Extension
UNIVERSITY OF WISCONSIN–MADISON

You can't manage what you don't measure: Knowing and managing heifer weights

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With the cost to raise a dairy replacement being more than to purchase one, farmers must be diligent in raising a dairy replacement to enter the milking string at the optimal time and weight to reduce rearing costs and increase productivity. Numerous studies recommend the optimal age at first calving (AFC) is 24 months of age. Any delay past 24 months will add an additional $2.50, or more, a day to the cost of raising replacements as well as require more heifers to meet the herd replacement needs.

To reduce rearing expenses and have heifers enter the milking herd sooner, farmers have been working to lower the age at first calving (AFC) to as much as 21 or 22 months. However, we have seen an increase in the mature body size of the Holstein cow over the past 10 to 20 years, with animals becoming heavier and taller in stature. With the increase in the size of the average dairy cow or if the heifer is not properly grown for size, heifers may be missing out on their genetic productivity potential and/or have difficulties calving if they are too small when entering the milking string. In this case, heifers may need to reach an older age before achieving adequate size to withstand the demands of high milk output.

First lactation milk production is a function of size, not age

Based on meta-analysis of current data, studies have demonstrated first lactation milk yield increased by increasing nutrient intake in pre-weaned calves. Calves fed for a greater pre-weaned average daily gain (ADG) were 2x more likely to have a greater milk yield in the first lactation. This can equate to for every one pound of pre-weaning ADG, first lactation cow milk yield increased by 1,550 pounds (Soberon & Amburgh, 2013).

Mature body weight, the average weight of the milking herd's third and greater lactation cows 100 plus days in milk (DIM), also has an impact on first lactation milk production. Historically the industry has focused on age, not weight, for calving in first lactation heifers. Based on a UW-Madison study reviewing Dairy Comp-305 files from a 6,692-cow Holstein herd with an average age at first calving (AFC) of 22 months, it was observed there was no interaction between AFC and weight at 30 DIM on first lactation milk production during weeks 4, 8, and 12 (Chart 1). However, it was observed first lactation cows who weighed 94% of the

herd's mature body weight at 30 days in milk (DIM) had 11 to 12 pounds more milk per cow per day than the lighter first lactation cows weighing 75% of the herd's mature body weight. It is important to note that first-lactation cows account for between 38 to 40% of the milking herd. Since many cows complete three or fewer lactations, the dairy animals spend nearly half of their life as growing, non-productive heifers.

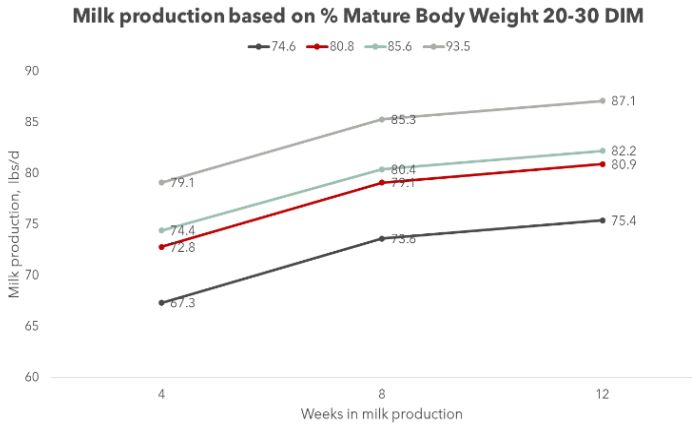

Chart 1: First lactation milk production based on percent MBW 20-30 DIM

Growth goals

A business-like heifer-raising approach is critical as it dictates the future income and resilience of a dairy enterprise. Following feed costs, heifer raising is the second-largest expense on a dairy, accounting for 20% of total costs. Getting heifers in the milking herd just one month sooner can save a dairy producer $93 per head. Therefore, the outcome and cost-effectiveness of heifer-raising systems deserve careful attention.

Even though our goal is to raise a healthy, productive heifer calving in at 22 to 24 months of age, we need to also make sure she is achieving adequate growth rates (Chart 2). If a heifer grows too slow, there is a delay in the onset of puberty, thus a delay in calving. If she grows too rapidly, she may deposit fat instead of developing muscles, causing dystocia, metabolic disorders, and/or udder development concerns.

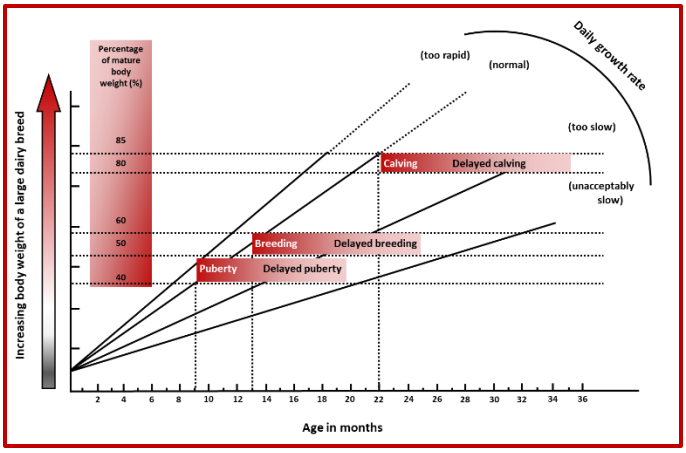

Chart 2: Comparison of various growth rates and impact on puberty, breeding, and calving. Adapted from UW Babcock Institute Dairy Essentials-Raising Dairy Heifers.

Monitoring dairy replacement rates from birth to freshening can add to an operation's bottom line, as well as being one of the most important ways to gauge the heifer raising program. Knowing what the starting and ending weights are and weighing at key times during the heifer's life allows us to precisely determine how they grow, how we should feed them, and how many days on feed.

Growth Benchmarks	
Puberty	
Weight	740 pounds 45% herd's mature body weight
Breeding age heifers	
Weight	825-900 pounds 55% herd's mature body weight
Hip height	>50"
Wither height	>48"
Freshening heifers	
Pre-calving	1,550 pounds 55" -56" in height 92-94% herd's mature body weight
Post-calving	1,350 pounds 83-85% herd's mature body weight

Table 1. Recommended growth benchmarks for Holstein heifers, assuming a herd mature body weight is 1,650 pounds. Adapted from Dairy Calf & Heifer Association Gold Standards, 2nd edition. 2016.

Based on Dairy Calf & Heifer Association Gold Standards (2nd Edition, 2016), heifers should be 45% of the herd's MBW at time of puberty, 55% MBW at

breeding, and 94% and 85% of MBW at pre- and post-calving, respectively. (Table 1).

Cannot manage what you do not measure

Collecting and measuring data about livestock performance is standard practice in the beef industry, from knowing birth and weaning weights. This can be adopted in the dairy industry to manage how we are feeding heifers and growing them to their optimal weight. Heifers should be weighed at the following times in their lives, each time corresponding with a management change:

- Birth
- Weaning
- Transition to TMR (4-6 months of age)
- Pre-breeding (10-12 months of age)
- Post-calving (22-24 months of age)

Weighing heifers at key points in their lives allows us to manage the heifers better. Average daily gains (ADG) can be calculated specifically for your herd and used as a management tool to adjust rations accordingly to achieve the proper MBW at different stages of growth.

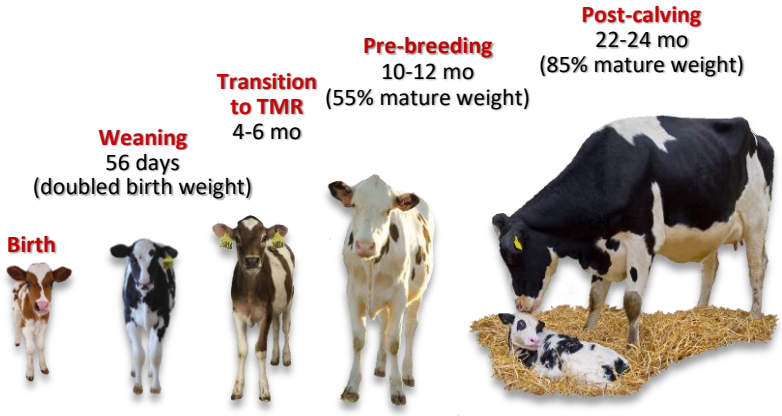

Photo credit: A. Bjurstrom

We cannot manage what we cannot measure. Scales are an investment to improve efficiency and productivity while minimizing the time, cost, and effort of weighing cattle.

Van Dijk et al. showed veterinarians underestimate the weight of dairy cows 65% of the time and that same study showed farmers were off 81% of the time, their averages were off an average of 214 pounds. Recording accurate weights impact efficiency on the farm.

Choosing the right scale to fit the needs of the herd and facility is the most important aspect of making the investment. Considerations should be made for the location of the scale, current and potentially new facilities, function of the scale/chute, and exposure to the elements all need to be considered when choosing a scale. The scale and chute should serve multiple purposes beyond weighing. To maximize the investment, the scale and chute could be used for restraining for vaccinations, ultrasounding, veterinary checks, and the aisle leading to the chute could be used for other purposes such as footbaths or pour-on worming.

While human comfort is an important factor when deciding where to put a scale, animal safety is also a top priority. Handling facilities should always consider human and animal safety. Well-designed workspaces will allow for efficient use and minimize stress on livestock. Flooring in cattle moving areas, especially at the entrance and exit of the scale/chute, should allow for safe footing and be free of distractions and projectiles that may cause injuries.

"If you can't measure it, you can't manage it" is a well-known quote in the business world but can be applied just the same in dairy management. We all agree, the cost to raise a dairy replacement is higher than it has ever been, proving that taking benchmark weights at key times ensures you meet your goal of raising the highest quality heifer that will eventually be your profit makers in your lactating herds.

Developed by UW–Madison Extension Regional Dairy Educators Aerica Bjurstrom and Tina Kohlman and Agriculture Educator Angie Ulness for the 2022 Badger Dairy Insight Webinar Series: Managing Heifer Maturity: Pre- and Post-breeding, March 15, 2022.

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