



Track heifer growth patterns

by Al Kertz

IN ITS Gold Standards, the Dairy Calf and Heifer Association specifies a growth rate goal of about 1.75 pounds of daily gain for heifers with a mature body weight of about 1,400 pounds. Heifers have a distinct growth curve for weight and wither height, which will vary by genetics in a herd and among individual animals.

An example from a five-year database that I published is shown in Figure 1. Daily gains beyond 2.2 pounds can be problematic because that has been found to be the maximum rate of protein deposition. Gains greater than that are fattening. This climb in heifer body weight is fairly linear.

With pre- and postcalving body weight, we need to consider that irrespective of parity, cows lose about 11% of their body weight at calving from the weight of the calf, placenta, and other tissues and fluids. Height gains are not linear, though. About one-half of height growth occurs between birth and the end of 6 months of age. Only another 25% height increase occurs in the next six months, and 25% of height growth occurs over the last 12 months before first calving. This is different from weight gain and is critical to understand when feeding and managing calves and heifers.

This height increase is directly related to growth hormone secretion and is age-dependent. There is no compensatory gain in height at a later period of growth. While Figure 1 illustrates wither height, hip height may also be used to measure height and is about 2 inches greater.

As noted above, growth is most efficient during the first six months of life. Adipose (fat) cells first multiply by hyperplasia, creating a greater number of fat cells at an early age. Fattening later occurs by hypertrophy, leading to bigger fat cells. If more fat cells are developed early in life, there is a greater propensity to fatten more easily later because more fat cells are present to expand in size.

A somewhat controversial area

has been whether excessive body weight of the calf and associated

Figure 1. A five-year dataset of heifer growth

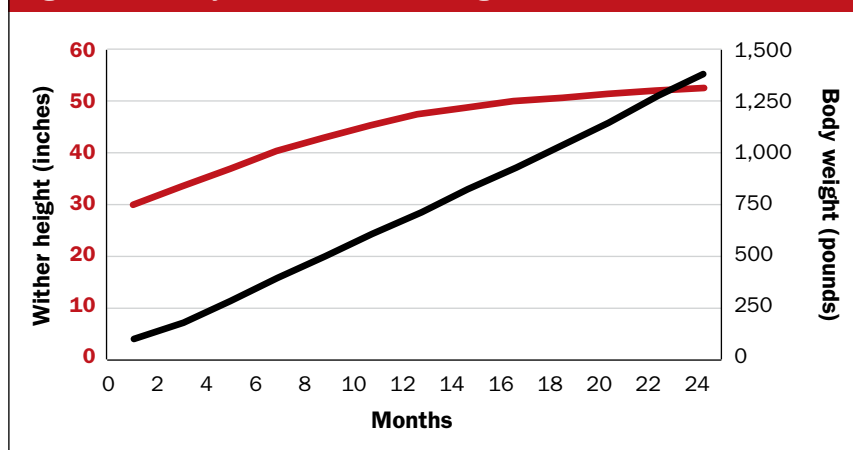


Table 1. Holstein growth data from a 1997 database

Lactation number	First	Second	Third
Body weight, lbs.			
Close-up	1,345	1,504	1,627
Postcalving	1,204	1,350	1,464
Wither height, inch	54.3	55.5	57.1
Calf birth weight, lbs.			
Females	84.8	90.7	91.6
Males	91.2	97.1	97.8

weight gain, especially prepubertal growth, impairs mammary gland development and subsequent milk production. A multi-university study evaluated the impact of two growth rates, 1.43 and 2.09 pounds daily gain, with growth and serial slaughter measurements in Holstein heifers.

They concluded that the rate of gain, per se, had minimal impact on mammary gland histological development. It is likely that daily gain in excess of 2.2 pounds causes internal fattening in the birth canal, which leads to calving difficulties and metabolic issues in that first lactation.

As heifers matured, data in Table 1 show that mature body weight and height peak at about the third lactation. At calving, about 11% of body weight is lost from the

fluid and tissues. Calves weighed more after the first lactation. Male calves weighed about 7% more than female calves.

Measurement challenges

The University of Wisconsin-Madison's Pat Hoffman addressed two limitations of taking body weights or heights to plot heifer growth on a graph. First, desired daily gain or body weights of a heifer at a given age is a function of genetic size potential. Second, breed-based growth charts used for individual heifers do not take into account that genetic variation for size within a breed can be as great as between breeds.

Mike Van Amburgh and Matt Meyer at Cornell University proposed expressing heifer growth or body weight as a simple function of mature

body weight. While acknowledging that the mature body weight of cows in most large herds that initiated or expanded with heifers purchased from around the U.S. and Canada is largely absent genetic information, Hoffman proposed a surrogate mature body weight based on a zero to 12-day postcalving body weight.

Using factors to adjust postcalving body weight to fourth lactation mature body weight, the second lactation factor appeared to most closely approximate mature body weight based on data from Table 1. Since body weights were the same for third and fourth lactation, if that same relationship held for data for a Minnesota database, then the second lactation factor would avoid the over prediction of mature body weight as in the database in Table 1. As noted by Hoffman, it is not easy to get mature body weight of cows in a herd, whether by scale or weight tape, and crossbreeding further complicates the data.

To better manage your heifers, take some periodic body weights (and wither or hip heights) at birth, weaning, 6 months of age, 12 months of age, and prior to first-calving. A set of random 12 animals per data recording will provide a good snapshot of how your heifers are growing. 🐄

The author is the executive vice president for the American Registry of Professional Animal Scientists (ARPAS). Learn more at www.arpas.org.

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