Balancing Reproductive Performance and Lactation Yields

Canadian dairy producers have made great strides in the area of reproductive performance. Statistics such as pregnancy rate, average days in milk and calving interval are rhymed off much more easily by the herd manager of today than the one of the past. For various reasons, improved herd management and reproductive performance translates to more cows pregnant earlier in lactation. At the other end of the lactation, these cows may also be dried off earlier and therefore not surpass the standard lactation length of 305 days in milk. Canadian Dairy Network (CDN) took a closer look at this reality to assess its impact on lactation records and genetic evaluations.

BCA = Breed Class Average

Lactation records in Canada include the kilograms of milk, fat and protein produced as well as BCA values and BCA deviations from herd average. BCA refers to Breed Class Average, which is an index for expressing lactation yields used by milk recording in Canada since the 1950's. They allow for a fair comparison of 305-day production levels within a breed independent of the month during the year and the age of the cow at each calving. For example, BCAs allow us to directly compare the production of a cow that calved at 26 months of age in July to another that calved as a 4-year old (48 months) in December. Although unique only to Canada, the BCA system is useful since it allows for an easy comparison of production performance across all cows instead of trying to look at actual kilograms of production when such levels vary by the age at calving and the month/season of calving during the year. BCA is similar to the use of Mature Equivalent values but BCAs have the added benefit of being comparable across the traits of milk, fat and protein.

Performance for Production Versus Reproduction

Lactation yields in kilograms reflect the cumulative levels of milk, fat and protein produced over the length of lactation as indicated by the number of days in milk (DIM). For the calculation of BCA values, the lactation yields to 305 DIM are used for a standard comparison. Cows that are dried off prior to reaching 305 DIM end up with a lower 305-d lactation record used to calculate the associated BCAs for milk, fat and protein. Clearly, cows that are pregnant earlier in lactation have a decreased likelihood of reaching a lactation length of 305 days. The use of 305-d lactation records is the international standard for expressing lactation records. This standard was derived based on a targeted calving interval of 12 months (365 days) and a targeted dry period of 60 days. Given these targets and a standard gestation length of 280 days, any cow becoming pregnant prior to reaching 85 DIM would normally be dried off before a lactation length of 305 days.

Current Statistics

To investigate the potential scope of this question of balancing reproductive and production performances, CDN conducted an analysis based on Holstein lactation and insemination records in recent years. Only lactations that ended by a normal drying off were considered. General statistics are presented in Table 1. One-quarter of all lactations end with a normal drying off before reaching 305 days in milk, which is consistent with the fact that 26% of successful pregnancies occur before reaching 85 days in milk and today there is even 5% occurring prior to 50 days in milk. With good herd management in terms of reproduction, some herds will achieve a higher proportion of cows successfully pregnant before 85 days in lactation, which will also depend on the voluntary waiting period adopted for the herd. Pregnancy prior to 85 days in milk does not necessarily translate into a lactation length of 305 days if one is willing

to reduce the length of the following dry period from the traditional standard of 60 days. This seems to be the current trend since 57% of all dry periods are shorter than 60 days and one-third are 50 days or less (Table 1). Another measure of reproductive performance often quoted is calving interval. Currently, 30% of calvings have an interval that is 12 months or less while 51% have an interval up to 13 months.

Table 1: Reproductive Statistics for Canadian Holsteins	
Lactations dried off before 305 DIM	25%
Lactations with less than 85 days open	26%
Dry periods less than 60 days	57%
Dry periods less than or equal to 50 days	33%
Lactations with a calving interval of 12 months or less	30%
Lactations with a calving interval of 13 months or less	51%

Impact on Lactation BCAs

In any event, it is true that some cows do get pregnant early in lactation and therefore will be dried off prior to reaching 305 DIM. The CDN analysis also quantified the impact of such shorter lactations on the calculation of resulting BCA values. To do so, the average lactation curve for Holstein cows was used to quantify the average amount of milk that would be excluded from a 305-d lactation when the cow was dried off earlier. Roughly speaking, for the average cow dried off during the weeks prior to reaching 305 DIM, the expected impact is approximately 1 BCA point for every two days dried early. Specifically for a cow dried off at 280 DIM, the BCAs for milk, fat and protein would be reduced by 13 to 14 points, on average. Depending on the number of lactations affected during the year, this could also reduce the average BCA values for the herd and BCA deviations will be negatively affected to a lesser degree compared to the BCA values per se.

What About the Impact on Genetic Evaluations?

CDN uses a very sophisticated model for calculating genetic evaluations for production traits. This system uses the 24-hour yields of milk, fat and protein on each test day rather than lactation yields, BCAs or BCA deviations. In addition, the effect of pregnancy on each test day is taken into account depending on the number of days pregnant at that time. These two factors, taken together, ensure that cows that get pregnant earlier in lactation and therefore have a shorter lactation length are not penalized in any way in terms of the resulting genetic evaluations.

Summary

As herd management levels improve and increased attention is given to measures of reproductive performance, more cows will become successfully pregnant earlier in lactation. While some flexibility exists in terms of the dry period prior to the next calving, some cows pregnant earlier in lactation will need to be dried off prior to reaching the standard of 305 days in milk used to express lactation records and to calculate BCA values. On average, this will reduce published BCAs by approximately 1 point for every two days dried off prior to 305 DIM. Of importance, however, is the fact that genetic evaluations published by CDN are not affected.

Authors: Brian Van Doormaal, General Manager, CDN
Lynsay Beavers, Industry Liaison Coordinator, CDN

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