Grazing Habits of Cattle in a Mixed-Prairie Pasture

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Introduction

PROPER utilization of forage plants by livestock is one of the problems which confront range men today. The number of acres to allow per animal unit, time to begin and cease grazing, and methods of determining degree of utilization are only a few aspects. The problem is further complicated when the ranges are of diversified topography and include several types of vegetation, since some areas may be over-utilized while others are scarcely touched. It would be of value to have more information on specific activities of cattle on the range. The purpose of this study was to find the amount of time cattle spend at various activities, the time of day at which they occur, and the area in which they are carried on. These data are correlated with season, weather, and condition of the vegetation. The study was made by the senior author while a student at Fort Hays Kansas State College.

Grazing habits have been studied in various parts of the country, but little information is available for the mixed-prairie region. Cory (1927), in Texas, made one of the earliest studies and presented considerable detail as to the time spent at various activities. Stanley (1938), working in Arizona, concluded that grazing habits are dependent upon factors that influence the condition of various plant species. In eastern Kansas the time spent grazing has been correlated with the condition of the pasture (Atkeson *et al.*, 1942). More time was used in grazing on poor pastures than on good pastures. Hein (1935), in Maryland, likewise found that grazing time was directly proportional to the abundance and palatability of the forage. In New York it has been reported that cattle may graze as much at night as in the daytime (Johnstone-Wallace, 1938).

Description of Pasture

The study was conducted in the 828-acre college pasture near Hays, Kansas. The short-grass type of vegetation, which is characteristic of the uplands, includes about 143 acres. Dominants are buffalo grass (*Buchloe dactyloides*) and blue grama (*Bouteloua gracilis*). The hillsides support a mixed-grass type of vegetation, which comprises 536 acres. The chief grasses are sideoats grama (*Bouteloua curtipendula*), big bluestem (*Andropogon furcatus*), blue grama, and little bluestem (*Andropogon scoparius*). The lowland, which consists of 77 acres, was formerly dominated by big bluestem (Albertson, 1937). In much of the area it has now been replaced by western wheat grass (*Agropyron smithii*), sideoats grama, and an understory of buffalo grass and blue grama. An additional area of about 75 acres, undergoing natural revegetation, is

populated by buffalo grass and sand dropseed (*Sporobolus cryptandrus*). Observations in this area were included with those in the short-grass type.

The topography is rolling, although many of the hillsides are steep and rocky (Fig. 1). The pasture is divided by a fence into two nearly equal parts. Water is located only in the lowland. The south pasture contains 4 large ponds in one ravine; the north pasture has 3 ponds in 3 ravines and a well with water tanks in one of these ravines.

FIGURE 1. General view of cattle grazing in a lowland area. A rocky hillside is shown in the left background.

METHODS OF STUDY

The study was started April 1, 1948, and continued through September 20. Continuous records were kept of temperature and relative humidity on a self-recording hygro-thermograph. Rainfall and soil moisture data were also obtained. These data are not presented as such but are used in an effort to interpret certain activities of the cattle.

Studies were generally restricted to the herd rather than to individual animals. At least one day of each week every hour from 8 a.m. to 8 p.m. notes and counts were made as to the location and activities of the cattle. A record was made of the number grazing, standing idle, lying down, ruminating, drinking, and licking salt. In addition, on two occasions the herd as a group and certain individual animals were closely observed for a 24-hour period.

RESULTS

The pastures were moderately grazed, and there was always an abundance of forage. Consequently the use of certain plants indicated a preference for those plants or for the site in which they were growing and not a lack of forage elsewhere. Each pasture was completely protected during alternate months so that there was a good growth of grass at the first of the month when the cattle were turned in.

April

Grazing started in the south pasture on the first of April with 124 cows, heifers, and steers. Available green forage during the early portion of this month consisted mostly of western wheat grass on the lowland and little barley (*Hordeum pusillum*) on the upland. The warm-season

grasses on the hillsides had not started to grow. Grazing was largely restricted to areas where vegetation was most succulent. The cattle spent an average of 59 percent of their time from 8 a.m. to 8 p.m. on the lowland, 35 percent on the upland, and only 6 percent on the hillsides (Table 1). From 52 to 70 percent of the herd was on the lowland all day except for a short period in late afternoon when about half the cattle were on the upland (Fig. 2).

TABLE 1

Percent distribution of cattle from 8 a.m. to 8 p.m. Based on average of hourly counts, one or two days per week

	APRIL	MAY	JUNE	JULY	AUG.	SEPT.
Lowland. . .	59	57	50	26	55	48
Hillside. . . .	6	19	34	28	27	18
Upland.	35	24	16	46	18	34

There were 3 periods during the day when the cattle were most actively grazing. The first of these was prior to 8 a.m. Nearly half the animals then rested for 2 or 3 hours and resumed grazing at about 11 o'clock. During the middle of the afternoon there was another resting period of about the same length. In these resting periods often as many as half the cattle were feeding. However, their activities were somewhat listless lacking the enthusiasm displayed during the active grazing periods. Nearly all the cattle grazed vigorously from 5 until after 7 o'clock p.m. Bedding down occurred between 7 and 8 o'clock.

May

Precipitation was low in May as it was in April and the vegetation grew slowly. However, green forage became available in all of the habitats as the mid grasses on the hillsides began to grow. Little barley on the upland had become somewhat unpalatable, but the short grasses in the same area had grown enough to be available for grazing. Nevertheless, a large portion of the herd remained on the lowland except during the early morning and late evening hours. During the warmer part of the day they tended to remain in the vicinity of water, where there was also plenty of succulent forage.

Early morning grazing, which had been at a peak at 8 o'clock in April, began earlier during May, and less than half the animals were still grazing at 8 o'clock. Another grazing peak occurred in the late morning although only about 50 percent of the cattle were involved (Fig. 2). There was no distinct idle period during the afternoon, but grazing gradually increased beginning about 4 o'clock. During the evening, when grazing was most vigorous, about half the herd was on the lowland. This indicated a preference of the livestock for the more succulent lowland grasses. At nearly all times the hillside seemed to be the least preferred of the 3 habitats, although it was used considerably more than during April.

June

The herd was increased by 76 animals to a total of 200 head. This increased the difficulty of making a census. The abnormally dry weather during the spring ceased with the advent of 6.6 inches of rain in June. As a result the soil moisture was replenished and the vegetation grew vigorously.

The cattle spent much less time in the vicinity of water than when the grasses were less succulent, but they still occupied the lowland an average of 50 percent of their time (Table 1). At each census during this month, nearly 100 percent of the cattle were on the lowland at noon. However, in contrast to the dry month of May, they did not linger sev-

eral hours in the vicinity of water. They still made some use of western wheat grass, but showed most preference for greater use was made of these areas. In fact at the 8 a.m. census, about 95 percent of the animals were there. Al-

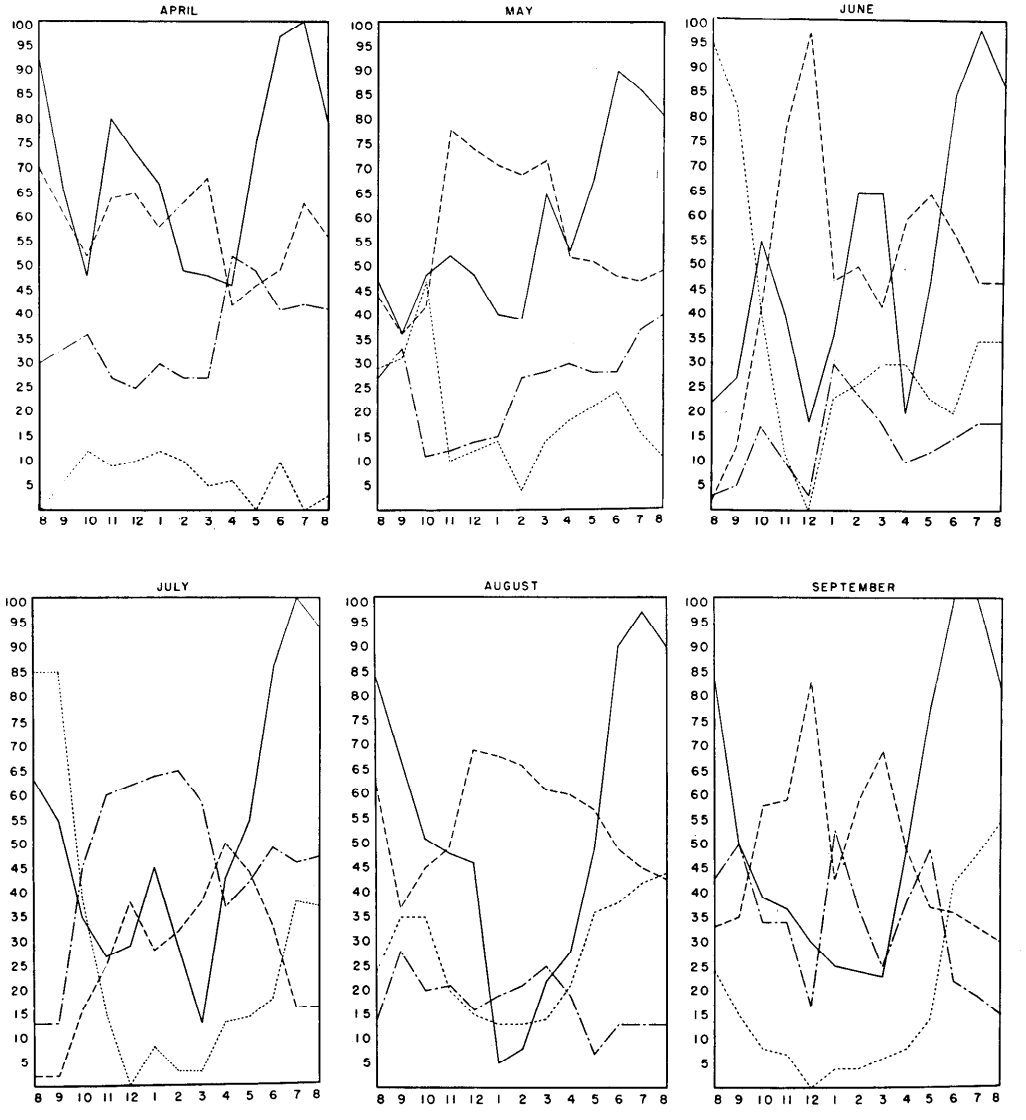

FIGURE 2. Percent of total herd present in the short-grass type (alternate long and short lines), hillside mixed-grass type (short broken lines), and lowland mixed-grass type (long broken lines) at each hour of the day from 8 a.m. to 8 p.m. from April to September. Percent of cattle grazing when observed is also shown (unbroken line).

big bluestem, sideoats grama, and the short grasses.

As the mid grasses on the hillsides grew tall enough to be readily available, though only 22 percent were grazing at the time, it was evident they had been grazing earlier. The upland was preferred less during this month than any other

habitat. Furthermore it received less use than at any other time during the season. This may have been due to the dry little barley, which made the short grasses less accessible.

As the days became longer the first grazing period occurred earlier so that by 8 o'clock the animals were comparatively idle. There was another grazing period about 10 a.m., another in mid-afternoon, and another in the evening. Between each of these periods many of the cattle were idle, although some grazing occurred at all times. Greatest activity was in late evening prior to bedding down.

July

The high precipitation during June continued in July. Total rainfall was 6.3 inches, which is well above normal. Vegetation of the entire pasture continued rapid growth and was consequently highly succulent.

The cattle spent 46 percent of their time in the short-grass areas of the upland which received its greatest use of the season. This is especially significant in view of the fact that no water was available in the immediate vicinity. The hillside was utilized mostly in early morning and some in the evening, but hardly at all during the day. The lowland was visited to the greatest extent between noon and 4 p.m. The cattle went into this area primarily for water and spent the grazing periods in the other habitats.

At the 8 a.m. census the cattle were tapering off from their early morning grazing period. Except for some listless feeding around noon, most of the animals rested or grazed only intermittently until the beginning of the evening period (Fig. 2).

August

Precipitation of 3.3 inches of moisture was adequate to maintain growth, and there was still an abundance of good forage. This was especially true in the lowland where big bluestem had grown rapidly while it was protected during July. The cattle again showed a preference for this area, especially during the morning grazing period. A large part of the herd remained in the vicinity of water throughout much of the day. Then as the late afternoon grazing period started, many of them moved out of the lowland and up on the hillsides.

During this month more than half the herd continued grazing until almost noon. Then there was a lapse in feeding activities during the early afternoon when seldom more than a dozen animals were grazing. This was the only month during the summer when the idle period involved nearly all the herd. After 4 o'clock there was a sharp increase in the number of animals feeding, and the peak of grazing activities was reached about 7 p.m. This pattern of activities differed considerably from the usual alternate grazing and resting periods of earlier summer. This may have been due, to some extent, to higher mid-day temperatures causing the animals to prefer to rest or remain near water.

September

During September the vegetation became semi-dormant with a consequent decrease in succulence. This condition first became evident among the short grasses of the upland. Grazing activities were similar in several respects to those of August, although fewer animals were idle during the middle of the day. The morning grazing period occurred somewhat later as the days became shorter. The upland received the greatest amount of use during the morning grazing period,

and the hillsides were used more than any other area in the evening. Maximum concentrations of cattle in the lowland were during the middle of the day when grazing was at a minimum (Fig. 2).

Observations of Individual Animals

In order to supplement data concerning the entire herd, a cow, heifer, and steer were observed closely for two 24-hour periods during the first and second weeks of August. Observations were made with field glasses whenever possible so that the animals were not likely to be disturbed. Routes were mapped and later followed with an automobile to ascertain distances travelled.

There were not enough animals observed to know whether the activities of each were individual characteristics or true of that particular type of animal. Periods of grazing corresponded well to those of the majority of the herd. As shown by Table 2, there was little difference in the time spent grazing and bedded down by the different animals.

TABLE 2

Average time in hours (h) and minutes (m) spent by 3 animals at various activities during two 24-hour periods

	GRAZING		LYING DOWN (daytime)		STANDING (inactive)		DRINKING	LICKING SALT	BEDDED DOWN	
	h	*m*	*h*	*m*	*h*	*m*	*m*	*m*	*h*	*m*
Steer	9	54	3	30	3	7	4	6	7	19
Heifer	10	21	4	19	1	57	5	5	7	13
Cow	10	25	2	28	3	30	5	10	7	22

The distance travelled by each of the 3 animals was from 2.5 to 3 miles per day. Most of the travelling was done while grazing. They drank 2 or 3 times per day and took salt from 1 to 3 times. There was little if any correlation between drinking and taking salt. Unfortunately salt was placed near the water, but nevertheless several hours often elapsed between these activities.

Discussion

It is apparent that with the uneven distribution of cattle, the grass was not properly utilized. Some areas were too heavily grazed to maintain good yield and compositon. Others were under utilized, thus wasting forage and causing the accumulation of a large amount of mulch, which tends to cause a decrease in cover.

The beef producing capacity of the pasture could be increased considerably by nothing more than better distribution of the animals while grazing. Such management would result in an increase in the most valuable species, an overall increase in yield, and more complete use of available forage. Additional fencing or a change in watering places would not be feasible in this particular pasture, but a change in location of salt from the lowland to the lightly used hilltops should stimulate use of the latter areas (Chapline & Talbot, 1926). Furthermore the salt can be moved from place to place preventing localized trampling and over utilization.

The lowland furnished less than 10 percent of the total area of the pasture, yet the cattle spent an average of almost half the time there. This may have been due to several factors. First, the presence of cool-season grasses made this habitat desirable during early spring. Second, the ample soil moisture insured a continued regrowth of grazed plants so that they remained succulent through a large part of the season. Third, the location of both water and salt caused the animals to visit this area even when they were not interested in grazing. However, heavy use of the lowland may be somewhat justified

in that it yields from 3 to 4 times as much per acre as the other habitats (Weaver & Albertson, 1944).

Summary

Activities of cattle on the range have certain relationships with proper range management. The purpose of this study was to find when and how much time cattle spend at various activities in a mixed-prairie pasture.

During April, green forage was mainly limited to western wheat grass on the lowland and little barley on the upland. Consequently, the cattle spent most of the time in these areas. The little barley approached maturity in May and became less desirable. The warm-season grasses on the hillsides had started to grow, but the cattle still preferred the succulent grasses of the lowland. During June use of the hillsides became more extensive, and in July greatest use was made of the upland. In August preference was again for the lowland both for grazing and for resting. The greatest amount of time was also spent in the lowland during September but this was mostly during the middle of the day when grazing was at a minimum.

Grazing began between 5 and 6 a.m. depending on the time of sunrise and continued unabated for about 3 hours. The cattle then started moving toward water doing some grazing along the way. After reaching water, some drank immediately while others ruminated a short time, either standing or lying down. The middle part of the day was marked by alternate periods of resting and feeding during the first part of the summer, but by a distinct resting period in late summer. The evening grazing period was well under way by 5 p.m. and lasted until 8 p.m. or later when the cattle bedded down. During the active grazing periods, the herd tended to become scattered in small groups, which joined into one or two herds during the idle periods.

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