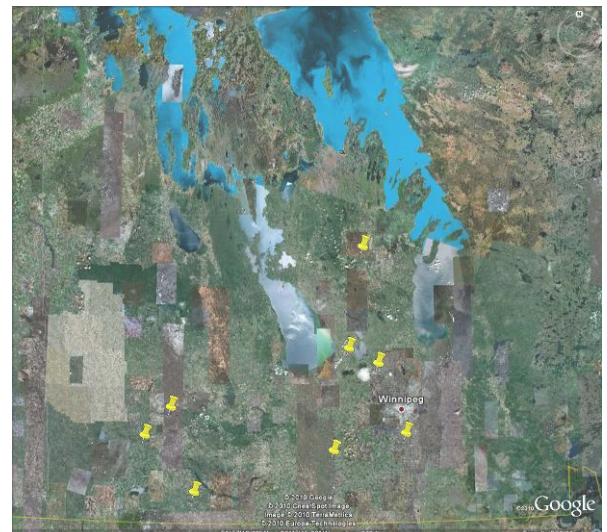


## What is the National Centre for Livestock and the Environment?

The National Centre for Livestock and the Environment (NCLE) is a team of scientists from a variety of backgrounds that partner with industry and government on research looking at ways to further the economic and environmental sustainability of livestock production systems. We explore opportunities to strengthen the connections between beef cattle, dairy cattle, pig and poultry production systems and plant production for food, feed, fuel and fibre. Along this pathway we attempt to improve multiple aspects of farm productivity and viability, environmental stewardship, human and animal health, and efficient use of our resources in agricultural production. This integrated, multi-disciplinary approach to research facilitates the development of comprehensive solutions to the complex challenges facing animal agriculture.

## NCLE Cattle Production Systems Research

Cattle production systems research takes place at multiple locations around Manitoba and extends into Saskatchewan and Alberta through cross-province collaborations. By working closely with the Manitoba Cattle Producers Association, individual producers and research colleagues in Manitoba, we are able to conduct studies across a diverse physical landscape of our province. Whether it's producers providing cattle from their farm in Fisher Branch or cooperating on field trials in Argyle, Lake Francis and Brandon, these relationships improve our research and help make our research relevant to you. Working closely with Manitoba Agriculture, Food and Rural Initiatives and AAFC Agri-Environment Services Branch bridges the transition from research outcome to tools-in-the-hand, encouraging rapid uptake and implementation of proven BMPs.



NCLE cattle production systems research across Manitoba.

## Research Projects

### Off-stream watering systems

**Status:** In progress

**Research team:** Kim Ominski, Gary Crow, Don Flaten, Luciano González

This project is a partnership led by the Manitoba Conservation Districts Association, the Assiniboine Hills and East Interlake conservation districts and MRAC.

#### Objective:

To determine if providing off-site watering or a combination of off-site watering plus a natural barrier for cattle lead to changes in:

- ❖ drinking behavior and performance of cattle
- ❖ improved streambank health

#### Why is this research important?

Identification of beneficial management practices that improve both animal productivity and help sustainably manage nutrients for surface and ground water quality will benefit producers, conservation districts and others living in the watershed.

## Overwintering beef cows in Manitoba – impact of management on productivity and environmental sustainability

**Research team:** Kim Ominski, Karin Wittenberg, Denis Krause, Mario Tenuta, Don Flaten

Funding provided in part by MCPA, CCA, MRAC, ARDI, MITACS, GreenCover, MSAPP

### *Supplementing low quality forage diets with dried distillers grains in cold stressed environment*

**Status:** In progress

#### **Objectives:**

How do feed quality, method of protein delivery and cold stress affect:

- ❖ nutrient utilization by cattle based on fermentation efficiency and nutrient excretion
- ❖ enteric methane emissions; methane and nitrous oxide emissions from cattle excreta
- ❖ structure and function of the rumen microbial community
- ❖ pathogen shedding



#### **Why is this research important?**

- ❖ to better predict the impact of supplementing low quality forage diets with DDGs and cold stress on beef cow performance, nutrient release, pathogen survival and net greenhouse gas emissions
- ❖ to identify the most suitable method for delivering protein supplements such as DDGs

### *Overwintering beef cows in an extensive bale grazing system*

**Status:** Starting winter 2010

#### **Objectives:**

- ❖ Compare the impact of overwintering in a confinement or a pasture-based system as well as the impact of supplementing low quality forage diets with protein on animal performance, enteric methane emissions, and pathogen shedding and survival
- ❖ Characterize and quantify greenhouse gas emissions and nutrient cycling during beef cow overwintering in a pasture-based system

#### **Why is this research important?**

Although pasture overwintering beef cows is increasing in popularity in Manitoba, there is limited information available on animal performance and the environmental implications of these more extensive systems.

## Use of residual feed intake to select breeding stock in forage-based beef cattle production systems

**Research team:** U of M - Kim Ominski, Luciano González, Karin Wittenberg, Gary Crow; John Basarab (AB ARD), Bart Lardner (WBDC), Vern Baron (AAFC), Susan Markus (AB ARD), Shannon Scott (AAFC)

Funding provided in part by MRAC, MAFRI; supported by MCPA

**Status:** Started 2010

**Overall objective:** Determine and quantify the factors which influence RFI of beef cattle under western Canadian conditions (feed intake, diet, temperature and activity) such that RFI can be used as an effective tool for selection of breeding stock in cow-calf production systems.

#### **Why is this research important?**

Being able to use RFI as a tool to select and breed for replacement animals with low RFI indices will serve to improve the economic sustainability of the beef cattle industry. Further, animals with low RFI have also been shown to have lower methane emissions and reduced manure output.

## Controlling the spread of Johne's Disease

**Research team:** Denis Krause, Kim Ominski, Kees Plaizier, Kathy Buckley (AAFC-Brandon), Tim McAllister (AAFC-Lethbridge), Steve Hendricks (U of S), Herman Barkema (U of C) and Jeroen De Buck (U of C)

Funding provided in part by MRAC, Broad foundation; supported by MCPA.

### *Composting as a means of eliminating Johne's Disease (JD)*

**Status:** Completed 2010

**Objective:** Assess the effectiveness of a biosecure carcass composting system for destroying *Mycobacterium avium* subspecies *paratuberculosis* (MAP), the bacterium that causes Johne's Disease.

#### Why is this research important?

A suitable means of disposing JD-infected animals that have been euthanized is needed since infected animals cannot be sold into the food chain and burial results in risk to ground water.

**Findings:** Although proven to be effective for destroying certain bacteria, this composting system did not destroy MAP. Under controlled laboratory conditions, MAP also persisted under long term exposure to as high as 80C. Other alternatives for disposing of JD-infected animals need to be investigated.

### *Natural history of JD and developing tests for early-stage identification in cattle*

**Status:** Started 2010

#### Objectives:

- ❖ Identify which bacteria in addition to MAP are involved in the infectious process
- ❖ Determine if these bacteria can be used in diagnosis of JD

#### Why is this research important?

Early stage identification of MAP will improve efforts to eradicate JD in Canadian beef and dairy herds. A simplified diagnosis tool is important because it is difficult, laborious and time consuming to detect MAP-infected cattle using currently available tests.

## Use of tannin-containing legumes in cattle-forage production systems

**Research team:** U of M - Kim Ominski, Denis Krause, Karin Wittenberg, Martin Entz, Mario Tenuta; AAFC - Tim McAllister, Kathy Buckley, Shannon Scott

Funding provided in part by ARDI.

**Status:** In progress

**Objective:** To determine if using high tannin-containing forages improves the sustainability of beef-forage production systems in terms of forage and cattle productivity, pathogen survival, nutrient dynamics and greenhouse gas emissions.

#### Why is this research important?

Tannin containing legumes can be an alternative to alfalfa in forage-based cattle production systems, providing a source of protein, energy, minerals and vitamins. Further, tannin-containing forages can prevent bloat and can improve protein digestion and utilization in cattle. This research fills knowledge gaps in productivity and environmental sustainability.



Researchers Kim Ominski and Don Flaten.

## To learn more about our research...

Visit us online at [umanitoba.ca/afs/ncle/](http://umanitoba.ca/afs/ncle/) or contact Christine Rawluk at [christine\\_rawluk@umanitoba.ca](mailto:christine_rawluk@umanitoba.ca)



## Using cattle manure as a fertilizer

**Research team:** Darshani Kumaragamage (U of Winnipeg), Don Flaten, Katherine Buckley (AAFC-Brandon), Wole Akinremi, Kim Ominski, Karin Wittenberg

### *Nutrient release from solid cattle manure in perennial and annual cropping systems*

Led by MCPA with funding by DFM, AAFC, MRAC, SDIF

**Objective:** To determine nitrogen and non-nitrogen benefits of manure as a fertilizer in crop production on annually and perennially cropped lands.

### **Why is this research important?**

Manitoba cattle producers need access to information based on scientifically sound, locally relevant data to aid in management planning for using solid manure as fertilizer.

### *Developing a calculator for estimating the fertilizer equivalence of different manures*

Funding provided by MLMMI

**Objective:** To develop a user-friendly calculator for estimating the fertilizer equivalence of different livestock manures based on characteristics of the manure, plus soil temperature and moisture conditions.

### **Why is this research important?**

Manure is typically applied onto farm land based on an assumed availability of N, yet the rate of N release from organic material is dependent on many factors. A potential “mis-estimation” can lead to either under- or over-supply of N creating a situation where either optimal yields are missed or excess nitrogen can accumulate.



## Use of needle free injection systems in cattle

**Research team:** Kim Ominski, Karin Wittenberg, Juan Carlos Rodriguez, Luciano González, Terry Whiting (MAFRI)

Funding provided by MAFRI

**Objective:** To compare immune response following vaccination with needle free injection systems compared to traditional vaccination using a needle

### **Why is this research important?**

Needle free injection systems have been used in both the swine and dairy industries where animals are typically housed indoors. This research will examine the impact of: location of injection (neck vs caudal fold), temperature during injection (winter vs summer) and type of vaccine in both needle-free and conventional injection systems.

## Thank you...

**To the Manitoba Cattle Producers Association.** Your continued investment and support of our research attracts hundreds of thousands more in matching research dollars than would otherwise be possible. As an example, MCPA's \$60,000 commitment to an overwintering project is now a \$600,000 overwintering systems research program.

**To individual cattle producers.** Whether your contribution is providing cattle for a research project or dedicating and managing a piece of land over the span of a multi-year research trial, your commitment makes our research possible.

