

Germplasm Improvement of Low-Input Fine Fescues in Response to Consumer Attitudes and Behaviors

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Objectives:

The long-term goal of this project is the development of improved, low-input fine fescue cultivars that provide economic and environmental benefits for the public.

This project provides matching funds for a five-year USDA-NIFA project funded by the Specialty Crops Research Initiative (grant number 2012-51181-19932). The project involves 10 scientists, along with graduate students and support staff, from three Universities (University of Minnesota, Rutgers University, and the University of Wisconsin). The project has four objectives: Objectives 1 and 2 involve social science research that will determine what consumers desire in new low-input fine fescue varieties; Objective 3 is focusing on identifying breeding material that is tolerant of stresses common to low-input turf environments; Objective 4 is addressing the challenges of educating end-users about the use of fine fescues in parks, lawns, and golf courses.

A major concern for turfgrass managers considering increasing their use of fine fescues is the ability of these grasses to withstand wear and traffic; this is especially of concern to golf course superintendents. We have completed one year of traffic trials in New Jersey (Figure 1) and found that fine fescue species differ in their response to traffic based on the type of traffic that is applied. Another trial is being conducted to determine during which season traffic should be applied (spring, summer, or fall) when screening germplasm. These trials are ongoing. Because our ultimate goal is the development of new, traffic-tolerant cultivars, we have



Figure 1. Traffic tolerance evaluations are being conducted in New Brunswick, NJ (photo credit: Hui Chen).

also initiated a breeding effort in this area. In 2014, a replicated mowed spaced-plant evaluation trial of fine fescue breeding material representing several fine fescue species was planted in both New Jersey and Minnesota. Beginning in 2015, all plants will receive traffic treatments so that we can identify breeding material to advance in our collaborative breeding program.

In many part of the United States, summer patch can be the most devastating disease of fine fescues. We have



Figure 2. Hard fescue genotypes showing different responses to summer patch disease pressure in New Jersey (photo credit: Austin Grimshaw).

used field screening of mowed spaced-plants to identify a number of resistant and susceptible hard fescue genotypes (Figure 2). These genotypes will be used in two ways: (1) both resistant and susceptible genotypes will be used in a series of crosses that will help us to better understand genetic resistance to this disease, and (2) highly resistant plants will be integrated into a fine fescue breeding program.

When we started this project, we also identified snow mold as an important target for breeding efforts. Before breeding work could be done, we needed to quantify snow mold resistance levels in current germplasm. Field trials were established at two sites in Wisconsin and one in Illinois in fall 2013. We found very little snow mold disease in these plots in spring 2014; this was even the case at sites where other turfgrass species were under severe disease pressure (Figure 3). This suggests that in many environments, snow mold disease may not be of great concern; however, we have observed severe damage on

home lawns in Minnesota. Therefore, we will inoculate each of these field plots with a different snow mold pathogen (*Microdochium nivale*, *Typhula incarnata*, or *Typhula ishikariensis*). Each site will also be covered to create a favorable environment for disease development.

Other projects that are ongoing include screening for heat tolerance, identifying fine fescues with increased weed-suppressive ability, and social science research associated with our first two objectives.

Summary

- Traffic tolerance trials are ongoing and breeding work has been initiated
- Genotypes resistant to summer patch have been identified
- Snow mold screening will continue during the winter of 2014-2015



Figure 3: Snow mold damage was more severe on perennial ryegrass (right) than fine fescue (left) in Eau Claire, WI (photo credit: Paul Koch)