

Grazing Distribution Patterns of Hereford and Santa Gertrudis Cattle on a Southern New Mexico Range¹

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Highlight

Actual observations for 3 years and utilization surveys for 4 years were used to determine the grazing distribution patterns of Hereford and Santa Gertrudis cattle in southern New Mexico. The grazing patterns of the 2 breeds were similar in the pastures studied. There was good distribution throughout the pastures which extended 3.5 mi. from water. In larger pastures, Santa Gertrudis cows may graze farther from water than Hereford cows because they walk farther. Earlier studies indicated a decreasing degree of utilization with an increasing distance from water. In this study, where a variety of species were available, cattle readily grazed a distance from water to obtain certain species. It is suggested that an important tool in obtaining better livestock distribution would be to encourage the growth of palatable species at a distance from water.

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Improper distribution of livestock which can result in local overgrazed areas, is difficult to correct in range areas where pastures are large and there is a minimum of water development. Some practices that may promote more uniform use are proper placement of salt or supplemental feed, fencing, herding, trail building, water development, or changing the kind of livestock (Stoddart and Smith, 1955). This study was conducted to determine the difference, if any, in grazing distribution patterns of Hereford and Santa Gertrudis cattle on rangeland.

Methods

We conducted the study on the Jornada Experimental Range, 25 mi. north of Las Cruces, New Mexico. Herbel and Nelson (1966 a, b) described the study area, the details on management of the test herd, and the methods used in observing the cows and gave their species preferences. A salt-bone meal mix was available at water. There were no physical factors in the pastures that would encourage grazing in any particular area. The 2 pastures were in poor to fair range condition as a result of the 1951-56 drought.

While the activities and species preference of the Hereford and Santa Gertrudis cows were being observed, their locations in the pasture while grazing were noted. There were 37, 24-hr. observations of each breed over the 1961-64 study period. The pastures were zoned as follows:

Zone	Distance from water (mi.)
I	0 - 0.75
II	0.75 - 1.25
III	1.25 - 1.75
IV	1.75 - 2.25
V	2.25 - 2.75
VI	2.75 - 3.5

The time spent grazing in each zone was recorded.

In addition, we determined the utilization of perennial grasses, by zones, approximately every 6 weeks, November through June. We used the grazed-plant method (Roach, 1950). Only plants grazed by cows were counted; plants grazed only by rabbits or rodents were not included. Since the zones varied in size, 8 to 20 observations of 50 plants each were made in each zone. The major perennial grasses in each zone are shown in Table 1. The grass observations were begun in the fall of 1959, discontinued in the fall of 1960 because of severe drought conditions, resumed in the fall of 1961, and continued until the fall of 1964. The breeds were rotated between pastures each year, so that each breed was in each pasture 2 years.

Confidence intervals (0.95) were computed for all statistical comparisons.

Results

Grazing Time.—Table 2 shows the percentage of surface area in each zone by pasture and the percentage of grazing time by each breed for the 1961-64 period. The Santa Gertrudis cows were

Table 1. Major perennial grasses by zones.

Zone	Pasture 10	Pasture 11
I	alkali sacaton (<i>Sporobolus airoides</i>), ¹ burrograss (<i>Scleropogon brevifolius</i>)	burrograss, black grama (<i>Bouteloua eriopoda</i>)
II	alkali sacaton, burrograss, mesa dropseed (<i>Sporobolus flexuosus</i>)	black grama, mesa dropseed
III	burrograss, tobosa (<i>Hilaria mutica</i>), ear muhly (<i>Muhlenbergia arenacea</i>)	mesa dropseed, black grama
IV	burrograss, black grama, mesa dropseed	mesa dropseed
V	mesa dropseed, burrograss	mesa dropseed
VI	mesa dropseed	mesa dropseed

¹ Scientific names follow T. H. Kearney and R. H. Peebles. 1960. Arizona flora. University of California Press, Berkeley. 1085 p.

Table 2. Area (%) and grazing time (%) by zone.

Zone	Pasture 10			Pasture 11		
	Area	Hereford	Santa Gertrudis	Area	Hereford	Santa Gertrudis
I	5.4	7.2	7.9	10.1	11.0	13.5
II	11.1	8.5	6.4	18.0	14.7	6.8
III	17.3	6.0	14.0	21.1	13.6	15.3
IV	23.2	35.7	26.7	20.4	18.4	16.1
V	28.1	32.3	28.2	19.9	19.4	25.0
VI	14.9	10.3	16.8	10.5	22.9	23.3

in pasture 10 during 2 of the 3 years and in pasture 11 one year. Conversely, the Hereford cows were in pasture 11 for 2 years and pasture 10 one year.

There were no significant differences between breeds in grazing time spent in any zone, either within years, within pastures, or in combination of years and pastures. In pasture 10, the Herefords spent significantly more grazing time in zones IV and V than in any other zone, whereas the Santa Gertrudis spent significantly more grazing time in zones IV and V than in zones I and II. There were no significant differences in grazing time among zones within breeds in pasture 11.

Generally, there was a close relationship between surface area and grazing time in each zone, but there were some notable exceptions. An examination of the grazing time per unit area shows the Herefords spent significantly more time grazing in

Table 3. Percentage of perennial grass plants grazed.

Zone	Hereford	Santa Gertrudis
I	73.3	64.2
II	68.8	66.4
III	56.8	58.0
IV	53.8	67.6
V	53.2	61.8
VI	66.6	65.3

zones IV and V in pasture 10 than they did in zone III. In pasture 11, the Herefords spent significantly more grazing time per unit area in zone VI than in zone III whereas the Santa Gertrudis spent significantly more time in zone VI than in zone II. There were no significant differences among zones in grazing time per unit area for the Santa Gertrudis while they were in pasture 10.

Utilization Survey.—Table 3 shows the percentage of perennial grasses grazed by the 2 breeds for each zone at the close of the grazing season (about July

1 each year). Each breed was in each pasture for 2 of the 4 years in which this phase was studied. The 4-year averages are shown in Table 3. The only significant difference in percentage of perennial grasses grazed by the 2 breeds was in zone IV, where the Santa Gertrudis cows grazed more perennial grasses than the Herefords.

An examination of each year's data collected at the close of the growing season revealed the following significant differences. In 1960, the Herefords grazed more perennial grasses in zone I. In 1962, the Santa Gertrudis used more grasses in zone VI, and in 1963 in zone III. In 1964, the Herefords grazed more perennial grasses in zones II and III, while the Santa Gertrudis grazed more in zones IV and V.

The data in Table 3 show a remarkably similar utilization among the zones rather than a decreasing utilization with an increasing distance from water. The data collected during a year also show relatively even utilization over the 6 zones at any one time rather than heavy use near water early in the year followed by heavier use at increasingly greater distances from water as the grazing season progressed.

Discussion and Conclusions

There was little difference between the Hereford and Santa Gertrudis cows in the grazing distribution in these pastures. The farthest distance to water was 3.5 mi. in both pastures. Since the Santa Gertrudis walked farther than the Herefords, 7.8 mi. vs. 4.9 mi. (Herbel and Nelson, 1966 a), they might graze farther out in larger pastures.

The major factor affecting grazing location in this study was the species distribution. For example, both breeds preferred black grama in late winter. When either breed was in pasture 10, the cattle grazed primarily in zone IV, while the cattle in pas-

ture 11 grazed primarily in zones II and III during that period. This was verified both by actual observation and by the utilization survey. For a further discussion of the species preferences of these cattle, see Herbel and Nelson (1966 b).

Grazing distribution was not a major problem in these 2 pastures. Perhaps the problem is not important in pastures no larger than these, in poor to fair condition, on relatively level terrain, and with young cows. Earlier studies (Ares, 1936 and 1953 and Valentine, 1947) indicated that grazing use declined with increased distance from water. In those studies, the pastures were uniformly good or excellent condition black grama. In our study, there were a variety of species available and distance from wa-

ter was unimportant if the cattle were interested in grazing a species that occurred 3 mi. from water. Data presented by Norris (1953) also indicated that the location of a palatable species at a distance from water was responsible for better grazing distribution. This information suggests that better grazing distribution may be obtained by growing palatable species at the opposite side of the pasture from the water development.

LITERATURE CITED

- ARES, F. N. 1936. How the use of salt obtains better forage utilization on a cattle range. *Cattleman* 22 (12):20-22.
- ARES, F. N. 1953. Better cattle distribution through the use of meal-salt mix. *J. Range Manage.* 6:341-346.
- HERBEL, C. H., AND A. B. NELSON. 1966 a. Activities of Hereford and Santa Gertrudis cattle on a southern New Mexico range. *J. Range Manage.* 19:173-176.
- HERBEL, C. H., AND A. B. NELSON. 1966 b. Species preference of Hereford and Santa Gertrudis cattle on a southern New Mexico range. *J. Range Manage.* 19:177-181.
- NORRIS, J. J. 1953. Observations on salt-meal feeding of cattle. In *Range Day. N. Mex. Agr. Exp. Sta., N. Mex. Agr. Ext. Serv., Southwestern Forest and Range Exp. Sta.* n.p.
- ROACH, M. E. 1950. Estimating perennial grass utilization on semi-desert cattle ranges by percentage of ungrazed plants. *J. Range Manage.* 3:182-185.
- STODDART, L. A., AND A. D. SMITH. 1955. *Range Management.* McGraw-Hill Book Co., Inc. New York. 433 p.
- VALENTINE, K. A. 1947. Distance from water as a factor in grazing capacity of rangeland. *J. Forest.* 45:749-754.