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Reducing age at first breeding, calving possible

Bottom Line

with
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NATIONAL surveys in the U.S. have determined dairy heifers' age at first calving (AFC) for the following report years: 25.8 months in 1991, 25.5 months in 1996, 25.4 months in 2002 and 25.2 months in 2007. Those same studies have found preweaned calf mortality rates in the range of 8-11%.

In both cases, while there is general agreement as to overall objectives, data show that progress has not been realized. In the case of AFC, the age at breeding and weight at first calving are both too late as reference points to modify the final outcome. Growth curves have been developed, but how they are developed can be a limiting issue.

Some earlier databases were developed from on-farm measurements. Such growth data represent what was being achieved on farms, not what realistically should be achieved and is achievable.

There also are various approaches to establishing reference points for dairy heifer growth (*Feedstuffs*, Jan. 14, 2008). These include using mature bodyweights (MBW) in a herd to determine how well heifer growth is occurring at certain times, such as at first breeding (55%) and first calving (82%). Other factors are how to take measurements of bodyweight and wither or hip height. Heart girth has been used as a proxy for scale bodyweights since few dairy or heifer operations have a scale for weighing heifers individually.

Given the above context, a study was reported recently from provincial data in Quebec (Duplessis et al., 2015).

Data were obtained from the Valacta database (DHI agency, Ste-Anne-de-Bellevue, Que.) from 1995 to 2012. On-farm Valacta technicians measured wither height and heart girth and then estimated bodyweights from the tapes.

By breed, the following numbers of records were accessed for bodyweights and wither heights: 401,474 and 359,650 for Holsteins; 20,668 and 18,066 for Ayrshires; 3,226 and 2,796 for Jerseys, and 3,563 and 3,416 for Brown Swiss. I will discuss only the Holstein data since relationships within the other breeds were similar.

Mature weights in this study (Table) were greater than those in Van Amburgh et al. (1998) and Kertz et al. (1997). This was attributed to Canadian genetics and environmental and management differences. Comparatively, data in the latter study were 1,319 lb. at 24 months versus 1,381 lb. in this study; 1,473 lb. versus 1,563 lb. for MBW in this study, and overall daily gain of 1.54 lb. versus 1.75 lb. in this study.

Duplessis et al. noted that over the 15 years of records in this database, whole-herd bodyweight went from 1,312 lb. in 1998 to 1,440 lb. in 2012. They also noted that bodyweights at 15 and 24 months in this study were 154 lb. greater than the field data of Heinrichs and Hargrove (1987). However, the latter data were only from herds in Pennsylvania and were collected from October 1983 through May 1985 — 12-17 years earlier than this study.

In this study, variability was considerable in heifer weights, with a standard deviation of 57-79 lb. at 15 months of age and 59-106 lb. at 24 months of age.

The researchers also noted that while heifers may be big enough to breed at 14-15 months of age so they calve at 24 months of age, dairy producers have had no way of knowing at what age heifers are big enough to begin breeding without actually measuring bodyweights.

In many geographical areas, hot weather also skews results to lower calf birth weight, lower heifer daily gain and a longer calving cycle.

When conception rates are as low as 10% in hot weather, cows may not be bred until the cooler fall months. This places calving at the beginning of the following summer, and the normal days post-calving to initiate breeding will be during the hotter summer months. At times, heifer breeding may be delayed so they calve during less-busy calving times compared to the rest of the herd.

These factors may be the main reasons why some herds do not average 24 months of age at first calving. Using 55% of MBW as the reference point to begin breeding heifers, heifers in this study averaged 13.6 months of age for optimal first breeding. With a good breeding program, services per conception for first pregnancy should be about 1.2-1.3. Thus, an AFC of about 24 months should be doable.

In Quebec, the quota system also can affect when it might be most advantageous for heifers to first calve.

Average reliabilities of 87-92% at 15 months of age (with a standard deviation of 12-14%) and average reliabilities of 67-82% at 24 months of age indicate that periodic bodyweight measurements before those 15-month and 24-month reference points would help better define when measurements should be done.

Duplessis et al. suggested three-month intervals throughout the 24-month heifer growth period to better predict how well heifer growth is being achieved. Economics may preclude this many measurements.

I have advocated minimum bodyweight (and height) measurements at birth, two months of age (should be double birth weight), six months of age (half of first-calf height should be achieved at this point), 12 months of age (75% of height of first-calf height should be achieved at this point) and right before the first calving. Early-age growth is the most efficient, and

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Quebec dairy heifer growth data (Holsteins)

Item	Mean	Std. deviation
Mature weight, lb.	1,563	143
Optimal weight at first breeding, lb.	861	—
15-month weight, lb.	936	75
24-month weight, lb.	1,381	86
15-month height, in.	52.8	1.9
24-month height, in.	56.3	2.3
Daily gain, lb.		
Before 15 months	1.87	0.17
After 15 months	1.64	0.09
Age at optimal breeding weight, months	13.6	1.4

height achievement is particularly critical by six months of age (Kertz et al., 1998).

Also keep in mind that, irrespective of lactation number, 11% of immediate pre-calving dam weight is lost at calving due to the weight of the calf and tissues/fluids lost from calving (Kertz et al., 1997).

The Bottom Line

This large-scale study of Quebec dairy heifer bodyweights and heights provides further evidence that achieving first calving at 24 months of age is quite doable. Whether that actually occurs is dependent on the growing and breeding program, taking periodic, scheduled measurements of weight and height and making feeding and management adjustments as needed.

References

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