

Growth and Carcass Performance of Calves Sired by Bulls from Hereford and Angus Lines Selected for Weaning or Yearling Weight

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Story in Brief

Growth and carcass performance of calves sired by bulls chosen from two lines selected for weaning weight (WWL) and yearling weight (YWL), respectively, were evaluated in both Hereford and Angus cattle. The final group of selected Hereford bulls (top three bulls from each line born in 1976 and 1977) in a 15-yr selection project were mated randomly to a group of Angus cows to produce 83 crossbred calves in 1979. The final group of selected Angus bulls (top four bulls per line born in 1978) were mated randomly to a group of Angus cows to produce 98 straightbred calves in 1980.

Sire lines were compared separately for each breed. In both breeds differences between the WWL and YWL sires were small and generally nonsignificant. Within the Hereford breed, calves from WWL sires were 2.8 lb lighter at birth, gained .08 lb/day faster preweaning ($P < .10$), were 17 lb heavier at weaning, gained .13 lb/day slower postweaning and thus were 14 lb lighter in yearling weight than calves from YWL sires. WWL sired calves were in the feedlot 7 fewer days, required .11 lb more feed per pound of gain, were 38 lb lighter ($P < .10$) and 9 days younger at slaughter and thus were 32 lb lighter ($P < .05$) in carcass weight. Calves from WWL sires tended to mature earlier as indicated by a higher marbling score (5.2 vs 4.7 units, $P < .05$) and higher carcass grade (10.1 vs 9.6 units, $P < .10$) even though they were lighter and younger at slaughter.

Within the Angus breed, calves sired by WWL bulls were 1.6 lb heavier at birth, gained equally fast from birth to weaning, were 3 lb heavier at weaning and 10 lb lighter in yearling weight. Calves sired by bulls from WWL gained .17 lb/day ($P < .05$) slower in the feedlot, were in the feedlot 9 more days ($P < .05$), were 9 days ($P < .10$) older but 14 lb lighter at slaughter and had 11 lb lighter carcass. Also, calves sired by WWL bulls had .08 in. ($P < .01$) more fat over the rib eye. All other carcass traits were similar for both lines.

These data indicate that selection for weaning weight or yearling weight has resulted in similar responses in total growth performance and carcass merit.

Introduction

Selection is the primary force by which breeders can change the genetic composition of their herds. This study was part of a long-term selection project at the Oklahoma Agricultural Research Station designed to evaluate the effectiveness of selection for increased weaning weight and yearling weight. The purpose of this study was to compare growth and carcass performance of calves sired by bulls

from two lines selected for weaning weight and yearling weight, respectively, in both Angus and Hereford cattle. Differences between calves sired by bulls selected for weaning weight and bulls selected for yearling weight in each breed would indicate if selection for weaning weight gives different responses than selection for yearling weight.

Materials and Methods

The data utilized in this study was collected in 1979 and 1980 for the Hereford and Angus sired calves, respectively, as a portion of a beef cattle selection project. In both Hereford and Angus one line was selected for increased weaning weight and one line for increased yearling weight during the 15-yr period, 1964 through 1979. The final group of selected Hereford and Angus bulls from this project sired calves utilized in this study. In the two Hereford lines the top three bulls per line were selected in 1976 and 1977 and randomly mated to a group of Angus cows to produce 83 crossbred calves in 1979. In the two Angus lines the top four bulls per line were selected in 1978 and mated to Angus cows to produce 98 straightbred calves in 1980.

Managerial procedures were similar in both breeds. Cows were managed on native and bermudagrass pastures at the Southwestern Livestock and Forage Research Station at El Reno. Calves were born from early February through April, and birth weights were recorded within 24 hours after birth. Calves were allowed to run with their dams on pasture and received no creep feed. After weaning at an average age of 205 days, all calves were placed in the feedlot and fed ad libitum a corn based finishing ration. Calves were individually removed from the feedlot and slaughtered when an anticipated low choice carcass grade was reached. Growth and carcass traits were analyzed separately for each breed by least squares procedures.

Results and Discussion

Calves sired by selected Hereford bulls

Performance through a year of age of calves sired by selected WWL and YWL Hereford bulls is presented in Table 1. Generally, differences between sire lines were small and nonsignificant. WWL sired calves were 2.8 pounds lighter at birth than YWL sired calves but gained .08 pounds per day ($P < .10$) faster from birth to weaning and were 17 pounds heavier at 205 days. After weaning, however, calves sired by WWL bulls gained more slowly (2.29 vs 2.42 lb) and were lighter at 365 days (837 vs 851 lb) than calves sired by YWL bulls.

Table 1. Performance through a year of age of calves sired by selected weaning weight line and yearling weight line Hereford bulls

Trait	Sire line		Difference (WWL-YWL)
	WWL	YWL	
Number of calves	41	42	
Birth weight (lb)	77.3	80.1	- 2.8
Prewearing ADG (lb/day)	1.91	1.83	.08 ⁺
205-day weaning weight (lb)	469	452	17
Weaning to yearling ADG (lb/day)	2.29	2.42	- .13
365-day weight (lb)	837	851	- 14

⁺ Difference significant at the .10 probability level.

Feedlot and carcass performance of calves sired by selected WWL and YWL Hereford bulls is summarized in Table 2. In general, differences between progeny of sires from the two selection lines were small and nonsignificant. WWL sired calves were heavier going into the feedlot (467 vs 552 lb), were in the feedlot fewer days (212 vs 219 days) but required .11 lb more feed per pound of gain than YWL sired calves. Final feedlot weight was lighter (-38 lb, $P < .10$) for calves of WWL sires, and, as a result, hot carcass weight was also lighter (-32 lb, $P < .05$) than calves of YWL sires. Calves sired by WWL bulls were in the feedlot fewer days (212 vs 219 days) and were younger at slaughter (415 vs 424 days) than calves by YWL bulls. Differences in carcass traits between progeny of the two sire lines were small and generally nonsignificant although calves by WWL sires had higher marbling scores (+.5 units, $P < .05$) and higher carcass grades (+.5 units, $P < .10$) than calves by YWL sires.

Table 2. Feedlot and carcass performance of calves sired by selected weaning weight line and yearling weight line Hereford bulls

Trait	Sire line		Difference WWL-YWL)
	WWL	YWL	
Number of calves	41	42	
Initial weight on test (lb)	467	552	15
Final weight (lb)	925	963	-38 ⁺
ADG on test (lb/day)	2.19	2.31	-.12
Days on feed	212	219	-7
Feed efficiency (lb feed/lb gain)	7.35	7.24	.11
Age at slaughter (days)	415	424	-9
Hot carcass weight (lb)	585	617	-32 [*]
Average fat thickness (in)	.76	.75	-.01
KHP fat (%)	2.9	3.1	-.2
Marbling score ^a	5.2	4.7	-.5 [*]
Carcass grade ^b	10.1	9.6	.5 ⁺
Rib eye area (sq in)	11.0	11.1	-.1
Carcass cutability (%)	49.1	49.1	0

^{*} Difference significant at the .05 probability level.

⁺ Difference significant at the .10 probability level.

^a Marbling score: 4 slight, 5 = small.

^b Carcass grade: 9 = high good, 10 = low choice.

Calves sired by selected Angus bulls

Performance through a year of age of calves sired by selected WWL and YWL Angus bulls is presented in Table 3. Although differences between WWL and YWL were not significant, calves sired by WWL bulls were slightly heavier at birth (69.7 vs 68.1 lb), gained equally fast from birth to weaning and were similar at weaning (383 vs 380 lb). Weaning to yearling ADG and yearling weight were slightly lower for calves from WWL bulls (2.55 vs 2.62 lb/day and 729 vs 802 lb, respectively).

Feedlot and carcass performance of calves sired by selected WWL and YWL Angus bulls is summarized in Table 4. Calves from the two sire lines had similar weights upon entering the feedlot (398 vs 397 lb for WWL and YWL sired calves, respectively), but WWL sired calves gained more slowly in the feedlot (2.46 vs 2.63 lb/day), were in the feedlot longer (228 vs 219 days, $P < .05$) and were older (442 vs 433 days) than YWL sired calves. Also, WWL sired calves were lighter at

Table 3. Performance through a year of age of calves sired by selected weaning weight line and yearling weight line Angus bulls

Trait	Sire line		Difference ^a (WWL-YWL)
	WWL	YWL	
Number of calves	51	47	
Birth weight (lb)	69.7	68.1	1.6
Preweaning ADG (lb/day)	1.53	1.52	.01
205-day weaning weight (lb)	383	380	3
Weaning to yearling ADG (lb/day)	2.55	2.62	-.07
365-day weight (lb)	792	802	-10

^aNone of the differences were significant.

Table 4. Feedlot and carcass performance of calves sired by selected weaning weight line and yearling weight line Angus bulls

Trait	Sire line		Difference (WWL-YWL)
	WWL	YWL	
Number of calves	51	47	
Initial weight on test (lb)	389	397	1
Final weight (lb)	952	966	-14
ADG on test (lb/day)	2.46	2.63	-.17*
Days on feed	228	219	9*
Feed efficiency (lb feed/lb gain)	6.9	7.1	-.2
Age at slaughter (days)	442	433	9 ⁺
Hot carcass weight (lb)	602	613	-11
Average fat thickness (in)	.80	.88	.08**
KHP fat (%)	3.1	3.3	-.20
Marbling score ^a	5.0	5.2	-.20
Carcass grade ^b	10.0	10.2	-.20
Rib eye area (sq in)	10.3	10.4	-.10
Carcass cutability (%)	48.3	47.6	-.70

** Difference significant at the .01 probability level.

* Difference significant at the .05 probability level.

⁺ Difference significant at the .10 probability level.

^aMarbling score: 5 = small.

^bCarcass grade: 10 = low choice.

slaughter (952 vs 966 lb) and had a lighter carcass (602 vs 613 lb) than YWL sired calves. Calves sired by WWL bulls had less fat over the rib eye (.80 vs .88 in, $P < .01$), less KHP fat (3.1 vs 3.3 percent) and higher carcass cutability (48.3 vs 47.6 percent) than calves sired by YWL bulls. Sire line differences for other carcass traits were small and nonsignificant.

Summary

In summary, these data indicate that selection for weaning weight or yearling weight has resulted in similar response in growth and carcass traits in both Hereford and Angus cattle. Thus, the breeder has the option of using either weaning weight or yearling weight or a combination of the two and can expect similar selection responses. Since weaning weight can be selected for earlier in life, selection for weaning weight may be more economical than selection for yearling weight.