Milk Production, Calf Performance, Body Weight and Condition Score of Mature Beef Cows Sired by High and Low Milk EPD Angus and Hereford Bulls

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Story in Brief

The purpose of this study was to evaluate the effect of sire Milk EPD level for predicting calf weaning weight differences and to determine its relationship to other measures of calf and mature beef cow performance. Bulls (n=38) were chosen from the Angus and Hereford breeds to represent High or Low Milk EPD. Birth weights, 205-d weights, final cow weights, final cow condition scores, and 24-h milk production at seven monthly intervals were recorded. Cows from High Milk EPD bulls produced more milk than cows from Low Milk EPD bulls in all months except in mo 7. Calf birth weights were similar across breeds and Milk EPD levels. Cows from High Milk EPD bulls had 13.83 kg heavier calves at weaning than cows from Low Milk EPD bulls. The difference in weaning weights between High Milk Angus and Low Milk Angus was 13.97 kg and the difference between High Milk Hereford and Low Milk Hereford was 13.69 kg. Cows sired by Low Milk EPD bulls were heavier than cows sired by High Milk EPD bulls. Cows from High Milk EPD bulls had lower body condition scores than cows from Low Milk EPD bulls. These results verify that Milk EPD is an accurate predictor of differences in milk production and calf performance. Cows from High Milk EPD bulls produced more milk and had calves with a higher 205-d weight than cows from Low Milk EPD bulls at the expense of body condition.

Key Words: Beef Cattle, Maternal Ability, Milk Expected Progeny Differences, Weaning Weight

Introduction

Calf performance is greatly affected by the milk production of the dam. Therefore, milk production of beef cows is considered one of the most important factors affecting the weaning weight of calves and the profitability of the cow-calf enterprise. Cows with high genetic merit for maternal ability are expected to wean heavy calves. Beef cattle breed associations have developed and adopted expected progeny differences (EPDs) to predict the genetic merit of cattle for different traits. The maternal ability of dams is evaluated by the Milk EPD. The Milk EPD predicts the differences in weaning weights of calves born to daughters of different bulls, due to milk production of the daughters. The Milk EPD is measured in units of calf weaning weight not units of milk. Previous works have been done utilizing these same cows at a younger age (Buchanan et al., 1993, 1995, 1996; Gosz and Buchanan, 1998; Minick et al., 1999) and at an older age (Buchanan and Stutts, 2001). The objective of this study was to evaluate the effect of sire Milk EPD level on differences in milk production and calf performance and determine its relationship to body condition and weight of mature beef cows.

Materials and Methods

All cows and calves in this study were from the beef research range at North Lake Carl Blackwell near Stillwater, OK. An existing herd of crossbred cows (½ Hereford - ½ Angus; ¼ Brahman - ¼ Angus - ½ Hereford; and ¼ Brahman - ¼ Hereford - ½ Angus) was mated to Angus or Hereford (polled) sires (n=38) that were either very high or very low for Milk EPD at the time of selection. Average EPD for these bulls are shown in Table 1. Heifers from these matings were born from 1989 through 1993. These heifers were mated to Angus, Gelbvieh, Polled Hereford, Salers, Limousin, Charolais, Maine-Anjou, or crossbred bulls to calve starting in 1991. This study used only 6-, 7-, and 8-year-old cows. Cows and calves that were used in this study were maintained on native grasses including big Bluestem little Bluestem, Indiangrass, Switchgrass, and introduced grasses such as Cheatgrass and Bermudagrass. Cows were supplemented with 41% crude protein cubes and Bluestem hay during the winter months.

Table 1. Average Expected Progeny Difference (kg) for High and Low Milk EPD Angus and Hereford bulls

Breed	Milk Level	n	BW EPD	WW EPD	Milk EPD
Angus	High	10	1.13	9.66	8.71
Angus	Low	10	2.31	12.15	-6.21
Hereford	High	9	1.18	10.11	7.62
Hereford	Low	9	2.54	11.93	-4.76

Heifers and cows were artificially inseminated for a period of approximately 55 d and then turned out with crossbred bulls for 20 d clean up period. If females were not able to conceive during a mating period of 75 d, they were moved to the opposite breeding season. Cows that failed to conceive in two consecutive breeding seasons were culled from the herd. Cows used in this study calved in spring or fall from 1995 to 2000 and produced a total of 701 records. Spring calving was from February through April, and fall calving was from September through November. At the time of calving all calves were weighed within 24 h of birth and male calves were castrated. Calves were weaned an average age of 205 d. Final cow weights and body condition scores (1=very thin, 9=very fat) were also recorded at weaning.

Milk production estimates were obtained by the weigh-suckle-weigh method at seven monthly intervals throughout the lactation. Cows and calves were gathered from pastures and separated around 6:00 p.m. the evening before measurement. At 5:45 a.m. the day of measurement, calves were allowed to suckle the cows. This ensured that all cows were milked out at the beginning of the separation period and the cows were weighed and scored for body condition. After weighing and scoring, the cows were returned to pens and kept separate from their calves. At 11:45 a.m., calves were weighed, allowed to suckle, and reweighed. This procedure was repeated at 5:45 p.m. These measurements of 6-h yield were summed and doubled to estimate 24-h milk production for each cow.

The data were analyzed using least squares. Terms included in the statistical models were cow sire breed, Milk EPD level, year, season, sire of calf, sex of calf, sire of cow within breed and Milk EPD level, age of cow within year and all two- and three-way interactions. Age of calf was

included in the model as a covariate. Means were obtained for seven monthly milk production, calf birth and 205-d weight, and final cow weight and body condition score.

Results and Discussion

Least squares means for monthly 24-h milk productions are given in Table 2. Cows sired by High Milk EPD bulls produced more milk than cows sired by Low Milk EPD bulls in mo 1 through 6 (P<.03). This was consistent with differences in the sire's Milk EPD. Breed exhibited a significant effect in mo 1 (P<.03) and mo 3 (P<.04) at which time Angus-sired cows had higher estimates of daily milk production than Hereford-sired cows. High Milk Angus cows produced more milk than Low Milk Angus cows in mo 2, 3, 5 and 6 (P<.04) whereas High Milk Hereford cows produced more milk than Low Milk Hereford cows in mo 1, 2, 3, and 4 (P<.05).

Table 2. Least squares means and standard errors for the seven monthly measurements of 24-h milk production

Milk production (kg)				
Month	High Angus	Low Angus	High Hereford	Low Hereford
1[a]	7.18 ± .33	6.58 ± .31	6.65 ± .37[*]	5.78 ± .32[*]
2[a]	6.09 ± .30[**]	4.84 ± .29[**]	5.89 ± .36[*]	4.92 ± .30[*]
3[a]	5.80 ± .28[**]	4.55 ± .26[**]	5.05 ± .32[*]	4.15 ± .27[*]
4[a]	5.09 ± .25	4.52 ± .24	5.12 ± .30[*]	4.17 ± .25[*]
5[a]	4.45 ± .29[**]	3.36 ± .28[**]	3.66 ± .34	2.97 ± .30
6[a]	3.53 ± .23[*]	2.84 ± .22[*]	3.28 ± .28	2.75 ± .23
7	3.08 ± .32	2.59 ± .31	2.38 ± .39	2.11 ± .33

[a]Differences between high and low levels across breed are significant (P<.03)

[*]Within a breed and row, means differ (P<.05)

[**]Within a breed and row, means differ (P<.01)

Least squares means for birth weight, weaning weight, final cow weight, and final cow body condition score are given in Table 3. Breed (P>.2) and Milk EPD level (P>.3) had no significant effect on calf birth weight. The effects of breed approached significance for weaning weight (P<.06). Angus-sired cows had calves with a higher 205-d weight than Hereford-sired cows. Cows from High Milk EPD bulls had 13.83 kg heavier calves at weaning than cows from Low Milk EPD bulls (P<.0001). Weaning weights were 13.97 kg heavier (P<.002) for calves out of High Milk Angus cows than for calves out of Low Milk Angus cows and 13.69 kg heavier (P<.005) for calves out of High Milk Hereford cows than for calves out of Low Milk Hereford cows. The predicted differences between high and low milk groups were 14.92 and 12.38 kg for

Angus and Hereford, respectively. Cows from Low Milk EPD bulls were heavier than cows from High Milk EPD bulls (P<.04). High Milk Angus cows were lighter than Low Milk Angus cows (P<.03) whereas no significant differences were detected between High Milk Hereford and Low Milk Hereford cow weights (P>.3). Cows sired by High Milk EPD bulls had lower body condition scores than cows sired by Low Milk EPD bulls (P=.0002). High Milk Angus cows had lower body condition scores than Low Milk Angus cows (P<.002). High Milk Hereford cows had lower body condition scores than Low Milk Hereford cows (P<.007).

Table 3. Least squares means and standard errors for birth weight (kg), age-adjusted weaning weight (kg), final cow weight (kg) and final cow body condition score (1-9 scale)

	High Angus	Low Angus	High Hereford	Low Hereford
BW	37.81 ± .70	38.31 ± .66	38.53 ± .79	39.03 ± .69
WW[a]	224.73 ± 3.32**	210.76 ± 3.24**	217.99 ± 3.74**	204.30 ± 3.43**
Cow Wt[b]	524.33 ± 7.78*	548.85 ± 7.60*	543.22 ± 8.83	553.77 ± 8.09
Cow BCS[c]	4.97 ± .07**	5.27 ± .06**	5.10 ± .08**	5.27 ± .06**

[a]Differences between high and low levels across breed are significant (P<.0001)

[b]Differences between high and low levels across breed are significant (P<.05)

[c]Differences between high and low levels across breed are significant (P=.0002)

*Within a breed and row, means differ (P<.05)

**Within a breed and row, means differ (P<.01)

These results indicate that the Milk EPD is an accurate predictor of differences in milk production and calf performance. Producers who select for higher Milk EPD will increase weaning weights but this will be at the expense of cow body condition.

Literature Cited

Buchanan, D.S. et al. 1993. Okla. Agr. Exp. Sta. Res. Rep. P-933:5.

Buchanan, D.S. et al. 1995. Okla. Agr. Exp. Sta. Res. Rep. P-943:1.

Buchanan, D.S. et al. 1996. Okla. Agr. Exp. Sta. Res. Rep. P-951:1.

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

Minick, J. et al. 1999. Okla. Agr. Exp. Sta. Res. Rep. P-973:5.

Buchanan, D.S. and K.J. Stutts. 2001. Okla. Agr. Exp. Sta. Res. Rep. P-986.

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