



Performance and behaviour of dairy heifers according to their milk diet

Duration: 2018-2022

Highlights

- The milk feeding phase can affect growth and production parameters in heifers.
- Little information exists on the impact of modifying milk feeding of calves between the current Canadian recommendation and unrestricted feeding.
- Using a tape measure to record thoracic circumference is the tool most frequently used on farms to assess weight. This project helped validate that this technique works well for pre-weaned calves.
- Epigenetics sheds light on gene regulation to increase our knowledge of the impact of calves' consumption on this mechanism with respect to weight gain and future milk production.

Objectives

The objectives of this project are:

- 1) to evaluate the effect of different milk feeding management scenarios on weight gain in heifers (pre-weaning performance), cow productivity (post-weaning performance) and gene methylation (epigenetics);
- 2) to evaluate the impact of different milk feeding management scenarios on calf behaviour;
- 3) to validate the use of a tape measure to assess the weight of very young heifers.

Results and potential benefits

To attain these objectives, one experiment involving more than 300 heifers is currently underway at two dairy farms implementing a milk feeding phase with an automated calf feeder. The experiment has two different milk feeding management scenarios (restricted vs. unrestricted) as treatments. Data collection up until weaning is complete. Data was collected three times per week for the first three weeks of life, followed by every two weeks until the calves were weaned. To date, more than 300 calves have been recruited for the project and over 5,000 weight and height data items have been recorded. The experiment is being continued on one farm to obtain the impacts of the treatments on post-weaning performance. The heifers were weighed and measured before their first insemination. Milk production during the first lactation on the same farm is in the course of being recorded. Additionally, a sub-sample of the data will be used for epigenetic analysis. The project's current findings confirm the validity of using a tape measure to evaluate the calves' weight prior to weaning and show that, despite minor differences, both treatments result in behaviours that are typical of calves at that age. Data on milk feeding programs (restricted vs. unrestricted) will be used as a basis for making recommendations to farmers. There is currently a lack of guidelines for the feeding of young heifers in Quebec.



Innovative aspects

- Establishment of guidelines for feeding young heifers in the context of Quebec dairy farm production.
- Validation of the tape measure as a means of measuring heifer growth in the Quebec context.

Professionals trained

- **Marwa Hasnaoui**, master's student, tape measure validation
- **Ousmane Magassa**, master's student, calf behaviour
- **Léonie Laflamme-Michaud**, master's student, relationship between the milk feeding phase, pre-weaning performance and gene expression
- **Jennifer Phillion**, master's student, relationship between the milk feeding phase and post-weaning performance in heifers

For further information

The research results will be promptly transferable to dairy farmers. An article will be written for the journal *Le Producteur de Lait Québécois*. In addition, a presentation proposal will be submitted to CRAAQ for the Quebec Dairy Cattle Symposium (*Symposium des bovins laitiers*). Other communication activities (articles and presentations) are planned for collaborating users, including Novalait and Lactanet. Already published:

- *Bulletin des agriculteurs* – November 2019: “Mesurons les jeunes génisses laitières”
- *Le Producteur de lait Québécois* – April 2020: “Le ruban québécois pour estimer le poids des veaux”
- *Poster at the Quebec Dairy Cattle Symposium* – November 2019: “Validation et développement de méthodes pour le suivi de la croissance pré-sevrage des génisses laitières”
- *Posters at the Quebec Dairy Cattle Symposium* – November 2020: “Comparaison du comportement des veaux laitiers Holstein nourris selon la recommandation canadienne actuelle et à volonté” and “Alimentation lactée à volonté ou selon la recommandation canadienne: impacts sur la croissance des génisses”
- *Poster at the American Dairy Science Association conference* – June 2019: “Use of body measurements to estimate live weight of Holstein dairy calves in the pre-weaning period”
- *Presentation summary at the Science Information Day – Dairy cows and fodder plants* – February 2019: “Validation et développement de méthodes pour le suivi de la croissance pré-sevrage des génisses laitières”

Financial contributions

Special call for proposals in dairy production and processing (2016–2021):

- Natural Sciences and Engineering Research Council of Canada (NSERC)
- Quebec consortium for industrial bioprocess research and innovation (CRIBIQ)
- Novalait
- Ferme M.G. L'Heureux

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Contact persons

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