

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

## A Comparison of Different Methods of Managing Bluestem Pastures—1950.

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### INTRODUCTION

In the present series the first test to compare different methods of grazing bluestem pasture was conducted in 1949 and was reported in Kansas Agricultural Experiment Station Circular 265. This report is concerned with the second test conducted in 1950.

The objective of this experiment is to find out what the carrying capacity of bluestem pasture is, how deferred and rotation grazing compare with season long grazing, and if bluestem pastures should be burned or not.

### EXPERIMENTAL PROCEDURE

One hundred and twenty-eight moderately fleshed, good quality, yearling Hereford steers weighing about 620 pounds per head on May 8 were used to stock the pastures.

The method of management of each pasture was as follows:

Pasture 1: Normal rate of stocking, 4 acres per head.

Pasture 2: Over-stocked, 3 acres per head.

Pasture 3: Under-stocked, 6 acres per head.

Pastures 4, 5, 6: Deferred and rotation grazing, 3.6 acres per head.

All steers were held in two pastures until June 20, then turned into the protected pasture until it was deemed advisable to allow them the run of all three pastures, which in 1950 was August 1.

Pasture 7: Rate of stocking—4 acres per head. This pasture was burned March 24, 1950.

Pasture 8: Rate of stocking—4 acres per head. This pasture was burned April 13, 1950.

Pasture 9: Rate of stocking—4 acres per head. This pasture was burned May 2, 1950.

### OBSERVATIONS

1. Among all the methods of management tested, there was not a large difference in gain per steer except on the medium-burned pasture where the steers gained 33 pounds more per head than on Pasture 1 which was normally stocked. Several years' work will be required to verify results of this type.

2. The largest gain per acre occurred on the over-stocked pasture and the smallest gain per acre on the under-stocked pasture.

3. At the close of the grazing season, 1950, the burned pastures did not appear to be as heavily grazed as the non-burned Pasture 1. More spot grazing took place in the non-burned pasture. Pasture 2 appeared to be closely grazed and Pasture 3 lightly grazed. The deferred and rotated pastures, 4, 5, and 6, compared favorably with Pasture 1 which was grazed straight through the summer.

4. The effects of grazing management on the vegetation are being studied chiefly in terms of plant populations because the species population in a given pasture is the best indicator of its range condition. By means of annual sampling, the relative amounts of each important native species have been determined each year since 1947. On the basis of these records, any changes brought about in the management can be detected by future sampling. If species like the bluestems, Indiangrass, and switchgrass become more abundant, it may be taken

as evidence of improvement. If, on the other hand, the shorter grasses like buffalograss and the grammas increase or if weedy species invade, deterioration will be indicated. Any such trends can then be correlated with livestock responses.

Studies on the relation of soil type to plant population were started in 1950 when a detailed soils map of pastures 1 to 6 was made. Plant population samples from each of 10 major soil categories were compared, and certain ones were found to be alike so far as vegetative cover was concerned. This made it possible to combine them into 4 categories, and future sampling will take these groups into account.

Considering pastures 1 to 6 as a whole, the following vegetative populations have been observed:

Species	% of Total Population
Big bluestem .....	17.6
Little bluestem .....	24.1
Indiangrass .....	7.7
Sideoats grama .....	8.1
Blue grama .....	3.5
Hairy grama .....	2.7
Buffalograss .....	4.5
Kentucky bluegrass .....	8.3
All other perennial grasses .....	7.8
Total perennial grasses .....	84.3
Sedges and rushes .....	6.0
Annual grasses .....	1.7
Total grass and grasslike species .....	92.0
Perennial broad-leaf plants .....	5.5
Annual broad-leaf plants .....	2.2
Shrubs .....	0.3

Population counts like these and measurements of actual areas occupied by each species have been made for each pasture, for each year, and for each soil type. They will furnish the basis for evaluating any trends that develop as the experiments progress.

**TABLE I: A COMPARISON OF DIFFERENT METHODS OF MANAGING BLUESTEM PASTURE**

Pasture number	May 8, 1950 to October 5, 1950—150 days								
	1	2	3	4	5	6 <sup>3</sup>	7 <sup>1</sup>	8	9
Management	Normally stocked	Over-stocked	Under-stocked	Deferred and rotated	Deferred and rotated	Deferred and rotated	Early Spring burned Apr. 24, '50	Medium Spring burned Ap. 13, '50	Late Spring burned May, 2, '50
Number head per pasture	15	20	10	50	50	50	44	44	44
Acres in pasture	60	60	60	3-60 acre pastures	3-60 acre pastures	3-60 acre pastures	11	11	11
Number acres per head	4	3	6	3.6	3.6	3.6	4	4	4
Average initial weight	619	619	619	619	619	619	622	619	619
Average final weight	840	829	833	824	824	824	838	873	849
Average gain	221	210	214	205	205	205	216	254	230
Average daily gain	1.47	1.40	1.43	1.37	1.37	1.37	1.44	1.69	1.53
Average gain per acre	55	70	36	57	57	57	54	63.5	57.5
Initial cost per steer @ \$27.12 per cwt. plus \$12 per head for summer pasture	\$179.87	\$179.87	\$179.87	\$179.87	\$179.87	\$179.87	\$180.69	\$179.87	\$179.87
Average net selling price per steer <sup>2</sup>	\$219.61	\$216.67	\$217.74	\$215.34	\$215.34	\$215.34	\$219.08	\$228.40	\$222.01
Average return per steer	\$39.74	\$36.80	\$37.87	\$35.47	\$35.47	\$35.47	\$38.39	\$48.53	\$42.14

1. Only 10 steers were used to compute results—one steer developed an infected ear in August and did not do well. He remained in pasture entire season.  
 2. Net selling price per steer is based on selling price of \$28.15 per cwt. and market weight which represents a 5.3% shrink from home weight less average marketing costs of \$4.32 per head.  
 3. Deferred and rotated grazing—all steers were held in two pastures until June 20, then moved into protected pasture until August 1, at which time they were allowed the run of all three pastures.

## Project 68: Factors Influencing the Salt Requirements of Beef Cattle<sup>1</sup>

### I. The Effect of Withholding Salt on the Growth and Condition of Steers—1949-1950.

E. F. Smith, D. B. Parrish, A. J. Clawson

Ten good quality Hereford steer calves were used in this study. They were divided into two equal lots. Both lots were treated similarly except salt was withheld from one lot. The calves were started on the test December 14, 1949, wintered, used in a spring digestion trial, full-fed in dry lot and marketed on November 2, 1950.

#### OBSERVATIONS

1. During the wintering phase, the calves allowed access to salt consumed slightly more silage and gained 139 pounds per head, as compared to 80 pounds per head for those not fed salt.
2. The non-salt steers required about 60 per cent more silage and 74 per cent more soybean pellets per 100 pounds of gain during the wintering phase.
3. During the dry lot, full-feeding phase, the gains were as follows: steers allowed access to salt, 363 pounds; steers from which salt was withheld, 386 pounds. The steers from which salt was withheld drank more water and used slightly less feed per 100 pounds of gain.
4. Over the entire test, the steers allowed free access to salt gained 22 pounds more than those not given salt. There was little difference in carcass grades between the two lots and the selling price per hundred weight was the same.
5. It is significant that in this test and in a similar test conducted in 1948-49 during those periods where the ration was composed largely of roughage, the steers allowed access to salt gained considerably more than those fed no salt, whereas when the ration was composed largely of grain, this difference did not appear.

**TABLE I—The Effect of Withholding Salt on the Growth and Condition of Steers**

Phase I—Wintering—Dec. 14, '49-April 25, '50—132 days

	Salt free access	No salt
1. Management	1	2
2. Lot number	5	5
3. Number of head per lot	5	5
4. Average daily ration, pounds:		
Atlas Sorgo silage	28.37	26.14
Soybean oil meal	1.00	1.00
Salt	.054	None
5. Average initial weight, pounds	448.00	448.00
6. Average final weight, pounds	587.00	528.00
7. Average total gain, pounds	139.00	80.00
8. Average daily gain, pounds	1.05	.61
9. Feed required per 100 pounds gain, pounds:		
Atlas Sorgo silage	2694.24	4312.50
Soybean oil meal	94.96	165.00
Salt	5.18	None

(1) This study is supported by the Salt Producers Association, Detroit, Mich.