RELATIONSHIP OF MILK PRODUCTION IN ANGUS AND SIMMENTAL COWS WITH MILK EXPECTED PROGENY DIFFERENCES (EPDs) AND CALF WEANING WEIGHT

T. T. Marston, D. D. Simms, R. R. Schalles, K. O. Zoellner, L. C. Martin, and G. M. Fink[1]

Summary

Spring and fall calving Angus (n=86) and Simmental (n=96) cows at three different locations in Kansas were used to evaluate the relationships between milk production, Milk Expected Progeny Difference (Milk EPD), and calf weaning weight. A change of 1 lb in Milk EPD resulted in 4.95 lb change in calf weaning weight in Angus and 4.60 lb in Simmental. Each lb increase in Milk EPD predicted a 69.87 lb increase in total lactation milk production in Angus and 70.74 lb in Simmentals. Positive correlations were .40 and .64 between Milk EPD and total milk produced per lactation and .24 and .49 between Milk EPD and calf weaning weight for Angus and Simmental, respectively. Milk EPDs can be used as genetic selection tools to influence milk production levels and make corresponding changes in calf weaning weights.

(Key Words: Angus, Simmental, Milk, Lactation, Calf Weaning Weight, Milk Expected Progeny Differences.)

Introduction

Milk production is a major factor influencing calf weaning weight. The ability to predict milk production is useful in improving calf weaning weight and would aid in matching milk production levels to the environment. The development of Milk EPDs has provided both commercial and purebred cattle producers with estimates of the milking ability of an individual's daughters expressed in lb of calf weaned. Milk EPDs predict the genetic difference in average 205-d weight of a individual's daughters' progeny related to milking ability. Because the industry is concerned about the validity of these predictions, we initiated this study to determine the relationships between Milk EPD, milk production, and calf weaning weight.

Experimental Procedures

Milk production in spring- and fall-calving, purebred Angus and Simmental cows was measured at three different locations. Milking took place at approximately 60, 120, and 180 d postpartum. On the day preceding each milking, cows and calves were separated for 4 to 6 hr,

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then placed together until all calves completed nursing and separated again. Approximately 12 hr following the separation, cows were injected IM with 40 IU of oxytocin to stimulate milk letdown and were immediately machine milked. Samples from each milking were analyzed by the Kansas Dairy Herd Improvement Association to determine butterfat, lactose, protein, and somatic cell count.

Twenty-four hr milk production was estimated by doubling the 12-hr production, which had been adjusted for time of separation from the calf. Daily milk production values were used to calculate lactation curves using the equation $Y(n)=Ae^{kn}$, where n=week of lactation, Y=daily milk production in kg, e=base of natural logarithms, and A and k are constants defining the shape of the lactation curve. Total milk production per lactation was estimated from each cow's individual curve.

Spring calves were born from late February to mid April, and the cow/calf pairs were grazed on native bluestem pastures throughout the summer without creep feed. Fall Simmental calves were born from late August to early October; cow/calf pairs were supplemented with a milo-based energy ration and sudan hay as they grazed dormant short grass pasture and crop residues. In addition, fall Simmental calves received an energy creep feed. All calf weaning weights were measured at approximately 205 d of age.

Expected Progeny Differences were provided by the American Angus Association, St. Joseph, Missouri, and the American Simmental Association, Bozeman, Montana.

Results and Discussion

Correlations between milk production, calf weaning weight, and Milk EPD are presented in Table 25.1 by breed, location, calving season, and year. The positive correlations indicate that Milk EPDs can be used in predicting milk production. Similarly, cows that produced heavier calves at weaning possessed higher Milk EPDs. Environmental conditions affected total milk production and its relationships with calf weaning weight and Milk EPD, but we were unable to compute the magnitude of those effects.

A 1 lb change in Milk EPD resulted in 4.95 lb and 4.60 lb changes in Angus and Simmental calf weaning weights, respectively. Total milk production changed 69.87 lb in Angus and 70.74 lb in Simmental with each corresponding 1 lb change in Milk EPD.

Angus averaged 3,524 lb of milk production per lactation, with an avg Milk EPD of 1.92 lb. Simmentals averaged 3,773 lb of milk production per lactation, with an avg Milk EPD of 2.89 lb. Figure 25.1 represents the milk production predicted from Milk EPDs by breed.

Table 25.1. Correlations between Milk Production, Weaning Weight and Milk EPD by Location

Comparison	Angus			Simmental				
	Sp88 A[1]	Sp89 A	Total	F88 B[1]	Sp88 C[1]	Sp88 A	Sp89 A	Total
	correlation coefficient							
Total milk production and weaning weight	.61	.25	.40	.62	.23	.57	.51	.61
Total milk production and milk EPD	.42	.34	.38	.28	.77	.48	.55	.40
Milk EPD and weaning weight	.30	.17	.24	.44	.55	.55	.45	.44

[1]A, B, and C represent different herd locations in the fall (F) and spring (Sp) of 1988 and 1989.

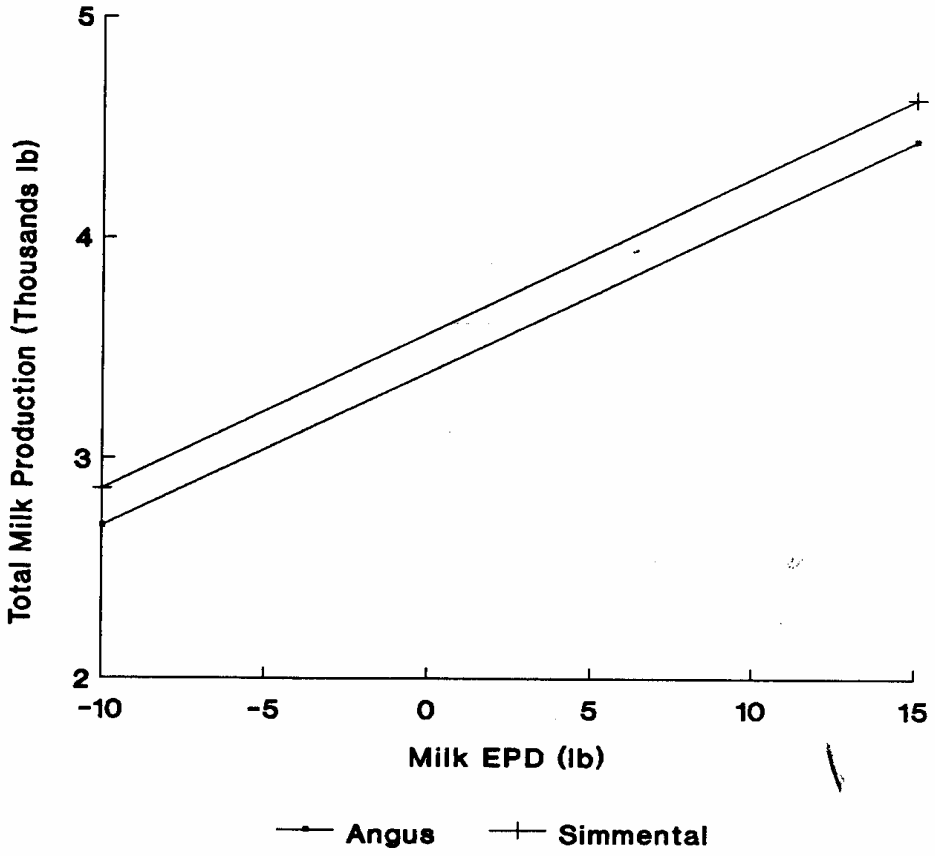

Figure 25.1. Relationship of Milk EPD and Total Milk Production