Development and Evaluation of Soft Leaf Tall Fescue Hybrids

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Tall fescue (*Lolium arundinaceum*) is a persistent cool-season perennial grass in the southern USA, but it has lower forage nutritive value than ideal for many livestock enterprises. A major goal of our tall fescue breeding program is improving nutritive value, while maintaining persistence and forage yield. The objective of this experiment was to assess nutritive value of hybrids between persistent cultivars and soft leaf germplasm. We obtained soft leaf tall fescue populations from the National Plant Germplasm Collection including nine French and one Romanian population. In the winter/spring of 2011, we made reciprocal crosses between soft leaf genotypes and PDF/AR584 (i.e., Texoma Max Q II) genotypes. A total of 78 soft leaf genotypes (between 2 and 15 genotypes per population) were hybridized to numerous genotypes of PDF/AR584. A total of about 5500 seeds were obtained in each direction. All PDF plants were confirmed to have infection with the AR584 endophyte and all soft leaf genotypes were confirmed to be endophyte free using a PCR test.

Field trials consisting of two replications in a randomized complete block design were established in fall 2011 at the Noble Foundation's Unit 3 Farm located in Ardmore, OK and at the Oklahoma State University's Eastern Oklahoma Agricultural Research Station located in Haskell, OK. The ten parental soft leaf populations, PDF/AR584, BarOptima +E34, Barianne, and Barolex were included for comparison. Each plot consisted of five plants. All maternal soft leaf hybrid progeny were confirmed to be endophyte free and all PDF maternal hybrid progeny were confirmed to have the AR584 endophyte before planting. Morphological trait data were collected from each plant in a given plot when a minimum of three plants in the plot reached heading stage. Trait data for each of the individual plants within a plot were averaged for statistical analysis. Both replications of the entry were then harvested for yield and analyzed for forage quality using NIRS. We statistically compared five groups of germplasm: PDF/AR584, soft leaf parents, checks, hybrids with PDF as maternal parent, and hybrids with PDF as paternal parent.

Entries at Ardmore averaged 9 days earlier heading and seven times higher biomass than entries at Haskell, but no population x location interaction was observed. Similar trends were observed among entries across locations for day of heading, yield, crude protein (CP) and *in vitro* true dry matter digestibility (IVTDMD). PDF/AR584 at Haskell headed 19 days earlier than the two hybrid groups and the parental soft leaf population. Crude protein and IVTDMD was lower in PDF/AR584 than the soft leaf parents at Ardmore and was lower than all other groups at Haskell. The hybrid population PDF/AR584 x Sopline was highest in CP at 20.0%.

These initial results confirm that the soft leaf populations offer improved nutritive value, but that they also yield less than the adapted cultivar Texoma Max Q II. The trials are currently being grazed with beef cattle to gauge the persistence of the hybrid populations. Selections for increased palatability, combined with improved persistence, will be made from these trials for further evaluations and a possible cultivar release.