

Relationship of Grazing Time To Forage-On-Offer

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Summary

A study on the relationship of time spent grazing by cattle to forage-on-offer was conducted in summer 1986.

Average forage-on-offer differed significantly ($P < 0.001$) between July [152 lbs dm/(cow-calf day⁻¹)], and September [123 lbs dm/(cow-calf day⁻¹)]. Conversely, grazing time increased significantly ($P < 0.001$) from 535 minutes/day⁻¹ in July to 778 minutes/day⁻¹ in September. Grazing time also increased significantly ($P < 0.001$) as forage-on-offer decreased by days, but not by stocking rates. In general, cattle grazed more actively during the day than during the night. These results suggest an indirect relationship between grazing time and forage-on-offer.

Introduction

Numerous investigations have reported a general tendency for animals to adjust their grazing time in response to changes in forage-on-offer. As forage-on-offer decreases, time spent grazing increases as the animal attempts to meet its forage intake (Allden and Whittaker, 1970; Hein, 1935; Scarnecchia et al, 1985; Jamieson and Hodgson, 1979). Other investigations have further demonstrated that as forage-on-offer becomes limiting, grazing animals will increase grazing time up to a point beyond which any further limitation results in a corresponding decline in grazing time (Chacon and Stobbs, 1976; Chacon et al. 1978; and Hendricksen and Minson, 1980) Thus, under critical shortages of forage-on-offer, animals may not compensate for small bite sizes, consequently, their daily forage intake will be reduced. Other researchers have reported increases in night grazing by dairy cattle under forage limiting conditions (Chacon and Stobbs, 1976; Cowan and O'Grady, 1976). However, Ebersohn et al. (1983), working with beef cattle reported that night grazing contributed only a small percentage to total grazing time.

Procedures

The study was conducted on Coastal bermudagrass [*Cynodon dactylon* (L.) Pers.] pastures at the Texas A&M University Research Farm in the Brazos River Bottom during summer 1986. The soil at the site is described as a ships clay—westwood silt loam intergrade (Udic chromustent-fluvertic ustochrept) (Hons pers. Comm.). Eight bermudagrass pastures were rotationally grazed (7 days grazing-21 days rest) at multiple stocking rates set at 2.7, 3.2, 3.8, and 5.0 cow-calf pairs per acre. The experiment was conducted as a repeated measure, randomized complete block design with two replications per stocking rate.

A double sampling technique described by Kanyama-Phiri and Conrad (1986) and separate regression equa-

KEYWORDS: Grazing time / stocking rates / bermudagrass / forage on offer.

tions were used on a weekly basis in order to predict forage-on-offer.

Three esophageal fistulated steers were fitted with Kienzle vibracorders to measure total time spent grazing each day and the time of day during which grazing occurred (grazing time distribution). The time spent grazing as measured in this study included time spent by the animal searching for forage. Record charts on the vibracorders were changed every 7 days. Interpretation of these charts was done using a 7-day chart analyzer. Grazing time distribution was then expressed in 6-hour increments (0-6, 6-12, 12-18, and 18-24 hours). Statistical analysis procedures were used to document the relationship of grazing time to forage-on-offer.

Similar information is lacking to document the relationship of grazing time to forage-on-offer of bermudagrass. Such information is critical for the proper stocking management for livestock production from bermudagrass pastures in Texas. The objective of this study was, therefore, to investigate the relationship of grazing time to forage-on-offer.

Results and Discussion

Forage-on-offer by days and by stocking rates for July and September are shown in Table 1. Forage-on-offer in September was 25 percent, 15 percent, and 10 percent less, respectively on days 1, 5, and 7 than in July. During both sampling dates there were similar declines in forage-on-offer with increasing stocking rates and time but the degree of utilization was less in September than in July. Grazing time on the other hand did not follow the same pattern (Table 2). The time spent searching for and consuming forage (grazing time) was much greater in September than in July. There were large decreases in the grazing time between day 4 and day 7 for the heavy stocked pastures. The July results appear to be in agreement with the findings of Chacon and Stobbs (1976), Chacon et al. (1978), and Hendricksen and Minson (1980). These authors attributed the decline in grazing time, towards the end of the grazing cycle, to lack of desire by the animals to eat stems. Other investigators have suggested that animals will decrease grazing time

TABLE 1. FORAGE-ON-OFFER BY STOCKING RATES AND DAYS

SR	Forage-on-offer (lbs DM/Cow/Calf)			
	Day 1	Day 4	Day 7	Mean
Cow/Calf/A	July			
5.0	152	54	16	74
3.8	192	126	58	126
3.2	256	148	109	171
2.7	296	239	182	239
Mean	224	142	91	
	September			
5.0	104	67	30	67
3.8	129	76	54	86
3.2	204	155	112	157
2.7	233	188	129	183
Mean	168	121	82	

TABLE 2. GRAZING TIME BY SR AND BY DAYS, MINUTES PER DAY

Stocking rate (Cow/Calf/A)	Grazing Time			
	Day 1	Day 4	Day 7	Means
	July			
5.0	515.5	649.0	408.5	524.3
3.8	533.0	541.5	466.5	513.7
3.2	545.0	595.5	552.0	564.2
2.7	593.0	476.0	640.5	569.8
Means	546.6	565.4	516.9	
	September			
5.0	735.5	781	591	702.50
3.8	833	741	877	817.00
3.2	628	766	777	723.83
2.7	844	841	882	869.00
Means	770.25	782.25	781.75	

towards the end of the grazing cycle in anticipation of being moved into new a pasture (Jamieson and Hodgson, 1979). These two reasons could possibly explain the grazing behavior of animals under the heavy stocking rates. The changes in the grazing behavior in September did not follow this trend. Apparently with bermudagrasses the heavy stem load concept does not exist nor are the animals anticipating being rotated as depicted by the grazing times in September between days 4 and 7. It may be associated with an environmental condition variable that tends to restrict animal movement during hot dry weather. Visual observations indicated that some cows on heavily stocked pastures were forced to wean their calves early when forage-on-offer became limiting. It was also interesting to note that a significant ($P < 0.05$) decrease in the average forage-on-offer from 152 lbs DM/(cow-calf day⁻¹) in July to 123 lbs DM/(cow-calf day⁻¹) in September resulted in a highly significant ($P < 0.00$) increase in time spent grazing from 543 to 778 minutes/day⁻¹, respectively.

Results of percentage grazing time distribution by quarter of day are presented in Table 3. On the average, the time spent grazing between 0 and 6 a.m. was significantly less than the other quarters. These results appear to be in agreement with those of Ebersohn and Limpus (1983) who reported that steers spent between 12 and 15 percent of total grazing time between midnight and daybreak (0-6 hours). Other researchers have reported that night grazing may increase in dairy cattle because grazing is interrupted by milking schedules during the day.

These results appear to provide inconclusive evidence of a relationship between grazing time and forage-on-offer and that the period of grazing during the season appears to play a significant role in this relationship.

Literature Cited

1. Allden, W. G. and I. A. McD. Whittaker. 1970. The determinants of herbage intake by grazing sheep. The interrelationship of factors of herbage intake and availability. *August. J. Agric. Res.* 21:755-766.
2. Chacon, E. A. and T. H. Stobbs, 1976. Influence of progressive defoliation of a grass sward on the eating

- behavior of cattle. August. J. Agric. Res. 27:709-727.
3. Chacon, E. A., T.H. Stobbs, and M. B. Dale. 1978. Influence of sward characteristics on the grazing behavior and growth of Hereford steers grazing tropical grass pastures. August. J. Agric. Res. 29:89-102.
 4. Cowan, R. T. and P. O'Grady. 1976. Effect of presentation yield of tropical grass-legume pasture on grazing time and milk yield of Fresian cows. Trop. Grassl. 10:213-218.
 5. Ebersohn J. P., J. Evans, and J. F. Limpus. 1983. Grazing time and its diurnal variation in beef steers in Coastal South East Queensland Trop. Grassld. 17:81.
 6. Hendricksen, R. and D. J. Minsen. 1980. The feed intake and grazing behavior of cattle grazing *Lab lab purpureus* cv. Rongai. J. Agri. Sci. Comb. 95: 547-554.
 7. Kanyama-Phiri, G. Y. and B. E. Conrad. 1986. Effect of stocking rate on forage-on-offer, bite rate, bite size, bite quality, and animal weight gain on warm season pastures. In Forage Research in Texas. Texas Agri. Exp. Sta., College Station., TX pp. 41-43.
 8. Scarnecchia, D. L., A. S. Nastis, and J. C. Malechek. 1985. Effects of forage availability on grazing behavior of heifers. J. Range Manage. 38: 177-180.