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Effects of Interseeding Ladino Clover into Tall Fescue Pastures of Varying Endophyte Status on Grazing Performance of Stocker Steers

L.W. Lomas and J.L. Moyer

Summary

Sixty-four yearling steers grazing tall fescue pastures were used to evaluate the effects of fescue cultivar and interseeding ladino clover on grazing gains and available forage. Fescue cultivars evaluated were high-endophyte 'Kentucky 31,' low-endophyte 'Kentucky 31,' 'HM4,' and 'MaxQ.' Steers that grazed pastures of low-endophyte 'Kentucky 31,' 'HM4,' or 'MaxQ' gained significantly more ($P < 0.05$) and produced more ($P < 0.05$) gain/a than those that grazed high-endophyte 'Kentucky 31' pastures. Gains of cattle that grazed low-endophyte 'Kentucky 31,' 'HM4,' or 'MaxQ' were similar ($P > 0.05$). High-endophyte 'Kentucky 31' pastures had more ($P < 0.05$) available forage than low-endophyte 'Kentucky 31,' 'HM4,' or 'MaxQ' pastures.

Introduction

Tall fescue, the most widely adapted cool-season perennial grass in the United States, is grown on approximately 66 million acres. Although tall fescue is well adapted in the eastern half of the country between the temperate north and mild south, presence of a fungal endophyte results in poor performance of grazing livestock, especially during the summer. Until recently, producers with high-endophyte tall fescue pastures had two primary options for improving grazing livestock performance. One option was to destroy existing stands and replace them with endophyte-free fescue or other forages. Although it supports greater animal performance than endophyte-infected fescue, endophyte-free fescue has been shown to be less persistent under grazing pressure and more susceptible to stand loss from drought stress. In locations where high-endophyte tall fescue must be grown, the other option was for producers to adopt management strategies that reduce the negative effects of the endophyte on grazing animals, such as diluting the effects of the endophyte by incorporating legumes into existing pastures or providing supplemental feed. In recent years, new tall fescue cultivars have been developed with a non-toxic endophyte that provides vigor to the fescue plant without negatively affecting performance of grazing livestock. Interseeding legumes into tall fescue cultivars with the toxic endophyte should be an effective way of increasing gains of cattle grazing tall fescue. However, these cultivars lack the competitiveness of high-endophyte 'Kentucky 31' and their competitiveness with legumes could be a potential

problem. Objectives of this study were to evaluate forage availability, stand persistence, and performance of stocker steers grazing tall fescue cultivars with non-toxic endophyte and high- and low-endophyte 'Kentucky 31' with and without ladino clover.

Experimental Procedures

On March 30, 2016, 64 mixed black yearling steers were weighed (535 lb) on two consecutive days and allotted to sixteen 5-acre established pastures of high-endophyte 'Kentucky 31' or low-endophyte 'Kentucky 31,' 'HM4,' or 'MaxQ' tall fescue (4 replications per cultivar). 'HM4' and 'MaxQ' are cultivars with a non-toxic endophyte. Two pastures of each cultivar had been interseeded with 5 lb/a of 'Will' ladino clover on February 22, 2016. Four steers were assigned to each pasture. Pastures without clover were fertilized with 80 lb/a nitrogen (N) on February 10, 2016. All pastures were fertilized with 40 lb/a N and P_2O_5 and K_2O as required by soil test on September 13, 2016.

Pasture was the experimental unit and weight gain was the primary measurement. No implants or feed additives were used. Cattle were weighed and forage availability was measured every 28 days with a disk meter calibrated for tall fescue. Cattle were treated for internal and external parasites before being turned out to pasture and later vaccinated for protection from pinkeye. Steers had free access to commercial mineral blocks that contained 12% calcium, 12% phosphorus, and 12% salt. Two steers were removed from the study for reasons unrelated to experimental treatment and replaced with grazers to maintain equal stocking rates. Pastures were grazed continuously until November 29, 2016 (224 days) when steers were weighed on two consecutive days and grazing was terminated.

After the grazing period, cattle were moved to a finishing facility, implanted with Synovex-S (Zoetis, Madison, NJ), and fed a diet of 80% whole-shelled corn, 15% corn silage, and 5% supplement (dry matter basis). Cattle were being finished for slaughter to determine the effect of grazing treatment on subsequent finishing performance at the time that this report was written.

Results and Discussion

Grazing performance is pooled across legume treatment and presented by tall fescue cultivar in Table 1 and pooled across fescue cultivar and presented by legume treatment in Table 2. There were no significant interactions ($P > 0.05$) between fescue cultivar and legume treatment for cattle performance. However, there was a significant ($P < 0.05$) fescue cultivar $\times$ legume interaction for average available forage DM. Steers that grazed low-endophyte Kentucky 31, HM4, or MaxQ were heavier ($P < 0.05$) at the end of the grazing period, had greater ($P < 0.05$) grazing gain, greater ($P < 0.05$) daily gain, and produced greater ($P < 0.05$) gain/a than steers grazing high-endophyte Kentucky 31. Average available forage DM of high-endophyte Kentucky 31 pasture was greater ($P < 0.05$) than that of low-endophyte Kentucky 31, HM4, or MaxQ. MaxQ pasture had greater ($P < 0.05$) available forage DM than low-endophyte Kentucky 31. Average available forage DM of HM4 pasture was similar ($P > 0.05$) to that of low-endophyte Kentucky 31 and MaxQ pastures. Steer gains were similar ($P > 0.05$) between pastures fertilized with an additional 80 lb/a N and those interseeded with ladino

clover. Pastures with clover had less ($P < 0.05$) available forage DM than those without clover for all cultivars except high-endophyte Kentucky 31 where available forage DM of pastures with and without clover were similar ($P > 0.05$).

Table 1. Effects of cultivar on performance of steers grazing tall fescue pastures, Southeast Agricultural Research Center, 2016

Item	Tall fescue cultivar			
	High-endophyte Kentucky 31	Low-endophyte Kentucky 31	HM4	MaxQ
Grazing phase (224 days)				
Number of head	14	16	16	16
Initial weight, lb	533	535	535	537
Ending weight, lb	764a	920b	931b	924b
Gain, lb	232a	385b	396b	387b
Daily gain, lb	1.03a	1.72b	1.77b	1.73b
Gain/a, lb	185a	308b	317b	310b
Average available forage dry matter, lb/a*	7,365a	5,944b	6,139bc	6,300c

Means within a row followed by the same letter do not differ ($P < 0.05$).

*There was a significant ($P < 0.05$) fescue cultivar $\times$ legume interaction.

Table 2. Effects of interseeding ladino clover on performance of steers grazing tall fescue pastures, Southeast Agricultural Research Center, 2016

Item	Legume treatment	
	No legume	Ladino clover
Grazing phase (224 days)		
Number of head	31	31
Initial weight, lb	534	536
Ending weight, lb	868	902
Gain, lb	334	366
Daily gain, lb	1.49	1.63
Gain/a, lb	267	293
Average available forage dry matter, lb/a*	6,888a	5,986b

Means within a row followed by the same letter do not differ ($P < 0.05$).

*There was a significant ($P < 0.05$) fescue cultivar $\times$ legume interaction.