Lifetime Productivity of Crossbred Cows Sired by High and Low Milk EPD Angus and Hereford Bulls

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Story in Brief

The objective of this study was to evaluate lifetime productivity of cows as measured by total milk production and calf weaning weight. Cows were sired by Angus or Hereford bulls with either very high or very low Milk Expected Progeny Differences (EPD). Total milk production, from 37 to 205 d after calving, and 205-d weaning weights were evaluated for each cow-calf pair (n=1864). High Milk EPD Angus cows reached peak milk production later in life than low Milk EPD Angus. High milk Angus cows were able to maintain high milk production levels for a number of years, whereas, low milk Angus cows immediately dropped in productivity after reaching peak milk production. High and low Milk EPD Hereford cows exhibited similar milk production patterns, but high milk cows peaked later, and thus, produced more milk as older cows than low milk cows. High and low Milk EPD Angus cows followed similar patterns for weaning weight but differences due to Milk EPD level decreased after nine years of age. High Milk EPD Hereford cows weaned heavier calves earlier and maintained those weaning weights longer than low Milk EPD Herefords. High milk Angus cows weaned 32.18 lb heavier calves than low milk Angus cows. High milk Hereford cows weaned 29.60 lb heavier calves than low milk Hereford cows. Milk EPD is effective in identifying weaning weight differences due to maternal ability. Production differences due to age of cow can be useful for producers when considering which animals to cull from the herd.

Key Words: Milk Production, Expected Progeny Differences, Weaning Weight

Introduction

Milk production of beef cows greatly influences the weaning weights of calves and, thus, affects the efficiency of cow-calf operations. The amount of milk a cow produces during each lactation varies throughout her life, making lifetime productivity of the beef cow an important consideration. The genetic merit for maternal ability is evaluated by the Milk EPD. This EPD is widely used by beef cattle breed associations to predict the differences in weaning weights, due to milk production, of calves born to daughters of different bulls. The purpose of this study was to evaluate lifetime productivity, measured by total milk production and calf weaning weight, of cows sired by high or low Milk EPD bulls.

Materials and Methods

An existing herd of Hereford X Angus, ¼ Brahman X ¼ Hereford X ½ Angus, and ¼ Brahman X ¼ Angus X ½ Hereford cows were bred to high and low Milk EPD Angus or Polled Hereford sires. Thirty-five bulls were used: 12 high Milk EPD Angus, 11 low Milk EPD Angus, 9 high Milk EPD Hereford, and 9 low Milk EPD Hereford. EPD values are presented in Table 1. Heifers from these matings were born 1989 to 1993 and were managed to begin calving in 1991. Heifers and cows were mated to Angus, Charolais, Gelbvieh, Limousin, Maine-Anjou, Polled

Hereford, Salers, South Devon or crossbred bulls. Spring calves were born from February to April and fall calves were born from September to November. At calving, all calves were weighed and males were castrated. Cows and calves were placed on native pasture at North Lake Carl Blackwell Range.

Table 1. Average Expected Progeny Differences (lb) for Angus and Hereford sires

Breed	Milk Level	n	BWEPD	WWEPD	MILKEPD
Angus	Low	11	5.1	26.8	-13.7
Angus	High	12	2.5	21.3	19.2
Hereford	Low	9	5.6	26.3	-10.5
Hereford	High	9	2.6	22.3	16.8

Milk production data were collected on 1864 calvings from spring 1991 to fall 2000 by weigh-suckle-weigh procedures. Cows and calves were separated at 1800 h on the day prior to measurement. At 0545 h the next morning, calves were placed with cows and allowed to nurse until the udder was empty. This ensured that all milk was removed from the udder at the beginning of the separation period. Calves were separated from the cows until 1145 h, at which time they were weighed and returned to their dams to nurse. Calves were weighed after nursing and the difference between the two weights was the 6-h milk production of the cow. The procedure was repeated at 1745 h and the two estimates of 6-h milk production were used to calculate a 24-h estimate for each cow.

Total milk production and 205-d weaning weights were analyzed using least squares analysis of variance. Terms included in the model were breed of cow sire, Milk EPD level, year, season, sex of calf, age of cow, breed x milk EPD level, breed x level x age of cow, and all two- and three-way interactions with $p<.20$. Cow sire(breed x milk EPD level) and calf sire(year) were included as random effects. Age of calf was included as a covariate.

Previous results from studies utilizing these cows were reported by Buchanan et al. (1992, 1993, 1995, and 1996), Gosz and Buchanan (1998), and Minick et al. (1999).

Results and Discussion

High Milk EPD cows produced more milk than low Milk EPD cows ($P<.0001$). Angus cows produced more milk than Hereford cows ($P=.0021$). Age of cow ($P<.0001$) significantly influenced total milk production. Breed x Milk EPD level ($P=.4177$), breed x age of cow ($P=.3764$), Milk EPD level x age of cow ($P=.5666$), and breed x Milk EPD level x age of cow ($P=.7130$) were not significant. High Milk EPD cows weaned heavier calves than low Milk EPD cows ($P<.0001$). Angus cows weaned heavier calves than Hereford cows ($P=.0387$). Age of cow significantly influenced weaning weight ($P<.0001$). Breed x Milk EPD level ($P=.8343$), breed x age of cow ($P=.9265$), Milk EPD level x age of cow ($P=.9832$), and breed x Milk EPD level x age of cow ($P=.6243$) were not significant.

Least squares means for total milk production are presented in Table 2. Differences between high and low Angus were fairly consistent but were not significant after nine years of age. High Milk EPD Angus cows reached peak production later than low Milk EPD Angus cows and were able to maintain that production, whereas, production of low milk Angus cows immediately

declined. Differences in total milk production in Herefords were only significant for 6, 9, and 10 year olds. High Milk EPD Hereford cows reached peak milk production later in life than low Milk EPD Hereford and maintained that production through older ages. Lack of significance for breed and Milk EPD interactions with age of cow indicate that these differences may not be large.

Table 2. Least squares means and standard errors by breed, Milk EPD level, and age of cow for total milk production (lb) from 37 to 205 days post-calving

Age of cow	High Angus	Low Angus	High Hereford	Low Hereford
2	1449.52±93.63*	1171.52±98.15*	1340.04±113.61	1294.64±101.90
3	1732.35±75.17*	1479.49±78.04*	1552.27±100.66	1404.58±83.69
4	2027.37±71.79*	1794.63±69.69*	1724.99±91.24	1637.95±78.27
5	2040.21±73.76*	1817.78±69.55*	1803.37±86.30	1661.98±76.08
6	2126.82±74.30**	1718.06±69.58**	1873.97±94.00*	1601.44±82.44*
7	2014.44±84.68**	1640.28±78.70**	1756.01±107.70	1612.22±87.11
8	1850.00±97.66*	1581.21±92.22*	1692.38±112.85	1564.57±94.25
9	1955.83±106.48**	1514.32±100.98**	1732.20±124.67*	1360.81±113.41*
10	1798.45±124.68	1505.87±122.30	1866.10±156.47**	1308.89±126.75**
11	1580.75±166.82	1251.59±159.78	1464.98±202.85	962.28±193.16

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

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

Least squares means for weaning weight are presented in Table 3. High and low Milk EPD Angus cows followed similar patterns for weaning weights with differences due to Milk EPD level becoming less pronounced after nine years of age. Angus cows weaned the heaviest calves between the ages of six and nine. Differences between high and low Milk EPD Herefords were much less consistent. High Milk EPD Herefords weaned heavier calves earlier than low Milk EPD Hereford and maintained heavier weaning weights longer. Lack of significance for breed, Milk EPD level, and breed x Milk EPD level interactions with age of cow indicate that these differences may not be very large. High Milk EPD Angus cows weaned calves that were 32.18 lb heavier than low Milk EPD Angus cows, which was 0.68 lb less than predicted by Milk EPDs. High Milk EPD Hereford cows weaned calves that were 29.60 lb heavier than low Milk EPD Hereford cows, which was 2.33 lb more than predicted by Milk EPDs.

Table 3. Least squares means and standard errors by breed, Milk EPD level, and age of cow for weaning weights (lb)

Age of cow	High Angus	Low Angus	High Hereford	Low Hereford
2	447.29±12.24**	410.75±13.12**	425.70±±16.96	404.43±15.73
3	461.14±10.30**	423.66±10.66**	442.87±14.35*	409.15±12.56*
4	494.21±9.78**	455.02±9.65**	463.73±12.63	447.48±11.28
5	502.57±9.81*	473.91±9.62*	472.84±12.07	448.70±11.28
6	508.34±9.90*	477.93±9.59*	507.23±13.06**	457.10±11.83**
7	516.88±11.03**	476.06±10.62**	493.37±14.72	476.29±12.51
8	507.37±12.47**	468.02±12.01**	491.81±15.68	472.87±13.65
9	499.06±13.44	471.37±13.14	491.67±17.49*	450.26±16.39*
10	482.23±15.53	461.24±13.14	469.55±21.49	435.50±18.46
11	454.33±20.89	433.52±20.24	436.69±28.04	397.78±26.28

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

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

Increased milk production results in increased weaning weight of calves. The Milk EPD can help predict these differences. Age of cow also affects total milk production and weaning weight. Knowing the peak production years of cows in a herd would assist producers in culling less productive animals.

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