Implants for Feedlot Bulls

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Story in Brief

Ninety-six bulls, one-third each being Charolais (614 lb), Hereford (600 lb) and Hereford-Angus crossbreds (566 lb) were implanted with (1) nothing, (2) Compudose, (3) Synovex or (4) Ralgro. The latter two groups were re-implanted on day 75. Bulls were placed in 12 pens and were fed a high concentrate diet for 118 days. Impants increased liveweight gains by a mean of 34 pounds (6.2 percent) and carcass weights by 17 pounds. Feed intake was increased with Compudose and Synovex implants. Feed efficiencies by implant type adjusted to a dressing percentage of 62 percent were 4.85, 4.85, 5.14 and 4.64, indicating that intake, not utilization of energy, was the primary change induced by implants. Bulls with Ralgro implants appeared to have less internal and external carcass fat. Though all implants increased gain, only Ralgro improved efficiency of feed use by feedlot bulls. Liveweight daily gains and feed efficiencies by breed type were 3.74, 3.86 and 3.64 pounds per day and 5.24, 5.27 and 5.34, respectively. Herefords consumed about .85 pounds (5 percent) more feed per day than Charolais and crossbred bulls. Charolais bulls had less internal and external fat and larger rib eye areas than other breeds.

Introduction

Bulls are used extensively for beef production in many other countries but, due to grading standards, only limited numbers of bulls are produced for beef in the U.S. Scientists at a recent conference in Kansas (Oltjen, 1982) reviewed aspects of management and handling of bulls. Most past experiment station studies have used bulls selected from purebred herds, which were subjected to selection pressure for performance. In contrast, most bulls available commercially are of nondescript origin and probably come from herds with less than average management and selection pressure. For this study, bulls of three breed types were selected for uniformity from a much larger group of commercial bulls.

As noted in the conference above (Oltjen, 1982), growth stimulating implants have not been developed for bulls. Hormonal differences between bulls and steers make direct application of steer implant data to bulls questionable. Though gain and feed efficiency responses of bulls to DES and Ralgro implants have been variable (Preston, 1972; 1973; Embry, 1972), in general, more favorable responses have been observed with sexually immature bulls. Brethour (1982) found that Ralgro implants increased both growth rate and efficiency of feed use by bulls. Compudose and Synovex S have not been evaluated extensively with bulls.

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The objectives of this experiment were to determine the influence of breed type and hormone implants on feedlot performance and carcass characteristics of growing-finishing commercial bulls. Carcasses from the bulls were evaluated by a taste panel at Texas A&M University. Atesticular development study from these same bulls is found on page 138 of this publication.

Materials and Methods

Bulls were selected for uniformity from a large group of commercial bulls, which had been purchased in auction barns in the Southeast part of the United States and assembled at the Hitch Feedlot, Guymon. They were then transported to Panhandle State University on April 8, 1982. Three breed types — Charolais, Hereford and Hereford-Angus cross — were used. Bulls were estimate to be slightly over one year of age at the start of the trial. Within each breed, one pen (8 bulls) received one type of implant. These were (1) no implant, (2) a single Compudose implant at the start of the trial, (3) Ralgro implants at the start and on day 75 of the trial and (4) Synovex S at the start and on day 75 of the trial. Bulls not re-implanted were not disturbed on day 75. Bulls were fed a diet (Table 1) consisting primarily of whole shelled corn. Feed was available ad libitum with fresh feed added twice daily. Bulls were weighed on arrival (shrunk) and at 28-day intervals (unshrunk weights) during the 118-day study. Results present full weights whereas rate and efficiency of gain are calculated using a pencil shrink of 5 percent on final weight. Compudose implants were removed on day 112. On day 118 (August 4, 1982), bulls were trucked to Booker, Texas and slaughtered. Slaughter and carcass data were obtained from each bull.

Treatment effects (breed and implant) were compared by Duncan's Multiple Range Test using pen means. Breed by implant was used as the error term to evaluate main effects.

Table 1. Diet composition[a]

Ingredient	Percentage
Corn, whole shelled	89.0
Cottonseed hulls	5.0
Pelleted supplement[b]	6.0

[a]Dry matter basis. Also included monensin (22 g per ton), Tylan (8 g per ton) and Vitamin A.
[b]Commercial supplement from Moorman Mfg. Co.
Diet dry matter contained 12.3% protein, .53% calcium, .35% phosphorus, .66% potassium and calculated ME (kcal/g) of 3.09.

Results and Discussion

Implant Effects — Implants increased liveweight gains by 21 to 47 pounds (Table 4) and carcass weights by 9 to 25 pounds per bull. Gains appeared equally increased by all implants the first half of the feeding trial, but were increased more during the second half of the trial by Compudose and the Ralgro reimplant.

Table 2. Performance with different implants.

	Implant			
	None	Compudose	Synovex	Ralgro
Bull wt, lb				
Initial	593	594	593	594
29 day[d]	740[b]	756[a]	751[ab]	747[ab]
56 day[d]	866	890	887	882
84 day[d]	967[b]	1008[a]	990[ab]	990[ab]
112 day[d]	1040[b]	1087[a]	1061[ab]	1076[ab]
118 day[e]	1048	1089	1063	1079
Daily gain, lb				
0-56[f]	4.11	4.49	4.46	4.35
57-112[f]	2.95[b]	3.35[a]	2.94[b]	3.30[a]
0-112[f]	3.53[b]	3.92[a]	3.70[ab]	3.83[ab]
0-118[e]	3.86	4.20	3.98	4.11
Daily feed, lb				
0-56	19.6[c]	20.8[a]	20.6[ab]	19.8[bc]
57-112	18.0[b]	20.1[a]	20.6[a]	18.7[b]
0-112	18.8[b]	20.4[a]	20.6[a]	19.2[b]
0-118	18.7[b]	20.3[a]	20.4[a]	19.1[b]
Feed/Gain				
0-56	4.76	4.62	4.62	4.55
57-112	6.10[b]	6.01[b]	7.01[a]	5.66[b]
0-112	5.32[ab]	5.21[b]	5.57[a]	5.03[b]
0-118	4.85[ab]	4.85[ab]	5.14[a]	4.64[b]
ME of diet[g], kcal/g	3.29[ab]	3.30[ab]	3.17[b]	3.40[a]
ME intake, mcal	28.5	31.1	29.8	30.2

[a,b,c]Means with different superscripts differ ($P < .05$)
[d]Full weights
[e]Carcass weight/.62
[f]After 5% pencil shrink
[g]Calculated from weight, gain and feed intake using net energy equations designed for yearling steers.

Implants tended to increase gain the most when feed intake was increased. Synovex and Compudose increased intake more than Ralgro. Feed efficiency was not significantly altered by implant, but efficiency of feed use was 9.7 percent greater for bulls with Ralgro than those with Synovex implants. Had cattle been slaughtered at equal weights rather than after an equal feeding time, all implants probably would have increased efficiency of feed use.

Carcass characteristics remained largely unchanged by implants (Table 3). Internal fat (KHP) and external fat cover tended to be less with Ralgro than the other implants. Less fat deposition with Ralgro could explain why bulls treated with this compound were most efficient in feed use.

The typical response to estrogenic implants in steers is increased gain and increased feed intake. Such a response was noted with Synovex and Compudose in this trial. In contrast, gain and efficiency were increased with little feed in-

Table 3. Carcass characteristics by implant.

	Implant			
	None	Compudose	Synovex	Ralgro
Carcass wt, lb	650	676	659	669
Dressing %	64.4	63.9	64.0	64.0
Liber abscess incidence	4	8	4	0
Rib eye area				
Sq. inches	13.6	13.8	13.1	13.6
Sq./cwt	2.11[a]	2.05[ab]	2.00[b]	2.04[ab]
Marbling score[d]	10.3	10.1	10.4	9.6
KHP, %	1.7	1.8	1.8	1.7
Fat over rib, in[e]	.31[b]	.37[ab]	.41[a]	.32[b]
Cutability	52.8[a]	52.3[ab]	51.7[b]	52.6[a]
Maturity, bone[f]	2.1	2.1	2.3	2.3
Maturity, lean[f]	1.8	1.7	1.9	1.8
Sex class[g]	1.2	1.3	1.4	1.3
Federal grade[h]	10.6	10.4	10.7	10.1
Percent choice[h]	16	4	12	4

[a,b]Means with different superscripts differ ($P < .05$)
[c]From estimate shrunk weight on day 118
[d]Slight = 11; slight minus = 10
[e]Adjusted for overall fat thickness
[f]A = 2; A minus = 3
[g]Bull = 1; steer type = 2
[h]Ignoring sex characteristics

take response with Ralgro. If the mechanism of action differs among implants, perhaps some combination or sequence would be more desirable than a single implant material. A single implant with Compudose proved as effective as implant with Synovex twice in this trial with less handling of cattle. Compudose should be especially useful when time and management of cattle make re-implanting difficult.

Breed Effects — Charolais bulls were heavier than Hereford bulls and Herefords were heavier than Hereford-Angus crossbred bulls at the start of the trial (Table 2). All bulls gained well. During the last half of the trial, Hereford bulls gained 9 percent more rapidly than Hereford-Angus crossbred bulls. Herefords also consumed 8 percent more feed than other breeds during the last half of the trial. For the total trial, Herefords consumed almost one pound of feed per day more than bulls of other breeds. Differences in feed efficiencies between breeds were not significant, but Charolais bulls gained slightly more rapidly and efficiently on a live basis (0.3 and 2 percent advantage over Hereford and black baldy) and on a carcass basis (5 and 3 percent advantage). Efficiency of energy use for gain was 6.6 percent greater for Charolais than crossbred bulls. The mean ME value of the feed, using yearling steer equations for NE content of gain, was 3.29 kcal/g. This is 6.5 percent above the ME of the diet calculated from table versus for feedstuffs.

Carcasses of Charolais bulls were heaviest. Dressing percentages were all high considering the low degree of marbling and carcass fat. A high degree of muscling or a small gastro-intenstinal weight may be responsible. Dressing

percentage was lowest for Hereford bulls.

Many characteristics of Charolais bulls (greater rib eye area, lower marbling score, less fat cover, greater calculated cutability and lower Federal grade) differed from those of Hereford and black baldy bulls. These characteristics suggest that the Charolais bulls were more muscular, possibly due to breed selection or to being slaughtered at an earlier physiological age than the other breeds. But if Charolais bulls were physiologically younger, one would have expected greater rates of gain late in the feeding trial for this breed. Federal grades were all low due to lack of marbling. Whether a longer feeding would have greatly increase marbling is unknown. Based on carcass traits, about 20 percent of the Charolais and Hereford-Angus and .50 percent of the Herefords would have been classified as steers. Slaughter at heavier weights may increase the detectability of bull meat in the carcass.

Table 4. Performance by breed type.

	Breed		
	Charolais	Hereford	Hereford by Angus
Weight, lb			
Initial	614[a]	600[b]	566[c]
28 day[d]	767[a]	759[a]	720[b]
56 day[d]	906[a]	891[a]	847[b]
84 day[d]	1013[a]	1006[a]	948[b]
112 day[d]	1098[a]	1098[a]	1025[b]
118 day[e]	1097[a]	1080[a]	1032[b]
Daily gain, lb			
0-56[f]	4.40	4.40	4.26
57-112[f]	3.07[ab]	3.32[a]	3.02[b]
0-112[f]	3.74	3.86	3.64
0-118[e]	4.10	4.07	3.95
Daily Feed, lb			
0-56	20.2	20.3	20.0
57-112	18.6[b]	20.2[a]	18.7[b]
0-112	19.5[b]	20.3[a]	19.4[b]
0-118	19.4[b]	20.3[a]	19.3[b]
Feed/Gain			
0-56	4.60	4.62	4.70
57-112	6.10	6.12	6.20
0-112	5.24	5.27	5.34
0-118	4.73	4.98	4.89
ME of diet[g], kcal/g	3.40[a]	3.28[ab]	3.19[b]
ME intake	30.6	30.3	28.7

[a,b,c]Means with different superscripts differ ($P < .05$)
[d]Full weights
[e]Carcass weight/.62
[f]After 5% pencil shrink
[g]Calculated from weight, gain and feed intake using net energy equations designed for yearling steers.

Table 5. Carcass characteristics by breed.

	Breed		
	Charolais	Hereford	Hereford by Angus
Carcass wt, lb	680[a]	670[a]	640[b]
Dressing %[c]	64.5[a]	63.4[b]	64.3[a]
Liver abscess incidence, %	3	3	3
Rib eye area			
Square inches	14.5[a]	13.2[b]	13.0[b]
Sq. in/cwt	2.1[a]	2.0[b]	2.0[b]
Marbling score[d]	8.8[b]	10.5[a]	11.0[a]
KHP, %	1.6	1.7	1.9
Fat over rib, in.[e]	.24[b]	.40[a]	.42[a]
Cutability	56.6[a]	51.8[b]	51.7[a]
Maturity, bone[f]	2.0	2.0	2.6
Maturity, lean[f]	1.7	1.8	1.9
Sex class[g]	1.2	1.5	1.2
Federal grade[h]	9.7[b]	10.7[a]	11.0[a]
Percent choice[h]	3	9	15

[a,b]Means with different superscripts differ ($P < .05$)
[c]From estimated shrunk weight on day 118
[d]Slight = 11; slight minus = 10
[e]Adjusted for overall fat thickness
[f]A = 2; A minus = 3
[g]Bull = 1; steer type = 2
[h]Ignoring sex characteristics; Good minus = 10, Average good = 11.

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