1988

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COMPARISON OF SIRE EXPECTED PROGENY DIFFERENCES TO ACTUAL PERFORMANCE OF CROSSBRED OFFSPRING

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CATTLE 88-20

Summary

Actual performance of crossbred calves produced at the Antelope Range Livestock Station was evaluated and compared to the sire's expected progeny differences (EPDs) as reported in 1988 beef breed association sire summaries. Comparisons were made between high EPD and low EPD sire groups in retrospect for actual birth weight and weaning weight performance of crossbred progeny. Separate analyses were completed for Polled Hereford, Simmental, Tarentaise and Angus sires. Progeny of high EPD sires ranked higher for average birth weight than progeny of low EPD sires for all sire breeds. Rankings for calf weaning weight were less consistent than for birth weight in reflecting rankings of sire EPDs.

(Key Words: Beef Cattle, Expected Progeny Difference, Crossbred Offspring.)

Introduction

Expected progeny differences (EPDs) have become increasingly available to seedstock and commercial beef cattle breeders to evaluate the relative genetic value of a sire within a breed. Comparisons among sires in national genetic evaluation programs have been made possible by widespread use of sires in artificial insemination programs and development of sophisticated computing and statistical techniques. For some breeds, comparisons can be made among all registered animals in the breed with appropriate performance data. It should be stressed that although EPDs can evaluate animals across herds they should not be used to compare animals in different breeds. For EPDs to be commonly used as a selection tool by commercial beef breeders, evidence that actual performance of crossbred offspring reflects relative differences in sires' EPD values would be useful. The objective of this analysis was to evaluate in retrospect the relationship of actual performance of sire crossbred offspring to 1988 sire EPDs for birth weight and weaning weight.

Materials and Methods

This analysis included data from crossbreeding systems implemented at the Antelope Range Livestock Station in northwestern South Dakota. Sires of the offspring were either Tarentaise, Angus, Simmental or Polled Hereford. Cow breed types included Angus-Hereford, Simmental-Hereford and Tarentaise-Hereford cross cows produced in two-breed rotational crossbreeding systems. The initial F1 cross cows generally were mated to Hereford sires as were the crossbred cows within each rotation that were of low percentage Hereford. Cows containing high percentage Hereford were mated to the other sire breed within the rotation.

EPD information was acquired where possible on the artificial insemination sires used, from either national sire summaries published by the breed associations or directly from the breed association. The EPDs assigned to the sires were from recent (1988) summaries rather than from summaries published at the time at which the sires were actually used. EPDs were not available at the the time of use of some of the sires for which current EPDs are available. Calf birth weights and 205-day weaning weights were adjusted using the Beef Improvement Federation standard adjustments for age of dam. Performance comparisons were made between high EPD sires and low EPD sires on a within breed basis.

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Analyses were completed separately for each sire breed. Sires with 1988 EPDs were assigned within a breed to a high EPD group or low EPD group. All non-EPD sires (primarily cleanup bulls) were assigned to a non-EPD group. A weighted average EPD was computed for both of the EPD groups based on the number of offspring for each sire within the group. Since bulls might rank differently for different traits, group average EPDs were computed once based on birth weight EPD rankings (Table 1) and again based on weaning weight EPD rankings (Table 2).

Contemporary groups were formed based on the year the offspring was born and sex of calf. Contemporary groups which contained only one sire's offspring were deleted. Inspection of contemporary groups revealed that one Polled Hereford sire with EPDs produced offspring only in contemporary groups in which the only other calves were sired by non-EPD bulls. Since the offspring of this sire never competed directly with offspring of other EPD sires, a second analysis was conducted for Polled Hereford in which data involving offspring of this sire were deleted.

Least-squares means were computed by individual sire for adjusted birth weight and adjusted weaning weight of offspring. Offspring performance values were used to compute a weighted average for each sire EPD group based on the number of offspring. Sires were grouped into respective high and low groups such that differences between the weighted EPD values for the high and low groups were maximized. Since original matings were not made with the present analysis in mind, numbers of EPD sires are limited and numbers of offspring per sire are much less balanced than desired. Data used to analyze actual offspring performance had not been reported to breed associations and represent an independent dataset compared to data used to compute EPDs.

Results and Discussion

Of primary interest was the extent to which differences in 1988 EPDs between high EPD and low EPD groups reflected differences in performance of crossbred offspring. The grouping of sires into high and low EPD categories does not necessarily reflect how these sires rank within their respective breeds but simply how they rank relative to other sires in this analysis (on a within breed basis). Also, one should not try to evaluate sire breeds from these analyses since different sire breeds were mated to different dam breeds.

Data in Table 1 summarize performance of the offspring of high versus low EPD groups when arranged according to birth weight EPDs. Birth weights of offspring for the high birth weight EPD group ranked higher than for the low EPD group for all sire breeds. Among Simmental and Tarentaise sires, offspring birth weights for non-EPD sires averaged lower than for offspring of high EPD sires but were similar to birth weights of offspring sired by low EPD sires. For Polled Hereford sires, offspring birth weights were similar among all three groups. Analysis I for Polled Hereford sire groups included all EPD sires, whereas Analysis II did not include offspring data for the one EPD sire whose calves' only contemporaries were offspring of non-EPD sires.

Data presented in Table 2 are of similar content to that in Table 1, except the high and low EPD sire groups were assigned based on sire weaning weight EPDs. In the case of the Tarentaise sires, the high and low groups for weaning weight contained the same sires as did the high and low groups for birth weight. In the case of the Simmental and Polled Hereford breeds, sires ranked differently for weaning weight EPD than they did for birth weight so some of the individual sires fell into different groups for each trait. For Simmental and Tarentaise, offspring weaning weights averaged higher for the high weaning weight EPD group than for the low or non-EPD groups, and offspring weaning weights were similar for low EPD and non-EPD groups. For Polled Hereford sires, offspring weaning weights were similar for high and low EPD groups, but averaged higher for non-EPD sires than for EPD sires.

Data were available from offspring of Angus sires but were not included in the tables since only two of the Angus sires had EPDs. These two sires ranked the same for offspring birth weight as for birth weight EPD. However, their ranking for offspring weaning weight was switched from their weaning weight EPD ranking, despite a difference in weaning weight EPDs of 17 lb. Accuracy values for weaning weight EPD were .93 for one bull and .83 for the other bull.

TABLE 1. OFFSPRING PERFORMANCE OF SIRES GROUPED BY BIRTH WEIGHT EPDs

	No. sires	No. offspring	Birth wt[a] EPD	Birth wt[a] Acc.	Birth wt[b], lb	Weaning wt[c], lb
			Simmental Sires			
High EPD sire	1	21	+2.6	.65	103.7	589.9
Low EPD sires	3	89	-2.2	.90	96.7	551.3
Non-EPD sire	1	80			96.9	549.1
			Tarentaise Sires			
High EPD sires	2	36	+1.1	.95	93.0	527.7
Low EPD sires	2	16	-3.6	.89	85.4	502.8
Non-EPD sire	1	64			86.4	504.0
			Polled Hereford Sires			
Analysis I						
High EPD sire	1	86	+2.3	.84	90.3	532.2
Low EPD sires	3	75	+0.1	.90	89.5	541.7
Non-EPD sires	8	110			90.7	546.1
Analysis II						
High EPD sire	1	86	+2.3	.84	90.2	532.0
Low EPD sires	2	57	+0.4	.93	89.7	533.3
Non-EPD sires	8	110			90.7	546.1

[a] Group average EPDs and Accuracy values were computed by weighting the individual sire values within the group by the number of offspring.

[b] Birth weights were adjusted using the Beef Improvement Federation standard adjustments for age of dam.

[c] 205-day weaning weights were adjusted using the Beef Improvement Federation standard adjustments for age of dam.

TABLE 2. OFFSPRING PERFORMANCE OF SIRES GROUPED BY WEANING WEIGHT EPDs

	No. sires	No. offspring	Wean wt[a] EPD	Wean wt[a] Acc.	Birth wt, lb[b]	Weaning wt, lb[c]
			Simmental Sires			
High EPD sires	2	68	+15.2	.81	99.5	567.2
Low EPD sires	2	40	+4.5	.90	95.6	544.6
Non-EPD sire	1	76			96.9	549.1
			Tarentaise Sires			
High EPD sires	2	37	+8.4	.95	93.0	527.7
Low EPD sires	2	16	-16.3	.89	85.4	502.8
Non-EPD sire	1	65			86.4	504.0
			Polled Hereford Sires			
Analysis I						
High EPD sires	2	57	+9.3	.92	89.7	533.1
Low EPD sires	2	99	-3.2	.82	90.1	538.8
Non-EPD sires	8	103			90.7	546.1
Analysis II						
High EPD sires	2	57	+9.3	.92	89.7	533.3
Low EPD sire	1	82	-3.1	.83	90.2	532.0
Non-EPD sires	8	103			90.7	546.1

[a] Group average EPDs and Accuracy values were computed by weighting the individual sire values within the group by the number of offspring.

[b] Birth weights were adjusted using the Beef Improvement Federation standard adjustments for age of dam.

[c] 205-day weaning weights were adjusted using the Beef Improvement Federation standard adjustments for age of dam.

In conclusion, progeny of high birth weight EPD sires consistently had heavier average birth weights than progeny of low EPD sires. Rankings based on calf weaning weight were frequently consistent with sire EPD group rankings, with a notable exception in comparing two Angus sires. Original matings were not planned with the present analysis in mind, and "ties" between sires were often largely indirect. Offspring data for some sires could not be included in the analysis. It would be desirable to collect additional data with more sires and better balance in the number of offspring per sire.