

On the basis of data collected thus far, the following summary statements have been made. Only minor differences in weight gains between the five lots of cattle were recorded during the first two years. During the third and fourth years while suckling calves, cows fed 3 lb. per head daily of pelleted cottonseed meal lost less weight during the winter and produced heavier calves than cattle fed 1.5 lb. pelleted cottonseed meal, 3 lb. of 20 percent protein combination pellet or 3 lb. of 40 percent protein pellet containing urea. Feeding 1.5 lb. of pelleted cottonseed meal was the least desirable practice. There were only minor differences in production due to feeding two 20 percent protein pellets or the urea-containing pellet. However, the combination pellet was apparently slightly more desirable than the simple pellet. The test is being continued in order that more data may be collected.

Effect of Rolling vs. Pelleting Milo, Previous Implantation, and Certain Feed Additives on the Feedlot Performance of Steer and Heifer Calves.

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With the high investment in cattle, feed, and labor, it is essential that the feeder seek new methods of feed processing or ration ingredients that will increase gain and lower the cost per cwt. gain. Several new antibiotics and other feed additives have appeared on the market over the past few years. New equipment is constantly being developed to better prepare grains and roughages for fattening cattle. Much attention has been given to pelleting or cubing either the grain or the complete ration.

Much interest has developed in the use of hormone implants for feeder cattle. Elsewhere in this publication, it is shown that two, 12 mg., stilbestrol implants given to suckling beef calves will increase weaning weights by approximately 36 pounds. An important question from the standpoint of the feedlot operator is whether or not this early implantation of feeder calves, or older cattle, will adversely affect their performance during the fattening period. To obtain information on this point, certain calves were selected from the station herd which had been previously implanted at about 100 days of age, together with a like number which were not implanted. The feedlot performance of these calves was studied during a 155-day feeding period.

Many benefits are claimed from the use of hormone-like drugs and other feed additives in cattle fattening rations. The wide use of stilbestrol for fattening cattle has raised questions as to whether our rations are adequate in some nutrients, such as protein. The development of certain new antibiotics has raised questions as to whether fattening cattle will benefit from their use. Recent studies suggest that low levels of tranquilizer in fattening rations will increase gain and improve feed efficiency.

This report gives the results of the second in a series of trials to study the effect of previous implantation as well as certain antibiotics, tranquilizers and a high protein intake on the performance of beef calves. The results of the first trial can be found in Okla. Agri. Exp. Sta. Misc. Pub. MP-48 (1956-57).

Procedure

Part 1.

Twenty, choice, Hereford, heifer calves were selected from the Fort Reno and Lake Blackwell experimental herds for use in a fattening test in which the objectives were:

1. To study the value of rolled milo versus finely ground and pelleted milo.
2. To study the effect of previous implantation as suckling calves on subsequent feedlot performance.

The calves were divided into two lots on the basis of age, weight, sire, and previous implantation. Each lot consisted of 10 calves, five of which served as controls and five which had been implanted the previous summer as suckling calves. All calves received 10 mg. of stilbestrol in the daily ration while on the fattening test. The daily ration consisted of a full-feed of grain (either rolled or pelleted), 1.5 lb. cottonseed meal, 1.0 lb. of dehydrated alfalfa meal pellets and approximately 11 lb. sorghum silage. A mineral mixture consisting of two parts salt and one part steamed bone meal was available to the calves at all times.

Part 2.

Fifty, choice, Hereford, steer calves were selected from the Fort Reno and Lake Blackwell herds for a study on the effect of high protein levels, antibiotics and tranquilizers in fattening rations. Of the calves selected for this study, 15 steers had been implanted with two, 12-mg. stilbestrol pellets at the base of the ear during the previous summer as suckling calves; an equal number had served as controls during the summer test. These calves were so allotted into the five lots during the fattening test that each lot contained three previously implanted, and three control steers.

The steers were fed all the rolled milo they would consume, 1.5 lb. of cottonseed meal (containing 10 mg. stilbestrol), 1.0 lb. dehydrated alfalfa meal pellets, and approximately 11 lb. of sorghum silage, with a 1:1 mineral mix free choice. The protein supplements and feed additives fed per steer daily were: Lot 3, controls; Lot 4, an additional 1.0 lb. cottonseed meal to test the effect of a higher protein level on feedlot performance of calves; Lot 5, 75 mg. of a new antibiotic "Ilotycin" (Erythromycin, Lilly) mixed in the cottonseed meal; Lot 6, 1 to 5 mg. of a new tranquilizer Hydroxyzine* added to the protein supplement, and Lot 7, 10 mg. of the tranquilizer Chlorpromazine* added to the protein supplement.

*The Hydroxyzine was supplied by Chas. Pfizer and Co., Terre Haute, Ind.; the Chlorpromazine by Smith Kline and French Laboratories, Philadelphia, Pa.

All cattle were hand-fed one-half the daily ration allowance, morning and evening. The feeding test continued for 155 days. At that time, an appraisal of the market value of the cattle was made by a committee from the Oklahoma City yards. Following Feeders' Day, the cattle will be sold on the Oklahoma City market and data will be obtained on shrink to market, yield, and carcass grades. Chemical composition of the feeds used in the trial are shown in Table 1.

Table 1.—Chemical composition of feeds (percent as fed)

Feed	Moisture	Ash	Crude Protein	Fat	Crude Fiber	N-free Extract	Ca	P	Carotene mcg./gm.
Milo	12.35	1.49	11.44	3.14	1.65	69.93	.07	.24	
Cottonseed meal	7.52	5.93	42.25	4.31	11.68	28.31	.19	.79	
Cottonseed meal + Stilbestrol	7.92	5.76	41.63	1.06	11.45	32.18	.19	.73	
Dehyd. alfalfa pellets	7.80	10.00	16.94	3.32	25.83	36.11	1.30	.21	26.6
Sorghum silage	74.75	1.58	2.19	0.47	6.03	14.98	.09	.03	1.5

Results

Part I.

The average results obtained in the comparison of heifer calves fed either rolled or ground and pelleted milo are shown in Table 2. Gains were increased slightly for calves fed the pelleted product. Pelleted milo proved less palatable to the calves of Lot 2, although average daily grain intake differed only slightly. Fine grinding and pelleting of milo in this test reduced the grain required per cwt. gain by about 8 percent, and feed cost per cwt. gain by \$0.60 per cwt. There was a further advantage of \$0.96 per cwt. in the appraised value of the pelleted milo cattle; these advantages resulted in an increase of \$11.15 per head in the net return per heifer in favor of pelleting.

While these results must be regarded as preliminary, the indications point to an increase in feed efficiency from fine grinding and pelleting vs. a medium degree of rolling. Somewhat similar results have been obtained in Kansas tests. In large commercial feedlots, differences in efficiency of feed utilization as small as 5 percent could lead to a distinct difference in profits.

Effect of High Protein, Antibiotic and Tranquilizers.

The average results from Part 2 of this study in which 50 steer calves were used to test the benefit of a high protein intake, a new antibiotic and two tranquilizers are shown in Table 3. The most marked advantage appeared where an additional pound of cottonseed meal was fed. The greater amount of protein supplement increased gains of Lot 4 cattle by 0.17 lb. per head daily over Lot 3. While the addition of this higher

Table 2.—Rolled vs. pelleted milo for fattening heifer calves

Preparation of milo	Lot 1 Medium Rolled	Lot 2 Finely ground and pelleted (3/8")
Number of heifers per lot	9 ¹	10
Av. weights (lb.)		
Initial 10/26/57	498	497
Final 4/3/58	826	838
Av. daily gain	2.09	2.17
Av. daily ration (lb.)		
Rolled milo	11.96	
Pelleted milo		11.49
Cottonseed meal + stilbestrol ²	1.50	1.50
Dehyd. alfalfa meal pellets	1.00	1.00
Sorghum silage	11.58	10.77
2-1 mineral mix	.10	.06
Feed required per cwt. gain (lb.)		
Milo	572	529
Cottonseed meal	72	69
Dehyd. alfalfa pellets	48	46
Sorghum silage	554	496
Feed cost per cwt. gain (\$) ³	18.64	18.04
Financial results (\$)		
Total heifer and feed cost ⁴	175.69	175.76
Appraised value per cwt.	26.44	27.40
Total value per heifer	218.39	229.61
Net return over heifer + feed ⁵	42.70	53.85

¹ One heifer removed from data for Lot 1 due to founder.

² Cottonseed meal fed per head daily contained 10 mg. stilbestrol.

³ Charge of \$.10/cwt. for rolling; \$.25/cwt. for fine grinding and pelleting.

⁴ Initial feeder price=\$23.00 per cwt.

⁵ No charge made for labor, equipment, spraying, trucking or marketing.

level of cottonseed meal increased the amount required per cwt. gain by 37 lb., the saving in milo was 53 lb. and in silage, 30 lb. This led to slightly reduced feed cost per cwt. gain. With the slightly higher appraisal on the value of Lot 4 cattle, the additional cottonseed meal increased net returns of Lot 4 by \$5.88 per head over Lot 3. It would appear that calves of the age and weight used in this experiment require higher levels of protein supplement than 1.5 lb. per head daily where they are being stimulated by stilbestrol in the ration. Results of the 1956-57 trial indicated a greater early period gain from the higher protein level—but no effect when final weights were taken at approximately 160 days.

Calves of Lot 5, receiving 75 mg. of Ilotycin per head daily, gained slightly more than the controls. An outbreak of respiratory infection occurred in all lots during the fourth week of the trial, and observations indicated less disturbance among the calves of Lot 5. Early in the trial these calves appeared to have more "bloom" and a better hair coat, which many feeders take as an indication of health. However, final results showed little effect on gain, feed efficiency or net return from feed-

Table 3.—Effect of additional protein, antibiotic and tranquilizers on performance of fattening steer calves receiving stilbestrol.

Treatment	Lot 3	Lot 4	Lot 5	Lot 6	Lot 7
	Basal	Basal + 1 lb. CS. meal	Basal + 75 mg. Ilotycin	Basal + 1-5 mg. Hydroxyzine ¹	Basal + 10 mg. Chlorpromazine
Number steers per lot	10	10	10	10	10 ²
Av. weights (lb.)					
Initial 10/28/57	489	475	482	478	471
Final 4/3/58	833	846	837	838	819
Av. daily gain	2.22	2.39	2.29	2.32	2.25
Av. daily ration (lb.)					
Rolled milo	12.08	11.73	12.03	12.02	11.76
C.S. meal + Stilbestrol ³	1.50	2.50	1.50	1.50	1.50
Dehyd. alf. pellets	1.00	1.00	1.00	1.00	1.00
Sorghum silage	11.52	11.69	11.47	11.19	11.83
2-1 mineral mix	.07	.06	.09	.08	.08
Feed required per cwt. gain (lb.)					
Milo	544	491	525	518	523
C.S. meal + stilbestrol	68	105	66	65	67
Dehyd. alfalfa pellets	45	42	44	43	44
Sorghum silage	519	489	501	482	526
Feed cost per cwt. gain (\$) ⁴	17.60	17.36	17.40	16.73	17.15
Financial results (\$)					
Total steer + feed cost ⁵	187.70	187.79	187.07	184.44	182.27
Appraised value/cwt.	26.40	26.70	26.45	26.45	26.50
Total value per steer	219.91	225.88	221.39	221.65	217.04
Net return over steer + feed	32.21	38.09	34.32	37.21	34.77

¹ 1 mg. per head daily fed for 98 days, then increased to 5 mg.

² Two steers lost from this lot during 3rd month due to urinary calculi. Data on these steers not included.

³ Cottonseed meal fed per head daily contained 10 mg stilbestrol.

⁴ Rolling charge of \$0.10 per cwt. on milo. Cost of antibiotic supplement to Lot 5, \$1.29 per steer. No charge made against Lots 6 and 7 for tranquilizers fed as these are still in experimental stage.

No charge made for labor, equipment, spraying, trucking or marketing.

⁵ Initial cost of steers—\$26.00 per cwt.

ing the antibiotic. Further tests are needed to demonstrate more clearly the effect of this material in fattening rations.

Gains of Lot 6 calves fed the tranquilizer, Hydroxyzine, were somewhat greater than those of Lot 3 which served as controls. The other tranquilizer, Chlorpromazine, gave no apparent response at the 10 mg. level fed. No signs of sedation were noted in any of the cattle fed tranquilizers. Two steers were removed from Lot 7 because of urinary calculi, but whether or not this was related to the Chlorpromazine fed is not known. Some improvement in efficiency of feed utilization was observed in Lot 6 where the calves received Hydroxyzine, but appraised market values were similar. Further tests will be attempted on the Hydroxyzine product before definite conclusions are reached.

Effect of Previous Implantation on Feedlot Gain

In Table 4 a comparison is made between heifers and steers implanted as suckling calves and their controls. The results were variable.

Table 4.—Effect of previous implantation as suckling calves on subsequent feedlot performance¹

	Controls	Previously Imprinted
<i>HEIFERS</i>		
Number compared	10	10
Av. weights (lb.)		
Initial	491	502
Final	806	848
Av. daily gain	1.98	2.18
Feed cost per cwt. gain (\$) ²	19.72	17.91
Appraised value per cwt. (\$)	27.25	26.78
Net return over heifer + feed cost (\$)	45.41	50.33
<i>STEERS</i>		
Number compared ³	14	14
Av. weights (lb.)		
Initial	478	529
Final	829	872
Av. daily gain	2.24	2.18
Feed cost per cwt. gain (\$) ²	17.66	18.15
Appraised value per cwt. (\$)	26.65	27.19
Net return over steer + feed cost (\$)	35.34	38.25

¹ See article on "Stilbestrol for Suckling Beef Calves" for implanting procedure used.

² One-half of controls and implants fed in same pens, thus an equal feed intake was assumed for both groups in arriving at this estimate.

³ One implanted calf from Lot 7 developed urinary calculi and was removed from this comparison together with his control.

Heifers previously implanted showed a marked increase in gain, (1.98 vs. 2.18 lb.), while steer calves were slightly depressed (2.24 vs. 2.18 lb.). The reason for this difference in response between steers and heifers is unknown and may be due to chance variation. In both groups, the previously implanted cattle showed greater net return.

Elsewhere in this publication it has been shown that, with long-yearling cattle, previous implantation on summer grass decreased subsequent feedlot gain. Results of the 1956-57 trial showed no consistent effect of implanting calves on subsequent feedlot performance. In the experiment reported here, all calves received 10 mg. stilbestrol in the daily ration. This may be important in avoiding a depression in gain in the feedlot following implantation on pasture. Considerable riding and evidence of estrus were noted among implanted heifers at the start of the feeding trial, but became less noticeable as the trial progressed.

Summary

Fattening trials with heifer calves indicate that finely ground and pelleted milo may improve gains and feed efficiency over rolled milo

at a rate sufficient to more than offset the added cost of feed preparation. Steer calves receiving 2.5 lb. cottonseed meal per head daily showed increased gain and feed efficiency as compared to calves receiving only 1.5 lb. Adding a low level of antibiotic (Ilotycin) or two tranquilizers to the daily ration gave only small increases in gain. Heifer calves previously implanted with stilbestrol as suckling calves out-gained their controls during the fattening period, while steer calves gained slightly less. Both groups showed greater net return than their controls.

Fattening Steers and Heifers on Rations Containing Different Levels of Concentrate

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The number of cattle being fattened in large commercial feed-lots in the southwest has increased greatly in the last ten years. The problems of feed preparation and ration formulation are unique for this enterprise. For one thing, the amount or percent of concentrate in the rations used may vary considerably from one feedlot to another, with apparent equal success.

Generally, ground or rolled milo is the principle grain used in self-fed mixtures, with cottonseed hulls, alfalfa hay or chopped bundle feed as the roughage. Molasses is frequently added to improve palatability.

Opinions vary as to how much concentrate a fattening ration should contain in order to obtain maximum feed intake, rapid gains, and to reach market grade as quickly as possible. This report deals with the third trial in a project designed to study the performance of beef calves self-fed mixed rations in which the amount of concentrate was varied 35 to 80 percent. The performance of steers vs. heifers was also compared. The results of two previous trials may be found in Okla. Agri. Exp. Sta. Misc. Pub. MP-45 (1956) and MP-48 (1957).

Procedure

Ninety-six, choice, Hereford calves were obtained in early September from the Lazy S Ranch near Springer, Oklahoma. They were fall and early winter calves and had not been creep-fed. The drove consisted of an equal number of steers and heifers, selected to be as nearly alike in age and quality as possible. Upon arrival at the Fort Reno station, the calves were supplemented on native grass for approximately three weeks until the start of the feeding trial. The cattle were contracted in mid-summer at a price of \$24.00 per cwt. for the steers and \$22.00 per cwt. for the heifers.

The calves were started on feed in late September. Within each sex, allotment was based on shrunk weight and feeder grade. Each lot con-