

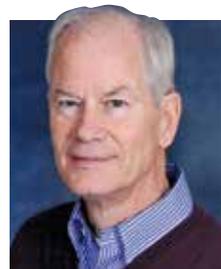


Grow heifers to meet your goals

Taking weight and height measurements at key times in a heifer's life cycle tells you if your program is on target or if heifers are falling behind.

by A.F. Kertz

VARIOUS national surveys conducted since 1991 have indicated that not much progress has been made on calf morbidity and age at first calving. For instance, preweaned calf death losses have ranged from about 8 to 11 percent over that period of time. Studies of large databases have found stillbirths to range from 10 to



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20 percent. Along with about 2 percent mortality for weaned calves, that sums to nearly 25 percent calf losses, which can occur from near birth and beyond. That is a staggering loss of potential herd replacements and genetics.

Mature body weight the driver

Average age at first calving (AFC) has only marginally improved from 25.8 months in 1991 to 25.2 months in the 2007 NAHMS (National Animal Health Monitoring System) report. Many seem to accept a goal of 24 months AFC, but some target 20 to 22 months of age. The latter makes sense from a standpoint of reducing feeding and rearing costs by 2 to 4 months. But what about the biology and reality of that? At 20 to 22 months of age, many first-calf heifers may not be well grown.

If a large breed heifer weighs 90 pounds at birth, and your goal is to double birth weight by the end of 2 months, that will yield a 180-pound calf. From that point on, if a heifer gains 1.8 to 2 pounds daily until 24 months of age, you have a first-calf heifer at 1,455 pounds. Since heifers (and cows, too) lose 11 percent of body weight from the calf and associated fluids/tissues, then that animal would weigh about 1,300 pounds at the initiation of first lactation. But there are caveats and other factors around this scenario.

First, what is the mature body weight (MBW) of your cows? Based on a five-year database published in the *Journal of Dairy*

Science, MBW is reached near the third lactation. But the average number of lactations in U.S. herds is only about 2.5. Heifer growth and performance are also impacted by many phenotypic variables beyond nutrition.

So, if MBW is the sum of many phenotypic and genotypic variables, how can you use one growth curve for all heifers? In 2007, Pat Hoffman developed Table 1 for universal use with differing MBW, assessing body weights as a percentage rather than an absolute number.

Too early compromises milk

But what about reducing AFC from 24 to 20 or 22 months? A recent Wisconsin study used a 2005 DHI database of 69,145 Holstein cows with herd lifetime records. The data were sorted to take into account various factors such as frequency of milking, herd management criteria and rolling herd average. The optimal AFC range (Table 2) was between 23 and 26 months on milk production and components.

Lifetime milk yield rose linearly at younger AFCs only for 3x herds with about 4,000

AGE AT FIRST CALVING DECLINED from 25.8 months in 1991 to 25.2 months in 2007, according to NAHMS data. While marginal, each incremental reduction reduces heifers' days on feed and gets them into the milking string sooner. If you push your age at first calving lower, however, you must ensure heifers are adequately grown.

pounds more milk versus 24 months. As with a number of published studies cited in that study, first-lactation milk yield dropped by 366, 813 and 1,440 pounds for heifers calving at 22, 21 and 20 months versus 24 months, respectively. However, this study did not support the hypothesis that lifetime days in milk and milk yield are improved by calving heifers at earlier ages.

While observing a greater response for 3x herds in improved lifetime milk, fat and protein production when AFC dropped below 24 months, they also observed the opposite effect in 2x herds. A disparity of improved lifetime milk and components when AFC was below 24 months may have been due to 3x herds also following other management practices that were not observed in this study.

There are other practical issues when targeting and reviewing what AFC may be best for a herd. For instance, we know from New York dairy herds' epidemiology data and from a more recent Pennsylvania herd study that respiratory and diarrhea episodes in preweaned calves impair these animals for life. So, check health records to see if heifers calving at greater than 24 months also had health problems as a calf.

Based on 10 years of data from the Cornell research herd, a 1 pound greater difference in daily gain during the first two months of life can result in about 850 pounds more milk in the first lactation and 2,200 pounds more milk in their first three lactations. A further review of these data found that the poorest calf growth was during the winter months because no adjustment had been made in the feeding program for colder weather. Thus, these calves grew slower and later produced less milk.

Another factor is when cows are bred to have calves at a certain time of year or age at breeding is changed to target calvings to better meet a herd's milk production program cycle. Since pregnancy rates are lower in hotter weather, many may choose not to breed cows then. Delayed breeding may make sense, but it can prolong the average age at first calving.

Where to go from here? I think there are key periods when weight and height should be taken to assess how your calf/heifer program is doing. Not necessarily for all animals but at least for a representative sampling of 10 to 20 animals at each time. Those times are at birth, at the end of 2 months of age, at the end of 6 months of age, at the end of 12 months of age (right before breeding) and right before first calving.

This provides a snapshot of how animals are doing at key points and provides data rather than waiting until first calving to find out that animals have not been growing well. We now also know that respiratory and diarrhea occurrence can impair calves for life, so we need to do all we can to prevent each of these from occurring. 🐄

Table 1. Weight assessed as percent MBW

Heifer age, months	Percent of mature body weight
Calf	6.5
1	9.7
2	12.8
3	16.5
4	20.2
5	24.0
6	27.7
7	31.4
8	35.0
9	38.9
10	42.4
11	46.3
12	49.9
13	53.7
14	57.4
15	61.1
16	64.7
17	68.5
18	72.2
19	76.0
20	79.6
21	83.3
22	
23	90.8
24 (7d precalving)	94.0
24 (7d postcalving)	85.0

Table 2. Milk peaked from 23 to 26 months

AFC	n =	Milk, lbs.	Fat, %	Protein, %
20	413	19,660	3.71	3.03
21	1,751	20,287	3.68	3.00
22	6,194	20,734	3.65	3.00
23	11,569	21,089	3.64	3.00
24	13,466	21,100	3.65	2.99
25	11,168	21,150	3.66	2.99
26	8,481	21,192	3.68	3.00
27	6,132	20,910	3.70	2.99
28	4,387	20,934	3.70	2.98
29	3,150	20,873	3.74	2.99
30	2,434	20,956	3.74	2.99