The second Dairy Research Cluster was launched on January 1, 2014 and 23 activities are now underway. The following is a brief report on progress made in select projects that are delivering results for farmers! Visit DairyResearch.ca for more information on dairy research in Canada.

**SUSTAINABLE MILK PRODUCTION**

**Dairy Cow Comfort “How-to” Published**

Researchers at the Universities of Guelph, Calgary, British Columbia and Laval developed a “How-to” tool that will help improve animal comfort on dairy farms. A total of fifteen researchers and extension specialists from several fields related to dairy cow comfort (behaviour, nutrition, health and management) helped design the tool.

The new tool (on DairyResearch.ca) will help farmers to assess how well they are meeting the Code of Practice for the Care and Handling of Dairy Cattle and identify management and environmental modifications to improve dairy cow comfort on their farms. Farmers can use the documents that are part of the tool on their own or with assistance from a dairy advisor or veterinarian.

The tool was also used by Dairy Farmers of Canada to help develop the animal care assessment program, which is now part of the proAction Initiative: On-Farm Excellence. The research in this area also served to form the basis for a practical cow comfort training program offered by Valacta in 2015.

Read Dr. Vasseur’s Blog post on DairyResearchBlog.ca.

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Dr. Anne-Marie de Passillé receives top honours!

Dr. Anne-Marie de Passillé was awarded the Honorary Fellow status by the International Society for Applied Ethology in recognition of her exceptional contributions to the Society in the fields of applied animal behavior and welfare. She was also elected to the post of Honorary Doctor by the Board of the Faculty of Veterinary Medicine of the University of Helsinki. She will receive this Honorary PhD in June 2015.

Dr. de Passillé was the lead investigator of a large national research project that developed an on farm cow comfort assessment tool in Canada under the Dairy Research Cluster (2010-2013).
Farmers’ Input Used to Develop Canada’s First National Dairy Study

In the spring of 2014, dairy farmers and stakeholders took part in a survey to prioritize topics for the creation of Canada’s First National Dairy Study on dairy cattle health and management. The response was overwhelming with over 1,000 respondents (most of which were farmers). Animal welfare was the number one management issue identified, while lameness was the number one health issue. Other management issues were: biosecurity, costs of diseases, antibiotic use, food safety, reproductive and udder health. The top health issues were: calf diarrhea, respiratory disease, bovine viral diarrhea (BVD), enzootic bovine leukosis (EBL)/bovine leukemia virus (BLV), Johne’s disease, *E. coli* (food safety), and *S. aureus* mastitis. (For Dr. David Kelton’s description of the study, visit the DairyResearchBlog.ca)

The National Dairy Study will begin in January 2015. There are two phases to rolling out of the study and the goal is to gather health and management information from a random sample of dairy farms across the country to describe and benchmark the current state of the Canadian dairy industry. This study is similar to the National Animal Health Monitoring System (NAHMS) surveys used in the U.S. The NAHMS is used to identify benchmarks for industry practices.

Farmers taking part in the 2015 National Dairy Study will receive:
- data that will allow them to compare their operation to local, regional and national benchmarks;
- free test results for selected diseases of importance if they participate in a farm visit;
- opportunity to provide input to help direct research priorities in the future.

Feeding, Cropping and Manure Management – A Whole Farm Approach to Sustainability

A cross-disciplinary team led by Dr. Martin Chantigny of Agriculture and Agri-Food Canada (AAFC) in Québec is working on the eco-efficient management of crops and manure. His team is taking a “whole farm” approach to improving environmental sustainability and farm performance. They are looking at the impact of certain feeding strategies (used to reduce greenhouse gases (GHGs) from the rumen) and manure storage approaches, on the fertilizer value of manure. They are particularly interested in the availability of nitrogen and nitrogen losses in soils (see the full project summary at DairyResearch.ca).

The researchers ran a series of tests in controlled conditions. They found that various feed strategies (use of different silage, concentrates and sub-products for feed) have little influence on the fertilizer value of manure or emissions of GHGs. However, certain manure storage strategies have a marked effect on emissions of GHGs. Manure stored in an empty manure tank emitted more CO₂ and N₂O and was associated with a lower yield of wheat compared to manure stored in a partially filled tank (mixed with older manure). Biomethanization of manure leads to net reduction of GHGs and was associated with better yields of wheat.

www.dairyresearch.ca ● www.recherchelaitiere.ca
Dr. Chantigny attributes these findings to the levels of volatile fatty acids or VFAs found in the manure and their effect on nitrogen. VFAs stimulate GHG emissions and immobilization of soil nitrogen, which decreases the availability of manure nitrogen to the crop. VFAs were higher in manure held in an empty tank, leading to higher emissions of GHGs and greater nitrogen immobilization, thereby resulting in lower yield for wheat. The VFAs were much lower when manure was mixed with older manure or following a process of biomethanization.

Dr. Chantigny’s results are very telling. The team will use these results to move from the lab to various farms. The research highlights the importance of testing the impacts of various farm practices at the whole farm level to better understand how one practice can effect another, when trying to reduce a farm’s environmental footprint.

**GENETICS AND GENOMICS**

**Hoof Health: A Step in the Right Direction!**

Hoof lesions and lameness cause important economic losses to the Canadian dairy industry. The cost of each case of lameness is estimated to be $452, generating losses of $125 million per year. A team of researchers led by Dr. Filippo Miglier, Adjunct Professor at the University of Guelph, are working to address this issue. They are studying ways to improve hoof health through genetic improvement and the use of farm management tools.

A preliminary picture of the situation – 30-60% of cows have at least one hoof lesion:
- 578 herds in the provinces of Alberta, British Columbia and Ontario between 2010-2012; and,
- Data collected from 26 hoof trimmers that were trained on hoof trimming, identification of lesions and use of the Hoof Supervisor R, a tactile computer with powerful data collection options.

<table>
<thead>
<tr>
<th>With lesions</th>
<th>Alberta</th>
<th>British Columbia</th>
<th>Ontario</th>
</tr>
</thead>
<tbody>
<tr>
<td>n = 40,558</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital dermatitis</td>
<td>20,644</td>
<td>9,523</td>
<td>9,156</td>
</tr>
<tr>
<td>Sole ulcers</td>
<td>13,241</td>
<td>5,464</td>
<td>4,488</td>
</tr>
<tr>
<td>White line lesion</td>
<td>5,284</td>
<td>2,149</td>
<td>1,684</td>
</tr>
<tr>
<td>Sole hemorrhage</td>
<td>4,760</td>
<td>2,053</td>
<td>1,106</td>
</tr>
<tr>
<td>Toe ulcer</td>
<td>1,964</td>
<td>1,026</td>
<td>2,894</td>
</tr>
<tr>
<td></td>
<td>1,504</td>
<td>763</td>
<td>213</td>
</tr>
</tbody>
</table>

**Benefits for farmers**
- A national data collection network on hoof health will be established by 2018;
- Estimated breeding values for hoof health and a sub-index integrated in the Lifetime profit index (LPI); and,
- Future reports and data will be created for farmers on: Types of lesions and their severity (1, 2 or 3); Hoof status and date of retrieval; Monthly and annual reporting for the herd and by cow; Evaluation and improvement of methods to intervene on farms and more.
HUMAN NUTRITION AND HEALTH

The following articles summarize recent findings from activities in the Cluster. The scientific reference articles are included at the end of each summary.

Can dairy product consumption lower blood pressure?

Hypertension is a chronic medical condition in which the blood pressure in the arteries is high. If left untreated, this condition can increase the risk of heart disease and stroke. The prevalence of high blood pressure has been steadily increasing worldwide. In Canada, over six million Canadian adults1 — that’s one in five — now have the condition.

The good news is that diet is a key factor in the prevention and treatment of hypertension. Healthy eating patterns, which include dairy products, have been shown to have beneficial effects on high blood pressure.

Many studies have shown that eating dairy products can help lower the risk of high blood pressure in healthy individuals. However, few studies have looked at the impact of dairy consumption on people diagnosed with mild to moderate hypertension.

The authors of this study decided to investigate how dairy product consumption could affect blood pressure in men and women with mild to moderate hypertension. They enlisted the help of 89 men and women, who were asked to eat three servings per day of dairy products (milk, cheddar cheese and yogurt) for a four-week period.

Results showed that eating three daily servings of dairy products led to a significant reduction in blood pressure in men, but not in women. According to the researchers, this is consistent with other findings that suggest men and women respond differently to blood pressure regulation.

The study also showed that consuming three daily servings of dairy products significantly improved endothelial function in both men and women. "Endothelial" refers to the cells that form the lining of blood vessels. When this inner lining is impaired, it can increase the risk of coronary artery disease and is also linked to high blood pressure.

Authors: Jean-Philippe Drouin-Chartier, Iris Gigleux, André J Tremblay, Luc Poirier, Benoît Lamarche, and Patrick Couture

Dairy product consumption lowers the risk of type-2 diabetes

The prevalence of type 2 diabetes is increasing worldwide. It's one of the fastest growing diseases in

1 Heart and Stroke Foundation of Canada website
Canada, with over 60,000 new cases every year\(^2\). The disease is characterized by high blood sugar, which can have serious health consequences over time. These include blindness, heart disease, nerve damage and stroke.

Many studies have been conducted to find out whether certain foods can lower the risk of type 2 diabetes. In recent years, several studies have shown that dairy products, especially low fat dairy products, could help reduce that risk. However, it is not clear whether regular fat dairy products/dairy fat could also help reduce the risk of type 2 diabetes.

In addition, few studies have looked at the link between dairy product consumption and the underlying traits of type 2 diabetes, namely *insulin resistance* and *beta-cell dysfunction*. These two conditions prevent the body from efficiently reducing blood sugar when it needs to. This usually leads to type 2 diabetes.

The authors of this study decided to investigate the link between dairy product consumption (especially dairy fat) and type 2 diabetes, as well as its underlying conditions, *insulin resistance* and *beta-cell dysfunction*.

The study was conducted using data from 659 adults who don’t suffer from diabetes and who consume dairy products. The study authors used an objective method to make certain that the participants were indeed consuming dairy. This method consisted of analysing blood samples to detect indicators (known as "biomarkers") of recent dairy product consumption, particularly dairy fat, as indicated by certain fatty acids in the blood.

The results of this study suggest that regular fat dairy consumption or dairy fat lowers the risk of type 2 diabetes by helping the body to better control blood sugar.

The authors conclude that these results could contribute to future recommendations regarding the benefits of dairy products in the prevention of type-2 diabetes.

**Authors:** Ingrid D Santaren, Steven M Watkins, Angela D Liese, Lynne E Wagenknecht, Marian J Rewers, Steven M Haffner, Carlos Lorenzo and Anthony J Hanley

**Journal:** American Journal of Clinical Nutrition

**October 2014**

Do dairy products have an impact on inflammation in the body?

Unlike acute inflammation, which helps protect and heal the body after an injury or infection, chronic inflammation – or "low-grade" inflammation – is largely invisible and can go on for years. Low-grade inflammation is thought to play an important role in the development of certain conditions such as heart disease, high-blood pressure and type 2 diabetes.

\(^2\)Health Canada website, 2014.
More and more studies suggest that milk and dairy products can lower your risk of cardiovascular disease, high blood pressure and type 2 diabetes, possibly by helping to reduce low-grade inflammation in the body.

Few studies have been specifically designed to evaluate the role of dairy products on inflammation. The authors of this study decided to specifically look at the impact of dairy products on inflammation in healthy men and women with low-grade inflammation. A special test was used to detect indicators (called "biomarkers") of inflammation in the study participants.

A total of 112 men and women took part in the study. They were asked to consume three servings of dairy products per day (low-fat milk, low-fat yogurt and regular cheddar cheese) during a four-week period.

The results showed that dairy products did not increase inflammation and in fact, they decreased one indicator of inflammation.

The authors concluded that short-term consumption of a combination of both low- and high-fat dairy products, as part of a healthy diet, does not have a negative effect on inflammation in the body.

Authors: Marie-Ève Labonté, Audrey Cyr, Mohammad M. Adbullah, Marie-Claude Lépine, Marie-Claude Vohl, Peter Jones, Patrick Couture, and Benoît Lamarche