1988

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BEEF REPORT

RELATIONSHIP OF SIRE EXPECTED PROGENY DIFFERENCES TO MATERNAL PERFORMANCE OF FIRST-CALF DAUGHTERS IN A COMMERCIAL HERD

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CATTLE 88-19

Summary

Maternal performance for first calf production was evaluated in retrospect for daughters whose sires had expected progeny differences (EPDs) available from 1988 beef breed association national genetic evaluation summaries. When grouped into high EPD and low EPD groups, sire EPD group averages for actual daughter milk production and weaning weights of daughters' offspring consistently ranked the same as sire group average EPDs for milk and maternal weaning weight, although differences between groups were not statistically significant.

(Key Words: Beef Cattle, Commercial, Expected Progeny Difference, Maternal.)

Widespread use of artificial insemination makes it possible to compare performance of sires and their relatives across herds within the same breed. For some beef breeds, relative genetic values expressed as expected progeny differences (EPDs) are available for essentially every registered animal in the breed with appropriate, recorded performance data. Thus, both seedstock and commercial breeders are likely to encounter EPD specifications on bulls available for sale or on bulls whose semen is available for sale.

The extent to which breeders utilize EPD information to assist in selection will depend on their level of confidence in the effectiveness of utilizing such information. Research at the University of Georgia (Hough et al., 1985) indicated that selection for increased yearling weight in Hereford cattle based on EPDs was effective. Information concerning the relationship of sire EPDs to actual performance of descendants in commercial herds is lacking. Semen from sires available through commercial semen companies has been used at the SDSU Antelope Range Livestock Station for a number of years, and daughters of many of these sires have been retained as replacement heifers. The objective of this analysis was to examine the relationship of sire EPDs for milk and maternal weaning weight, as published in 1988 national genetic evaluation programs, to actual performance of sires' daughters and daughters' offspring.

Materials and Methods

The data used in this analysis were collected on 2-year-old beef females and their calves managed in a drylot environment. Dam breed types included crossbred Angus-Hereford and Tarentaise-Hereford produced in two-breed rotational crossbreeding systems, and also straightbred Hereford. Sires of the dams were Angus, Tarentaise or Polled Hereford. Some of the sires were used in natural matings, while others were used in artificial insemination. Many of the artificial insemination sires have current EPD information available through their respective breed associations. Several of the sires have EPDs computed in current summaries even though EPDs were not available at the time semen of the sires was obtained. Current (1988) EPDs were obtained for as many of the sires as possible, either from the breed association's published 1988 sire summary or directly from the breed association. Data used to analyze actual offspring performance had not been reported to breed associations and so represent an independent set of data compared to data used to compute EPDs.

Daughters were born at the Antelope Range Livestock Station in northwestern South Dakota but produced their first calf in a drylot at Brookings as part of another experiment. These females entered the drylot at an average

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age of 1.6 years and remained there for 1 year through weaning of their first calf. A different set of first-calf females was evaluated each year from 1981 through 1987. Milk production was measured by weighing the calf before and after nursing after an overnight separation of calf and dam. Milk production was measured at four different dates in the first 5 years, five dates in 1986 and six dates in 1987. The milk production measurements for a cow were totaled and divided by the number of measurements. Weaning weights of drylot calves were obtained in October. Variables of interest in this analysis are daughters' milk production and weaning weights of daughters' offspring.

Since comparisons of EPDs are valid only within a breed, separate analyses were completed for each sire breed of daughters. Angus and Tarentaise sires were mated only to cows within their respective rotation, whereas Polled Hereford sires were used in each rotation and on straightbred cows. Contemporary groups were formed based on year of daughter production and sex of daughters' calves and, in the case of Hereford sires, also on dam breed type. Data for contemporary groups that included daughters of only one sire were deleted. Means were computed by sire for daughters' milk production and for weaning weight of daughters' offspring (i.e., grand-offspring of sire). Relative values of sire EPDs were examined within each sire breed, and sires were assigned to a high EPD group, low EPD group or non-EPD group. The non-EPD group included primarily cleanup bulls. Averages were computed for each sire EPD group by weighting each sire mean by the number of records associated with each sire mean. EPD sires were assigned to groups in a manner which maximized the difference between weighted average EPD's of high EPD vs low EPD groups.

Results and Discussion

Grouping of data into high EPD, low EPD and non-EPD groups within each sire breed resulted in rather uneven numbers of daughters per group. This was not unexpected since matings were not planned with the present analysis in mind. For this same reason, differences between high EPD and low EPD groups for sire EPDs were smaller than desired in some cases, particularly for milk EPD groups for Angus and Tarentaise sires. Grouping of sires into high and low EPD categories does not necessarily reflect how these sires rank within their respective breeds but how they rank relative to other sires in this analysis (on a within breed basis).

Performance of first-calf daughters and their offspring grouped by sire milk EPD's is presented in Table 1. A difference in sire milk EPDs should be interpreted as the expected difference in weaning weights of offspring of sires' daughters due to differences in daughters' milk production. Weaning weights were adjusted for age of calf but not for age of dam, since all dams were the same age (2-year-old). For all three sire breeds, daughters of high milk EPD sires ranked higher for calf weaning weight and milk production than daughters of low milk EPD sires, although differences between groups were not statistically significant. Differences between weaning weights of offspring of daughters of high vs low milk EPD sires exceeded sire milk EPD differences. Daughters of high milk EPD sires ranked higher for calf weaning weights than daughters of non-EPD sires. Daughters of low milk EPD sires produced heavier calf weaning weights than daughters of non-EPD sires for Tarentaise and similar calf weaning weights compared to daughters of non-EPD sires for Polled Hereford and Angus.

TABLE 1. FIRST-CALF PERFORMANCE OF DAUGHTERS GROUPED BY SIRE MILK EPDs

	No. sires	No. daughters	Sire milk EPD[a] EPD	Acc.	Daughter 1st calf weaning wt, lb	Daughter milk yield[b]
			Polled Hereford Sires			
High EPD sire	1	8	+32.7	.88	442.6	6.41
Low EPD sires	2	35	+19.4	.60	422.8	6.24
Non-EPD sires	7	37			421.0	6.51
			Angus Sires			
High EPD sire	1	21	- 2.4	.88	454.8	8.24
Low EPD sire	1	4	- 4.7	.58	450.9	7.59
Non-EPD sires	3	21			445.8	7.19
			Tarentaise Sires			
High EPD sires	1	5	+ 2.9	.97	470.4	10.67
Low EPD sires	3	16	- 1.9	.89	447.8	9.07
Non-EPD sire	1	26			421.5	8.53

[a] Group average EPD and Accuracy values were computed by weighting individual sire values by numbers of daughters.

[b] Milk production expressed as pounds of milk after an overnight separation of calf and dam.

First-calf performance of daughters grouped by sire maternal weaning weight EPDs is presented in Table 2. A difference between two sires' maternal weaning weight EPDs should be interpreted as the expected difference in weaning weights of offspring of sires' daughters due to differences in milk production and genetic growth potential. For Polled Hereford sires, the difference between actual weaning weights of offspring of daughters of high vs low maternal weaning weight EPD sires closely reflected the difference between sire EPDs of the two groups. For Tarentaise sires and Angus sires, differences in daughter first-calf weaning weights reflected differences in sire EPDs less closely than for Hereford sires, but actual differences in performance were in the same direction as sire EPD differences. Differences in actual performance between high EPD vs low EPD group averages were not statistically significant with the limited numbers of records. For all three sire breeds, daughters of high EPD sires ranked higher for first-calf weaning weights than daughters of non-EPD sires. Daughter first-calf weaning weights were similar for low EPD vs non-EPD sire groups.

TABLE 2. FIRST-CALF PERFORMANCE OF DAUGHTERS GROUPED BY SIRE MATERNAL WEANING WEIGHT EPDs

	No. sires	No. daughters	maternal weaning wt[a] EPD	Daughter 1st calf weaning wt, lb	Daughter milk[b] yield
			Polled Hereford Sires		
High EPD sire	1	8	+36.7	442.6	6.41
Low EPD sires	2	35	+17.7	422.8	6.24
Non-EPD sires	7	37		421.0	6.51
			Angus Sires		
High EPD sire	1	21	+14.6	454.8	8.24
Low EPD sire	1	4	+ 5.0	450.9	7.59
Non-EPD sires	3	21		445.8	7.19
			Tarentaise Sires		
High EPD sires	2	17	+ 2.6	459.1	9.50
Low EPD sires	2	4	-10.5	428.2	9.23
Non-EPD sire	1	26		421.5	8.53

[a] Group average EPD and Accuracy values were computed by weighting individual sire values by numbers of daughters.

[b] Milk production expressed as pounds of milk after an overnight separation of calf and dam.

In conclusion, maternal performance of sires' daughters for first-calf production were consistent with sires' rankings for milk EPDs and maternal weaning weight EPDs, although differences between high EPD vs low EPD groups were not statistically significant. Magnitudes of differences in actual performance between high EPD and low EPD groups were reasonably reflective of EPD differences, especially considering the limited numbers of sires and daughters evaluated. Data will continue to be collected and re-summarized at a future date.

Literature Cited

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