Buffalograss Breeding and Genetics

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1. Late spring applications of propiconazole effectively control false smut in seed production fields
2. Identified false smut and buffalograss decline resistant germplasm
3. Aerial robotics can quickly and easily document timing of winter dormancy

Buffalograss is often regarded as a model low-input turfgrass species, requiring less management inputs to maintain an acceptable quality level compared to most other commonly used turf species. Pesticide applications are not typically recommended for buffalograss unless stand loss is imminent, thus host resistance to pests is a primary objective of the buffalograss breeding program.

Buffalograss false smut, caused by *Porocercospora seminalis*, is primarily a cosmetic disease in managed turf but negatively impacts seed quality and production. The pathogen grows in place of a developing caryopsis reducing the number of viable caryopses per bur. Following greenhouse screens, and two years of field studies, the female experimental lines NE-BFG-11-3625, NE-BFG-5-3010, NE-BFG-7-3453-35, NE-BFG-7-3462-69 and NE-BFG-7-3464-5 were identified as having exceptional false smut resistance. Management studies were also conducted to evaluate application timing of three different fungicides for false smut control. Propiconazole (Banner Maxx), boscalid (Emerald), and pyraclostrobin (Insignia) were applied at high label rates in the first and third weeks of either May or June. At the end of the growing season, seed was harvested and 125 seeds were randomly selected and separated based on occurrence of disease. Banner Maxx applied in June provided 100% control of the disease giving needed tools for controlling buffalograss false smut in seed production fields (Figure 1).

Buffalograss decline has also been observed sporadically in managed buffalograss turf. Buffalograss affected by buffalograss decline do not break winter dormancy in the spring. Presumably these plants are compromised before the onset of winter dormancy and succumb to winter injury. Damage is similar to patch diseases in other species, but the causal pathogen has yet to be identified. In 2014, an older germplasm nursery exhibiting significant buffalograss decline symptoms was rated for visual quality. Variability for resistance to buffalograss decline was documented (Figure 2). The resistant line NE-BFG-2974 was identified suggesting host resistance is present in the germplasm collection (Figure 3). During the summer of 2015, a more exhaustive evaluation was performed and NE-BFG-03-098 was highly resistant to buffalograss decline and an additional 21 accessions were moderately resistant. In the absence of knowing the cause of buffalograss decline, host resistance will provide a means for mitigating the disease impact in future cultivars. Crossing blocks were established in 2015 to increase false smut, leaf spot, and buffalograss decline resistance in breeding stocks.

In addition to pest resistance, the buffalograss breeding program is focused on improving visual and functional quality, seed yield, canopy density, sod strength, and length of growing season. As an example, aerial robotics were used to document timing of spring green up and onset of winter dormancy in the fall (Figure 4). Data is being compared to visual quality ratings and weather data to develop a model predicting timing of dormancy which will then be used to quantify variation in growing season length. Selections were also made from approximately 6,000 segregating progeny for establishment rate, gender expression, stolon internode length, and canopy density. Together these data along with information on host resistance are expanding our knowledge and germplasm collections of buffalograss, providing valuable resources for cultivar development and improved management practices.

Figure 1. Number of false smut infected burs per 125 seed sample following fungicide applications. Error bars represent standard deviation among three replications.

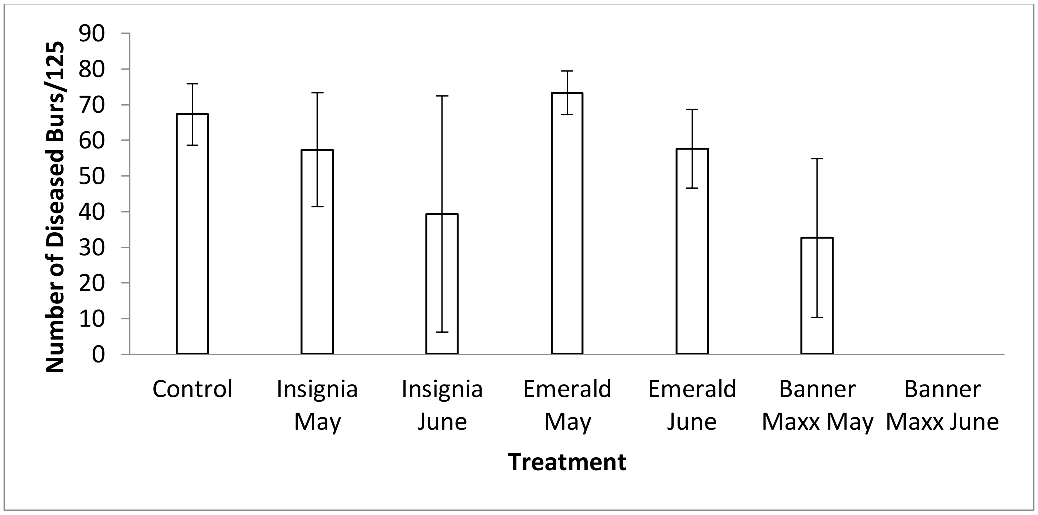

Figure 2. Experimental lines exhibiting buffalograss decline symptoms.

Figure 3. Mean visual quality ratings for host resistance to buffalograss decline.

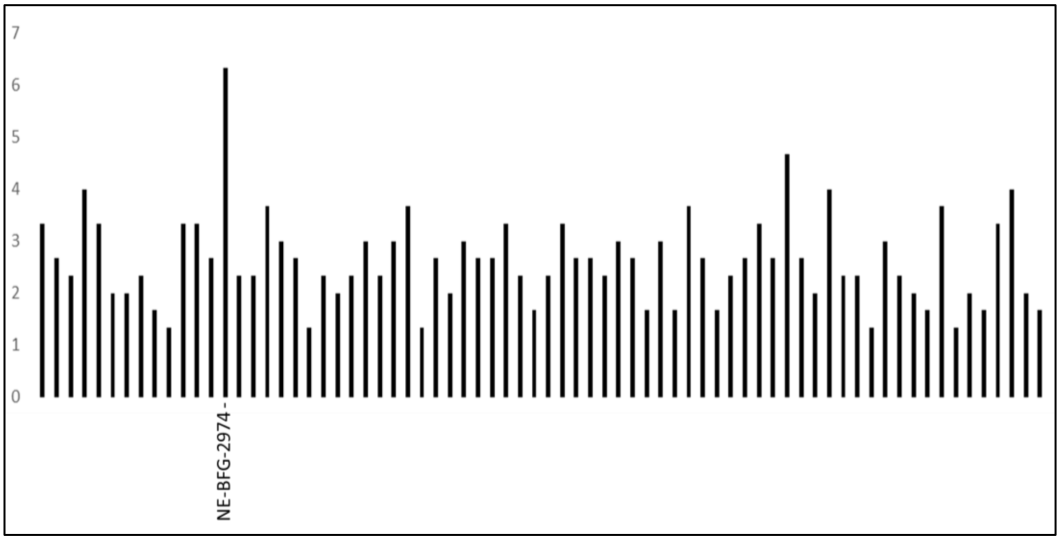

Figure 4. Variability of spring green up of experimental buffalograss accessions.