September, October, November and December were .979, .990, .989, .995, .964, .994, .973 and .943, respectively. Ash content of the forage samples, prior to and after ruminal incubation in the nylon bags, is shown in Table 2. Ash content of the forage ranged from 6.8-9.1 percent prior to incubation and from 9.4-14.1 percent following incubation. Ash disappearance from the nylon bags ranged from positive to negative. Ash may arise not only from minerals in the forage, but soil contamination due to dust, wind, etc. Nevertheless, the high correlations in these data suggest that relative differences in the forage quality of native ranges, as measured by *in vivo* digestibility, can be determined about equally well using either DMD or OMD.

Cattle Breeds, Feedlot Performance and Carcass Characteristics

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Story in Brief

Gain and carcass measurements of steers from four past trials were sorted by breed. Overall feedlot gain favored the Angus by Hereford (AH) crossbred steers over the Angus (A) and Hereford (H) by 8.4 percent. Herefords gained less rapidly than either A or AH the first 40 to 60 days but more rapidly than A during the remainder of the 117 to 167-day trials. Rib eye area per hundred lb of carcass and cutability favored A. AH had slightly more fat over the rib eye and a poorer yield grade.

Marbling and federal grade favored A over AH and AH over H. The percent of steers grading low choice or above for A was 88 percent, for AH was 70 percent and for H was 54 percent. Percentage of steers grading choice plateaued for all breeds at about 1100 lb live weight. How carcass characteristics changed with carcass weight depended on breed.

Introduction

Performance and carcass characteristics of 618 feedlot steers from four past trials were sorted by breed into three classes: Angus (A), Angus by Hereford crossbred (AH) and Hereford (H). Feedlot performance for the first 40 to 60 days and subsequently in the 117 to 167-day feeding trials was available. Steers for all trials were obtained as feeder calves or yearlings from similar weight groups entering feedlot pens in Guymon, Oklahoma. No information on age or specific background of the steers is available, but the cattle should represent a typical sampling of steers available for feeding in the Great Plains.

Groups were slaughtered at a constant number of days on feed with no sorting by breed. Although 13 different breeds or crosses were visually identifiable in these trials, insufficient numbers of other breeds and crosses were available for analysis. The alteration in carcass characteristics for every 100 lb change in carcass weight was calculated.

Table 1. Breed effects, weighted averages.

Item	Breed		
	Angus	A x H Cross	Hereford
Number of steers	185	186	247
Initial weight	695	731	710
Daily gain			
Initial			
(First 41-56 days)	3.94[b]	4.05[b]	3.68[a]
Later			
(to slaughter)	2.94[a]	3.29[c]	3.02[b]
Total	3.36[a]	3.62[b]	3.32[a]

[abc]Means with similar superscripts do not differ statistically (P<.05).

Table 2. Breed effects, weighted averages.

Item	Breed		
	Angus	A x H Cross	Hereford
Dressing, %	61.9[a]	62.5[b]	61.7[a]
Carcass weight, #	706	730	703
Rib eye area			
Sq in	12.67[b]	12.62[b]	12.28[a]
Sq in/cwt	1.80[b]	1.74[a]	1.75[a]
Cutability[d], %	49.86[b]	49.23[a]	49.43[a]
KHP, %	3.05	3.05	3.00
Fat over rib eye, in	.50[a]	.56[b]	.53[ab]
Liver abscess score	.62	.49	.72
Yield grade	3.27[ab]	3.34[b]	3.22[a]
% yield grade 4 & 5	9.7	12.4	6.5
Marbling score[e]	15.28[c]	14.03[b]	12.86[a]
Quality grade[f]	13.31[c]	12.59[b]	12.18[a]
Percent choice[g]	87.6[c]	69.9[b]	53.8[a]

[abc]Means with similar superscripts do not differ statistically (P<.05).
[d]From standard formula.
[e]Slight = 11; slight plus = 12; small minus = 13.
[f]Good = 11; high good = 12; low choice = 13.
[g]Percentage of carcasses with quality grade above low choice.

Results and Discussion

Performance characteristics by breed are presented in Table 1. Initial weights were slightly greater for AH steers than H and A steers. Rate of weight gain the first 41 to 56 days was slower for H than A and AH. Later, gains of AH exceeded both H and A steers. No index of feed intake or feed efficiency is available. Rate of gain by AH steers exceeded the purebred mean by 8.4 percent. Animal breeders expect about half this response from heterosis. The remainder may be a result of more stringent selection of sires by livestock breeders producing crosses rather than straight-bred cattle.

Carcass characteristics by breed are presented in Table 2. Dressing percentage was higher for AH, possibly due to the heavier carcass weight. These dressing percentages are hot carcass weight divided by *full* weight, not shrunk weight. Rib eye area, in

Table 3. Weight, breed, grade and yield.

Live Weight	Dressing	Carcass weight	Percent choice[d]			% yield 4 & 5[e]		
			A	A x H	H	A	A x H	H
#	%	#						
966	59.5	575	75[b]	—	12.5[a]	17	0	0
1040	60.1	625	80[b]	59.1[ab]	43.8[a]	0	0	3
1090	61.9	675	95.5[c]	72.7[b]	56.5[a]	9[b]	12[b]	1[a]
1166	62.2	725	88.9[c]	71.7[b]	57.7[a]	13	10	10
1228	63.1	775	84.2[b]	70.0[ab]	59.5[a]	11	10	14
1314	62.8	825	90.9[b]	70.0[ab]	53.8[a]	9[a]	30[b]	15[a]

[abc]Means in a row in a group differ statistically.

[d]Quality grade was largely dependent on marbling of the rib eye in these studies.

[e]Poor yield grades, over 4, were largely caused by excessive fat thickness over the rib eye in these studies.

square inches, was smallest for H. Expressed as area per hundred lb of carcass, A were superior. Cutability, an index of the lean cuts available for the consumer, favored A. Although internal fat (kidney, heart and pelvic) differed little by breed, fat over the rib was greater for AH than A. Yield grade was higher for AH than H and a few more AH fell into the yield 4 and 5 category.

Marbling score, one of the primary factors in federal quality grade, was greater for A than AH and greater for AH than H. The percentage of carcass graded low choice or above was 88 percent for A, 70 percent for AH and 54 percent for H.

Commonly, to improve marbling, steers are fed to heavier weights. Carcass grades for the breeds at different weights are presented in Table 3. As live weight increased, dressing percent increased, but the percent of steers grading choice had virtually plateaued by the 1090 lb live weight. Superiority of A over AH and AH over H in quality grade was apparent at all but one carcass weight. Percent of carcasses graded 4 or 5 tended to increase with weight.

Further relationships of carcass measurements to carcass weight are presented in Table 4. As an example, if steers are fed to gain an extra 100 lb of carcass, one might expect 8 percent more to grade choice, but 21 percent more would fall into the yield 4 and 5 category. Indices of growth (rib eye area) and fat increased with carcass weight for all breeds, but marbling and quality grade did not increase with weight for A steers as it did for H and HA. Because of these differences, relative values between breeds for cattle feeding will depend on current grading standards, the economics of long or short term feeding and relative discounts for grade or yield.

Table 4. Carcass changes with carcass weight.

Item	Change per 100 # carcass	Breed differences
Rib eye area, in²	+ .792	No
Cutability, %	− 1.14	A<H, HA
KHP, %	+ .17	No
Fat over rib eye, in	+ .12	A<H, HA
Yield grade	+ .22	No
% yield grade 4 & 5	+20.6	No
Marbling score	+ .71	A<H, HA
Quality grade	+ .33	A<H, HA
Percent choice	+ 8.2	A<H, HA