Feces samples were obtained on day 20 when steers were fed receiving diets containing cottonseed hulls (12.5 percent) or a mixture of cottonseed hulls (5 percent) plus alfalfa meal (7.5 percent) as a source of roughage. No marked effect of roughage source at this time or later in the feeding period was apparent (Table 4). The dry matter, starch and whole kernel percentages were higher later in the feeding trial, and pH was lower. Whether this difference is due to a reduced digestibility with age and time on feed or a ration composition difference is under study.

Influence of Starting Weight and Breed on Performance of Feedlot Steers

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Story in Brief

Steers were grouped by initial weight and fed high concentrate rations in two finishing trials. Feed intake was greater for heavier steers but, expressed as a fraction of body weight, declined from 2.5 to 2.2 percent per day as mean steer weight increased from 850 to 1137 lb. Efficiency of feed use has generally been lower for heavier cattle, but energetic efficiency, calculated from net energy equations, is consistently higher for heavier cattle. Fat cover and marbling have generally increased with starting weight and carcass weight. Comparison of breeds in these trials revealed lower rates of grain for Angus steers, especially late in the finishing period; lower dressing percentages for Hereford steers than other types; and high rates of gain and carcass cutability for exotic crossbred steers.

Introduction

Effect of starting weight on feedlot performance has been studied previously with 500 and 600-lb steers (Gill et al., 1980). Intakes and gains were greater for heavier steers, but heavier steers had less desirable feed efficiencies. These effects need examination with heavier steers.

Feedlot performance and carcass characteristics among common cattle breeds have been reviewed (Owens et al., 1979; Gill et al., 1981). Total feedlot gain for Angus-Hereford crossbred steers has exceeded the mean of Angus and Hereford steers by 6 to 8 percent. Marbling score and percent of carcasses grading choice

have consistently favored the Angus steers. Carcass traits of Angus-Hereford crossbred steers appears intermediate in all measurements. In these trials, performance and carcass traits of 280 steers of mixed breeding were examined.

Materials and Methods

Steers used in both trials had been assembled in Purcell, Oklahoma, and pastured together for several months prior to transport to Stillwater for finishing. Steers used in the "Lasalocid for Feedlot Steers" trial reported elsewhere in this publication were subdivided into two groups based on initial weight (640 vs 714 lb). Steers in the "Salinomycin for Feedlot Steers" trial were divided into four weight groups based on initial weight. Steers were classified into four breed types by appearance in both trials and assigned randomly to pens. Therefore, no feed intake or efficiency data are available for steers by breed type.

Results and Discussion

Animal performance information by weight group is presented in Tables 1 and 2. Feed intake was greater for the heavier set of steers in both trials (4.3 and 5.6 percent for every increase of 100 lb in the two trials), especially early in the feeding study when intake was 5.9 and 6.8 percent greater per hundred pounds. These differences are less than the 10 percent observed with steers averaging 100 lb heavier in a previous trial. Overall, feed intake was equal to 1.33 times weight to the .41 power. Subdividing feed intake by periods reveals that feed intake

Table 1. Steer performance by initial weights

	Weight group	
Item	Light	Heavy
Steers, no.	70	70
Pens	10	10
Weights, lb		
Initial	640[b]	717[a]
55 days	881[b]	962[a]
119 days	1061[b]	1137[a]
Daily gain, lb		
0-55 days	3.59	3.57
56-119 days	3.50	3.49
0-119 days	3.54	3.53
Daily feed, lb		
0-55 days	19.8[b]	21.7[a]
56-119 days	22.3	21.9
0-119 days	21.1	21.8
% of body weight	2.48	2.35
Feed/gain		
0-55 days	5.55[b]	6.09[a]
56-119 days	6.37	6.28
0-119 days	5.98[b]	6.19[a]
Metabolizable energy, mcal/kg	2.97	3.02

[ab]Means in a row with different superscripts differ (P<.05).

Table 2. Steer performance by initial weights

	Weight group			
	1	2	3	4
Steers, number	35	35	35	35
Weight, lb				
Initial	755[a]	768[a]	799[b]	828[c]
56 days	984[a]	1003[ab]	1025[b]	1069[c]
120 days	1158[a]	1180[ab]	1202[b]	1247[c]
Daily gain, shrunk, lb				
0-56	3.18	3.29	3.12	3.35
57-110	3.57[a]	3.22[b]	3.44[ab]	3.50[ab]
0-120 carcass	3.38	3.25	3.28	3.42
Daily feed, lb				
0-56	22.2	22.8	22.9	23.3
57-110	21.5	22.5	23.0	22.7
0-120	22.0	22.3	22.5	22.9
% of body weight	2.30	2.28	2.25	2.20
Feed/gain				
0-55	6.97	7.02	7.34	6.99
57-110	6.06	6.99	6.69	6.53
0-120	6.80	6.74	6.96	6.77
Metabolizable energy, mcal/kg	2.98[a]	2.87[b]	2.90[ab]	3.01[a]

[abc]Means in a row with different superscripts differ (P<.05).
[d]Calculated from gain and feed intake.

increased proportionately to body weight the first 56 days on test (Intake = 5.66 + .019 weight). Intake was not influenced by body weight during the last half of the feeding study when average steer weight exceeded 950 lb.

Daily gain was not influenced by weight group at any period of this trial. This contrasts with an 8 percent increase in gain per hundred pounds initial weight in the previous trial. No explanation for this difference is apparent. Efficiency of feed use was 4.6 percent lower for every hundred pounds increase in initial weight in the first trial compared with 0.6 percent in the second trial and 3.1 percent in the previous trial. Efficiency of conversion of feed to gain is depressed when feed intake above maintenance is low or when tissue gain is higher in fat and lower in protein and water. Yet, availability of energy, estimated from net energy equations, indicated a superiority for heavier animals in both studies as was true in the previous trial. This increase may be due to minor errors inherent in the net energy equations used to calculate energy efficiency. Digestibility might be expected to decline with greater intake and weight. Carcass characteristics (Tables 3 and 4) indicate that heavier steers were depositing more fat both over the rib and in the rib eye than lighter steers. Rib eye area per hundred pounds of carcass declined as carcass weight increased as expected.

The influence of breed type on performance and carcass characteristics is presented in Tables 5 and 6. In these trials, rate of gain of Angus-Hereford crossbred steers was 98 and 103 percent of the average of Angus and Hereford steers, somewhat below previous values (106 and 108 percent). Other crosses including Brahman and Charolais type steers gained at rates 2 and 5 percent

above the Angus-Hereford crossbred steers. Rate of gain of Angus steers was considerably less (6 and 3 percent) than for other breed types during the second half of the feeding trial as has been observed in previous trials (6 and 7 percent).

Table 3. Carcass characteristics of trial 1

	Initial weight	
	640	717
Carcass weight, lb	647[b]	698[a]
Dressing percent	61.0	61.4
Liver abscesses		
Incidence, %	38.6	41.9
Severity[c]	1.65	1.98
Rib eye area		
Square inches	11.9[b]	12.3[a]
In^2/cwt	1.84[a]	1.77[b]
Fat thickness, in.	.36	.41
KHP, %	2.31	2.26
Marbling score	12.4[b]	13.1[a]
Federal grade	12.5	12.5
Percent choice	49.5	56.3
Cutability	51.0	50.5
Value	61.5	61.3

[ab]Means in a row with different superscripts differ ($P<.05$).
[c]Slight = 1; severe = 3.

Table 4. Carcass characteristics from trial 2

	Weight group			
	1	2	3	4
Carcass weight	718[a]	731[ab]	745[b]	773[a]
Dressing percent	63.1[a]	64.2[b]	64.2[b]	64.5[b]
Liver abscesses				
Incidence, %	41	43	32	37
Severity	1.73	1.62	2.00	1.55
Rib eye area				
Square inches	12.7	12.8	13.3	13.4
In^2/cwt	1.78	1.75	1.79	1.75
Fat thickness, in.	.56	.51	.59	.60
KHP, %	2.74	2.68	2.75	2.80
Marbling score[c]	13.3	13.9	13.8	14.3
Federal grade[d]	12.8	13.0	12.9	13.0
Percent choice	70	60	64	69
Cutability	49.5	49.8	49.4	49.3

[ab]Means in a row with different superscripts differ ($P<.05$).
[c]Low choice = 13; average choice = 14.
[d]Slight plus = 12; small minus = 13.

Table 5. Breed effects on performance, trial 1

Item	Breed			
	Hereford	Angus	Black baldy	Crosses
Number	42	15	37	45
Weights				
Initial	662[c]	719[a]	688[b]	672[bc]
55 day	903[b]	958[a]	929[ab]	918[ab]
119 day	1064	1110	1095	1084
Daily gains				
0-55	3.55	3.47	3.54	3.65
56-119	3.51[ab]	3.22[b]	3.47[ab]	3.57[a]
0-119	3.35	3.26	3.39	3.45
Carcass hot weight	660	689	679	673
Dressing %	61.0	61.7	61.5	61.1
Rib eye area, in.^{2}	11.8	12.3	12.1	12.3
Rib eye area, in.^{2}/cwt	1.80	1.80	1.78	1.83
Fat over rib, in.	.40[a]	.48[a]	.43[a]	.32[b]
KHP, %	2.3	2.3	2.3	2.3
Marbling	12.7[ab]	13.6[a]	12.9[ab]	12.4[b]
Federal grade	12.5	12.6	12.6	12.4
Yield grade	2.8[ab]	3.0[a]	2.9[ab]	2.7[b]
Cutability	50.6[b]	50.3[b]	50.4[b]	51.3[a]
Choice, %	52	64	63	41

[abc]Means in a row with different superscripts differ significantly (P<.05).

Table 6. Breed effects on performance, trial 2

Item	Breed type			
	Hereford	Angus	Black baldy	Crosses
Number	13	8	33	78
Weights				
Initial	780	803	798	785
56 days	1014	1018	1019	1027
124 days	1206	1198	1207	1212
Daily gains				
0-56	3.27[ab]	2.94[b]	3.05[b]	3.41[a]
57-124	3.60	3.35	3.40	3.40
0-124	3.43	3.14	3.22	3.40
Carcass weight	737	738	743	746
Dressing %	63.7	64.2	64.2	64.1
Ribeye area				
sq. in.	12.6	12.7	13.2	13.1
sq. in./cwt	1.70	1.72	1.79	1.77
Fat over rib, in.	.58[ab]	.64[ab]	.65[a]	.53[b]
KHP, %	2.6	2.8	2.8	2.8
Marbling	12.8	14.6	14.0	13.8
Federal grade	12.6	13.1	12.9	12.9
Cutability	49.2	49.0	49.1	49.8
Choice, %	62	63	70	63

[ab]Means in a row with different superscripts differ significantly (P<.05).

This as well as the consistently increased marbling of the Angus steers and generally higher Federal grade suggests that the Angus steers are closer to mature size than other types tested and need to be marketed more promptly when finished than other breeds. Again, in these two studies dressing percent was lower for the Hereford than other breed types. Carcass value estimated from cutability favored the exotic crossbred steers. When sold on a live basis, exotic crosses are often discounted. Grade and yield marketing may improve the economic return on such cattle as these data suggest that carcasses were fully as valuable and cutability was higher than for other steers in these two trials.

Literature Cited

Gill, D. R. et al. 1981. Okla. Agr. Exp. Sta. Res. Rep. MP-108:131.
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