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USE OF MILK EPDs TO PREDICT DIFFERENCES IN MILK PRODUCTION OF RANGE BEEF COWS

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Story in Brief

Beef bulls can be evaluated for genetic merit for maternal ability using Milk Expected Progeny Differences (EPD). This study was designed to evaluate the effect of milk EPDs of Angus and Hereford sires on milk production of crossbred daughters. Bulls (n=35) were chosen from each breed to represent high or low milk EPDs. The daughters were between 5 and 9 yr old during this study. Milk production of cows (n=105) was evaluated via the weigh-suckle-weigh (WSW) method. A sample of these cows (n=48) were milked mechanically (MM) during the same lactation. Both techniques were used to generate 24-h milk production estimates. Least squares means were generated for the two EPD levels and the four breed x EPD level interactions. Seven WSW and four MM procedures were equally spaced throughout the lactation. Cows sired by High Milk EPD bulls had greater 24-h milk production estimates from WSW (Angus, 11.4 lb, Hereford, 10.0 lb) and MM (Angus, 16.8 lb; Hereford, 17.4 lb) than did cows sired by Low Milk EPD bulls (WSW: Angus, 9.1 lb; Hereford, 8.1 lb and MM: Angus, 13.4 lb; Hereford, 11.1 lb). In addition, WSW and MM totals were highly correlated (r=.82) which should increase the confidence of the conclusion that milk EPDs can be used to influence milk production.

Key Words: Beef Cattle, Milk EPD, Milk Production

Introduction

Milk production is an important variable affecting calf weaning weight and overall success of any cow-calf enterprise. Profitability of such an enterprise is affected by calf weaning weight and it has long been known that milk production of the cow greatly influences calf performance. Weaning weight of the calf is a result of its own genetic merit for growth, the genetic merit for maternal ability in the cow and other environmental effects. It is this genetic merit for maternal ability (milk) that can be evaluated using Milk Expected Progeny Differences (EPD). These EPDs allow producers to compare bulls based on predicted differences in weaning weight of calves from their daughters.

This study focused on determining milk production differences using two methods of evaluation for spring calving mature cows from sires that differed widely for Milk EPD in both the Angus and Hereford breeds.

Materials and Methods

Cows. Cows were produced from Angus and Hereford bulls that differed in Milk Expected Progeny Difference (Milk EPD). These bulls were mated to Hereford-Angus cows to produce crossbred females (Gosz and Buchanan, 1998). Bulls (n=35) were chosen to form each of four groups (High Milk EPD Angus n=12, Low Milk EPD Angus n=10, High Milk EPD Hereford n=6, Low Milk EPD Hereford n=7). Milk EPD averages for the four groups differed by 32.6 and 24.9 lb for Angus and Hereford sire groups, respectively (Table 1). Daughters (n=105) ranging in age from 5 to 9 yr old calved in the spring of 1998.

Cows were maintained on Bermuda grass and native range pastures at the North Lake Carl Blackwell Research Range, located west of Stillwater, OK. High and Low nutrition groups were defined by supplementing with 5 vs 3 lb of 40% CP range cubes per day, respectively. Cows from all four sire groups were represented in both nutrition programs. Cows chosen for mechanical milk equally represented the four sire groups in both high and low nutrition treatments.

Milk Production Evaluation. Twenty-four hour milk production of the cows was evaluated via the weigh-suckle-weigh (WSW) and mechanical milk (MM) collection methods. All cows were subjected to monthly WSW measurements during the lactation. A sample of these cows (n=48) were milked mechanically four times during the same lactation at an average of 11, 17, 23, and 29 wk post-calving.

In both cases, cows and calves were gathered from pastures and placed in holding pens the afternoon prior to WSW or MM. Calves were separated from cows at approximately 6:00 p.m. on evenings prior to WSW and 4:00 p.m. on afternoons prior to MM. For WSW measurements, calves were placed with dams at 5:45 the next morning and allowed to nurse. Groups were randomly separated into smaller pens (approximately 25 cows per pen). Upon completion of nursing (15 to 30 min), calves were separated from dams. This procedure was repeated at 11:45 a.m. with the exception that calves were weighed before and after nursing. Six-hour milk production was estimated as the difference between these two weights. The 11:45 a.m. procedure was repeated at 5:45 p.m. and the two estimates were summed and doubled to provide an estimate of 24-h milk production.

For MM measurements, the high and low nutrition treatments were evaluated on separate days during the same week. Calves were placed with dams at 8:45 p.m. and allowed to nurse. The following morning, cows were randomly separated into groups of four and milk collection began at 7:00 a.m. A 2 ml injection of oxytocin was administered intramuscularly immediately after the cow entered the chute. A portable DeLaval milking machine was used to evacuate the udder followed by hand stripping to

ensure total milk collection. An average of 8 to 15 min was required for total milk-out. Twelve-hour milk production was estimated as the total pounds produced. These estimates were doubled to provide an estimate of 24-h milk production.

Statistical Analysis. MM and WSW data were analyzed using least squares analysis to determine the effects of breed, EPD group, level of nutrition, age, sex of calf, calf sire and all two- and three-factor interactions on 24-h milk production. The residual sums of squares and cross products were used to estimate the correlation between the two methods.

Results and Discussion

Differences (P<.05) in 24-h milk production estimates existed between EPD levels within breeds in the second, third and sixth months of lactation for WSW (Table 2) and in the first, third and fourth MM collections (Table 3).

For WSW evaluation, differences (P<.05) existed in the second and third months for groups sired by Angus bulls and in the sixth month for groups sired by Hereford bulls.

For MM evaluation, high and low milk EPD groups sired by Hereford bulls were significantly different for those three stages of lactation. Differences between Angus groups were not significant even though High Milk Angus cows tended to produce more milk.

WSW and MM milk totals were highly correlated (r=.82). These results establish that cows sired by high milk EPD bulls produced more milk throughout the lactation. The high correlation between WSW and MM should increase the confidence of that conclusion. Milk EPDs can be used with confidence to influence milk production.

Literature Cited

Gosz, R.J. and D.S. Buchanan. 1998. Okla. Agr. Exp Sta. Res. Rep. P-965:11.

Table 1. Average milk expected progeny differences (EPD) (lb) of Hereford and Angus sires.

		Milk	
Breed	n	EPD level	Milk EPD
Angus	12	High	+19.2
Angus	10	Low	-13.4
P. Hereford	5	High	+16.3

P. Hereford	7	Low	-8.6

Table 2. Least squares means and standard errors for monthly weigh-suckle-weigh measurements of 24-h milk production by cow group.

	Milk production (lb)			
Month of	High Milk	Low Milk	High Milk	Low Milk
lactation[a]	Angus	Angus	Hereford	Hereford
First	16.4 ± 1.2[b]	15.4 ± 1.0[b]	16.2 ± 1.6[b]	13.6 ± 1.4[b]
Second	13.0 ± 1.8[b]	8.6 ± 1.4[cd]	11.0 ± 2.4[bd]	7.4 ± 1.6[cd]
Third	14.0 ± 1.2[b]	9.4 ± 1.2[c]	11.2 ± 1.6[bc]	11.8 ± 1.4[bc]
Fourth	10.6 ± 1.8[b]	7.6 ± 1.6[b]	8.6 ± 2.4[b]	8.8 ± 1.8[b]
Fifth	9.8 ± 1.6[b]	7.8 ± 1.4[bc]	7.8 ± 1.8[bc]	5.8 ± 1.6[c]
Sixth	7.8 ± 1.6[bc]	6.2 ± 1.6[bc]	11.8 ± 3.0[b]	4.0 ± 2.2[c]
Seventh	8.4 ± 1.8[b]	8.8 ± 1.6[b]	3.2 ± 2.6[b]	5.4 ± 2.0[b]

[a]Means reported by month are in lb/24 h.

[b,c,d]Means in a row with different superscripts are significantly different (P<.05).

Table 3. Least squares means and standard errors for mechanical milk measurements of 24-h milk production by cow group.

	Milk production (lb)			
Week of	High Milk	Low Milk	High Milk	Low Milk
lactation[a]	Angus	Angus	Hereford	Hereford
Wk 11	25.4 ± 3.0[bc]	19.2 ± 2.6[bd]	26.4 ± 2.6[c]	17.4 ± 2.8[d]
Wk 17	16.4 ± 1.6[b]	14.2 ± 1.4[b]	17.2 ± 1.6[b]	13.2 ± 1.6[b]
Wk 23	19.6 ± 2.2[b]	14.8 ± 2.0[bc]	18.4 ± 2.2[b]	10.8 ± 2.2[c]
Wk 29	5.6 ± 1.4[bc]	5.2 ± 1.2[bc]	7.4 ± 1.4[b]	2.8 ± 1.4[c]

[a]Means reported by period are in lb/24 h.

[b,c,d]Means in a row with different superscripts are significantly different (P<.05).

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