

Intakes and Digestibilities of Bermudagrass and Sorghum Silages

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Summary

Silages from common bermudagrass and a forage sorghum hybrid were fed to yearling steers in intake and digestion trials to determine relative intakes of indigestible neutral detergent fiber (INDF). Average dry matter intakes and digestibilities were similar for the forage portion of the diets. However, INDF intake was 35 percent greater for bermudagrass than for sorghum, indicating a higher ruminal rate of passage of undigested residues for bermudagrass-fed animals.

Introduction

In a series of stall feeding experiments with sorghum silage and fresh or ensiled ryegrass conducted at Angleton, yearling cattle were able to consume no more INDF than .4 percent of body weight (Lippke, 1986). As a consequence, dry matter intakes of diets with more than 15 percent INDF content were proportionally less than maximum. The objective of the experiment described here was to determine the relative intake capacity of yearling cattle for INDF from bermudagrass, which commonly has a much higher INDF content than sorghum or ryegrass.

Procedure

A hybrid forage sorghum was harvested in the soft-dough stage of maturity and ensiled in a 6- X 16-ft fiberglass tank. Common bermudagrass with less than 20 percent dallisgrass was harvested in mid-summer, 7 weeks after the previous cutting, and ensiled in two plastic-lined, 5- X 12-ft steel tanks. In each case samples were taken at harvest for determination of dry matter.

Nine-month-old Hereford x Brahman steers that had been weaned for 6 weeks and treated for internal parasites were weighed after a 16-hour fast and placed in individual pens. Five steers (548 lbs) were randomly assigned to receive ad libitum amounts of bermudagrass silage and six steers (523 lbs) were assigned to sorghum silage diets. Data from only the last 10 days of the 16-day intake trial were used to measure intake. Cottonseed meal was fed separately in amounts to bring diet protein content up to 8 percent. Following the intake trial, four steers on each forage were continued in a 7-day digestion trial in which each animal was offered 90 percent of the average amount consumed voluntarily during the intake trial. Details of experimental procedures have been described previously (Lippke, 1980).

Results and Discussion

Both forages were at optimum dry matter content (33 percent) for proper ensiling. Protein content of the sor-

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ghum was very low (Table 1) and required considerable cottonseed meal supplementation to raise diet protein content to 8 percent. This was considered a minimum to prevent protein level from having a major influence on intake.

TABLE 1. COMPOSITION, INTAKE, AND DIGESTIBILITY OF BERMUDAGRASS AND SORGHUM SILAGES

Item	Forage	
	Bermuda	Sorghum
Composition, %		
Protein	7.3	2.8
NDF	67.7	56.9
ADF	34.7	34.7
Cellulose	26.5	26.5
INDF	29.4	21.9
Intake, % of body weight		
Forage dry matter	1.79	1.69
Total dry matter	1.81 ^a	1.95 ^b
INDF	.58 ^a	.43 ^b
Digestible dry matter, %	51.6 ^a	56.6 ^b

Values in the same line with different superscripts are significantly ($P < .05$) different.

The content of INDF in bermudagrass was typically higher than in sorghum. However, the cattle in this experiment were able to consume significantly greater amounts of INDF from bermudagrass than from sorghum (Table 1). Consequently, average dry matter intakes of the silage portions of the diets were almost the same, although total dry matter intake was significantly higher for sorghum silage. Dry matter digestibility, though significantly higher for sorghum-containing diets, was reduced three percentage units when the contribution of cottonseed meal was discounted mathematically.

The higher intake of INDF by cattle-fed bermudagrass silage in this experiment is consistent with the conclusion drawn previously (Lippke, 1980) that a higher proportion of hemicellulose (NDF minus ADF) in the cell wall constituents results in more rapid ruminal degradation of cell structure, increased rate of passage from the rumen, and greater fiber intake. Correlations of INDF intake with changes in hemicellulose:cellulose ratio within forage species should be further explored.

Literature Cited

1. Lippke, H. 1980. Forage characteristics related to intake, digestibility and gain by ruminants. *J. Anim. Sci.* 50:952.
2. Lippke, H. 1986. Regulation of voluntary intake of ryegrass and sorghum forages in cattle by indigestible neutral detergent fiber. *J. Anim. Sci.* 63:1459.

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.