

ACTIVITIES AND SPECIES PREFERENCES OF HEREFORD AND SANTA GERTRUDIS
RANGE COWS

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Diurnal activities of beef cattle and the plant species grazed during various seasons are important in formulating grazing management plans and for nutritional studies. Breeds of cattle may perform differently on rangeland of southern New Mexico. Hereford is the predominant breed in the Southwest. Santa Gertrudis, whose genetic background includes the Brahman, may be better adapted to the hot, arid environment of this area. The purpose of this study was to determine the differences, if any, in the activities and species preference of Hereford and Santa Gertrudis cows.

Procedure

This 3-yr. study was initiated in November 1961 on the Jornada Experimental Range, 25 miles north of Las Cruces, New Mexico. The climate is typical of the arid phase of the semidesert grassland. There is an extremely variable precipitation, an abundance of sunshine, a wide range between day and night temperatures, and relatively low humidity. The average annual precipitation is 9.01 in. and the average seasonal precipitation (July-September) is 4.99 in. The average maximum temperature for January is 13.1 C and for July 34.8. The average minimum for January is -5.3 C and for July 17.9.

The major plant species are: burrograss (Scleropogon brevifolius Phil.); mesa dropseed (Sporobolus flexuosus (Thurb.) Rybd.); alkali sacaton (Sporobolus airoides (Torr.) Torr.); black grama (Bouteloua eriopoda (Torr.) Torr.); ear muhly (Muhlenbergia arenacea (Buckl.) Hitchc.); broom snakeweed (Gutierrezia sarothrae (Pursh) Britt. and Rusby); leather croton (Croton corymbulosus Engelm.); and soaptree yucca (Yucca elata Engelm.).

The two pastures used, one containing 2,628 A. and the other 3,610 A., were relatively level, and in each it was about 3½ miles from water to the far end of the pasture. Each breed was pastured separately and was rotated between the pastures each year about November 1. The test herd consisted of 15 cows of each breed born in 1959. However, additional animals of each breed were stocked as

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necessary to achieve proper grazing use. The stocking rate varied from 3 to 7 cows per section. A salt-bone meal mix was available near water. Small quantities of ground concentrate mixture were fed from March 17 through July 3, 1964.

Bulls were with the cows from May 1 to October 1. Most of the Hereford cows calved during the late winter while the Santa Gertrudis cows calved throughout the late winter and spring.

The activities of a cow of each breed were observed for a 24-hr. period every 4 weeks during the 3-yr. period. In addition, from November 1961 to March 1963, a cow from each breed was observed every 4 weeks during the daylight hours. Observations were alternated between breeds. The cows to be observed were selected at random from the test herd of each breed and marked with white paint immediately before the observation period. Each cow in the test herd was observed before any one cow was observed the second time. The cows were observed from a vehicle equipped with a spotlight as an aid for nighttime observations. Two men observed the cows continuously and recorded the time to the nearest minute for each activity. The activities of the cows generally were not affected by the observers or the vehicle.

At the same time as the activities of the cows were being observed, their species preferences were noted. There were 58 observations of each breed over the study period. During daylight hours, while the cattle were grazing, the species being grazed were noted at 4-min. intervals. Species grazed at nighttime were noted.

Results and Discussion

Activities. The average activities for the Hereford and Santa Gertrudis cows for the 3-yr. period are shown in table 1. The percent of time spent grazing includes grazing-standing and grazing-walking. The percentage shown for nursing also includes a small amount of grazing and standing-ruminating but most nursing time was standing-idle. The standing-idle percentage does not include any of the nursing time. The number of times watering is the actual number of times the cow drank from the water trough or from rain puddles. Rubbing includes the number of times the cows rubbed on rubbing devices or on shrubs. The time shown for standing-ruminating also includes a small amount of walking ruminating.

On a 24-hr. basis there were 37 observations of each breed. The Hereford cows spent significantly more time grazing and less time walking. It was estimated that the cows walked an average of 4.9 miles while the Santa Gertrudis cows averaged 7.8 miles during a 24-hr. period. The Hereford cows rubbed more than the Santa Gertrudis.

On a daytime-nighttime basis, both breeds spent significantly more time grazing and standing-idle in the daytime, but there were no significant differences between breeds. They both also watered and defecated significantly more times in the daytime. Conversely, both spent significantly more time ruminating, particularly lying-ruminating at night.

Table 1. Yearlong activities of Hereford and Santa Gertrudis cows¹.

	24-Hour		Daytime		Nighttime	
	H ²	SG ²	H	SG	H	SG
Observations (no.)	37	37	58	58	37	37
Grazing (%)	42.8 ^b	37.2 ^a	49.9 ^b	46.5 ^b	34.7 ^a	29.6 ^a
Ruminating, total (%)	31.0 ^a	30.8 ^a	21.1 ^a	19.5 ^a	41.3 ^b	40.3 ^b
Standing-ruminating (%)	8.6 ^a	6.8 ^a	8.9 ^b	7.3 ^{ab}	8.5 ^{ab}	5.6 ^a
Lying-ruminating (%)	22.4 ^a	24.0 ^a	12.2 ^a	12.2 ^a	32.8 ^b	34.7 ^b
Standing-idle (%)	7.5 ^a	7.5 ^a	10.2 ^b	10.8 ^b	5.0 ^a	3.5 ^a
Lying-idle (%)	9.9 ^a	10.1 ^a	7.5 ^a	7.1 ^a	12.1 ^a	13.4 ^a
Walking (%)	6.5 ^a	12.1 ^b	9.2 ^{ab}	13.4 ^b	4.8 ^a	11.5 ^b
Nursing (%)	1.6 ^a	1.6 ^a	1.4 ^a	1.6 ^a	1.8 ^a	1.6 ^a
Nursing (no.)	2.7 ^a	2.4 ^a	1.2 ^a	1.1 ^a	1.4 ^a	1.3 ^a
Watering (no.)	1.0 ^a	1.5 ^a	0.8 ^b	1.3 ^b	0.1 ^a	0.2 ^a
Salting (no.)	0.1 ^a	0.5 ^a	0.1 ^a	0.5 ^a	0.0 ^a	0.0 ^a
Rubbing (no.)	1.1 ^b	0.1 ^a	0.6 ^b	0.1 ^a	0.6 ^{ab}	0.0 ^a
Defecating (no.)	6.5 ^a	6.5 ^a	4.1 ^b	4.2 ^b	2.8	2.5
Urinating (no.)	5.9 ^a	6.5 ^a	3.4 ^a	3.8 ^a	2.8 ^a	3.2 ^a

¹Entries on the same line having the same superscript are not significantly different ($P < .05$). The 24-hour value should not be compared with either the daytime or nighttime values.

²H = Hereford, SG = Santa Gertrudis

Seasonal comparisons were also made. Hancock (1953) reported that the behavior of an animal on rangeland is conditioned by factors such as environment, quantity of forage, digestibility of forage, forage species available, and the individual animal. In this study the activities varied little by season. The Santa Gertrudis spent a little less time grazing and more time lying-idle in the winter than in any other seasons. There was little seasonal difference in nighttime grazing, which would indicate that weather had little effect on the activities of the animals. An examination of the data for the 6 hottest days of the 3-yr. period (maximum temperatures range from 35 to 41.7 C) showed no difference in the grazing time between breeds or when compared to cooler days. Ittner *et al.* (1954) reported that Brahman and Brahman

crosses grazed more than Herefords and Shorthorns during the daytime in summer on irrigated pasture in the Imperial Valley.

The Herefords spent significantly less time walking in the fall than did the Santa Gertrudis during the fall, spring, and summer. The Santa Gertrudis spent more time walking in the summer than the Herefords in any season. It was estimated that the Herefords walked 5.3, 5.2, 4.6, and 4.3 miles during a 24-hr. period in the fall, winter, spring, and summer seasons, respectively, while the Santa Gertrudis walked 8.0, 6.1, 8.3, and 9.1 miles during the same respective seasons.

The time spent grazing during the summer is similar to Oklahoma results (Dwyer, 1961; Nelson and Furr, 1966) and yearlong grazing was similar to California results (Wagnon, 1963). This would indicate that there is not a close relationship between grazing time and quantity of forage per unit area because both of those areas have higher production than the experimental area in this study. The winter grazing was less than Texas results (Box *et al.*, 1965) where forage production is also higher than on the experimental area.

The 24-hr. period was divided generally into the following grazing intervals: about midnight, from daybreak for the next 3 to 3½ hr., midday, and late afternoon for 3 to 3½ hr. The major difference for both breeds between winter and summer was the length of time spent grazing at midday; during the winter it was generally 1 to 1½ hr., while in summer it was generally 2 to 2½ hr. The major difference between breeds was the time spent grazing about midnight; the Hereford cows generally spent about 2½ hr. grazing at this time, while the Santa Gertrudis only spent about 1 hr.

Many miscellaneous observations were also recorded. When the cows grazed plants that had both green and dry portions, they would try to eat only the green portions, frequently letting the dry portion drop from their mouths. The Herefords were frequently in small groups of 4 to 8 cows, while the Santa Gertrudis all stayed together more frequently. The activities of the Santa Gertrudis as a group were more uniform than those of the Herefords; e.g., all of the Santa Gertrudis cows would graze more nearly at the same time, lie down at the same time, etc. The Santa Gertrudis cows walked faster and ran more than the Herefords. The Santa Gertrudis cows frequently permitted calves other than their own to nurse them, but the Hereford cows only rarely allowed this.

Species Preference. Each day a cow was observed, there generally were 70 to 90 observations of the species being grazed. The cows ate all available species to some extent. For example, they ate each of 12 different species of perennial grasses at least one time in the 3-yr. study. Table 2 shows the average preference for plant groups as a percentage of the total number of observations. On a yearlong basis, 49.4% of the Hereford's diet was perennial grasses while for the Santa Gertrudis it was 59.8%. Red threeawn (*Aristida longiseta* Steud.) was grazed when it was green during the spring, summer and fall. Tobosa (*Hilaria mutica* (Buckl.) Benth.)

was preferred during the summer and early fall. The Santa Gertrudis cows also grazed it in each February during the study period. They were observed grazing it about twice as many times as the Herefords each year. Alkali sacaton was grazed in spring and summer. Mesa dropseed was grazed throughout the year. Black grama was preferred in winter, probably because it has green culms throughout the year. Burrograss, possibly an underrated forage plant, was grazed throughout the year, although a little less in the spring than in the other seasons. The Santa Gertrudis cows grazed more of the coarse grasses, tobosa and burrograss, than the Hereford cows.

Table 2. Average seasonal preference (%) for plant groups by Hereford and Santa Gertrudis cows.

Season and breed	Perennial grasses	Annual grasses	Perennial forbs	Annual forbs	Shrubs
Fall					
Hereford	48.5	1.7	29.9	11.4	8.4
Santa Gertrudis	45.5	3.8	28.4	14.4	7.8
Winter					
Hereford	42.5	7.1	9.7	17.6	23.0
Santa Gertrudis	63.1	1.9	8.7	11.0	15.2
Spring					
Hereford	35.0	-	28.4	11.8	24.8
Santa Gertrudis	58.4	-	24.8	4.8	11.8
Summer					
Hereford	71.4	-	15.4	7.1	5.9
Santa Gertrudis	72.0	9.5	15.6	1.2	1.9
Yearlong					
Hereford	49.4	2.2	20.8	12.0	15.5
Santa Gertrudis	59.8	3.8	19.4	7.8	9.2

Annual grasses were consumed during only relative small percentages of the time. Sixweeks grama (Bouteloua barbata Lag.), a summer annual, was grazed in small amounts in the fall of 1961 by the Santa Gertrudis, by both breeds in the winter of 1962, and by the Herefords in the early fall of 1963. The cattle were observed grazing a considerable amount of it when it was dormant in the winter of 1964. This latter use was probably due to a shortage of other more palatable species at that time.

On a yearlong basis, both breeds were observed grazing perennial forbs during about 20% of the observations. Leatherweed croton was grazed throughout the year, but less during the winter than in other seasons. On several occasions it made up 50% of the grazed plants. Woolly paperflower (Psilostrophe tagetinae (Nutt.) Greene) was eaten primarily during the fall, winter and spring of 1962-63.

Of the annual forbs, russianthistle (Salsola kali L.) was grazed primarily during the spring, summer and fall of 1962. The Herefords ate about twice as much of this species as the Santa Gertrudis even though there was an abundance of it in both pastures. Bugseed (Corispermum nitidum Kit.) a summer annual, was relished during the

winter of 1961-62, apparently because the plants had much seed. It did not grow in any other year of the study. Wislizenus spectaclepod (Ephedra wislizeni Engelm.) and sumpweed (Iva dealbata Gray) were readily grazed in the fall and winter in the year when they occurred.

The Herefords grazed shrubs and shrub-like plants, particularly soaptree yucca, more than the Santa Gertrudis. Soaptree yucca was eaten primarily in the winter and spring, when the faces of the cattle that ate the leaves often became green. Increased use of it was made in the dry winter-spring of 1964 when it sometimes was 70% of the grazed plants. In late winter and spring, if the plants bloomed, the cattle particularly relished the flowers and the flower stalks. Long-leaf mormontea (Ephedra trifurea Torr.) and fourwing saltbush (Atriplex canescens (Pursh) Nutt.) were also browsed. Only the fruits of broom snakeweed and honey mesquite were eaten.

Summary

A 3-yr. study was made of the activities and plant species preference of Hereford and Santa Gertrudis cattle under southern New Mexico conditions. The Herefords spent significantly more time grazing than the Santa Gertrudis, but there was no evidence that environmental conditions affected the grazing time of either breed. One of the major differences between breeds was that the Santa Gertrudis spent more time walking (12.1 vs 6.5%) and traveled farther (7.8 vs 4.9 miles) than the Herefords.

The cattle grazed a variety of species, undoubtedly an important factor in their diets. During the winter and spring, the cattle grazed a number of forbs and shrubs not previously known to have been grazed in significant amounts. Some mature and dry shrubs were grazed, particularly while softened by dew. The cattle ate all available species to some extent. There was no apparent breed difference in the percentage of coarse plants grazed; although the Santa Gertrudis consumed more of the coarser grasses, the Herefords ate more russianthistle and soaptree yucca.

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