HOARD'S DAIRYMAN

Impact of age at first calving

by Al Kertz

I CRINGE when I read about dairy farms averaging 20 to 21 months of age at first calving (AFC). Why? Because while it is done to save months of feeding and labor from the traditionally accepted 24 months AFC, there seems to be limited awareness of potential downsides. In their defense, there has been little data on these.

With many variables and much variation, massive data is needed to sort out these negative effects. For this reason, I initiated a major project about five years ago, which involved researchers from the Miner Institute and the Holstein Association USA who provided access to lactation records through Agritech Analytics. The database for calving difficulty (CD) had 794,870 records of mainly Holsteins with some Jerseys and crosses located primarily in California. Only about 90,000 records were available for AFC evaluations. Some prior AFC studies have also addressed possible interrelations with stillbirths.

Realistic gains

With any AFC goal, there will always be calves below and above that average. I have seen some of these heifers bred to calve at 20 to 21 months of age, and they appear not well grown. In typical first lactation, when AFC averages 24 months, those heifers grew about another 11% before their second calving. If heifers are grown from weaning to calve at 20 to 21 months of age, they would have to average about 2.1 to 2.2 pounds of daily gain, which approaches fattening.

A major prior study was done at Cornell University in 1986 with 305,237 Northeast U.S.-DHIA records. Data was not based on AFC, but was from first postcalving DHI test day taped body weights. Peak 305-day milk production among these first-lactation heifers in this data set was around 1,400 pounds postcalving. With 11% weight loss at calving, those heifers would have weighed about 1,600 pounds before calving. This data did not provide the number of first-calf heifers at each body weight, but it is likely that most were around 24 months at first calving. If so, and if they weighed 1,200 pounds postcalving, they would have produced about 1,500 pounds more milk than first-calf heifers that weighed 900 pounds; but about 600 pounds less than peak body weight postcalving body weight heifers.

Current study data

Data in our current study (Figure 1) indicates the following:

The number of heifers in this database (90,718) peaked at 22 months of age (18,901) and then declined rapidly beyond 23 months of age (17,014). The number of heifers below 22 months of age dropped from 15,384 to 12,389 at 21 months of age; then to 12,389 at 20 months of age, and finally to only 1,136 at 19 months of age.

Annual energy-corrected milk (ECM) rose from a low of 21,039 pounds at 19 months of age up to a peak of about 23,000 pounds at 27 to 29 months of age, before dropping to 22,742 pounds at 30 months of age. The decline in annual milk yield from 20 months of age to 24 months of age was approximately 1,060 pounds. Thus, the cost reduction from raising and breeding heifers to calve at 20 months of age versus 24 months of age in this database would be offset by 1,060 pounds less milk in the first lactation.

Field data from a large nutrition group calculated that 20- to 21-month AFC versus 23- to 24-month AFC resulted in 2 to 4 pounds less milk per day, per month difference in AFC, or 1,000 to 1,500 pounds less milk per lactation.

In addition, younger heifers may

use more nutrients to grow in their first lactation, or may not grow as much. If so, then they may not produce as much milk in second and later lactations as older cows reflect their first lactation lower body weight.

Another factor to consider is whether younger heifers have more calving difficulty due to reduced growth or fattening, which can restrict the birth canal area.

Calving considerations

Calving difficulty can be scored as 1 = quick, easy birth with no assistance; 2 = over two hours in labor, but no assistance; 3 = minimum assistance, but no calving difficulty; 4 = used obstetrical chains; and 5 = extremely difficult birth that required a mechanical puller. However, this data may not be consistently recorded on dairy operations — especially when calvings are overnight or on weekends when labor may be scarce.

The importance of this area was made evident to me when I was asked once by a calf and heifer operation to visit two dairy farms from which he received calves to contract raise. These dairies were in a similar area and managed by two brothers, but in separate operations. The problem was that calves from one dairy did well, but calves from the other dairy did not. I was only able to visit the former operation. When I completed that dairy's review, I asked the calf manager if she had any idea why calves from the other dairy had problems. She said "Yes, because they pull every calf."

where more productive cows tend to have more calving problems; however, when CD is 1 or 2, that does not affect their current milk yield. But when CD is greater than 3, there is a negative consequence for that current lactation."

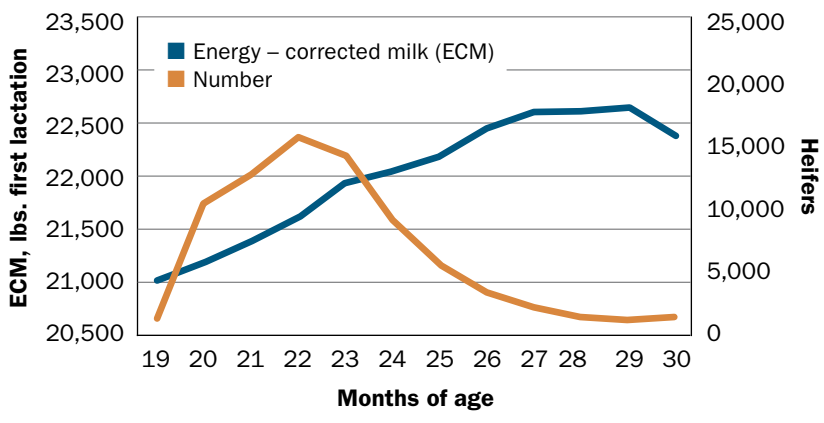
There was a fall in milk yield when CD went from 1 to 2 in Holsteins and Jerseys, but no further decline with higher CD levels. With crossbreds, there was a slight reduction in milk yield from CD 1 to 3, but a greater drop from CD 3 to 4. This may be because CD is more intense in crossbred cattle than in purebred cattle due to several factors, including heterosis (hybrid vigor), which generally leads to improved overall performance. But, if that results in larger birth weights and longer gestation length, both are closely associated with greater dystocia rates. This explanation is likely more valid with cross-breeding, resulting in calves of greater body weight and conformation changes.

Size of the calf

Greater calf size elevated milk yield in that cows pregnant with male calves produced more than cows carrying female calves. Other research has found the opposite. This may be due to hormonal differences, but could also be due to whether male calves had greater CD. If not, their greater body weight could enhance milk yield as found in other species.

Calving difficulty needs to be recorded and managed to be minimized in order to avoid negative

Figure 1: Energy-corrected milk (ECM) and number of heifers in data set by months of age at first calving



Such stress is not good for the dam, but it also affects the calf since it may lower antibody absorption from colostrum.

Other studies have found that dystocia (calving difficulty) negatively affects milk yield, reproduction, stillbirths, longevity, retained placenta, uterine infection, greater involuntary culling, veterinary fees, and extra labor. In our study, CD affected primiparous and multiparous cows differently. In primiparous cows, there was a linear decline in milk yield with higher CD, while in multiparous cows, there was an increase in milk yield from CD 1 to 2, and then a linear reduction after that. We suspect there is a correlation between CD and milk yield, effects on the dam and calf. Younger heifers calving at an average of less than 24 months of age, especially at 20 to 21 months of age, will most likely be less developed or fatter if daily gain has been near 2.2 pounds. Heifers at first calving around 20 to 21 months versus 24 months of age have been found in this study to produce about 1,000 pounds less milk in the first lactation. This may also carry over into subsequent lactations. Thus, these negative effects must be weighed against reduced costs to calve heifers at 20 to 21 months of age.

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