribution of milk composition and microflora during ripening of cheeses**

The project will highlight the origin of the main sources of microorganisms in the secondary ripening microflora, analyse their interactions with the natural antimicrobial system of milk and determine their impact during ripening of two types of cheeses (Cheddar and washed-rind). The study will take into consideration the effects of the season as well as milk concentration prior to cheesemaking.

**RESEARCH TEAM**

Steve Labrie, Université Laval and Claude P. Champagne, AAFC-Saint-Hyacinthe
Sylvie Turgeon, Yves Pouliot (Université Laval), Michel Britten, Daniel St-Gelais (AAFC-Saint-Hyacinthe)

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**PROJECT**

**Occurrence and impact of microbial biofilms on milk quality from farm to cheese vats**

The project will study the origin, structure, composition and formation of detrimental and beneficial biofilms at the farm and cheese plants, and recommend best management practices and equipment sanitation protocols to farmers and cheese producers.

**RESEARCH TEAM**

Denis Roy, Université Laval and Evelyne Guévremont, AAFC-Saint-Hyacinthe
Julie Jean, Ismail Fliss (Université Laval), Mario Jacques, Simon Dufour (Université de Montréal), Gisèle LaPointe, David Kelton (University of Guelph)
Cardiometabolic health is a term that includes: obesity, Type 2 diabetes, hypertension, metabolic syndrome* and cardiovascular disease.

**PROJECT**

**Effects of long-term consumption of dairy products on satiety, body weight and glycemic control**

This project aims to assess the potential beneficial role of consuming milk, yogurt and cheese on satiety, blood glucose levels and body weight in adults. The project outcomes could have implications to help address Type 2 diabetes and obesity, two major health burdens facing many Canadians.

**RESEARCH TEAM**

G. Harvey Anderson, University of Toronto  
Bohdan Luhovyy (Mount Saint Vincent University), John Sievenpiper (University of Toronto)

**PROJECT**

**Role of dairy products on body weight and metabolic health in families**

This project aims to demonstrate the potential beneficial effect of consuming dairy products on body weight, appetite control, diet quality and metabolic health in adults and children using an innovative web-based approach. The project outcomes could have implications to help address obesity, a major health burden facing many Canadians.

**RESEARCH TEAM**

Angelo Tremblay and Vicky Drapeau, Université Laval  
Sylvie Turgeon, Jean Doré, Vincenzo Di Marzo, André Marette (Université Laval),  
Eric Doucet (University of Ottawa), Marion Hetherington, Graham Finlayson (University of Leeds - England)

*Metabolic syndrome is a clustering of at least three of the five following medical conditions: excess abdominal fat, hypertension, insulin resistance, high triglycerides, and low HDL-Cholesterol. Metabolic syndrome is associated with the risk of developing cardiovascular disease and Type 2 diabetes.
The third Dairy Research Cluster builds on the success of the Dairy Research Cluster 1 and 2 (2010-2018) to stimulate productivity, sustainability and profitability on farms and to improve knowledge on milk and dairy products health benefits. Joint industry and government commitments to Dairy Research Cluster 3 total $16.5 million, including $11.4 million from Agriculture and Agri-Food Canada under the Canadian Agricultural Partnership AgriScience Program, $2.8 million from Dairy Farmers of Canada, $1 million from Lactanet, $736,300 from Novalait Inc., $75,700 from Dairy Farmers of Ontario and in-kind contributions from dairy sector partners.