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Beef cattle commercial feedlot studies Trial 1—Effects on steer performance of variable protein levels, implanting, and worming

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Abstract
A 112-day trial used 280 mixed-breed yearling steers to study effects of varying protein levels in finishing steers rations. Crude protein content ranged from 15.1 percent for the first 28 days to 8.9 percent crude protein the final 28 days. Feeding a 15.1% crude protein ration for 28 days and a 13.2% crude protein ration the second 28 days or feeding a 13.2% crude protein ration for the first 56 days did not significantly improve total gain compared with feeding an 11.2% crude protein (control) ration.

Keywords
Cattlemen's Day, 1973; Report of progress (Kansas State University. Agricultural Experiment Station); 568; Beef; Commerical feedlots; Steer performance; Protein; Implants; Worming

Beef Cattle Commercial Feedlot Studies
Trial 1--Effects on Steer Performance of Variable Protein Levels, Implanting, and Worming

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Summary

A 112-day trial used 280 mixed-breed yearling steers to study effects of varying protein levels in finishing steers rations. Crude protein content ranged from 15.1 percent for the first 28 days to 8.9 percent crude protein the final 28 days.

Feeding a 15.1% crude protein ration for 28 days and a 13.2% crude protein ration the second 28 days or feeding a 13.2% crude protein ration for the first 56 days did not significantly improve total gain compared with feeding an 11.2% crude protein (control) ration.

Removing supplemental protein from the ration of 140 steers the final 28 days increased rate of gain 6.9% and decreased dry matter required per pound of gain 8.4%.

One hundred twenty steers were implanted with 36 mg. zeranol[1] and 120 with 36 mg. stilbestrol[2] each at the beginning of each trial. Forty controls were not implanted. Implanted steers gained 16.9% more rapidly than control steers with zeranol implanted animals gaining 3.0 pounds each more during the 112 days than those implanted with stilbestrol.

Half the steers, wormed with thiabendazole[3] boluses, gained 5.2 pounds more each during the trial than those not wormed.

Introduction

The tremendous increase in commercial cattle feedlots in Kansas has helped to focus attention on problems for research. Cost of protein supplements is a major concern. An often heard opinion is that cattle need more crude protein

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1 Marketed under tradename RALGRO, an exclusive product of Commercial Solvents Corporation, Terre Haute, Ind. RALGRO provided by Commercial Solvents Corporation.

2 Marketed under tradename STIMPLANTS by Chas. Pfizer and Co., Inc., Terre Haute, Ind. STIMPLANTS provided by Chas. Pfizer and Co., Inc.

3 Marketed under tradename Thibenzole and TBZ by Merck and Co., Inc., Rahway, N. J. TBZ was provided for this trial by Merck and Co., Inc.

(13,14,15%) during early stages of the finishing period. On the other hand, some believe that too much protein is being fed late in the finishing period. Research at other institutions has indicated that zeranol (RALGRO) is as beneficial as stilbestrol, which may be banned.

The effect of internal parasites on animal performance also needs more research effort.

This project was designed to provide data on protein levels, implants, and worming.

Experimental Procedure

Two hundred eighty mixed-breed yearling steers, purchased from a backgrounding lot in southeastern Colorado were used. They averaged 732 pounds at the beginning of the trial. Seventy were allotted at random to each of four groups. Group 1 was fed an 11% crude protein ration for 112 days as the controls. Group 2 was fed an 11% crude protein ration for 84 days, then the protein supplement was removed the last 28 days. Lot 3 was fed a ration containing 13% crude protein for the first 56 days and 11% crude protein the next 56 days. Group 4 received a 15% crude protein ration the first 28 days, 13% crude protein the second 28 days, 11% crude protein the third 28 days, and a basal ration with no protein supplementation the final 28 days. Composition of the supplement is shown in Table 1 and of the complete rations in Table 2.

Removing the protein supplement the final 28 days was done by replacing soybean oilmeal with rolled milo. No adjustment was made for the difference in mineral content between soybean oilmeal and milo. Periodic samples of each ingredient used in the rations were taken and proximate analyses obtained. Average crude protein was calculated as shown in Table 2.

Half the steers in each trial were wormed with thiabendazole boluses; the other half was not. In addition, 30 steers in each pen were implanted with 36 mg. of zeranol, and 30 with 36 mg. of stilbestrol, and 10 in each group were nonimplanted . Individual weights were taken at 28 day intervals and adjustments were made in levels of crude protein being fed. Feeding was twice daily. Hot carcass weight and USDA grade were obtained for each steer at the end of the trial.

Results

Feedlot performance for the 112-day trial are shown in Table 3. Differences in daily gain were not significant. Group 4, started on a 15% crude protein ration, was the fastest gaining and most efficient group. Performances of the other three groups varied little.

Based on a daily dry matter intake of 20 pounds per steer and feed prices January 10, 1973, feed costs were $0.10 more per day per steer with the 13% crude protein ration and $0.18 more per day per steer for the 15% crude protein ration than for the 11% crude protein ration. That assumes that protein was being supplied by soybean oilmeal. The effect on steer performance of discontinuing protein supplements during the final 28 days is shown in Table 4. Protein supplementation seemed not to be required to maintain steer performance the last 4 weeks of the feeding period. Only the supplemental protein was discontinued. Adequate minerals, trace minerals, and vitamins were continued throughout the experiment. The 140 steers with no supplemental protein in their ration gained 6.9% faster and 8.4% more efficiently than the 140 steers fed the more conventional 11.2% crude protein ration the final 28 days. Average weight for the steers at the beginning of the last 28 day period was 963 pounds. Removing the protein portion of the supplement and using January 10, 1973, feed prices reduced the ration cost 8.6%

Performance and carcass grade of steers implanted with zeranol were slightly superior to that of steers implanted with Stilbestrol. Implanted steers gained 16.9% more rapidly (average) than steers not implanted. Our results indicate that zeranol (RALGRO) could be used as an alternative to stilbestrol.

A zeranol advantage is its 65-day waiting period from implantation until slaughter compared with stilbestrol's 120-day waiting period. However zeranol implants now are approximately 3 times more expensive than most stilbestrol implants.

The effects of worming on performance, a small difference in daily gain, is shown in Table 6. Research at other stations has indicated improved efficiency from worming when gains were similar. We did not evaluate efficiency. A worm-egg count before the trial indicated no internal parasite infestation.

Additional trials in progress will further evaluate variable levels of protein in rations for feedlot steers, including no protein supplements near the end of the finishing period.

Table 1. Composition of Protein Supplement

Ingredient	%
Soybean oilmeal*	70.2
Limestone	15.6
Salt	10.0
Urea	2.3
Trace mineral**	1.0
Aureomycin (10 gms/lb.)	0.7
Vitamin A (30,000 I.U./gm)	.2

* Replaced by rolled milo to provide supplement for treatments 2 and 4 last 28 days of trial.

**Calcium Carbonate Co. Z-5

Table 2. Composition of Rations % - Dry Matter Basis

Ingredient	11% C.P. 0-56 Days	11% C.P. 56-112	13% C.P. 0-56 Days	15% C.P. 0-28 Days	Basal 85-112 Days
Sorghum silage	24.0	14.2	22.1	20.1	14.2
Flaked milo	35.1	40.4	33.3	31.6	40.4
Cracked corn	35.1	40.4	33.3	31.6	40.4
Supplement	5.0	5.0	5.0	5.0	5.0
SBOM	0.8	--	6.3	11.7	--
*Calculated crude protein content %	11.1	11.2	13.2	15.1	8.9

* Based on periodic sampling of each ingredient during experimental period.

Table 3. Feedlot Performance of Steers Fed Indicated Levels of Protein

	Days	% Crude protein (dry matter basis)			
	0-28	11.1	11.1	13.2	15.1
	29-56	11.1	11.1	13.2	13.2
	57-84	11.2	11.1	11.2	11.2
	85-112	11.2	8.9	11.2	8.9
ITEM					
Lot No.		1	2	3	4
Number of steers		70	69[a]	69[b]	70
Initial wt., lb.		728.1	731.3	739.6	727.6
Final wt., lb.		1011.7	1013.7	1025.8	1022.2
A. D. G., lb.		2.53	2.52	2.55	2.63
Daily D. M., lb.		20.18	19.83	20.12	20.07
Feed D.M./lb. gain, lb.		7.97	7.86	7.89	7.63

[a] one steer removed because of abcess
[b] one steer died during trial

Table 4. Effect on Steer Performance of Withdrawing Protein Supplement Final 28 Days

	Lots 1 & 3 11.2% C. P.	Lots 2 & 4 8.9% C. P.
No. steers	139	139
Avg. initial wt., lb.	965.95	961.10
Avg. final wt., lb.	1018.75	1017.95
Total gain. lb.	52.80	56.85
Avg. daily gain, lb.	1.89	2.03
Avg. daily D.M., lb.	19.36	19.05
Feed D.M./gain, lb.	10.24	9.38

Table 5. Influence of Implants on Performance and Carcass Characteristics of Feedlot Steers

Item	Implant		
	0	36 mg. Ralgro	36 mg. stilbestrol
No. steers	39	119	120
Initial wt., lb.	734.7	732.5	729.6
Final wt., lb.	984.7	1026.3	1020.4
Total gain, lb.	250.0	293.8	290.8
A.D.G., lb.	2.23	2.62	2.60
Dressing percentage	63.1	63.6	63.8
USDA Prime	1	13	4
USDA Choice	33	101	107
USDA Good	5	5	9

Table 6. Effect of Worming on Performance of Feedlot Steers

Item	Thibenzole*	No wormer
No. steers	140	138
Initial wt., lb.	733.1	730.2
Final wt., lb.	1022.4	1014.3
Total gain, lb.	289.3	284.1
A.D.G., lb.	2.58	2.54
Dressing percentage	63.5	63.6

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