

TALL FESCUE PERSISTENCE IN EAST TEXAS

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Background. Tall fescue is a cool-season perennial grass that grows from autumn through spring. It is best adapted from northern Arkansas and Missouri east to the Atlantic coast. Growth is reduced south of this area because of higher summer temperatures and west of this area because of lower rainfall. It can be grown in the eastern part of Texas in creek and river bottoms which are usually loam and clay-loam soils that retain some moisture during the summer. Tall fescue will not persist on upland sandy soils because of poor drought tolerance. Varieties that are presently available are “summer active” that stops growing during the summer because of limited moisture. When summer rains do occur, tall fescue greens up and then dies back because of the hot, dry conditions. Carbohydrates stored in the root system are used to initiate the new growth. After several alternating wet and dry periods, the carbohydrate reserves are depleted and the plant dies.

Tall fescue would be a good alternative to cool-season annual grasses like rye, wheat, and oat because it would not have to be planted every autumn. There are new tall fescue varieties from Australia and New Zealand that had their origin in the Mediterranean region and Argentina where little or no summer rainfall occurs. It is believed these new varieties go dormant due to high temperatures and not lack of moisture. The interaction of environmental factors responsible for initiating dormancy in late spring and the release of dormancy in autumn is not fully understood. Summer dormancy in cool-season perennial grasses is believed to be controlled by temperature, soil moisture, and day length. Entering dormancy due to high temperature would expand the use and persistence of tall fescue in Texas. A growth chamber study was conducted on four tall fescue lines that are considered to have three levels of summer dormancy.

Grasslands Flecha E- (obligatory summer dormant, endophyte absent), Flecha AR542 E+ (highly summer dormant, endophyte present), AgResearch AGRFA 125 E- (highly summer dormant, endophyte absent), and Jesup AR542 E+ (summer active, endophyte present) were grown in pots during the winter. Seven pots of each entry were placed in one of three chambers set to day/night cycles of 92/73°, 77/59° or 63/45°F, with a constant day length of 14 hours. After 6 weeks in the growth chambers, top growth was removed to a 2 inch stubble height and the number of vegetative and reproductive tillers recorded. The harvested top growth was dried for 48 hrs at 104°F to determine dry weight.

Research Findings. None of the plants entered dormancy. At the middle temperature (91/73°F) AGRFA 125 E- and Flecha E- were covered with aphids while Flecha AR542 E+ and Jesup AR542 E+ that contained the endophyte had next to none. Top growth was similar at the two lower temperature treatments but was substantially reduced by the high temperature of 33/23°C (Table 1). Jesup, the summer

active entry, produced the most growth at all temperature treatments. The trend for total and vegetative tiller numbers was to decrease as temperature increased. Flecha and Jesup containing the AR542 endophyte had more vegetative tillers than the other two entries at the high temperature.

Application. These results indicate that temperature alone does not influence the initiation of summer dormancy in any of the tall fescue entries used in this study. Entries containing the endophyte had resistance to aphids. Future studies will look at the interaction of soil moisture level and temperature on summer dormancy of tall fescue.

Table 1. Dry wt. (g), total tillers, vegetative tillers, and reproductive tillers per pot.

Entry	Temperature °		Total tillers	Vegetative tillers	Reproductive tillers
	C	Dry wt. (g)			
				per pot	
AGRFA 125	7/17	8.77	138.7	138.7	0.00
AGRFA 125	15/25	8.10	105.4	105.1	0.29
AGRFA 125	23/33	3.33	84.9	84.6	0.29
Flecha E-	7/17	10.51	153.9	153.1	0.71d
Flecha E-	15/25	9.74	126.3	126.3	0.00
Flecha E- ¹	23/33	3.71	82.4	82.4	0.00
Flecha AR542	7/17	9.64	145.6	145.6	0.00
Flecha AR542 ¹	15/25	9.70	97.4	97.1	0.29
Flecha AR542	23/33	5.23	120.0	119.9	0.14
Jesup AR542	7/17	15.60	169.0	166.1	2.86
Jesup AR542	15/25	16.53	134.6	129.6	5.00
Jesup AR542	23/33	8.02	113.9	112.9	1.00

¹One of 7 pots stopped growing and turned brown in growth chamber.