Yearling Beef Heifer Performance on Limpograss Pastures Grazed to Different Heights

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Limpograss pastures were continuously grazed to 8, 16, or 24 in during summer. Approximately a 16-in height provided the best overall pasture persistence and heifer performance.

Summary

Grazing height of limpograss pastures is thought to be important in determining pasture performance and cattle weight gains, but this has not been tested under continuous grazing. The objectives of this study were to determine the effects of grazing limpograss pastures (continuous grazing) to heights of 8, 16, or 24 in during two summers and providing a non-protein nitrogen supplement to yearling beef heifers on forage characteristics, heifer average daily gain (ADG), and invasion of the pasture by grass weeds (vaseygrass and bermudagrass). Limpograss crude protein (CP) and digestibility (IVOMD) were generally higher with shorter grazing heights. Average daily gain was greatest for cattle grazing 16-in pastures and increased due to supplementation only for cattle grazing 8- and 24-in tall pastures. Number of vaseygrass plants in the pasture declined for all grazing heights, but the decline was greatest for the 8-in height. When grazed to 8 in, however, common bermudagrass invasion of pastures was greatest. Continuous grazing of limpograss pastures to approximately a 16-in height during summer appears to provide better pasture persistence and heifer performance than the other heights tested.

Introduction

Perennial pastures are the main source of nutrition for Florida beef cattle. 'Floralta' limpograss (*Hemarthria altissima*) is one of the warm-season perennial grasses that has been increasingly adopted by farmers during the past 15 yr because of its superior digestibility, adaptation to seasonally flooded soils, and cool-season growth. Despite high digestibility of limpograss forage, cattle daily gains have sometimes been low due to protein deficiencies.

Previous research looked at different management alternatives that could overcome protein deficiencies of cattle grazing limpograss pastures during the summer. These included legume-limpograss associations, use of higher rates of nitrogen fertilizer, and protein supplementation to the animals. These strategies proved effective in overcoming the deficiency, but they represented either additional expense, a significant increase in management intensity, or had a high risk of failure, especially in the case of planting legumes with limpograss.

Managing grazing height of a pasture is an inexpensive and relatively undemanding practice that affects not only nutritive value of the forage but also pasture survival. The effect of grazing height on gains of cattle grazing limpograss has not been evaluated and represents an alternative solution to the problem of protein deficiency.

The objectives of this research were to determine the effects of pasture grazing heights and feeding nitrogen supplement on forage nutritive value, performance of beef heifers, and grass weed invasion of limpograss pastures.

Procedure

The study was conducted for 84 d during the summers of 1998 and 1999 (July 15 to Oct 7, 1998 and June 24 to Sept 16, 1999) on established pastures of Floralta limpograss at the Beef Research Unit, Gainesville. Soils were poorly drained flatwood types. Based on soil analysis and the intended use of the land, all pastures were fertilized annually with 140 lb N/acre, 35 lb P_2O_5/acre, and 70 lb K_2O/acre.

The six treatments were the three heights (8, 16, and 24 inches) of the continuously grazed limpograss pastures in all possible combinations with two supplement treatments (none and 1.8 lb/d of a 44% CP corn-urea mixture). Supplement was fed daily in individual tubs. Treatments were replicated two times and pastures were 1.25 acres. Two crossbred (3/4 Angus, 1/4 Brahman) yearling heifers of similar initial weight (average of 780 and 740 lb for 1998 and 1999, respectively) and medium frame were assigned to each pasture as testers. Additional animals of the same breed and similar weight as the testers were added or removed as needed to graze the pasture to the desired height.

Animals were weighed at the beginning and end of the experiment and every 28 d throughout. Forage mass was measured biweekly at five representative sites per pasture, and samples were cut to a 3-in stubble height and dried. At the same time a sample of forage from the top 2 in of the pasture, was taken to represent the diet selected by the animals. Crude protein and IVOMD analyses were conducted on the latter samples.

Measurements were taken at nine sites per pasture to monitor the presence of grass weeds at the beginning and end of each grazing season. Vaseygrass plant density was measured on each pasture and expressed as plants/square yard. Ground cover of vaseygrass, bermudagrass, and limpograss was assessed by visual estimates of cover for the entire pasture. Two observers assessed cover individually and then compromised on their appraisal.

Results

Pasture height affected ADG of non-supplemented heifers only (Table 1).

Supplemented heifer ADG was 1.26 lb. Non-supplemented heifers grazing 16-in pastures gained 1.4 lb/d and did not differ from those receiving supplement. When considering only non-supplemented heifers, ADG of animals grazing 16-in pastures (1.4 lb/d) was higher than those grazing 8 in (1.0 lb/d) and than those grazing 24 in (0.7 lb/d).

Forage mass increased as the grazing height increased from 8 in (2,700 lb/acre) to 24 in (5,300 lb/acre). Forage CP and IVOMD were affected by canopy height (Table 2). Crude protein and IVOMD of forage sampled to represent the diet were higher in 1999 compared to 1998. This can be attributed to less rainfall in 1999 than 1998 during the experimental period. Mild droughts, such as that observed in 1999, have been associated with increased forage nutritive value. Also, during 1998 there was a greater incidence of chinchbug damage than in 1999, and the browning of the herbage was partially responsible for the lower nutritive value in 1998. Crude protein decreased with increasing height in both years but IVOMD decreased only in 1999.

Vaseygrass plant density, and cover of vaseygrass, bermudagrass, and limpograss were also affected by canopy height (Table 3). Vaseygrass initial plant density averaged 4.5 plants/square yard across treatments. After two grazing seasons, vaseygrass plant density decreased for all grazing heights but the decrease was greatest for the 8-in pastures (loss of 4.4 plants/square yard) and was –0.6 and –0.4 plants/square yard for 16- and 24-in treatments, respectively.

At the beginning of the experiment, limpograss, vaseygrass, and bermudagrass initial cover averaged 88, 6, and 1%, respectively, across treatments. During the experiment, vaseygrass cover was decreased by nine percentage units when pastures were grazed to an 8-in height, but changed little when grazing height was 16 or 24 in. Limpograss cover was not affected by treatment. Bermudagrass cover increased for all canopy heights, but the greatest increase (seven percentage units) occurred when pastures were grazed to 8 in (Table 3).

In conclusion, highest ADGs were obtained when heifers grazed limpograss pastures to a 16-in height. This is thought to be due to more forage available for grazing (compared to 8-in pastures) and easier access to leafy forage (compared to both 8- or 24-in pastures; 24-in pastures tended to be trampled more). Continuous grazing of limpograss pastures and grazing to heights between 8 and 24 in will likely decrease the density of vaseygrass plants, especially so when the height is approximately 8 in. However, grazing to an 8-in height is not recommended because common bermudagrass may invade limpograss. Thus, our results indicate that grazing limpograss to approximately 16 in provides good production per animal and limpograss pasture persistence.

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Table 1. Average daily gain (ADG) for non- and supplemented treatments in response to pasture height.

	ADG	
Pasture Height	Non-Supplemented	Supplemented
in	----------lb----------	
8	1.0	1.4
16	1.4	1.2
24	0.7	1.2
Contrast[a]	Q	NS

[a]Orthogonal polynomial contrasts for the effect of pasture height on average daily gain; Q=quadratic, $P \leq 0.05$; NS=not significant.

Table 2. Limpograss pasture forage mass (FM), estimated diet crude protein (CP), and in vitro organic matter digestibility (IVOMD) in response to pasture height during 1998 and 1999.

Pasture Height	FM[a]	CP		IVOMD	
		1998	1999	1998	1999
in	lb/acre	----------%----------		----------%----------	
8	2,700	8.6	12.0	51.4	59.8
16	4,100	7.9	11.6	50.9	60.3
24	5,300	8.0	10.0	51.6	57.5
Contrast[b]	L	L, Q	L, Q	NS	L, Q

[a]Data are means across two supplement levels and 2 yr.
[b]Orthogonal polynomial contrasts for the effect of pasture height on forage mass and nutritive value; NS=not significant, L=linear, Q=quadratic, $P \leq 0.01$.

Table 3. Changes in vaseygrass plant density and percentage unit changes in limpograss, vaseygrass, and bermudagrass cover in response to pasture height.

Pasture Height	Vaseygrass Density	Vaseygrass Cover	Limpograss Cover	Bermudagrass Cover
in	plants/yard^2	----------%----------		
8	- 4.4	- 9.0	0.1	7.0
16	- 0.6	4.0	0.1	1.0
24	- 0.4	- 1.0	10.0	4.0
Contrast[a]	L[b]	L[c], Q[d]	NS	L[b], Q[c]

[a]Orthogonal polynomial contrasts for the effect of canopy height on vaseygrass density, and cover of vaseygrass, limpograss and bermudagrass; L = linear, Q= quadratic, NS= not significant.
[b]$P \leq 0.1$.
[c]$P \leq 0.05$.
[d]$P \leq 0.01$.