

Is there a best growth rate for heifers?

Young Holsteins with an average daily gain of 1.75 pounds did the best as first-calf heifers.

by Geoff Zanton and Jud Heinrichs

LET'S face it, raising heifers isn't cheap. It is often the second or third largest expense on a dairy. The time between birth and first calving is a long duration, sometimes exceeding two years. This is a high-cost period that creates a lag in the return on your investments of feed, labor, and everything else related to that developing dairy cow.

Given that many cows only complete three or fewer lactations, many dairy animals spend nearly half of their total herd life as heifers. In fact, if cows are culled before the end of their second lactation, they will spend over 50 percent of their



MEASURE, WEIGH, AND ADJUST to hit the 1.75-pounds-per-day gain during the prepubertal period. That will lead to the highest-yielding, first-lactation cows.

life as heifers. Therefore, the outcome and cost effectiveness of heifer-rearing practices deserve careful attention.

While there are many factors that go into raising heifers, the primary goal is to produce well-grown heifers that are ready to calve at 22 to 24 months of age and to do so in a cost effective manner. It is important to balance the cost of inputs with later returns. There are many strategies that may be used to raise dairy heifers; however, there is one core requirement that must be fol-

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lowed — to raise heifers in a cost-effective manner that allows them to maximize their potential lifetime milk production.

Track and monitor . . .

Monitoring heifer growth is one strategy that can help you achieve success in raising heifers, and it is one of the most important ways to gauge a heifer program. It is also one of the best ways to determine if rearing costs are in line with the results and to ensure that future production is not impaired by poor management or nutrition.

Growth and its impact on future milk production is one of the most studied aspects of dairy

heifer raising . . . and yet one of the most confusing at times. In the past, numerous studies have looked at heifer growth rates with a variety of different treatments and rates of growth. And many of these studies reached different conclusions, depending on how the experiment was done, the growth rates used, and even the treatments imposed.

It is possible to achieve a very large range of average daily gain by changing the heifer nutrition program. As a result, it is difficult for a single study to include enough treatments to cover the range that is needed to fully understand heifer growth. Basically, this question of growth rate and its impact on future production is one that is well-suited to grouping a lot of studies together to completely evaluate the issue.

Analyzed 15 years of research . . .

To address this problem, we evaluated all the Holstein heifer growth studies published around the world in the past 15 years. We looked at the effects of prepubertal body weight gain and average body weight at calving on milk production in the first lactation. Our analysis allowed us to study Holstein heifer growth rates independent of genetic or management differences that were evident between the trials.

We didn't find a straight line relationship between average daily gain and milk yield as many experiments had assumed, but rather we found a curvilinear effect. Growing heifers at reduced average daily gain reduced milk production. On the flip side, growing them too fast also reduced production. In the prepubertal period from 2 to 10 months of age, growing heifers at 1.75 pounds per day resulted in the highest first-lactation milk production. The same type of relationship was found for milk protein yield.

Why conclusions vary . . .

An interesting note about many of the heifer growth experiments that have had varying conclusions is that the growth rates chosen dictated the response that the researchers found.

- If they picked rates of gain of 1.3 and 1.8 pounds per day, they would conclude that raising average daily gain improves milk production.

- If they picked 1.7 and 2.2 pounds per day, they would conclude that increasing growth reduces milk production.

- And if they picked 1.4 and 2.1 pounds per day, they would conclude no differences based on average daily gain.

All of these would be correct conclusions given the data of only that single experiment, but in the scope of heifer growth and mammary development, each one would be incorrect in their conclusion as far as the entire population of heifers. Looking at this combined analysis of all the studies, it is clear that there is an optimum growth rate for Holstein heifers.

It would be difficult for any single study to fully address the issue of rate of gain and milk yield by itself. However,

the statistical technique used in our study allows us to adequately address the issue. We finally have a definitive reason as to why the studies had differing conclusions, and now we finally have an answer as to how fast modern Holstein heifers should be grown.

At your dairy this means . . .

So what does this mean to you? Since first-lactation heifers represent a large percentage of the herd, and since there is some evidence that first-lactation differences due to mammary development will likely continue for the life of the animal, it is extremely important to grow heifers at the proper rate.

The simple answer to our question is — raise heifers to gain about 1.75 pounds per day from 2 months to puberty to achieve maximum milk production. Small variations around this rate will probably not be detrimental; yet 1.75 pounds per day should be the target.


Weights are best measured with a scale; however, weight tapes are reasonably accurate if used properly.

In addition to weights, some measure of skeletal growth is needed. This could be any of the common measurements: height at withers, height at the hip, or hip width. The relationship between weight and skeletal growth must be maintained in a normal, balanced fashion.

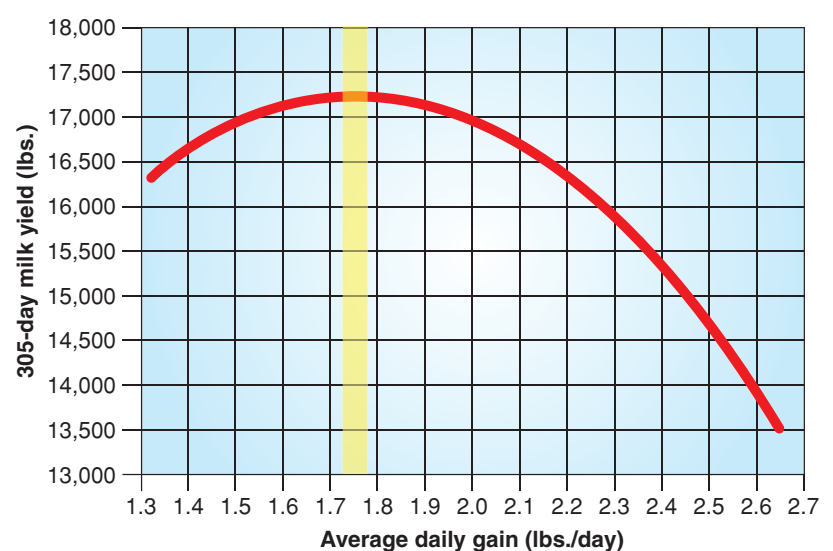
Short, fat heifers are not desirable; neither are tall, skinny heifers. You can develop a simple spreadsheet

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to compute average daily gain or download one for free at: www.das.psu.edu/dairynutrition/heifers.

After puberty, which usually occurs between 9 and 11 months of age in Holsteins, growth rates can be altered with the primary objective being body weight at calving. Body weight at calving has a strong direct effect on first-lactation milk production unrelated to growth rates in the prepubertal period. Set target weights for breeding and precalving; then use heifer weights at breeding to determine the average daily gain needed to achieve your target body weight at calving. Regular measurement of heifer growth will allow you to adjust rations to meet these goals. 

Growing heifers too fast or too slow stunted first-lactation milk



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