Evaluation of Milk Production and Calf Performance in Range Beef Cows Sired by High and Low Milk Expected Progeny Difference Angus and Hereford Bulls

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Story in Brief

Milk Expected Progeny Differences (EPD) are used to evaluate genetic merit for maternal ability in beef bulls. This study was designed to examine the effectiveness of milk EPD for predicting calf weaning weight differences, calf milk consumption, and correlated changes in other traits associated with the cow and her calf. Hereford and Angus sires (n=35) were selected at the extremes (High vs Low) of each breed for milk EPD. Differences between average high and low milk EPD of sires were 32.6 lb and 24.9 lb for Angus and Hereford, respectively. Calves (n=419) out of daughters sired by these bulls were evaluated for differences in birth weight and 205-d weaning weight, and cows were evaluated for body condition score and estimated 12-h milk production. Birth weights across all breeds and milk EPD levels were similar. Cows sired by high milk EPD bulls had heavier calves at weaning (Angus, 487.9 lb; Hereford, 472.8 lb) than cows sired by low milk EPD bulls (Angus, 467.6 lb; Hereford, 448.0 lb). Cows sired by high milk EPD bulls had calves that gained at a faster rate (Angus, 1.97 lb/d; Hereford, 1.88 lb/d) than cows sired by low milk EPD bulls (Angus, 1.86 lb/d; Hereford, 1.77 lb/d). The actual difference in calf 205-d weight between calves out of high and low milk EPD dams was 20.3 lb and 24.8 lb for Angus and Hereford, respectively. Cows sired by high milk EPD bulls had lower condition scores at weaning than cows sired by low milk EPD bulls. Milk EPD is an effective tool for identifying differences in maternal ability, but there may be a small cost in ability to maintain body condition.

Key Words: Beef Cattle, Milk Expected Progeny Difference, Growth

Introduction

Calf weaning weight is an important trait in beef production and is greatly determined by cow maternal ability. It is generally assumed that maternal ability is largely a function of the milking ability of the cow. Thus, milking ability of the cow herd plays a vital role in the efficiency of any cow-calf enterprise since weaning weight of the calf greatly influences net income. Calculation and use of expected progeny differences (EPD) for maternal milk have heightened interest in selection for milk production. Beef cattle breed associations have adopted the use of milk EPD to predict the difference in weaning weight of calves from daughters of different bulls. The difference in the milk EPD of two bulls is a prediction of the difference in average weaning weight of calves out of daughters of the two bulls due to milk production. Previous studies have been conducted utilizing these same cows at a younger age (Buchanan et al., 1993, 1995, 1996; Gosz and Buchanan, 1998; Minick et al., 1999). The purpose of this study was to quantify differences in milk production, calf performance, and dam's body condition when sires of cows varied widely in milk EPD.

Materials and Methods

Cows were produced through the mating of Angus and Hereford bulls that differed in milk EPD to Hereford x Angus x Brahman cows to produce crossbred females. Bulls were selected to form four different 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). During this study, cows ranged in age from 7 to 10 yr old. They were managed under spring and fall calving systems that are typical of commercial beef cattle management systems. Pastures were either native range or Bermuda and cows were maintained in moderate body condition. Cows were provided with 40% crude protein range cubes and Bluestem hay during the winter months.

Data were collected on 419 calvings from the spring of 1999 through the fall of 2000. Calves were sired by South Devon bulls, which were used via artificial insemination, or crossbred clean-up sires. Calving period in the spring extended from early February to late April and in the fall from early September to late November. Birth weights were obtained and males were castrated within 24 h of birth. Calves remained with their dams on pasture and were not creep fed. Calves were weaned at an average age of 205 d.

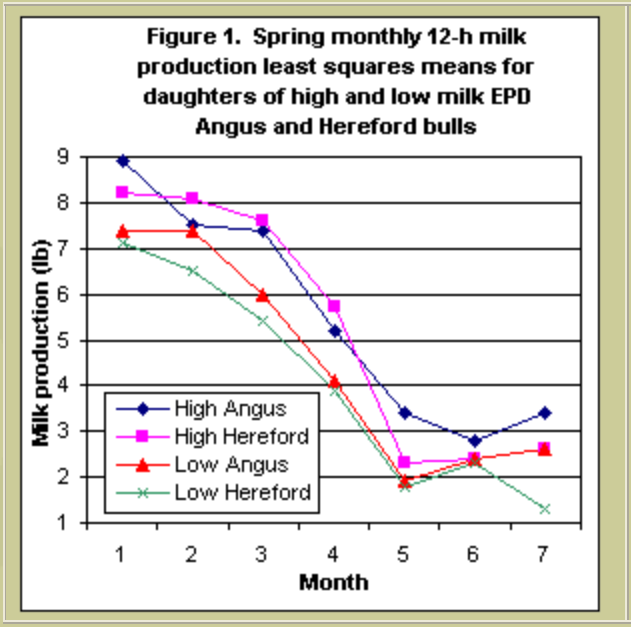
Cow body condition scores (1=thin, 9=obese) and milk production estimates were obtained during seven monthly intervals. Estimates of milk production were obtained using the weigh-suckle-weigh (WSW) method. Cows and calves were gathered from pasture and placed in holding pens the afternoon prior to measurement. Calves were separated from cows around 1800. The following morning, at 0545, calves were placed with dams and allowed to nurse. Cow-calf pairs were then randomly separated into smaller groups (approximately 20 cows per pen). Calves were separated from cows after all milk was removed from the udder. At 1145, calves were weighed and then allowed to nurse. After nursing, calves were weighed again. The difference between the two weights was the estimated 6-h milk production of the cow. This procedure was repeated at 1745. The two 6-h estimates were summed to produce a 12-h milk production estimate for each cow.

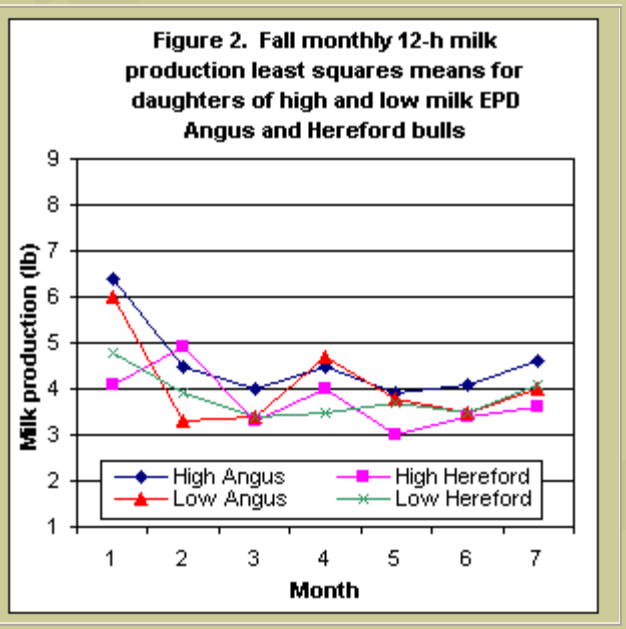
Data were analyzed using least squares analysis of variance. Factors included in the model were breed, milk EPD level, season of calving, year of calving, sex of calf, age of dam at calving, and all two-factor interactions. Age of calf was included as a covariate.

Results and Discussion

Cows sired by high milk EPD Angus and Hereford bulls had higher ($P<.01$) total milk production estimates than cows sired by low milk EPD Angus and Hereford bulls. Least squares means for monthly measurements of 12-h milk production during the spring and fall are presented in Figures 1 and 2, respectively.

There were significant differences between the cow breed groups in the first through fifth months during the spring. High milk EPD Angus cows produced a greater ($P<.05$) amount of milk than the low milk EPD Angus cows in those 5 mo, and the high milk EPD Herefords produced more ($P<.05$) milk than the low milk EPD Herefords in the third and fourth months. There were no significant differences in individual monthly measurements during the fall, but the high milk EPD Angus and Hereford groups tended to have higher estimates of milk production than the low milk EPD Angus and Hereford groups.





There were no differences in birth weight (P>.25) across breed or milk EPD level. There were significant differences in calf 205-d weaning weight between the cow breed groups (Table 1). High milk EPD Angus cows weaned calves that were heavier (P<.02) than calves weaned by low milk EPD Angus cows. Calves of high milk EPD Hereford cows also had higher (P<.04) 205-d weaning weights than calves of low milk EPD Hereford cows. In addition, calf average daily gain was higher (P<.04) for calves of high milk EPD cows compared to calves of low milk EPD cows within both breeds (Table 1).

Table 1. Birth weights (lb) (BW), 205-d weaning weights (lb) (WW), and average daily gains (birth to weaning, lb) (ADG) least squares means for calves from daughters of high and low milk EPD Angus and Hereford bulls

Breed	Level	n	BW	WW	ADG
Angus	Low	142	85.8 ± 1.0	467.6 ± 5.6[a]	1.86 ± .025[a]
Angus	High	128	84.4 ± 1.1	487.9 ± 5.8[b]	1.97 ± .026[b]
Hereford	Low	88	84.5 ± 1.4	448.0 ± 7.1[a]	1.77 ± .032[a]
Hereford	High	61	84.9 ± 1.8	472.8 ± 9.2[b]	1.88 ± .042[b]

[a,b]Within a column and breed, means without a common superscript letter differ (P<.05).

Heavier calf 205-d weaning weights and higher average daily gain of calves from daughters of high milk EPD bulls were not obtained without some cost in the cow's ability to maintain size and condition. Body condition scores (BCS) for daughters of high and low milk EPD sires are presented in Table 2. Spring-calving high milk EPD Angus cows had lower (P<.01) BCS than spring-calving low milk EPD Angus cows. Fall-calving high milk EPD Angus cows also had lower BCS than fall-calving low milk EPD Angus cows, but this difference was not significant. In addition, BCS of high and low milk EPD Herefords were not significantly different for the fall or spring calving groups, but low milk EPD Hereford cows had higher scores and were in better condition particularly in the spring calving group.

Table 2. Final cow body condition scores (1 to 9) least squares means for the spring and fall calving groups for daughters of high and low milk EPD Angus and Hereford bulls				
Breed	Level	n	Spring BCS	Fall BCS
Angus	Low	142	5.61 ± .06[a]	5.18 ± .08
Angus	High	128	5.16 ± .07[b]	5.08 ± .07
Hereford	Low	88	5.76 ± .09	5.30 ± .09
Hereford	High	61	5.45 ± .13	5.29 ± .09
[a,b]Within a column and breed, means without a common superscript letter differ (P<.05).				

These results provide verification that milk EPD is a useful predictor of weaning weight differences of daughter's calves between Angus and Hereford sires, and that producers who select bulls based on milk EPD should be able to use the values to rank bulls with confidence. The subsequent increase in weaning weight does not come without cost in the cow's ability to maintain herself. This is evident in the greater loss of condition for the high milk EPD groups.

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.

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