

Progress Reports FY02

Differential Response of Fine Fescue Cultivars to Nonthermal Residue Management

Objectives:

1. Characterize the genetic variability in crop and seed yield responses of fine fescue seed crops and cultivars to nonthermal management. Identify relationships among crop morphological characteristics, flowering, seed yield, and reproductive efficiency in diverse cultivars of fine fescue seed crops.
2. Develop educational programs to share information with clientele and public groups.

Principal Investigators:

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Abstract of Progress:

Field trials were sown in October 2000 at Hyslop Farm to ascertain the effect of residue management practices on seed yield performance and variability of fine fescue cultivars. Three stubble management treatments were conducted in August 2002 after the first seed harvest to differentiate plant responses. Yields and yield components varied among the three cultivar groups in the first-year seed harvest. Slender red fescue cultivars had greater fertile tiller numbers and seed yield than strong creeping red fescue or Chewings fescue.

Justification:

Potential loss of field burning acreage in fine fescue seed production has created the need to find alternative methods to profitably produce these seed crops. Three economically important fine fescue seed crops are taxonomically distinct subunits of red fescue. Yield loss resulting from nonthermal management has been generally reported for strong creeping red fescue (*Festuca rubra* L.ssp. *rubra*) and slender creeping red fescue (*F. rubra* L. ssp. *litoralis* (Meyer) Auquier), but seed yields are most often reported in the acceptable range when Chewings fescue (*F. rubra* ssp. *commutata* Gaud.) is not burned. However, evidence from research and anecdotal sources indicates that considerable variability exists in seed yield response among cultivars within this group. An increased understanding of the causes of seed yield losses in fine fescue seed crops is needed to develop new nonthermal management alternatives and the variability in seed yield response of these crops and cultivars needs to be characterized.

Progress:

Field trials were sown by using carbon seeding on 15 October 2000 at Hyslop Farm to ascertain the effect of residue management practices on seed yield performance and variability of ten fine fescue cultivars. Cultivar entries were selected to differ in seed yield potential, crop morphology, and crop maturity. Four cultivars each of strong creeping red fescue (Shademaster, Cindy, Silverlawn, Shademark) and Chewings fescue (SR 5100, Southport, Brittany, Barnica), and two cultivars of slender creeping red fescue (Seabreeze, Marker) were chosen for the trials.

No seed crop was harvested in the juvenile stand in summer 2001. Three stubble management treatments were conducted in August 2002 after the first seed harvest to differentiate plant responses. These treatments are: (i) no stubble removal (bale only), (ii) complete mechanical removal of stubble (bale and flail), and (iii) removal of stubble by burning. Residue management effects and potential interactions with the various cultivars will be ascertained in the second seed harvest in 2003.

Fertile tiller number and other seed yield components were determined on samples taken in each plot at peak anthesis (Table 1). Choke, a disease of the inflorescence caused by *Epichloe typhina*, was found in two cultivars of Chewings fescue and in one cultivar of strong creeping red fescue. Fertile tiller number of slender creeping red

fescue was greater than in strong creeping red fescue or in Chewings fescue. Chewings fescue tended to have lower cleanout than the other cultivar groups. Seed yield tended to be greatest with the slender red fescues. Analysis of panicle yield components (spikelets and florets) and seed weight will be presented in future reports. Trials will be continued for three harvest seasons.

Timeline for accomplishments.

Date	Management Practice	Data Collection
May 2002		Seed yield components
July 2002		Seed Harvest
August 2002	Residue Management	
Nov. 2002		Fall tiller height and plant weight
May 2003		Seed yield components
July 2003		Seed Harvest
August 2003	Residue Management	
Nov. 2003		Fall tiller height and plant weight
May 2004		Seed yield components
July 2004		Seed Harvest

Table 1. Harvest characteristics and seed yields of ten cultivars of first-year fine fescue in 2002.

Cultivar	Choke	Fertile tillers	Above-ground dry weight	Cleanout	Seed Yield
	no./ft ²	no./ft ²	g/ft ²	%	lb/A
<u>Shademaster</u>	0	250 ab	159.3 c	6.2 bc†	748 a
<u>Barnica</u>	0	276 b	110.3 a	2.8 a	823 ab
<u>Southport</u>	75 c	276 b	143.5 bc	3.9 abc	870 b
<u>Cindy</u>	0	177 a	140.3 bc	6.9 c	879 b
<u>SR 5100</u>	0	282 b	130.3 ab	7.2 c	1030 a
<u>Seabreeze</u>	0	404 c	144.0 bc	6.3 bc	1105 cd
<u>Silverlawn</u>	33 b	302 b	150.3 bc	4.9 abc	1156 de
<u>Brittany</u>	33 b	277 b	147.5 bc	3.2 ab	1254 e
<u>Shademark</u>	0	249 ab	141.8 bc	7.1 c	1363 f
<u>Marker</u>	0	521 d	151.8 bc	6.5 bc	1384 f

†FPLSD₀₅