CARCASS EVALUATION OF THREE-BREED CROSS CALVES PRODUCED BY VARIOUS TWO-BREED CROSS COW GROUPS

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Story in Brief

Carcasses from 1506 three-breed cross calves produced by Hereford X Angus (HA), Angus X Hereford (AH), Simmental X Angus (SA), Simmental X Hereford (SH), Brown Swiss X Angus (BA), Brown Swiss X Hereford (BH), Jersey X Angus (JA) and Jersey X Hereford (JH) cows mated to Charolais, Brahman, Limousin or Gelbvieh bulls were evaluated over a seven year period. Calves were placed in a feedlot at weaning and fed ad libitum a finishing ration until being individually removed for slaughter as each calf attained an estimated low choice carcass grade. As per design, rib-eye marbling and carcass grade did not vary significantly among crossbred cow groups. Compared to carcass weights for calves from HA and AH cows (averaged 703 lb), carcasses of calves from S, B and J cross cows; respectively, averaged 9% heavier, 6% heavier and 5% lighter. Carcass weight per day of age was similar for calves from S and B crosses (averaged 1.3 lb/day) and exceeded the average of calves from HA and AH cows by 6%. External fat thickness of calves from HA and AH cows (averaged .60 in) was .10 in greater than for calves from S cross and JA cows and .14 in greater than for calves from BH and JH cows. The average rib-eye area of calves from HA and AH cows (12.7 in^2), was .8 in^2 smaller than that of calves from S cross cows, but .6 in^2 larger than that of calves from JA cows. Calves from J cross cows had slightly more estimated KHP fat than did calves from HA and SH cows (3.3 vs 3.1%). Dressing percentage was greater for calves from AH, SH and BH cows (64.3%) than for calves from HA and J cross cows (averaged 63.4%).

(Keywords: Crossbreeding, Carcass traits, Angus, Hereford, Simmental, Brown Swiss, Jersey)

Introduction

This paper is one of a series reporting evaluation of productivity of various types of two-breed cross cows when mated to terminal cross sires. Preceeding papers characterized crossbred dam groups for the cow-calf and feedlot segments of production. Carcass merit of calves should also be considered when evaluating cow breed types for use in commercial beef production, especially in a terminal crossing system in which all calves are slaughtered. Relatively few studies have included both steers and heifers in carcass evaluation of breed types. The objective of this study was to evaluate carcass traits of three-breed cross calves from various two-breed cross cow groups, when calves were fed to a low choice carcass grade.

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Materials and Methods

Carcasses from 1,506 three-breed cross calves (769 heifers and 737 steers) were evaluated over a seven year period. The calves were born in the spring (1976-1982) from Hereford X Angus (HA), Angus X Hereford (AH), Simmental X Angus (SA), Simmental X Hereford (SH), Brown Swiss X Angus (BA), Brown Swiss X Hereford (BH), Jersey X Angus (JA) and Jersey X Hereford (JH) cows. Cows ranged in age from three to nine years and were mated to Charolais, Brahman, Limousin or Gelbvieh bulls. Only two sire breeds were used in a given year and were randomly assigned to one-half of the cows in each crossbred cow group.

Following weaning in the fall at an average age of 205 days, the three-breed cross calves were placed in a feedlot and fed a corn or conr-milo finishing diet. Based on visual appraisal of finish and feeling degree of finish over the loin and ribs, calves were individually removed from the feedlot upon attaining an estimated low choice carcass grade and sent to a commercial slaughter plant. During the time cattle were being slaughtered, cattle were weighed and appraised for finish and selected individuals were sent to slaughter at two week intervals. After a minimum 48-hour chill, carcasses were evaluated for marbling and were assigned quality grades by university personnel.

Crossbred cow group means for percentage of calves weaned, calf survival in the feedlot and calf carcass weight were used in the calculation of carcass weight per cow exposed to breeding. Estimated yield of retail lean cuts per cow exposed to breeding was calculated by multiplying the mean estimated cutability by the mean carcass weight per cow exposed to breeding for each crossbred cow group.

Results and Discussion

Carcass Trait Evaluation

Least-squares means for carcass weight traits, fat thickness and rib-eye area are presented by crossbred cow group in Table 1. Compared to the average carcass weight of calves from HA and AH cows (703 lb), calves from S and B cross cows, respectively, produced 65 lb (9%) and 43 lb (6%) heavier carcasses. Calves from JA and JH cows, respectively, produced 44 lb (6%) and 28 lb (4%) lighter carcasses than calves from HA and AH cows. Carcass weight per day of age was greater for calves from AH cows (1.55 lb/day) than for calves from HA or J cross cows (averaged 1.50 lb/day). Calves from S and B cross cows attained similar carcass weights per day of age (averaged 1.63 lb/day), and exceeded the average of calves from HA and AH cows by 6%.

External carcass fat thickness was greatest for calves from HA and AH cows (averaged .60 in) and least for calves from BH and JH cows (averaged .45 in). Compared to the average for calves from HA and AH cows (12.7 in^2), rib-eye area was .8 in^2 (6%) larger for calves from S cross cows and .6 in^2 (5%) smaller for calves from JA cows. Calves from B cross (13.1 in^2) and JH (12.4 in^2) cows were similar to that of calves from HA and AH cows.

Least-squares means for estimated KHP fat, dressing percentage, cutability, marbling and quality grade are presented in Table 2. Calves from J cross cows had slightly more estimated internal (KHP) fat than did calves from HA and SH cows (3.31 vs 3.08%). Carcasses of other

groups had an average of 3.19% KHP fat.

Dressing percentage was greater for calves from AH, SH and BH cows (64.3%) than for calves from HA and J cross cows (averaged 63.4%). Calves from SA and BA cows had intermediate dressing percent-ages (averaged 64.0%).

Estimated cutability was significantly greater for calves from BH, S and J cross cows (averaged 49.8%) than for calves from HA cows (49.2%). Cutability was significantly greater for calves from JH cows than for

Table 1. Least squares means for carcass weight traits, fat thickness and rib-eye area.

Crossbred cow group[a]	No. carcasses	Carcass wt		Carcass wt/ day of age		Fat[b] thickness		Rib-eye[b] area	
		lb	% HA,AH	lb/day	% HA,AH	in	% HA,AH	in^2	% HA,AH
HA	175	701^{e}	99.7	1.51^{e}	98.6	$.61^{c}$	102.6	12.6^{f}	99.8
AH	168	705^{e}	100.3	1.55^{d}	101.4	$.58^{cd}$	97.4	12.7^{ef}	100.2
SA	208	767^{c}	109.1	1.63^{c}	106.6	$.50^{ef}$	84.8	13.5^{c}	106.5
SH	159	769^{c}	109.4	1.63^{c}	106.2	$.49^{efg}$	82.8	13.3^{cd}	105.1
BA	173	745^{d}	106.0	1.62^{c}	105.8	$.54^{de}$	90.1	12.9^{def}	101.7
BH	158	747^{d}	106.3	1.62^{c}	106.0	$.47^{fg}$	79.5	13.2^{cde}	104.3
JA	236	659^{g}	93.7	1.49^{e}	97.0	$.50^{ef}$	84.8	12.1^{g}	95.5
JH	229	675^{f}	95.9	1.51^{e}	98.3	$.45^{g}$	75.5	12.4^{g}	97.9
Overall	1506	721		1.57		.52		12.8	

[a] H=Hereford, A=Angus, S=Simmental, B=Brown Swiss and J=Jersey.
[b] Measured at the 12th rib.
cdefg Means in the same column not sharing a common superscript differ (P<.05).

Table 2. Least squares means for KHP fat, dressing percentage, cutability, marbling and quality grade.

Crossbred cow group[a]	No. carcasses	Estimated KHP fat, %	Dressing percentage, %	Cutability, %	Marbling score[b,d]	Quality grade[c,d]
HA	175	3.10^{gh}	63.7^{fgh}	49.2^{g}	5.1	10.0
AH	168	3.18^{fgh}	64.3^{e}	49.4^{fg}	5.1	10.1
SA	208	3.19^{efgh}	64.0^{ef}	49.8^{ef}	5.1	9.9
SH	159	3.06^{h}	64.3^{e}	49.8^{ef}	5.0	9.8
BA	173	3.22^{efg}	63.9^{efg}	49.5^{efg}	5.0	10.0
BH	158	3.18^{efgh}	64.3^{e}	49.7^{ef}	5.2	10.1
JA	236	3.33^{e}	63.4^{gh}	49.8^{e}	5.0	9.9
JH	229	3.28^{ef}	63.2^{h}	49.9^{e}	5.0	9.9
Overall	1506	3.19	63.9	49.6	5.1	10.0

[a]H=Hereford, A=Angus, S=Simmental, B=Brown Swiss and J=Jersey.
[b]<5=small, 6=modest amount of marbling.
[c]9=Good +, 10=Choice -, 11=Choice avg.
[d]Differences in marbling score and quality grade among crossbred cow groups were not significant (P>.05).
[efgh]Means in the same column not sharing a common superscript differ (P<.05).

calves from AH cows (49.9 versus 49.4%). There were no significant differences in cutability among S, B and J cross groups.

On the average, calves were slaughtered at the intended low choice carcass grade with little variation among crossbred cow groups. Crossbred cow group means ranged from 5.0 to 5.2 for marbling score (averaged 5.1) and ranged from 9.8 to 10.1 for carcass quality grade (averaged 10.0).

Presented in Table 3 are measures of production of carcass weight per cow exposed to breeding and estimated boneless, closely trimmed retail cuts per cow exposed to breeding. Characterization of crossbred

types by these measures takes into consideration cow reproduction, calf survival, calf carcass growth and cutability. Production of carcass weight per cow exposed was 18 lb/cow (3.5%) greater for HA cows than for the AH cows. Compared to the average of HA and AH groups, production of carcass weight per cow exposed averaged 13 lb/cow (2.6%) less for the BH group, similar for SH and JH groups and 28 lb/cow (5.4%) greater for SA, BA and JA groups. Excluding the HA and AH groups, A crosses produced 5.7% more carcass weight per cow exposed than H crosses, largely reflecting the advantage in reproductive performance of the A cross cows over the H cross cows (Frahm and Marshall, 1985). Similar rankings were attained for production of retail cuts per cow exposed to breeding. The HA group produced 7 lb (2.8%) more retail cuts per cow exposed than the AH group. Compared to the average of HA and AH (255 lb/cow), production of retail cuts per cow exposed averaged 7 lb/cow (2.6%) for SH and JH cows and 17 lb/cow (6.5%) greater for SA, BA and JA cows. Excluding the HA and AH cows, A cross cows produced 5% more retail cuts per cow exposed than H cross cows.

Table 3. Production of carcass weight and estimated retail cuts per cow exposed to breeding.

Crossbred cow group[a]	Carcass weight[b] per cow exposed		Retail lean cuts[b] per cow exposed	
	lb/cow	% HA,AH	lb/cow	% HA,AH
HA	527	101.7	258	101.3
AH	509	98.3	251	98.7
SA	547	105.5	271	106.5
SH	520	100.4	260	102.2
BA	551	106.4	273	107.4
BH	505	97.4	251	98.7
JA	540	104.3	269	105.6
JH	525	101.3	262	103.0
Overall	529		262	

[a]H=Hereford, A=Angus, S=Simmental, B=Brown Swiss and J=Jersey.
[b]Based on number of cows exposed to breeding.

Conclusion

While maternal traits are generally emphasized in studies evaluating cow breed types, carcass merit of calves is also an important consideration, especially in a terminal breeding program. With the exception of carcass weight, magnitudes of differences among crossbred cow groups in this study were relatively small for the traits evaluated. In general, both steer and heifer carcasses of all breed groups were quite acceptable and desirable from a consumer standpoint.

Literature Cited

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