

Project 253-5: Wintering and Grazing Yearling Steers

Effect of Feeding a Protein Supplement During the Latter Part of the Grazing Season to Two-Year-Old Steers on Bluestem Pasture, 1952.

E. F. Smith and R. F. Cox

The nutritive value of bluestem pasture usually begins to decline rapidly after mid-summer. This test is concerned with the effect the feeding of a protein supplement after mid-summer will have on cattle gains and condition. It is hoped that by starting the feeding at different times, the most opportune time to start feeding may be determined.

A summary of three years' work is included with this report.

Experimental Procedure

Forty head of good quality two-year-old Hereford steers were used in this test. They were wintered on dry bluestem pasture and then grazed together until July 21, when this test started.

The steers were divided into four uniform lots and grazed on bluestem pasture with the following treatment from July 21, 1952, to September 30, 1952:

Lot 1—July 21 to September 30—received 2 pounds of cottonseed cake per head daily;

Lot 2—August 12 to September 30—received 2 pounds of cottonseed cake per head daily;

Lot 3—September 4 to September 30—received 2 pounds of cottonseed cake per head daily;

Lot 4—received no supplemental feed.

Observations

1. In this test, the feeding of a protein supplement on bluestem pasture after mid-summer was not profitable.

2. The average protein content of bluestem pasture grasses in July¹ was 6.4 percent, in August, 7.7 percent, and in September, 8.6 percent.

3. No difference in degree of fleshing among the lots was noted.

(1) The samples selected were of immature grasses or regrowth after grazing in an attempt to take samples of grass comparable to what the cattle were consuming.

Table 24.—Effect of Feeding a Protein Supplement During the Latter Part of the Grazing Season to Two-Year-Old Steers on Bluestem Pasture. July 21 to September 30, 1952—71 days.

1. Lot number	1	2	3	4
2. No. steers/lot	10	10	10	10
3. Management	Fed 2 lbs. cottonseed cake daily from 7/21 to 9/30	Fed 2 lbs. cottonseed cake daily from 8/12 to 9/30	Fed 2 lbs. cottonseed cake daily from 9/4 to 9/30	No cottonseed cake fed
4. Initial weight/steer	913	908	910	915
5. Final weight/steer	1039	1031	1024	1026
6. Gain/steer	126	123	114	111
7. Daily gain/steer	1.77	1.73	1.61	1.56
8. Gain in weight contributed to feeding cottonseed cake	75	12	3	0

9. Total cottonseed cake fed/steer, lbs.	142	98	52	0
10. Appraised value/cwt.	\$24.00	\$24.00	\$24.00	\$24.00
11. Gain/steer by periods:				
July 21-August 12	19	18	22	24
August 12-September 4	46	52	46	45
September 4-September 30	61	53	46	42
12. Total gain, July 21-September 30	126	123	114	111

Three-Year Summary

1. Feeding 2 to 3 pounds of a 40 percent protein concentrate did not increase cattle gains appreciably in any period of any year. This is not conclusive. A response to protein feeding has been obtained in the past at this station. Tests planned for the future intend to give this problem more study. Perhaps one reason for a lack of response to protein is that the two-year-old steers used in these tests were wintered the previous winter on dry grass and were very thin at grass time.

2. Evidently grass protein content as reported here must drop below 6.5 to 7 percent to get an increase in gain from protein feeding.

Table 25.—Average Gain per Steer by Caking Periods for 1950, 1951, 1952.

	1950	1951	1952	Ave.
July 15-August 10 ¹				
Fed 2-3 lbs. protein	47	35	19	34
Fed no protein	44	46	21	37
Protein in grass	8.5	9.0	6.4	7.9
August 10-September 1 ¹				
Fed 2-3 lbs. protein	29	43	49	40
Fed no protein	32	49	46	42
Protein in grass	8.0	8.7	7.7	8.0
September 1-October 1 ¹				
Fed 2-3 lbs. protein	39	17	53	36
Fed no protein	26	17	42	28
Protein in grass	7.2	7.1	8.6	7.7

1. Represents in general the weigh period; it varied slightly each year.

Project 253-6: Wintering, Grazing, and Fattening Steer Calves

1. The Value of Trace Minerals in a Wintering and a Fattening Ration.
2. Self-Feeding Grain in Drylot vs. Self-Feeding on Bluestem Pasture, 1951-52.

E. F. Smith and R. F. Cox

Chemical analysis of the feeds commonly fed in this area has revealed no deficiency in the trace minerals, copper, cobalt, iron, manganese, and iodine, in view of what we know of the requirements of cattle for these minerals. It is possible that for some reason the minerals present are not available to the animal in sufficient quantity and perhaps not in the proper ratio. One of the objectives of this test

is to determine the effect of introducing trace minerals at a commonly used level into standard Kansas wintering and fattening rations.

Another phase of the test is to compare self-feeding grain in drylot to self-feeding grain on grass for calves handled in the deferred full-feeding program. The system of deferred full-feeding, using good quality steer calves, consists of three phases: (1) producing 225-250 pounds of gain during the winter; (2) grazing 90 days without grain; (3) full-feeding 100 days in the drylot.

Experimental Procedure

Thirty head of good quality Hereford steer calves were used in this test in three lots, 10 head to a lot. They were part of a shipment of 150 steer calves from Marfa, Texas. They were received November 8, 1952, and fed silage, prairie hay, and 1 pound of a protein concentrate per head daily until December 22, 1952, when they were started on test. The system of management for each lot follows:

Lot 1—Wintered on sorghum silage, prairie hay, 5 pounds of ground grain and 1 pound of 41 percent protein concentrate per head daily, free access to mineral (bonemeal and salt) and salt; bluestem pasture May 1 to August 1; self-fed grain on bluestem pasture after August 1 to choice grade.

Lot 2—Wintered on sorghum silage, prairie hay, 5 pounds of grain and 1 pound of protein concentrate per head daily, free access to mineral (bonemeal and salt) and salt; grazed on bluestem pasture May 1 to August 1; self-fed grain in drylot after August 1 to choice grade.

Lot 3—Wintered on sorghum silage, prairie hay, 5 pounds of grain, and 1 pound of protein concentrate per head daily; free access to mineral (bonemeal and salt) and trace mineralized salt; grazed on bluestem pasture, May 1 to August 1; self-fed grain in drylot after August 1 to grade choice with free access to trace mineral salt.

Observations

1. Poor quality sorghum silage contributed to low winter gains of all lots; silage consumption was very low (Table 26).

2. Trace minerals fed to Lot 3 (Table 26) did not affect the gain. The carcasses of Lot 3 graded lower than Lot 2 which did not receive trace minerals. Due to the increased selling price of Lot 3 they lost considerable less money than Lot 2. The most reasonable explanation for the increased selling price of Lot 3 over Lot 2 was the unsettled condition of the market.

3. Lot 1, self-fed grain on grass compared favorably in every respect with Lot 2, self-fed grain in drylot except they sold for \$1.00 per cwt. less. The fat on the carcasses of Lot 1 was of a light yellow color as compared to the whiter carcasses of Lot 2.

Table 26.—Wintering, Grazing, and Fattening Steer Calves.

Phase I—Wintering—December 22, 1951, to May 5, 1952—135 days.

1. Lot number	1	2	3
2. Number steers in lot	10	10	10
3. Management	Standard ration	Standard ration	Standard ration plus trace mineral
4. Initial weight per steer	444	443	443
5. Final weight per steer	633	613	627
6. Gain per steer	189	170	184
7. Daily gain per steer	1.40	1.26	1.36

8. Daily ration per steer:			
Ground milo	5.31	5.31	5.31
Cottonseed oilmeal pellets	1.00	1.00	1.00
Sorghum silage	20.26	20.26	20.01
Prairie hay	.26	.21	.22
Mineral ¹	.11	.11	.08
Trace mineral salt ²	.....	.....	.08
Salt	.10	.11	.....
9. Feed cost per cwt. gain ³	\$19.41	\$21.53	\$19.80
10. Feed cost per steer	\$36.69	\$36.61	\$36.44
Phase II—Grazing—May 5 to August 1, 1952—88 days.			
11. Initial weight per steer	633	613	627
12. Final weight per steer	721	702	714
13. Gain per steer	88	89	87
14. Daily gain per steer	1.00	1.01	.98
Phase III—Full-feeding—August 1 to December 6, 1952—127 days.			
15. Management	Self-fed grain on bluestem pasture	Self-fed grain in drylot	Self-fed grain in drylot plus trace minerals
16. Initial weight per steer	721	702	714
17. Final weight per steer	1058	1039	1045
18. Gain per steer	337	337	331
19. Daily gain per steer	2.65	2.65	2.60
20. Daily ration per steer:			
Ground milo grain	19.33	19.31	19.08
Cottonseed oilmeal pellets	1.72	2.00	2.00
Prairie hay	.....	5.90	5.92
Ground limestone	.09	.10	.10
Trace mineral salt	.....	.....	.02
Salt	.02	.....	.....
21. Feed per cwt. gain:			
Ground milo grain	728.37	726.63	732.20
Cottonseed oilmeal pellets	64.93	75.25	76.73
Prairie hay	.....	222.19	227.40
Ground limestone	3.50	3.76	3.83
Salt	.59	1.02	.92
22. Cost of feed per cwt. gain	\$23.91	\$25.96	\$26.25
23. Total feed cost this phase	\$80.61	\$87.65	\$86.90

Summary of Phases I, II, and III

24. Total gain per steer (all phases)	614	597	602
25. Daily gain per steer (all phases)	1.75	1.70	1.72
26. Feed cost per cwt. gain (all phases)	\$23.17	\$24.99	\$24.64
27. Total cost of feed per steer	\$142.28	\$149.19	\$148.34
28. Initial cost per steer @ \$42.00 cwt.	\$186.48	\$186.06	\$186.06
29. Feed cost plus steer cost	\$328.76	\$335.25	\$334.40
30. Selling price per cwt. at market	\$26.50	\$27.50	\$29.00

31. Selling price per steer	\$270.56	\$268.40	\$285.36
32. Loss per steer	\$58.20	\$66.85	\$49.04
33. Percent shrink in shipping to market	3.50	6.63	5.83
34. Dressing percent	60.2	60.1	60.6
35. Carcass grades: U.S. ⁴			
Average choice	1	4	1
Low choice	4	3	3
High good	4	2	1
Average good	1	1	3
Low good			2

1. Mineral was 2 parts steamed bonemeal to 1 part salt.
2. The trace mineral salt contained the following minerals: Manganese carbonate, .400 percent; iron oxide, .250 percent; copper carbonate, .060 percent; sodium thiosulphate, .100 percent; sodium carbonate, .100 percent; cobalt carbonate, .022 percent; potassium iodide, .010 percent; sodium chloride, 99.058 percent.
3. Feed prices: Milo grain, \$2.80 cwt.; cottonseed oilmeal pellets, \$100.00 ton; prairie hay, \$15.00 ton; sorghum silage, \$6.50 ton; mineral, \$5.00 cwt.; trace mineral salt, \$2.00 cwt.; salt and ground limestone, \$12.00 ton; bluestem pasture, \$25.00 per head for season.
4. The carcasses were graded the following day as follows: Lot 1, 1 prime, 7 choice, 3 good; Lot 2, 7 choice and 3 good; Lot 3, 5 choice and 5 good.

Project 370: Adapting Roughages Varying in Quality and Curing Processes to the Nutrition of Beef Cattle

A Comparison of Alfalfa Silage and Alfalfa Hay; Prairie Hay and Corn Cobs; a Special Supplement vs. Corn and Soybean Oilmeal, 1952-53.

E. F. Smith, D. Richardson, R. B. Cathcart, and R. F. Cox

The increased use of such feeds as alfalfa silage, corn cobs, and special cattle supplements has prompted this test. The objective of the test is to compare the following feeds:

1. Wilted and non-wilted alfalfa silage with alfalfa hay.
2. Ground corn cobs with prairie hay.
3. Three pounds per head daily of a special cattle supplement with 2 pounds of corn and 1 pound of soybean oilmeal per head daily.

Experimental Procedure

The Hereford heifers used in this test were of good to choice quality from the Brite Ranch at Marfa, Texas. They were delivered to Manhattan, Kansas, November 3, 1952, at a cost of 23 cents per pound. From that date until started on test December 22, 1952, they were fed prairie hay and 1 pound of soybean pellets per head daily.

The first cutting alfalfa fed to Lots 1, 2, and 3 came from the same field. No preservative was used in making the silage. The wilted alfalfa was left in the field from 30 minutes to 3 hours. The non-wilted was cut, raked, picked up with a silage cutter, and hauled to the silo as rapidly as possible.

The special supplement fed to Lot 5 at the rate of 3 pounds per head daily was of the following composition: soybean oilmeal, 2.25 pounds; molasses, 0.50 pound; steamed bonemeal, 0.18 pound; salt, 0.06 pound; vitamin supplement, 0.01 pound (2,250 A and 400 D per gram).

An attempt was made in Lots 17 and 18, where prairie hay and corn cobs were compared, to eliminate as many variables as possible,

leaving a comparison of the two roughages. An average of 4.90 pounds of corn and soybean meal per head daily was fed to each lot. The protein intake of each lot was maintained at about the same level. In the case of the corn cob lot, more of the protein had to come from the soybean meal to compensate for the low protein content of corn cobs as compared to prairie hay. Since the prairie hay lot received less concentrate feed on this basis, their corn allowance was increased so that each lot received the same number of pounds of corn and soybean meal combined. The prairie hay and corn cobs were fed in amounts the animal would clean up. The corn and soybean meal was fed to both lots twice daily and was mixed with the corn cobs in Lot 18. Synthetic vitamin A concentrate furnishing 10,000 I.U. per gram was mixed with the soybean meal fed to Lot 18 so as to furnish 50,000 I.U. of vitamin A per head daily to this lot.

Molasses was fed at the rate of 1 pound per head daily to Lots 17 and 18 for five days at the start of the test. It was discontinued with the objective of including it in future tests in a study of its value when fed with low quality roughage rations.

Observations

1. Wilted and non-wilted alfalfa silage appear equal in value in this test and definitely inferior to alfalfa hay for calves.
2. Two pounds of corn and 1 pound of soybean pellets fed to Lot 4 produced about the same gain as the special supplement fed to Lot 5 at a lower feed cost per 100 pounds of gain.
3. Prairie hay fed to Lot 17 produced 0.17 pound more gain per head daily than corn cobs fed to Lot 18 at only slightly less feed cost per 100 pounds of gain.
4. Some of the heifers in Lot 18, fed corn cobs, coughed the cobs up for about three weeks at the start of the test. With this exception the cobs appeared satisfactory as the only roughage for wintering calves in this test.

Supplementing Wheat Straw in the Wintering Ration of Beef Calves.

D. Richardson, Ed F. Smith, and R. F. Cox

Wheat straw is a very poor roughage and under normal conditions should never be used as the entire roughage for cattle; however, there are times when wheat straw has to make up most or all of the roughage. It is desirable to know how to supplement this poor quality roughage when one is forced to use it. The purpose of this preliminary experiment was to observe the value of vitamin A and dehydrated alfalfa pellets when added to a wintering ration for beef calves in which wheat straw was the only roughage.

Experimental Procedure

Twelve Hereford steer calves purchased in Texas were divided into three lots of four calves each. All calves received all the wheat straw they would consume. The daily ration for each animal in the various lots is shown in Table 28. A preliminary period of 25 days was used to get the calves used to eating the straw. After the experiment started, the calves were fed individually.

Observations

1. No vitamin A deficiency symptoms were observed. There was no source of vitamin A in Lot 1.
2. The calves did not like the straw but at no time did they completely refuse to eat it. The total amount consumed was lower than the amount of roughage which would be normally consumed if it were of better quality.