

Project 253-3: The Effect of Grazing Systems on Livestock and Vegetation

A Comparison of Different Methods of Managing Bluestem Pastures—1951.

E. F. Smith and Kling L. Anderson

Introduction

The objectives of this experiment are to determine the effects of different stocking rates, deferred and rotation grazing, and burning on livestock gains, productivity of pastures, and the vegetation itself.

Results are reported here for the third year of the experiment. Only two years' results on burning and understocking have been obtained. The results for 1949 and 1950 may be found in Kansas Agricultural Experiment Station Circulars 265 and 273, respectively.

Experimental Procedure

Good quality Hereford yearling steers, moderately thin, weighing about 520 pounds were used to stock the pastures. The method of management of each pasture was as follows:

- Pasture 1—normal rate of stocking, 3.3 acres per head.
 - Pasture 2—over-stocked, 2.5 acres per head.
 - Pasture 3—under-stocked, 5 acres per head.
 - Pastures 4, 5, 6—deferred and rotation grazing, 3.3 acres per head. All steers were held in two pastures until July 6, then turned in to the protected pasture until it was deemed advisable to allow them the run of all three pastures, which in 1951 was August 3.
 - Pasture 7—burned March 22, 1951; rate of stocking was 3.4 acres per head.
 - Pasture 8—burned April 13, 1951; rate of stocking was 3.4 acres per head.
 - Pasture 9—burned April 26, 1951; rate of stocking was 3.4 acres per head.
 - Pasture 10—not burned; rate of stocking was 3.5 acres per head.
- Due to accident, Pastures 1 through 6 were burned on April 26, 1951. The only pasture reported here that was not burned is Pasture 10.

Observations

1. In this year's test, the method of management which resulted in the greatest difference in gain per head was on the under-stocked pasture, where the steers gained 48 pounds more per head than on the normally-stocked pasture. This was not true in 1950 when the steers on the under-stocked pasture lacked 7 pounds per head gaining as much as those on the normally-stocked pasture.

2. There is probably not enough difference in gain per head among the various methods of management, other than the under-stocked pasture, to be significant. However, over a period of years, small differences may become important.

3. Deferred and rotation grazing has been compared with season-long stocking for three grazing seasons. Each year steers grazed season-long have made a greater gain per head; in 1949 it was 23 pounds, in 1950 it was 16 pounds, and in 1951 it was 8 pounds.

4. Burned Pastures 7, 8, and 9 produced comparable gains to those of Pasture 10 which was not burned.

5. The time of burning may have some effect on cattle gain. In 1950 and 1951 the early spring burning produced the least gain of the three different times of burning, and the medium spring burning the most gain; the late spring burned pasture has been between the other two in gains produced.

The 30 steers were divided into three lots of 10 steers each and received the following supplements in addition to dry bluestem pasture from December 7, 1951, to April 1, 1952:

Lot 1—2 pounds of cottonseed oil meal pellets daily, salt, and mineral (bonemeal and salt).

Lot 2—4 pounds of cottonseed oil meal pellets every other day (average 2 pounds a day), salt, and mineral (bonemeal and salt).

Lot 3—Cottonseed oil meal, salt self-fed, and mineral (bonemeal and salt). (The salt was mixed with the soybean oil meal to limit its consumption and make it possible to self-feed the cottonseed oil meal. This mixture was fed in a self-feeder.)

The cottonseed oil meal pellets were fed on the ground.

Observations

1. Weather conditions were favorable for wintering on dry grass except during the month of December and the first week in March.

2. All lots lost weight during the wintering period. Lot 1 fed every day wintered slightly better than Lot 2 fed every second day, and the steers in Lot 3 self-fed salt and cottonseed oil meal lost considerable weight, an average of 55 pounds per head for the winter. Usually April is a favorable month for cattle gains on dry grass, and some of the weight losses will probably be decreased or eliminated during April.

Wintering Yearling Steers on Bluestem Pasture
(December 7, 1951, to April 1, 1952—116 days)

Lot number	1	2	3
Number of steers per lot	10	10	10
Method of feeding	Fed cottonseed oil meal pellets daily	Fed cottonseed oil meal pellets every other day	Self-fed cottonseed oil meal and salt
Average initial weight	745	741	746
Average final weight	737	726	691
Average gain	-8	-15	-55
Average daily gain	-.06	-.13	-.47
Average daily winter ration, lbs.:			
Cottonseed oil meal pellets	2.00	2.00	
Cottonseed oil meal			2.05
Salt09	.07	.65
Mineral mixture ¹14	.12	.09
Prairie hay ²	1.52	1.47	1.42
Bluestem pasture	ad lib	ad lib	ad lib
Total feed cost per steer ³	\$17.78	\$17.61	\$18.14
Initial cost per steer at \$35.00 per cwt. ..	\$260.75	\$259.35	\$261.10
Initial cost per steer plus feed cost	\$278.53	\$276.96	\$279.24
Necessary selling price per cwt. to cover initial cost plus wintering costs	\$37.79	\$38.14	\$40.41

1 Mineral mixture composed of 2 pounds steamed bonemeal to 1 of salt.

2 Prairie hay was fed only in unfavorable weather.

3 Feed prices may be found on page 58 of this bulletin.

A COMPARISON OF DIFFERENT METHODS OF MANAGING BLUESTEM PASTURE

May 10, 1951, to October 2, 1951—145 days

Pasture number	1	2	3	4	5	6	7	8	9	10
Management	Normally-stocked, burned Apr. 26, 1951	Over-stocked, burned Apr. 26, 1951	Under-stocked, burned Apr. 26, 1951	Defered and rotated, burned Apr. 26, 1951	Defered and rotated, burned Apr. 26, 1951	Defered and rotated, burned Apr. 26, 1951	Early spring burned Mar. 22, 1951	Medium spring burned Apr. 13, 1951	Late spring burned Apr. 26, 1951	Not burned
Number head per pasture	15	24	12	54	54	13	13	13	13	9
Acres in pasture	60	60	60	3 60-acre pastures	3 60-acre pastures	44	44	44	44	139
Number acres per head	3.3	2.5	5	3.3	3.3	3.4	3.4	3.4	3.4	3.51
Average initial weight, lbs.	518	522	519	522	522	521	521	521	521	520
Average final weight, lbs.	760	778	809	756	756	764	764	786	780	778
Average gain, lbs.	242	256	290	234	234	243	243	265	259	258
Average daily gain, lbs.	1.67	1.77	2.00	1.61	1.61	1.68	1.68	1.83	1.79	1.78
Average gain per acre, lbs.	73	102	58	71	71	71	71	78	76	74
Initial cost per steer at \$41.00 per cwt. plus \$15.00 per head for summer pasture	\$227.38	\$229.02	\$227.79	\$229.02	\$229.02	\$228.61	\$228.61	\$228.61	\$228.61	\$228.20
Average selling price per steer at \$35.00 per cwt.	\$257.95	\$264.25	\$274.75	\$256.55	\$256.55	\$259.35	\$259.35	\$266.70	\$264.95	\$264.25
Average return per steer	\$30.57	\$35.23	\$46.96	\$27.53	\$27.53	\$30.74	\$30.74	\$38.09	\$36.34	\$36.05

1 Pasture 10 was stocked with other steers in addition to those reported in this test.

2 The final weight was shrunk 3 percent to obtain a sale weight.

6. There seems to be a greater difference in steer gain between burned and non-burned pastures early in the season than at the close of the grazing season. This difference to date tends to favor the burned pastures. Forage yield tests conducted by the agronomy department over many years showed an early advantage for burned plots, but plots not burned rapidly overtook them, especially in dry summers.

7. The different pastures (with the exception of No. 10) were rated for degree of range use as follows:

Pasture numbers	Degree of range use	Qualitative description
3	Light	Only best plants grazed.
5	Moderate	Most of the range grazed; little or no use of poor plants.
1, 4, 7, 8, 9	Proper	All of the range grazed; primary forage species properly utilized.
6	Close	All of the range plainly shows use and major sections are closely cropped; some use of low-value plants.
2	Severe	Hedged appearance of shrubs and trampling damage; primary forage plants almost completely used; low-value plants carried grazing load.

Ratio of Roughage to Grain for Fattening Steer Calves.

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

This is a preliminary report covering the first 98 days of this feeding trial which is still being conducted; therefore the reader should bear in mind that the figures are in no way conclusive or complete.

The physical balance or ratio of roughage to concentrates is an important factor to consider in the ration of fattening cattle. Beef cattle serve as one of the principal means of marketing roughage. Since a large amount of roughage is produced throughout the midwest, it is desirable to have information concerning the maximum amount of roughage that can be used in fattening rations consistent with maximum and economical production. This experiment was planned to secure information on the effects of different levels of roughage on average daily gain, feed requirement per unit of gain, quality of finish, selling price, and carcass quality.

The steer calves were started on feed December 22, 1951, and worked up to ratios of roughage to grain as given below. They are being self-fed and will remain on their respective rations for the remainder of the feeding period:

- Lot 1—1 pound of chopped alfalfa hay to 1 pound milo grain.
- Lot 2—1 pound chopped alfalfa hay to 3 pounds milo grain.
- Lot 3—1 pound chopped alfalfa hay to 5 pounds milo grain.

Table 1 contains a summary of the first 98-day results.

Observations

1. The figures on average daily feed consumption do not show the ratios described above. This is caused by including the feed consumed while the steers were being worked up to the desired ratios.