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Beljie Herd
Innovation for greater efficiency

Antibiotics
Specific attention to Category I

Purstein Herd
A remarkable level of production

Photo : *Sheila Sundborg*

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Category 1, Very High Importance

Antibiotics to be handled with care

Health is at the top of everyone's agenda these days, and consumers are paying closer attention to what they're eating and drinking. The dairy industry is well aware of this and aims to do all it can to meet consumer expectations. The MAPAQ also periodically reviews its actions and requirements as part of its oversight of the production of healthy food for the Quebec population, within a sustainable bio-food sector. It is important to keep this context in mind when analyzing the regulations that came into effect in February 2019 concerning Category I (Very High Importance) antimicrobials, which include antibiotics.

These regulations are a first in North America. Some say that Quebec is a step ahead once again, all to its credit. Others, however, don't see why things should be different here. Analyzing all the information surrounding these regulations sheds light on the legislative process that brought them into being.

In a training guide for producers, the Association des médecins vétérinaires praticiens du Québec (AMVPQ) explains that antibiotics are "substances that, in low concentrations, are able to halt bacterial growth" (1, page 5). Note that antibiotics are ineffective against other pathogens, such as parasites or viruses. In dairy production, Category I antibiotics are used primarily to treat mastitis, pneumonia and diarrhea in calves.

Antibiotics, a wonderful tool, but...

The particularities of Category I (Very High Importance) antimicrobials (more commonly called Class I) are detailed in a Health Canada document entitled *Categorization of Antimicrobial Drugs Based on Importance in Human Medicine*, which is available on the federal government's Internet site (www.canada.ca/en/health-canada). As the document states: "These antimicrobials are considered of very high importance in human medicine as they meet the criteria of being essential for the treatment of serious bacterial infections and limited or no availability of alternative antimicrobials for effective treatment in case of emergence of resistance to these agents."

It is important to remember that resistance to a newly discovered antibiotic usually develops quite rapidly, within three to nine months for the most well-known (idem, page 12). Dr. Marie-Ève Paradis, scientific advisor for the AMVPQ, also points out that the development of new antibiotics is relatively rare, which is why it is so important to ensure that those that are currently available remain effective.

These points explain the rationale behind the new rules laid down by the MAPAQ relative to the use of antibiotics in agriculture. The intention is to establish practices in veterinary medicine that prevent, as much as possible, the development of resistance to these drugs, so that their effectiveness for the treatment of infections in humans is not diminished. Veterinarians and dairy farmers therefore need consider the resulting benefits and restrictions from a public health perspective. Indeed, Health Canada states that "antimicrobial drug categories also reflect severity of adverse human health consequences in case of resistance development."

In addition to the primary motivation behind this regulation, it also makes sense for producers to comply with the directives, because, as Dr. Paradis explains, if a resistant form of bacteria develops, it will become more difficult to treat animals that are infected with it. Indeed, the overall concept of health recognizes that animal health, human health and environmental health are interdependent (idem, page 6). Dr. Lisiane Poulin, from the Clinique vétérinaire de Saint-Georges, in the Beauce, adds that this new approach could save breeders a considerable amount of money, as these drugs are very expensive.

Photos : Istock

A veterinarian examines a calf to make the right diagnosis.

That being said, the new directives issued by the MAPAQ do not prohibit the use of Category I antibiotics. They do, however, stipulate that such drugs be used only when necessary and justified, particularly in cases where they are the only possible remedy. This means that prescribing Category I antibiotics for preventative purposes is no longer allowed, and veterinarians are required to follow these new rules.

On the farm

In the day-to-day practice of dairy farming, Dr. Poulin explains, it is imperative that, when trying to cure an infection, producers and veterinarians aim for the right drug, administered at the right dosage, at the right time. This assumes that the cause of the disease is known. Treating randomly, trying a drug from the medicine cabinet and then, if it doesn't work, calling the veterinarian, is a habit that is fortunately losing ground, says Dr. Poulin.

With a case of mastitis, a milk culture test can be used to identify the bacteria involved. Many veterinary clinics provide this service, although some producers do the testing themselves on the farm. As Dr. Poulin explains, "It's easy to do and you can take a picture of the result." On the other hand, points out Dr. Paradis, the operation is simple but must be done with great care to avoid contaminating the sample. Moreover, the test is not the only justification needed to use a drug of Category I, Very High Importance. A prescription issued by a veterinarian is also required. The veterinarian therefore needs to see the photo, which is possible with a smart phone, determine the type of bacteria involved, and write a prescription. This approach is possible, explains Dr. Paradis, providing the veterinarian is very familiar with the herd. Lastly, the veterinarian is required to keep the photo for his or her records to justify the treatment.

These bacteriological tests are particularly useful for cases of acute mastitis caused by *E. coli* or *Klebsiella* bacteria, which can then be identified accurately. Dr. Poulin stresses that a bacteriological analysis, which provides a picture of udder health, should not be confused with the somatic cell count, which is an indicator of milk quality. While both these evaluations are useful, they have distinctive features.

In the case of respiratory ailments or diarrhea in calves, an accurate diagnosis is essential. As the AMVPQ points out with regard to respiratory problems: "all animals with a fever or rapid breathing are not necessarily suffering from pneumonia," (idem, page 49), and in the case of

A diagnosis and, ideally, a test identifying the bacteria involved should always precede the injection of an antibiotic.

Vaccines, another alternative

Dr. Lisiane Poulin, from the Clinique vétérinaire de Saint-Georges, in the Beauce, stresses that vaccines can also be used to protect dairy cows against mastitis. Although they unfortunately don't prevent the mammary gland from becoming infected, which underlines the importance of prevention through sound management, they can reduce the severity and frequency of such infections.

Vaccines are formulated to target the different bacteria likely to infect the udder. Hence, producers considering this approach need to have accurate knowledge of the bacteria present in their herds, so they can choose, in collaboration with their veterinarian, the vaccine(s) best suited to their situation.

Moreover, adds Dr. Poulin, vaccination does require a fair amount of work, because booster shots also need to be administered. Despite that, however, the approach is economical. Vaccines cost less than discarding milk or culling a cow, which explains their growing popularity.

diarrhea, "only calves showing signs of fever, anorexia, exhaustion and the presence of blood or intestinal mucus in their feces should receive antibiotics" (idem, page 56).

Likewise, adds Dr. Poulin, veterinarians are expected to do "an overall assessment of the situation before deciding to prescribe an antibiotic." This approach requires taking into account different aspects of herd management when making recommendations. It also means ensuring that preventative measures are in place to prevent other problems that would require the use of antibiotics. By the same token, treating chronic problems remains questionable.

Finally, veterinarians should always provide follow-up after an intervention, in particular to check if the producer has followed the prescription as directed and if the outcome is positive.

In accordance with the new regulations, drugs classified as Category I, Very High Importance, cannot be left on the farm in anticipation of an eventual need. On the contrary, antibiotics of this type must be sold for a specific animal and administered according to the prescribed dosage, within a given period of time. In very rare instances, a veterinarian may prescribe an antibiotic treatment for a group of animals, if the problem appears to be epidemic. In all cases, both the recommendation and the dosage schedule must be followed to the letter. This means that having a drug on hand "just in case" is out of the question. Lastly, producers must at all times be able to show an inspector the prescription and any other supporting documentation signed by the veterinarian.

Photos : iStock

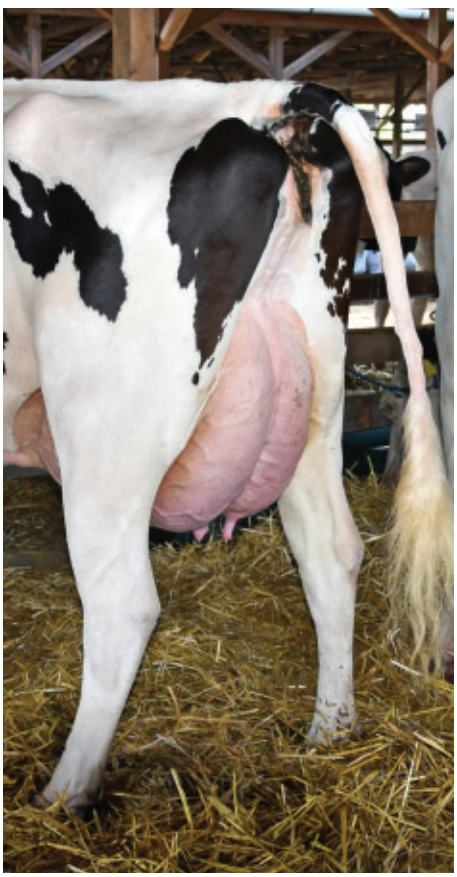
Good milking practices and well-maintained equipment are management factors that contribute to preventing mastitis, thus reducing the use of antibiotics.

The treatment plan, a valuable tool

Particularly where mastitis is concerned, Dr. Poulin emphasizes that breeders and their veterinarians need to establish a plan of treatment, with a milk culture test. She refers to a study conducted at the University of Wisconsin, on more than 600 cows, that confirmed the effectiveness of this approach. The researchers there compared the results obtained by breeders who were using this type of protocol with those of farmers using an approach based on their usual practices. The analysis revealed that the cost of treatment and discarded milk in the latter group amounted to $264 per case, while in the first group, the cost was only $90. That was in 2004, and it is easy to imagine what those costs might look like in 2020.

As Dr. Poulin recapitulates, using antibiotics judiciously means "keeping records, correctly identifying bacteria, and following a plan of treatment prescribed by a veterinarian." ■

(1) *Utilisation judicieuse des antibiotiques chez les bovins laitiers*, a training guide for producers prepared by the Association des médecins vétérinaires praticiens du Québec in partnership with Les Producteurs de lait du Québec.



Healthy cows and great looking udders are the aim of all breeders.

Keeping a herd healthy calls for good collaboration between breeders and veterinarians.

By
Michel Dostie
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Translation by
Nicole de Rouin

Ferme Beljie

Innovation you say? Indeed!

Brothers Marc and Éric Bellemare operate Ferme Beljie, in Yamachiche, with their parents, Jean-Luc Bellemare and Louise St-Yves. Their motto: make more milk efficiently. To do that, they try anything new, they say, whether product or technology. Then they evaluate the results to make an informed decision.

THE FIGURES FOR FERME BELJIE

Herd: 235 head, including 105 lactating cows

Production: 11 407 kg of milk, with 4.15% fat and 3.37% protein

BCA: 252-266-266

Quota: 145 kg BF/day

Classification: 2 M EX, 27 VG, 60 GP and 20 G

Crops: The Bellemare family grows 32 ha of silage corn, 85 ha of an alfalfa/bromegrass and timothy mix (70%/30%), harvested as hay and silage, and 12 ha of an oat/pea mix, harvested in wrapped square bales.

This forward-looking mentality is a family feature. Case in point is their father, who started out in breeding by putting the advice of a friend into practice. When Ghyslain Demers, formerly with the PATLQ, became a feed mill operator, Jean-Luc Bellemare was his first customer. The miller suggested he breed Holsteins, and invited him to visit the Blondin and Lolisée farms. That experience inspired Jean-Luc to buy a few cows from good families. The embryos from those animals were all sexed to ensure that only females were implanted.

With six daughters to her name, *Lolisée Broker Madame*, VG-86-3yr 2*, was the herd's main brood cow. Her daughter *Beljie Stormatic Manon*, EX-91 4E 3*, followed in her footsteps, recording a lifetime production of 104 985 kg in six lactations, with 4.1% fat and 3.2% protein. *Manon* is herself the dam of eight daughters, including one EX and four VG. Among them, *Beljie Braxton Madame*, EX 4E, granddaughter of *Broker Madame*, is particularly appreciated by the Bellemare brothers, who affectionately call her "No. 70". A model of longevity, *Madame* turned 10 this month, is expecting her ninth calf, and is currently in her eighth lactation, which is projected to yield 13 596 kg. As of her last milk test, she had produced 90 303 kg of milk (226-250-246). "She wanted to live," Marc says, recounting her hospitalization in Saint-Hyacinthe, when her owners were seriously considering having her euthanized, and how she surprised them all by getting back on her feet and coming home. On top of that, adds Éric, "This is a family of calm cows that are easy to handle with just a hand on the collar."

The herd has also been shaped by *Blondin Rubens Samantha*, a red factor carrier that produced over 40 000 kg of milk in three lactations and gave birth to eight daughters, including four VG and three GP. Among them, *Beljie Dusk Samantha*, VG-86, produced nearly 80 000 kg of milk in six lactations, with 4.4% fat.

Built in 2015, a free-stall barn with two robotic milkers houses the Beljie herd in Yamachiche.

Photo : Michel Dostie

Breeding for open housing

When the Bellemare family began to think their old barn was becoming outdated, the idea of a new free-stall barn had been running through

Photo : Ferme Beljie

***Beljie Braxton Madame*, EX 4E, a cow the owners affectionately refer to as "*No. 70*", is an excellent example of longevity, as she just turned 10 this month, has given birth to eight calves, and has produced 90 303 kg of milk (226-250-246) to date.**

Marc's mind. The idea was of little interest to his father, however, who considered open housing suitable only for commercial herds. Nonetheless, open-mindedness prevailed, and the breeders, along with DeLaval representatives, travelled to Ontario to visit a few good herds housed in free-stall facilities equipped with robotic milking systems. In the end, they too opted for a free-stall structure, and the new building was inaugurated in 2015.

That decision, however, changed the co-owners' vision of breeding. Thereinafter, selection would need to focus on developing a uniform herd, with smaller cows, better adapted to robotic milking. The larger cows, explains Éric, often have foot problems and shorter lives.

To maintain good conformation in the herd, the breeders choose sires that have a proof of at least +12 and are positive for feet and legs, openness of rib, teat placement and milking

Photo : Ferme Beljie

A family story

Brothers Marc and Éric Bellemare and their parents are the four shareholders of Ferme Beljie. Marc, who has always worked on the farm, has been a co-owner since 2012. His integration was facilitated by a loan of 5 kg of quota, allocated to young farmers as part of a succession assistance program. He is now in charge of inseminations and field work, among other responsibilities. Éric, who has a diploma in Farm Management and Technology from the ITA, Saint-Hyacinthe Campus, has been a co-owner since 2017, devoting most of his time to preventive medicine. Their mother looks after feeding the cows and calves, while their father is everywhere, supporting the rest of the team.

The four shareholders of Ferme Beljie (from left): Éric, Marc, with his daughter Noémie, 6 years old, and their parents, Louise St-Yves and Jean-Luc Bellemare.

speed. As for production, they focus primarily on components and select bulls that have positive deviations for fat and protein.

With the help of Frédéric Fillion, their dairy genetics advisor, the Bellemare brothers buy semen from four bulls at each proof release, choosing two proven sires and two genomic young sires. In the latter case, they base their selection mainly on an analysis of the bulls' maternal lines. Likewise, and in keeping with their progressive outlook, Marc and Éric are also interested in polled bulls and those with the A2 gene.

The cows in the top two thirds of the herd, based on robotic milking performance and conformation, receive semen from the four sires mentioned above. The yearling heifers and young cows in this group are inseminated with sexed semen. The cows in the remaining third of the herd are inseminated with beef semen. Animals with high SCCs, regardless of their other attributes, are automatically included in this last group.

Photo : Michel Dostie

For the first 40 days after calving, lactating cows are kept in a separate pen behind the robotic milkers at Ferme Beljie.

Photos : Beljie

The new barn for yearling heifers and dry cows at Ferme Beljie.

Animal well-being is a concern

The herd has been housed in free stalls, with two robotic milkers, for the past five years now. When planning the construction of the new barn, the breeders' focus on animal welfare motivated a number of consultations, in particular with veterinarian Raymond Caron. Aiming to eliminate competition among the cows, they allocated more space at the feed bunk and around the robots. As well, a section of the barn is now reserved for cows that have calved in the past 40 days.

With the construction of the new cow barn and the installation of two robotic milkers, the breeders were able to increase the size of their herd. Thirty cows were thus acquired, one of which was Sicy Goldwyn Arie, VG-2yr, descended from three EX dams. Finally, because the old barn was no longer fit to house their replacement animals, a new barn was built for the yearling heifers.

Concern for the well-being of their herd has also led the breeders to examine their animals biweekly, as part of a preventive medicine approach. As well, the cows' hooves are trimmed monthly, udders are shaved every three months, and foot baths are scheduled three times a week.

The herd is fed a TMR with an automated feed system. The forage portion of the TMR is composed of two thirds corn silage and one third haylage. High moisture corn, a supplement, and 1 kg per cow of hay or straw complete the ration. Each lactating cow also receives 2 to 6 kg of meal per day in the robot. Cows in their first 40 days of lactation are also fed an additive that is specially formulated for their condition.

The conception rate at first service is 60%. The cows give birth in the old barn, refitted for that purpose, and remain there as long as necessary. Reproduction management also involves embryo sexing, so that the breeders can plan herd replacements. The dry-off period lasts 40 to 45 days. ■

By
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Editor

Translation by
Nicole Rouin

Purstein Herd

Large quantities of good quality milk

The Purstein herd got off the ground in 1997. Prior to that, while studying dairy production at the agricultural school in Nicolet, François Charette completed a work placement at Ferme Ferlou, where he discovered an interest in breeding. The following year, with his father, Charles Charette, François acquired the Bicolore herd, recognized as a Master Breeder herd in 1992, with the intention of pursuing its development. He would thus be following in the footsteps of his father, former owner of the Malaury prefix.

THE PURSTEIN HERD

Herd: 175 head, including 95 lactating cows

Average production: 13 000 kg of milk, with 4.04% fat and 3.34% protein

BCA: 296-322-310

Quota: 150 kg BF/day

Classification: 2 EX, 37 VG, 60 GP and 10 G

François' father gave his son ample latitude in planning embryo flushes and purchasing a few more animals to build a solid base on which to develop the herd, and bring productivity up to the level it is at today. In that vein, *Bicolore Broker Donnie*, EX, with a single lactation at the age of 3 that yielded over 11 000 kg of milk and BCAs of 240-230-231, was, in 2000, the first cow to be used as an embryo donor.

But two cows have been especially influential in the herd's development: *Resons Fairy Leadership*, VG-3yr 2*, acquired in 2001, and *Sicy Jalouse Goldwyn*, EX-91 4*, purchased in 2014. Today, the descendants of these two cows make up about half of the herd.

Fairy was used for embryo collection right from the start. In addition to producing over 90 000 kg of milk in seven lactations, she produced eight daughters, including two VG and 4 GP. Of that group, *Purstein Goldwyn Fair*, VG-2yr, embodied the qualities of the family and transmitted them to her daughter *Purstein Shottle Flash*, VG-87-3yr 4*. This granddaughter of *Fairy* has earned two Superior Lactations and is the dam of seven daughters all classified GP or better, including one EX and three VG, with six Superior Lactation certificates among them. Now the fourth generation of this line is doing the breeder proud, in particular with *Purstein Pirate Famous*, GP-83-2yr, and *Purstein Mogul Floppy*, GP-82-1yr, both awarded Superior Lactation certificates for their respective yields of 13 392 kg of milk at 1 year and 11 months (354-379-346), and 13 627 kg at 1 year and 10 months (352-366-357). And the next generation maintaining the trend, in particular with *Purstein McCutchen Find*, VG-2yr, a cow that earned two Superior Lactations after her first two calvings.

The main building housing the Purstein herd owned by Ferme Charles Charette et fils inc.

Photo : Michel Dostie

Photo : Ferme Charles Charette et fils inc.

In this barn refitted in 2008, the Purstein herd is finally able to contribute the full measure of its genetic potential.

The more recent purchase of *Jalouse* also had a defining influence on the herd. With one Superior Lactation to her credit, *Jalouse* produced 14 daughters, including six VG and five GP. Her three daughters by Doorman demonstrate the productivity of this family: *Jenny*, VG-88-3yr, *Jessie*, VG-87-3yr, and *Judy*, VG-86-3yr, have each earned two Superior Lactations in as many calvings. François' high hopes for this line are bolstered by its third and fourth generation representatives, namely *Jenny's* daughter *Purstein Chief Jazzy*, who has just calved, and *Jazzy's* daughter *Purstein Ashby Jackie*, born last August.

From free stalls to tie stalls

François Charette initially tried a free-stall setup with a milking parlour, but was disappointed by the results. With average

Ferme Charles Charette et fils inc.

The Purstein herd is part of a much bigger operation, Ferme Charles Charette et fils inc., which, in addition to the dairy segment, includes 810 ha of crops, and a grain drying and storage facility. The same shareholders also own Ferme Familiporc inc., a farrow-to-finish swine operation with 300 sows.

Both farms are owned by brothers François and Nicolas Charette and their father, Charles Charette. François is responsible for crop development and purchasing farm inputs, as well as marketing the harvest, but his main passion is the dairy herd.

As for Nicolas, he manages the employees, seeding and harvesting, except for hay, and lends a hand in the pig barn when needed. Their father, at the wheel of a tandem truck, distributes the pig feed, which is manufactured on-farm, and takes care of all other transport needs, particularly during harvest. Their mother, Hélène Charette, does the bookkeeping for the three segments of the business. Ferme Familiporc inc. is run by Karine Rompré, Nicolas' partner.

In the fields, the owners grow about 303 ha of corn, 20 of which are harvested as silage while the rest of the grain corn is used to feed the pigs. They also seed 304 ha to soybeans, 122 ha to wheat for seed, and 81 ha to hay or to alfalfa (85%) and timothy (15 %) for silage. In the latter case, the first cut is harvested as hay and the last two

Photos : Ferme Charles Charette et fils inc.

The 12 people involved in production at Ferme Charles Charette et fils inc. and at Familiporc inc. are (from left): Jose Luis, Charles (co-owner), Isabelle, Daniel, Alfonzo, Josué, Karine (in charge of the pig farm), Nicolas (co-owner), François (co-owner), Hélène (accounting), Keven and Jean Sébastien.

as silage. The dairy herd is fed a TMR based on these two silages, with hay and a supplement added to the ration.

In addition to the five family members, seven employees, three of whom are foreign workers, are permanently employed on the farm.

The barn housing the Purstein herd's yearling heifers.

Replacement heifers for the Purstein herd are reared in this nursery facility.

production stalled at a substandard level, and digital dermatitis a constant presence in the herd, a solution had to be found.

François explains that there was a shortage of space in the cow barn and too much competition among the cows. At the time, the farm filled a quota of 103 kg BF/day with 105 cows. In 2008, François thus decided to sell 10 kg of quota and transform the building into a tie-stall facility, built to the most up-to-date standards. The new installation was designed to comfortably house 83 cows. Since then, production has improved steadily, and the herd now fills a quota of 150 kg BF/day.

Low CCS, a priority

François acknowledges straightaway that he is completely intolerant of the presence of somatic cells in his milk. Indeed, the herd average is below 100 000, and most of his cows, he affirms, are well below that level. His attention in this respect is reflected in the quality of his milk, as the Purstein herd has just won first place regionally in the Agropur milk quality competition.

Obviously, when it comes to sire selection, bulls with good proofs for somatic cell score top the list. Moreover, since François aims to breed functional cows that will able to produce for a long time, he favours sires that have a conformation proof of at least +12 (ideally +13), and positive proofs for health traits and rump. More specifically, he focuses on udder quality, feet and legs, and dairy capacity. As for stature, he aims for cows that are not too large. In terms of production, potential sires must have a proof of at least 500. Moreover, 75% of the bulls François chooses are proven, since he considers semen from genomic young sires too expensive for the low level of reliability it offers.

With these criteria in mind, François chooses five bulls at every proof release. He sticks to this number, he explains, so as to develop a herd that is as uniform as possible. He uses sexed semen from these sires for the first two services of his yearling heifers.

Community involvement

François' interest in breeding also prompted him to get involved in the Saint-Maurice-Maskinongé Holstein Club. He has been a director of the Club for about 15 years now, and its president since 2014. ■