Performance of Tall Fescue Cultivars Under Two Different Harvest Regimes

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Summary

This study was undertaken to determine whether progress has been made in breeding tall fescue (*Festuca arundinacea* Schreb.) lines adapted to north central Texas and to determine whether the time spent testing for adaptability to the Texas environment could be decreased. Two methods of harvest were used; one set of plots was harvested continuously throughout the year and the other set was not harvested during the summer months. Continuous harvesting of plots was the superior method for identifying superior tall fescue lines.

Keywords: plant breeding / summer survival.

Introduction

To determine whether progress is being made in a plant-breeding program, the performance of new breeding lines must be compared with breeding material from other plant breeders and existing cultivars. The primary problem with growing tall fescue in the southern United States is the survival of stands during summer months. In the South, the recommended practice is not to harvest or graze pastures during the summer thus to promote its survival. When recommended harvest methods are used to test tall fescue, several years may elapse before differences are detected in survival of tall fescue cultivars and lines. This test was conducted to determine whether harvesting plots

Table 2. Dry matter production of tall fescue cultivars under two different harvest methods during the 1989-90 growing season.

Cultivar	Conventional (mo.-day-year)				Continuous (mo.-day-year)				
	12-1-89	3-22-90	5-10-90	Total	12-1-89	3-22-90	5-10-90	6-19-90	Total
	lb/A								
AU Vigor	1927 ab*	1592 ab	3486 abcd	7005 ab	462 abc	1620 abc	3615 bc	847 cd	6544 ab
Martin	1988 ab	1136 b	3209 cd	6333 ab	200 de	1024 bc	3404 bc	911 bc	5539 bc
Mozark	1960 ab	1266 b	3334 bcd	6560 ab	254 cde	1217 cd	3133 c	783 cd	5387 c
Cajun	2134 ab	1128 b	3187 cd	6449 ab	306 bcde	1197 cd	3258 bc	905 bc	5666 bc
AU Early	1812 ab	1548 ab	3501 abcd	6861 ab	553 a	1888 a	3700 bc	807 cd	6948 a
AU Triumph	2415 ab	1367 ab	2958 d	6740 ab	455 abc	1408 abcd	3098 c	1051 b	6012 abc
PI144	1758 ab	1811 a	3142 cd	6711 ab	242 cde	1783 ab	3504 bc	913 bc	6442 abc
PI25	1514 b	1402 ab	3600 abc	6516 ab	202 de	1439 abcd	3567 bc	882 bcd	6090 abc
PI26	2099 ab	1182 b	3482 abcd	6763 ab	504 ab	1627 abc	3550 bc	896 bcd	6577 ab
Angleton	2296 ab	1435 ab	4026 a	7757 a	437 abc	1278 bcd	4405 a	708 d	6828 a
PI100-2	1814 ab	1203 b	3031 cd	6048 b	295 bcde	1309 bcd	3152 c	743 cd	5495 bc
Temple 3	2255 ab	1218 b	3466 bcd	6939 ab	373 abcd	1273 bcd	3487 bc	714 d	5847 abc
Courtenay	1519 b	453 c	2042 e	4014 c	102 e	231 e	1741 d	1501 a	3575 d
Stephenville	2468 a	1339 ab	3832 ab	7639 a	448 abc	1247 bcd	3913 ab	717 d	6325 abc
Mean	1997	1291	3307	6595	345	1324	3395	884	5948
CV (%)	25	24	10	14	34	24	12	13	11

*Means in a column not followed by a common letter differ significantly (5% level) using Duncan's multiple range test.

throughout the summer would speed the detection of improved summer survival of tall fescue lines.

Procedure

Fourteen different tall fescue cultivars and breeding lines were planted September 27, 1988, at the Texas A&M University Research and Extension Center at Dallas. Plots were 15.5 x 5 ft in a randomized block design with four replications. Paired plots were used for treatments. One set of plots was harvested using the recommended (conventional) harvest schedule, and the others were harvested throughout the year (continuous). Fertilizer was applied at 64 lb of nitrogen (N)/A in February 1989, November 1989, and February 1990. During the 1988-89 growing season, the conventional plots were harvested two times and the continuous plots were harvested four times. During the 1989-90 growing season, the conventional plots were harvested three times and the continuous plots were harvested four times.

Results and Discussion

Mean dry matter production during the 1988-89 growing season was 3,846 lb/A in the conventional plots, and the mean was 5,890 lb/A in the continuous plots (Table 1). As expected, a comparison of the first two harvests for both methods showed no differences caused by harvest method (analysis not shown). This increase in yearly production caused by harvesting throughout the summer illustrates why a producer will risk the loss of stand of tall fescue by grazing it during the summer. Mean dry matter production during the following growing season (1989-90) was 6,595 lb/A in the conventional plots, and the mean was 5,948 lb/A in continuous plots (Table 1). Not using the tall fescue the previous summer increased total dry matter production by 647 lb/A. This increase was primarily due to the higher yields of the conventional plots for the December 1, 1989, harvest (Table 2). Harvest method caused no differences in yield on the March 22, 1990, and May 10, 1990, harvest dates.

Continuous harvest was a superior method for testing for an adapted tall fescue for north central Texas. Five cultivars had significantly less dry matter production than did the top entries in the continuous treatment, whereas only two cultivars produced significantly less yield than did the top entries in the conventional treatment. Thus there was better separation of tall fescue cultivars by harvesting continuously throughout the year.

Table 1. Dry matter production of tall fescue cultivars under two different harvest methods during the 1988-89 growing season.

	Conventional (mo.-day-year)			Continuous (mo.-day-year)				
Cultivar	5-10-89	6-21-89	Total	5-10-89	6-21-89	7-19-89	8-22-89	Total
	lb/A							
AU Vigor	1101 ab*	1678 d	2779 de	1360 abc	2138 bc	999 e	595 ab	5092 cd
Martin	1424 ab	2835 ab	4259 abc	1264 abc	2718 ab	1734 abc	677 a	6393 ab
Mozark	1368 ab	2971 ab	4339 ab	1496 ab	3015 a	1617 abcd	617 ab	6745 ab
Cajun	1451 ab	3077 ab	4528 a	1458 ab	3181 a	1772 ab	673 a	7083 a
AU Early	972 b	1693 d	2665 e	907 c	1590 c	1232 de	669 a	4398 d
AU Triumph	1421 ab	3519 a	4940 a	1394 abc	3157 a	1933 a	639 ab	7123 a
PI144	1357 ab	1932 cd	3289 bcde	1340 abc	2261 bc	1315 cde	540 ab	5456 bcd
PI25	1066 ab	1610 d	2676 e	953 c	1769 c	1259 cde	512 ab	4493 d
PI26	1212 ab	1940 cd	3152 cde	1201 abc	1727 c	1235 de	623 ab	4786 cd
Angleton	1306 ab	2810 ab	4116 abc	1295 abc	2792 ab	1229 de	630 ab	5946 abc
PI100-2	1162 ab	2710 abc	3872 abcd	1096 bc	2661 ab	1597 abcd	569 ab	5919 abc
Temple 3	1462 ab	3150 ab	4612 a	1454 ab	3106 a	1451 bcde	614 ab	6624 ab
Courtenay	1520 a	3278 ab	4798 a	1621 a	3206 a	1247 de	440 b	6514 ab
Stephenville	1248 ab	2575 bc	3823 abcd	1300 abc	2699 ab	1284 de	603 ab	5886 abc
Mean	1291	2556	3846	1296	2573	1422	600	5890
CV (%)	21	20	18	21	16	18	21	13

*Means in a column not followed by a common letter differ significantly (5% level) using Duncan's multiple range test.