

**Project 253-1: Factors Influencing Profitable Grass Utilization and Sound Pasture Management.
Wintering and Grazing Steer Calves.**

**INFLUENCE OF WINTER RATIONS AND GAINS
ON SUBSEQUENT PASTURE GAINS**

A. G. Pickett—Ed F. Smith

1. Atlas silage, oats straw and a combination of these two roughages were compared in wintering calves. During the second winter the yearlings were fed a limited amount of silage with prairie hay.
2. One pound of cottonseed meal was compared with four pounds of alfalfa hay as protein supplements to the above feeds.
3. The advisability of feeding cottonseed meal on grass the latter part of the bluestem grazing season was studied in a series of tests.
4. The practicability of wintering yearling steers on bluestem grass with a protein supplement was studied.

INTRODUCTION

Five lots of good steer calves were used in this test which was started in the fall of 1946. Three lots were continued through two winters and two full grazing seasons. The other two lots were full fed as yearlings at the close of the first grazing season.

The objects of the test were to use grass to the fullest extent, compare early summer gains with late season gains and to determine the value of feeding a protein supplement on bluestem grass after mid-summer. During the winter periods rations were designed to secure varying rates of gain in order that the influence of winter gains on summer gains might be determined.

The comparison of feeds was incidental to the main purpose of this test.

EXPERIMENTAL PROCEDURE

Atlas silage, oats straw and a combination of these two roughages were used in wintering the steer calves in the 1946-47 season. Lot 1 was full fed silage, lots 2 and 3 were full fed oats straw alone and lots 4 and 5 were fed a half-feed of silage plus oats straw. All five lots were grazed together on bluestem grass until August 2. From August 2 until October 29, lots 2 and 4 received 1½ pounds cottonseed cake on grass while lots 1, 3, and 5 were continued on grass the full season without supplementary feed.

Following the grazing period, lots 4 and 5 were full fed in dry lot. These lots had been wintered alike but lot 4 was fed cottonseed meal on grass.

Lot 3 was wintered as yearlings on bluestem grass with cottonseed cake fed at the rate of 1 pound per head daily from November 1 until December 16 and 1½ pounds cottonseed cake until May 1. A low grade of prairie hay was fed only when the grass was covered with snow. These steers were not fed daily, but only every second day. Lots 1 and 2 were wintered on silage, prairie hay, and cottonseed meal.

During the summer of 1948, lots 1, 2, and 3, now two years old, were grazed together on bluestem grass until July 15. From July 15 to October 12, lots 2 and 3 were fed three pounds of cottonseed cake daily and lot 1 continued to graze without supplemental feed.

All three lots were full fed together in the pasture and marketed December 11, 1948.

OBSERVATIONS

PHASE 1—Wintering as Calves

1. Atlas silage again proved to be an excellent roughage for wintering steer calves. Gains were cheaper than from oats straw and a combination of silage and oats straw.
2. Four pounds of stemmy, medium to low grade alfalfa hay was equal to one pound of cottonseed meal as a protein supplement.
3. Oats straw as the only roughage produced slightly more than 1-3 pound daily gain and the steers to which it was fed developed large paunchy middles. They were, however, in good thrifty condition.
4. All lots, especially the last four, appeared to be in excellent condition to make large gains on grass.

**PHASE 2—Early Summer Period Grazing as Yearlings
April 24, to August 2, 1947**

1. All five lots made practically the same gains regardless of differences in winter gains. This was contrary to what was expected, since previous tests had indicated that summer gains tend to be inversely proportional to winter gains.
2. Lot 1, wintered on silage, still showed more flesh and bloom on August 2.
3. Grass was abundant but gains were relatively low. All of the steers were slow in shedding their winter hair coats.

**PHASE 3—Grazing as Yearlings
August 2 to October 29, 1947**

1. As stated above, the level of winter gains had little if any influence on grass gains up to August 1. Lot 1, which made the largest winter gain, gained approximately one-half as much from August 1 to October 29 as did lots 3 and 5.
2. One and one-half pounds of cottonseed meal fed during this period increased daily gains more than one pound per day.
3. Each pound of cottonseed cake fed produced approximately three-fourths pound extra gain.
4. Full season grazing gains were low considering the small gains during the previous winter.

**PHASE 4—Wintering as Yearlings
October 29, 1947 to April 29, 1948**

1. Lots 4 and 5 were full fed as yearlings at the end of the first year. The results of this will be discussed later under the full feeding phase.
2. Lots 1 and 2 were wintered with the expectation of putting them on grass at approximately the same weight and condition. Lot 1 had been wintered on silage as calves and grazed a full season, while lot 2 had been wintered on oats straw and fed cottonseed cake on grass which put them in fleshier condition and heavier off grass.
3. The thinner condition and extra cottonseed meal in the winter ration of lot 1 brought these two lots to grass as two-year-olds at approximately the same weight and condition.
4. Atlas silage and early cut, bright prairie hay proved to be an excellent roughage combination for wintering yearlings. Daily gains were 1.4 pounds and 1.13 pounds. Experienced cattlemen considered these steers too fleshy to put on grass.
5. Lot 3, wintered on bluestem grass with a protein supplement came through in strong thrifty condition. Every other day feeding of cottonseed cake proved to be satisfactory.

PHASE 6—Grazing as Two-Year-Olds
April 29 to July 15, 1948

1. Early pasture gains were about what would be expected. The fleshy steers of lots 1 and 2 gained .84 and .82 of a pound daily while the lot-3 steers, which were thin, gained 2.58 pounds daily. The season was quite dry until about mid-June.

PHASE 6—Grazing as Two-Year-Olds
July 15 to October 12, 1948

1. In 1947 the rate of gain on lot 1 steers as yearlings was about one-third as much during the late grazing season as was the rate of gain up to August 1. In 1948 as two-year-olds the daily gain on these fleshy steers was .84 of a pound up to July 15 and 1.47 pounds from July 15 to October 12, without supplemental feed.
2. Lot 2 fed three pounds of cottonseed cake per head daily gained 1.61 pounds daily or only .14 of a pound more than lot 1 fed no supplemental feed.
3. Lot 3 which gained 2.58 daily up to July 15, gained only 2.00 daily after July 15 despite the fact that three pounds of cottonseed cake were fed daily.
4. Contrary to popular belief and in contrast to results of some previous tests, the steers in this experiment as two-year-olds made larger gains after July 15 than they did before that date. It would seem therefore, that extended research on this problem is needed.
5. Feeding cottonseed cake on grass did not show the large increase in gain as in 1947 with yearlings. No increase in gain was noted until about September 1.
6. Steers receiving cottonseed cake showed more bloom and flesh and were appraised \$2.00 per hundred higher than those not receiving cottonseed cake.

Phase 7 - Full Feeding

1. Lots 1, 2, and 3 were wintered and summered twice and fed out after the second summer. Lots 4 and 5 were fed out as yearlings after the first summer.
2. Full feeding on pasture late in the fall proved to be very unsatisfactory. Gains were only about one pound per head daily, whereas two-year-old steers normally may be expected to gain at least two pounds per head daily when full fed in the dry lot.
3. Lot 4 was gaining faster than lot 5 in the fore part of the full feeding period, but went off feed when eating about 17 pounds of grain. It was then necessary to reduce the grain to ten pounds daily and they never consumed as much again as when they went off feed. These steers made practically no gain for 28 days and lost most of the weight advantage over lot 5.

The apparent cause was a foul, dirty bunk. This loss of four weeks gain when the cattle were on full feed was expensive and emphasized the importance of careful feeding.

SUMMARY

1. Even though the feeding and management varied widely between lots 1, 2, and 3 over a period of more than 2 years, the average daily gain for the entire period was the same for all three lots.
2. The three lots fed two years consumed less than one-half as much corn as the two lots full fed and finished as yearlings.
3. Although the table shows all five lots grading approximately the same it should be noted that it was necessary to use packer grades on lots 1, 2, and 3, while U. S. Government grades were used for lots 4 and 5. The packer grades may be somewhat higher than the U. S. Government grades.

4. Actual cost of corn was used and since lots 4 and 5 were fed out a year before lots 1, 2, and 3; the price was \$1.05 more per bushel
5. Using the same price for corn, lots 4 and 5 would show a profit, (line 66 in table), of \$87.00 and \$85.00 per head respectively. It should be remembered that profits for these lots are for one year, while profits shown for lots 1, 2, and 3 are for two years' operation and must be divided by two to get a figure comparable to that for lots 4 and 5. It should also be remembered that more calves can be wintered on a given amount of feed. Profit per head is not a true picture of profit or return for feed.
6. There is a tendency many times to evaluate cattle operations on the basis of bushels of corn used. Such a measure is not reliable. In Kansas the maximum gains from grass and roughage is a better criterion. If feeding more corn will increase the returns from grass and roughage, then it is advisable.
Lot 1 fed as two-year-olds consumed only 12 bushels of corn, while lot 5 consumed 28.7 bushels. Yet profit per head on a yearly basis assuming one price for corn was only \$54.89 for lot 1 marketed as two-year-olds, whereas it was \$85.16 per head for lot 1 marketed as yearlings.
7. Lot 1 wintered as calves produced 67 pounds of gain for each ton of silage fed. The second winter when fed to yearlings each ton of silage or its equivalent produced only 40 pounds of gain.
8. Feeding lot 2 three pounds of cottonseed cake from July 15 to October 12 resulted in practically no additional gain but did prove definitely beneficial as judged by the carcasses. Only one carcass was graded below U. S. Good while lot 1, grazed a full season without cottonseed cake, had seven carcasses in the commercial grade.
9. Lot 3 steers wintered on bluestem grass equalled lot 2 in weight when marketed but were disappointing as carcasses. This again indicates that in addition to weight, gain and apparent condition the plane of nutrition over a relatively long period of time also has an important bearing on the grade of beef produced.

PHASE 1—WINTERING AS CALVES

December 5, 1946 to April 24, 1947—140 Days

1—Lot number	1	2	3	4	5
2—Number of steers per lot	10	10	10	10	10
3—Daily ration per steer (pounds):					
Atlas silage	27.46			13.75	13.75
Oats straw		9.18	7.31	4.81	2.02
Alfalfa hay			4.00		4.00
Cottonseed meal ..	1.00	1.00		1.00	
Salt14	.04	.07	.08	.06
4—Daily gain per steer.	.96	.36	.39	.76	.70
5—Initial weight per steer	411	411	411	410	412
6—Gain per steer	135	50	55	106	98
7—Final weight per steer	546	461	466	516	510
8—Appraised value per cwt. May 3, 1947	\$ 22.00	\$ 21.00	\$ 21.00	\$ 22.00	\$ 21.75

PHASE 2—GRAZING AS YEARLINGS
April 24, 1947 to August 2, 1947—100 Days

9—Weight per steer at close of this period	653	568	586	624	624
10—Gain per steer	107	107	120	108	114
11—Daily gain per steer	1.07	1.07	1.20	1.08	1.14

PHASE 3—GRAZING AS YEARLINGS
August 2, 1947 to October 29, 1947—88 Days
Cottonseed Cake vs. No Cottonseed Cake

Lot Number	1	2	3	4	5
12—Amount of Cottonseed cake fed per steer daily, lbs.		1.5		1.5	
13—Daily gain per steer	.35	1.79	.67	1.65	.60
14—Additional daily gain per steer as a result of feeding Cottonseed cake		1.13*		1.06*	
15—Additional gain per steer as a result of feeding cake		1.13*		1.06*	
16—Initial weight per steer	653.	568.	586.	624.	624.
17—Gain per steer	31.	158.	59.	146.	53.
18—Final weight per steer	684.	726.	645.	770.	677.
19—Gain per steer for the total grazing season April 24 to October 29, 1947—188 days	138.	265.	179.	254.	167.
20—Appraised value per cwt. October 29, 1947	\$ 23.00	\$ 23.25	\$ 22.75	\$ 23.50	\$ 23.00

*—Lots 2 & 3 were wintered the same and compared to obtain the 99 pound figure while lots 4 & 5 were wintered the same and compared for the 93 lb figure.

PHASE 4—WINTERING AS YEARLINGS
October 29, 1947 to April 29, 1948—183 Days

Lot Number	1	2	3	4	5
21—Management followed	Winter'd in Dry Lot	Winter'd in Dry Lot	Winter'd on n'tive Blu'stem Grass	Full Fed in Dry Lot	Full Fed in Dry Lot
22—Daily ration per steer in lbs.					
Prairie Hay	5.23	5.00	1.36*	See Phase 7	See Phase 7
Silage	38.25	38.25			
Cottonseed Meal	1.21	1.06	1.37		
23—Daily gain per steer	1.40	1.13	.36		
24—Initial wt. per steer	684.	726.	645.		
25—Gain per steer	257.	206.	66.		
26—Final wt. per steer	941.	932.	711.		

27—Appraised value per cwt., April 29, 1948	\$28.50	29.00	28.50		
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*—A total of 228 lbs of poor quality prairie hay was fed each steer when snow covered the grass.

PHASE 5—GRAZING AS TWO YEAR OLDS
April 29 to July 15, 1948—76 Days

Lot Number	1	2	3	4	5
28—Initial wt. per steer	941.	932.	711.		
29—Gain per steer	64.	62.	196.		
30—Final wt. per steer	1005.	994.	907.		
31—Daily gain per steer	.84	.82	2.58		

PHASE 6—GRAZING AS TWO-YEAR-OLDS
July 15 to October 12, 1948—89 Days
Cottonseed Cake vs. No. Cottonseed Cake

Lot Number	1	2	3	4	5
32—Amount of cottonseed cake fed per steer daily, lbs.		3.00	3.00		
33—Daily gain per steer	1.47	1.61	2.00		
34—Additional daily gain per steer as a result of feeding cake		.14			
35—Additional gain per steer as a result of feeding cake, lbs.		12.			
36—Initial weight per steer	1005.	994.	907.		
37—Gain per steer	131.	143.	178.		
38—Final weight per steer	1136.	1137.	1085.		
39—Appraised value per cwt. October 15, 1948	\$ 26.00	28.00	26.75		

Phase 7—Full Feeding

Lot Number	1	2	3	4	5
40—Period when full fed.	(Oct. 12 to Dec. 11, 1948) Two-Year-Olds			(Oct. 29, 1947 to Feb. 18, 1948) Yearlings	
41—Where fed	Fed on Bluestem Grass			Fed in Dry Lot	
42—Total days fed	60	60	60	112	112
43—Daily ration per steer, lbs.					
Gr. shelled corn	11.18	11.18	11.18	13.7	14.4
Cottonseed meal	2.00	2.00	2.00	1.36	1.36
Atlas silage	15.00	15.00	15.00	16.2	14.9
Alfalfa hay				2.00	2.00
44—Feed consumed per steer					
Gr. shelled corn (Bu.)	12.00	12.00	12.00	27.4	28.7

Cottonseed meal (lbs)	120.00	120.00	120.00	153.00	153.00
Atlas silage (lbs.)...	900.00	900.00	900.00	1814.00	1666.00
Alfalfa hay (lbs)....				224.00	224.00
45—Initial wt. per steer	1136.	1137.	1093.	770.	677.
46—Gain per steer	64.	65.	100.	213.	293.
47—Final wt. per steer...	1200.	1202.	1193.	983.	970.
48—Daily gain per steer..	1.07	1.08	1.07	1.90	2.62

SUMMARY—Phases 1 through 7

49—Date experiment began ..	December 5, 1946				
50—Date experiment completed	December 11, 1948		Feb. 18, 1948		
51—Total days on experiment	737	737	737	440	440
52—Initial wt. per steer..	411	411	411	410	412
53—Total gain per steers	789	791	782	573	558
54—Final wt. per steer	1200	1202	1193	983	970
55—Daily gain per steer.	1.07	1.07	1.06	1.30	1.27
56—Total feed consumed per steer:					
Ground shelled corn (bu)	12	12	12	27.4	25.7
Cottonseed meal (lbs)	484	859	620	422	153
Alfalfa hay (lbs)....			562	226	786
Prairie hay (lbs)....	914	910	228		
Atlas silage	11,674	7830	900	3740	3592
Oat straw		1285	1024	673	307
Bluestem grass—days	413	413	596	188	188
57—Feed cost per steer:					
Ground shelled corn	16.20	16.20	16.20	65.85	68.98
Cottonseed meal ..	18.15	32.21	23.25	15.83	5.74
Alfalfa hay			5.62	2.26	7.86
Prairie hay	6.85	6.83	1.71		
Atlas silage	37.36	25.06	2.88	11.97	11.49
Oat straw		9.64	7.68	5.05	2.30
Bluestem grass	27.00	27.00	37.00	10.00	10.00
58—Total cost of feed and grass	\$105.56	\$116.94	\$ 94.34	\$110.96	\$106.37
59—Cost of feed per 100 lbs. gain ..	13.38	14.78	12.06	19.36	19.06
60—Initial cost per steer.	80.40	80.40	80.40	80.40	80.40
Feed cost plus initial cost					
61—per steer	185.96	197.34	174.74	191.36	186.77
62—Wt per steer at market	1116	1128	1118	945	930
63—Necessary selling price per cwt. at market to feed cost & initial cost	16.66	17.49	15.83	20.25	20.08
64—Selling price per cwt. at market.	26.50	27.00	27.00	26.50	26.00
65—Selling price per steer at market	295.74	304.56	301.86	250.43	241.80

66—Margin per steer above feed cost and initial cost	109.78	107.22	127.12	59.07	55.03
67—Marketing expense a steer sold at Kansas City	5.68	5.68	5.68	4.41	4.41
68—Shrink in transit:					
Pounds per steer	84	74	75	38	40
Percent	7	6.15	6.28	3.86	4.12
69—Dressing per cent	61.4	62.2	60.1	59.7	58.5
70—Carcass	**	**	**	***	***
Choice					
High					
Average					
Low		1			1
Good					
High				1	
Average		7	1	4	2
Low	3	1	4	3	4
Commercial					
High	7	1	4	1	2
Average				1	1
Low				1	1

***Feed Prices:**

Ground shelled corn for lots 1, 2, and 3, \$1.35 per bu.
 Ground shelled corn for lots 4 and 5, \$2.40 per bu.
 Cottonseed meal, \$75 per ton; alfalfa hay, \$20 per ton; prairie hay, \$15 per ton; Atlas silage, \$6.50 per ton; oat straw, \$15 per ton; bluestem grass for 1947, \$10 per head for yearlings; bluestem grass for winter of 1947-48, \$10 per head; bluestem grass for 1948, \$17 per head for two-year-olds.

**Lots 1, 2 and 3 graded by the packer grader.

***Lots 4 and 5 graded by the U. S. Government grader.

Project 253-1: Factors Influencing Profitable Grass Utilization and Sound Pasture Management.

WINTERING YEARLING STEERS ON BLUESTEM GRASS

Experiment II - 1948 - 1949

A. G. Pickett - Ed F. Smith

This current test includes four lots of 10 steers each. The objective is to determine the value of dry bluestem grass as a winter feed for yearling steers. All pastures used for winter grazing had been used the previous summer but were not closely grazed and dry grass was abundant. Steers were given from 12 to 18 acres per head.

EXPERIMENTAL PROCEDURE

- Lot 1 - Wintered on bluestem grass with 3 lbs. of soybean pellets per steer every other day.
- Lot 2 - Wintered on bluestem grass with a mixture of salt and cottonseed meal, self-fed.
- Lot 3 - Wintered on bluestem grass with 6 lbs. alfalfa hay per steer daily.
- Lot 4 - Wintered on bluestem grass with 1½ lbs. of soybean pellets per steer daily.