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Forage Production of Tall Fescue at College Station, Texas

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Summary

This study was conducted over a 2-year period to compare the forage production and persistence of three commercial and six experimental tall fescue (*Festuca arundinacea*) cultivars. Two defoliation strategies (fall and spring [DT-I] vs. fall, spring, and summer [DT-II]) were used in 1987-88 to discriminate among the cultivars. Over both years and defoliation treatments, mean forage production ranged from 3,120 to 5,060 lb/acre. Of the commercially available cultivars, 'Triumph' had the greatest mean yield, while 'Kenhy' and 'Johnstone' were not significantly different the lowest yielding entry. The experimental cultivars, PI 26 and Temple 3, had the greatest persistence under both management systems and may represent valuable germplasm for improving tall fescue for the southern United States.

Introduction

The development of cool-season perennial grasses for Texas and the southern United States has received considerable attention by plant breeders. Unfortunately, most cool-season grasses fail to persist in the lower South without significant management inputs. The presence of fungal endophytes such as *Acremonium coenophialum* in tall fescue have been implicated in improving plant survival under conditions of heat and moisture stress and grazing (Read and Camp 1986). Unfortunately, the presence of *A. coenophialum* has been associated with conditions ranging from reduced animal performance (liveweight gain) in cattle (Read and Camp 1986) to abortions in pregnant broodmares (Stuedeman and Hoveland 1988).

The objective of this research was to compare the yield and persistence of six experimental endophyte-free cultivars with three commercially grown endophyte-infected cultivars.

Procedure

This study was conducted in the Brazos riverbottom at the Texas A&M University Farm, which is located 11 miles west of College Station, in Burleson County. Three commercial and six experi-

mental tall fescue cultivars (Table 1) were seeded at a rate of 20 lb PLS/acre on 3 Dec. 1986 on a Norwood silty clay loam soil. A split-plot design with three replications was used. Cultivars constituted the main plots, and defoliation treatments (DT) were subplots. During the 1987-88 growing season, DT-I plots were harvested on 25 October and 29 March, and DT-II plots were harvested on 25 October, 29 March, 5 May, and 7 June. Stand density was greatly reduced as the result of all 1987-88 treatments, and the plots were harvested only one time during the 1988-89 growing season.

Results and Discussion

Significant year (y), cultivar (c), and defoliation treatment (DT) effects were observed for forage production in this study. In addition, significant $y \times c$ and $y \times DT$ interactions were also observed. The significant interactions are associated with the poor forage production of all cultivars during the 1988-89 growing season. The large reduction in forage production observed in 1989 was attributed to the poor persistence of tall fescue at this location.

Mean forage production of all cultivars averaged 5,963 and 1,720 lb/acre during the 1987-88 and 1988-89 growing seasons, respectively (Table 2). Triumph

Table 1. Origin of tall fescue entries.

Cultivar	Origin or breeding history
Angleton	Original plants were selected from a spaced plant nursery at Angleton, TX, for disease resistance.
Temple 3	Original plants were selected from plots at Temple, TX, following the retirement of Shorty Norris. This population represents two cycles of selection at Dallas.
PI 25	Selection out of PI 231558 from Morocco
PI 26	Selection out of PI 231560 from Morocco
PI 100	Selection out of PI 283291 from Portugal
PI 144	Selection out of PI 231557 from Morocco
Kenhy	Cultivar developed in Kentucky. Seed was produced from a low endophyte-infected pasture at Dallas.
Johnstone	Cultivar developed in Kentucky
Triumph	Cultivar developed by Auburn University, Auburn, AL

Keywords: fungal endophyte / *Festuca arundinacea*.

Table 2. Mean forage production (lb/acre) of tall fescue commercial cultivars and experimental lines.

	1987-1988	1988-1989	2-year mean
.....dry matter lb/acre			
PI 26	7940	2180	5060a*
Triumph	7310	1890	4600ab
PI 100	6675	1565	4120bc
Temple 3	5820	1860	3840cd
Angleton	5530	1450	3490de
PI 144	5315	1625	3470de
Kenhy	5110	1770	3440de
Johnstone	5045	1835	3440de
PI 25	4920	1320	3120e
Mean	5963	1720	3841

* Yields followed by the same letter.

and PI 26 were the two highest yielding entries in the test. The higher yield of PI 26 was due to its excellent production during the first year (DT-II), when it produced 9,105 lb/acre compared with 7,730 lb/acre by Triumph (Table 3).

Across cultivars and years, DT-II produced more forage than did DT-I (7,808 vs. 7,379 lb/acre) (Table 3). The advantage of DT-II was attributed solely to its higher yield during the first year. During the second year, plots harvested during the late spring and summer of the first year suffered a 33% reduction in forage production compared with DT-I. Only the experimental cultivars PI 26 and Temple 3 showed similar production during 1988-89 regardless of the defoliation treatment used during the first year (Table 3).

Table 3. Influence of defoliation treatment on the forage yield (lb/acre) of tall fescue varieties and experimental lines.

Cultivar	1987-88		1988-89	
	DT-II	DT-I	DT-II	DT-I
PI 26	9105	6775	2300	2055
Triumph	7730	6890	1465	2330
PI 100	6930	6420	1370	1745
Temple 3	6540	5100	1845	1870
Angleton	6220	4845	1140	1770
PI 144	5730	4900	1240	2000
Kenhy	5480	4740	1190	2350
Johnstone	6375	3720	1000	2660
PI 25	5380	4460	890	1780
Mean	6610	5317	1198	2062

According to observations from this study, PI 26 and Temple 3 appear to be promising sources of germplasm for improving persistence of tall fescue for the lower South.

Literature Cited

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