

# Milk EPDs and Milk Are We Getting Anywhere?

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**M**ilk production is vital to the growth and development of offspring for all mammals, including cattle. Among beef cattle, milk is so important that the milking abilities of the dams can account for 50 to 70 percent of the difference in weaning weight among calves in the same sire group.

Because of the high correlation between milk production and weaning weight, a reliable milk EPD can be calculated. However, because the milk EPD is derived indirectly from weaning weights, rather than actually milking cows and because the heritability of this trait is low, it is natural to ask the question: Do milk EPDs really predict milking ability?

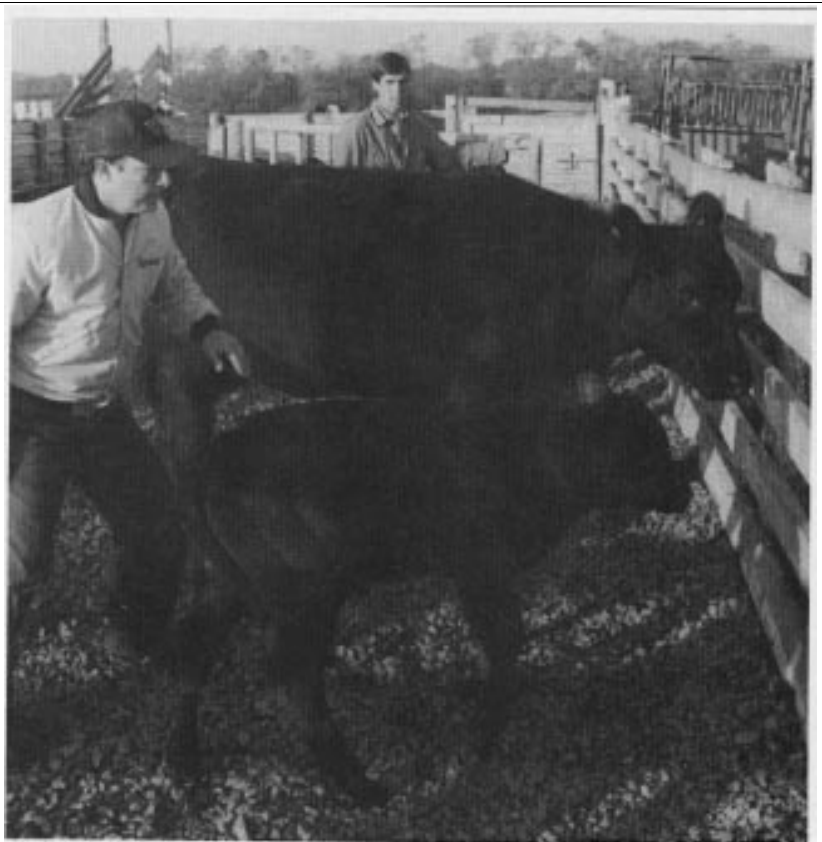
## Milk and Milk EPDs

In a cooperative project between Wehrmann Angus at New Market, Va., and the Animal Science Department at Virginia Tech we set out to test the relationship between milk EPDs and milk. The easiest way to do this was to machine milk cows with different milk EPDs.

This was much easier than it sounds! Beef cows after a night away from their calf are "almost" anxious to be milked.

In the spring of 1990, 87 purebred Angus cows with milk EPDs ranging from +0.4 to +23.4 pounds were machine milked after removing their calves for 12 hours. The calves were an average of 119 days of age at the time of milking. The milk each cow produced was weighed immediately after collection.

The amount of milk produced in 24 hours at this stage of lactation was calculated to be 19.8 pounds for the average cow in this herd. As expected, older cows (more than two years) produced more milk (20.1 pounds/day) than first-



*Cows and calves are separated for 12 hours before cows are milked with a portable machine milker. Machine milking gives the most accurate measure of milk production.*

calf heifers (17.1 pounds/day). So before doing any analyses we adjusted for differences in age and stage of lactation. The correlation between the daily milk production and weaning weights adjusted for calf age, sire effects and direct growth effects of the dam was .48. This finding verifies what we already knew: cows that give more milk have

faster gaining calves.

The correlation between milk EPD and milk was low, .19. At first this seemed disappointing; however, it turned out to be logical. The relationship between milk EPD and milk can't be any better than the following three factors multiplied by one another:

1. The relationship between milk EPD and actual genes for milk.
2. The relationship between genes for milk and actual milk produced.
3. The repeatability of our machine milking procedure.

The product of these factors is shown in Figure 1.

Based on this concept, a cow with a milk EPD accuracy of .25, considering the heritability for milk production to be .25 and assuming a machine milking repeatability of .7, the relationship between actual milk produced and milk EPD should be about .21.

The agreement between the expected and actual relationship between milk and milk EPD indicates that milk EPD is a true indicator of milking ability. In other words, milk EPDs work. However, the low magnitude of this relationship reemphasizes the variability in milk production due to factors other than genetics.

### Selection for Milk EPDs

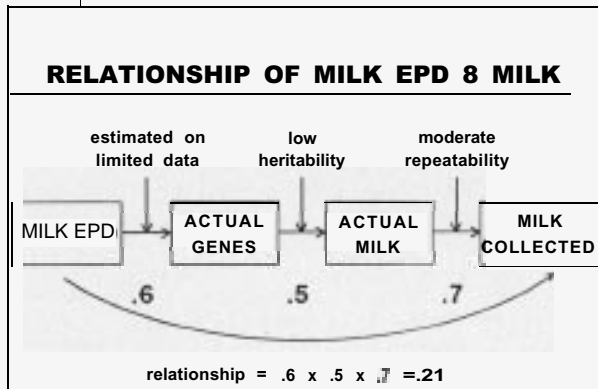
To make cattleman's sense out of this we analyzed the data after splitting the cows into high-, medium- and low-milk EPD groups. The cows with high milk EPDs, above 10 pounds, gave more milk per day (22.6 pounds), than cows with milk EPDs from 5-10 pounds (21.6 pounds) and cows with EPDs less than 5 pounds (20.8 pounds; Figure 2).

At first, this doesn't seem like much of a difference in milk production. However, if a cow in the high group gives 1.8 pounds of milk more per day than a cow in the low group, that is 369 pounds more milk over 205 days.

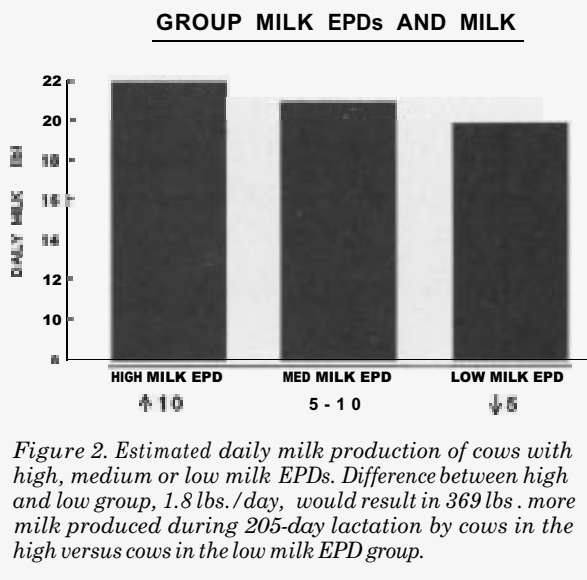
Data from our other experiments indicate that for each 15.4 pounds of milk you get about one additional pound of calf at weaning. If so, the high group should have weaned calves at 205 days that were 24 pounds heavier than the low group. As it turned out, the average 205-day weight of calves from cows in the high group was 27 pounds greater (548 vs. 521 pounds) than that of calves from cows in the low milk group after correcting for direct growth effects of the sires and dams.

To carry this one step further, compare the actual weaning weight difference, 27 pounds, with the difference in

heavier than the calves in the lower milk group based on the milk estimated breeding values. The actual difference was 27 pounds — pretty close to what was expected.



**Figure 1.** Theoretical relationship between the milk EPD and amount of milk collected by machine milking. The expected correlation is limited by the lack of data on most cows, the low heritability of milk production and the repeatability of machine milking.



**Figure 2.** Estimated daily milk production of cows with high, medium or low milk EPDs. Difference between high and low group, 1.8 lbs./day, would result in 369 lbs. more milk produced during 205-day lactation by cows in the high versus cows in the low milk EPD group.

the average milk EPDs of cows in the high and low groups. The difference in average EPD between the groups was 11.1 pounds. However, because we were measuring the cows performance (not her offspring's) we need to calculate the difference in breeding values between the groups.

Estimated breeding values are just two times the EPDs. The difference in estimated breeding values was 22.2 pounds. The calves in the high milk group were expected to be 22.2 pounds

**Editor's note:** This project has been supported by a grant from the American Angus Association and was intended to produce information that could assist all Angus breeders in interpreting and using EPDs. Research related to milk production will continue to be supported in an effort to improve the usefulness of maternal milk EPDs.

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