

Your Mature Cows: Your Heifers' Best Unit of Measure

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Tailor your rearing practices according to your own herd's frame.



In previous communications referring to rearing practices, special attention has been put on the opportunity to decrease replacement costs and increase lifelong profitability by reducing age at first calving of heifers entering the milking herd.

Nevertheless, this practice cannot be done by simply deciding to breed your heifers earlier. This decision must be encompassed by evaluating your heifers' growth and determining how early they can be bred based on their maturity.

In order to guide you in how to evaluate your heifers' maturity and take advantage of the potential insights this exercise could bring to improve your rearing program, let's look at the principles of the target growth system and share some observations made during an on-going research project led by Lactanet in collaboration with Laval University.

This project aims to integrate economic data with measures of growth and lactation performance to determine the cost and value of rearing programs in the province of Québec.

As part of this effort, several Holstein herds were visited across the province to characterize their rearing programs. Among the data taken, a sample of heifers, first calf heifers and mature cows were measured.

“If we are interested in the heifers, why do we need to measure our cows?”

This was one of the most common questions we got from the participating producers during our visits. The cows' size is a characteristic that has repercussions in many relevant areas of the farm, since it affects feed intake, nutrient requirements, space needs, medication dosing, among others.

When it comes to evaluating growth and maturity of the growing animals, determining mature size is the first step since it allows establishing the

reference frame for the herd.

With this in mind, the body weight of a sample of mid-lactation cows with three or more lactations was measured from each herd using a girth tape. Preliminary results, using data from 43 herds, indicate that the average mature body weight for Holsteins is 771 kg, a much larger estimate than previous references for the province. This pattern agrees with the observation that size of dairy cows has increased over the years. According to Lactanet's records for the province, today's Holsteins are over 80 kg heavier than those 20 years ago. Due to this constant increase in size, a regular monitoring, every year or two, is recommended.

Taking mature weight as reference, the target growth system can be used to estimate the target weights at breeding and first calving as 55 and 82% relative to the mature weight, respectively, regardless of the breed.

For Holstein herds in the province, producers could breed heifers as soon as they attain 425 kg and make sure they calve no lighter than 630 kg.

These recommendations relative to mature body weight have been established to optimize first lactation performance and profitability. Immature heifers at calving will be in higher risk of calving difficulties and produce significantly less milk, while waiting for heifers to reach higher maturity would also be economically disadvantageous.

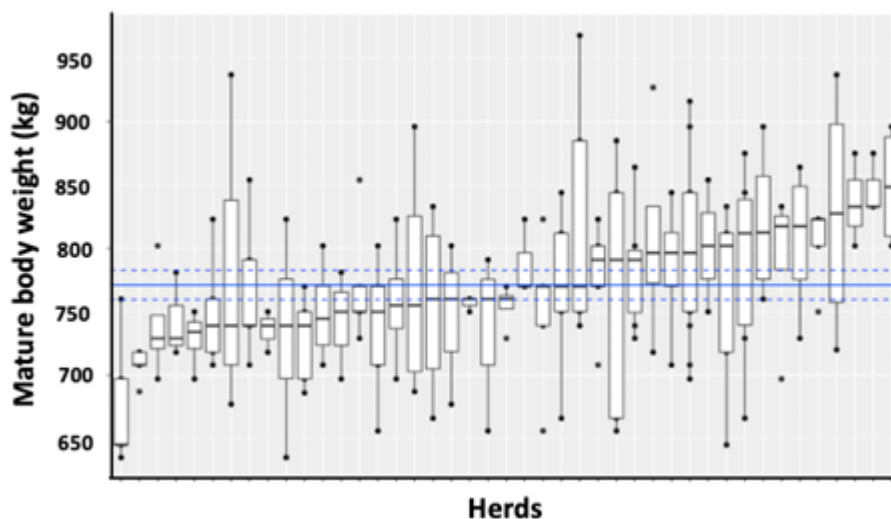
One size doesn't fit all

Although having a population estimate is a useful reference for the province, there is always the doubt whether it could have practical relevance at the individual herd basis. In other words, can every herd in the province assume that its mature size and growth targets correspond to those determined for the provincial average? To answer this question,

a subsequent analysis was performed that classified the data by herd. This analysis indicated that there was a significant variation of Holstein mature body weight *between* herds and that this variation was greater than the variation *within* each herd.

To illustrate this variation, the mature weights by herd are shown in ascending order in Figure 1. The size of each box and length of the emerging lines are an indication of the variability of mature cows' weight in each herd, whereas the black horizontal line within the box depicts the median mature weight for the herd. Interestingly, there was a difference of over 170 kg in the mean mature body weight between the lightest (676 kg) and heaviest (849 kg) herd. Equally, it could be appreciated that a considerable number of herds would be misrepresented by taking the overall average value for these 43 herds.

Figure 1. Holstein mature weights by herd are shown in ascending order

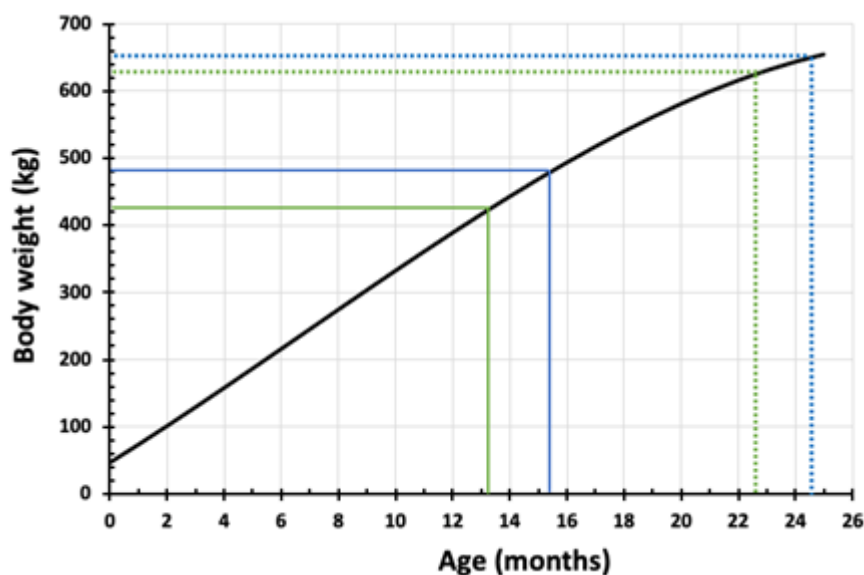


Points outside the boxes and the lines represent extreme values. The horizontal solid blue line represents the overall mean (771 kg) and the dashed lines above and below demarcate the 95% confidence interval (760 – 782 kg)

What does this mean for our heifers' first breeding age decisions?

As mentioned at the beginning, the variability in mature size described above could have important implications in many areas of the farm, one of them being the heifers' breeding strategy. To further elaborate on this, a growth curve was built with body weight measurements taken from 984 Holstein heifers varying in age from the different herds that we visited (Figure 2). Taking this curve as a template and using the average target for body weight at breeding (425 kg), it was derived that the average herd could breed Holstein heifers at 13.5 months. Similarly, considering the average age at first calving for the studied herds (24.5 mo.), it was inferred that, on average, Holstein heifers were actually being bred 2 months older and 55 kg heavier than recommended.

Figure 2. Average growth curve for Holstein heifers



Age and weight at breeding (solid lines) and at calving (dashed lines) as observed in the analysed herds (blue lines) and as indicated by the target growth system recommendations (green lines), using 771 kg as mean mature body weight.

Based on this growth curve, it was observed that heifers were calving

slightly heavier than targeted (650 kg) and that by calving 2 months earlier they would still meet the minimum maturity at calving (630 kg), which won't significantly affect their lactational performance. This observation might indicate that the average Holstein herd has the opportunity to reduce age at first breeding while still respecting maturity targets. Discussing with some producers that were in this situation, this discrepancy might have arisen by having stuck to a heifer breeding protocol that worked for them many years ago, while they have been improving rearing practices that have resulted in faster growth of calves and heifers over time. Of course, this mismatch has an economic impact.

Considering the average indicators of Holstein herds in the province for 2020 (*Évolution de la production laitière québécoise 2020*), a 100-cow herd can save over \$10,000 CAD in replacement cost per year by breeding heifers 2 months earlier and following the growth target recommendations. This amount can't be considered completely as net profit though, since calving heifers slightly lighter would impact their first lactation production in a proportional manner. However, this practice is profitable as the savings on replacement cost are greater than the slight shortfall in income from the unrealized production.

As a whole, this evidence should remind us that:

1. Knowing the mature size of the herd and the growth of heifers are key to establish the optimal breeding and calving age of heifers and get the most out of the replacement program;
2. Given the considerable variability in mature size and rearing practices among herds, maturity and age targets should be determined on a herd-specific basis;
3. Cows' mature size and heifer growth evolve over time and therefore should be monitored regularly.

Complement Body Weight with Other Measurements!

Finally, it is important to note that even if body weight was the main metric being discussed in this article, additional measures like stature could be used to determine the breeding age in your herd. Moreover, while measuring heifers, take the time to evaluate body condition score. Heifers should be between 3.25 – 3.5 at first breeding and 3.5 to 3.75 at calving, under the 1 to 5 scale. If you need guidance establishing a measuring protocol and adjusting your rearing program according to your conditions and needs, count on the expertise of Lactanet to help you get there.

Acknowledgments

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