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

Project leader: Eric Watkins

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Objective:

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

Start Date: 2012
Duration: three years
Total Funding: $30,000

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.

The fine fescue species have great potential to be functional grasses in sustainable landscapes including lawns, parks, 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 who might want to use fine fescues on fairways (Fig. 1). For this part of the overall project, our objectives were to 1) evaluate the performance of fine fescues under abrasive applied with Rutgers Wear Simulator (RWS) and trampling forms of traffic applied with Cady Traffic Simulator (CTS); and 2) assess the seasonal effect of abrasive wear (using RWS) on fine fescues in different seasons. Eight passes (one pass per week for eight weeks) were applied to lawn height fine fescue for each form of traffic during three traffic periods per year (April to June, July to August, and September to October) from September 2013 to August 2015. Ten cultivars were evaluated (2 each from the primary fine fescue species representing one each of a newer and older cultivar). As expected, the uniformity of turf cover and fullness of turf cover (FTC) was greatest in the non-trafficked check plots. All newer varieties had improved traffic tolerance than older varieties. In order to improve this trait in new cultivars, we have begun screening for wear tolerance in both Minnesota and New Jersey by applying wear to mowed spaced plants (Fig. 2).

As part of our social science research, we have conducted surveys of homeowners throughout Canada and the United States to discover which traits they desire in a turfgrass. We have completed choice experiments with homeowners using both online surveys (analysis complete)

and on-site experiments (analysis ongoing) with real plots (Fig. 3). Generally speaking, many consumers are willing to pay premiums for turfgrasses with lower maintenance requirements. Among the three maintenance attributes, mowing requirement is the most predominant attribute affecting consumers' purchasing decision. Water usage, followed by fertility requirement, is also considered as one of the most influential attributes for consumers. Fertility requirements are found to be affecting consumers' choices to some extent. Although this research is not directly applicable to golf courses, it does show that the general public is moving in a direction of desiring more sustainable turfgrass management.

Other projects that are ongoing include determining heat stress tolerance levels in fine fescues, screening fine fescues for summer patch and snow mold resistance, identifying fine fescues with increased weed-suppressive ability (Fig. 4), and additional social science research associated with our first two objectives.

Summary Points

- Fine fescues have shown potential for use on lower-input golf courses
- Traffic tolerance trials are ongoing and breeding work has been initiated
- Consumers prefer grasses that require less mowing, use less water, and have lower fertility requirements

Figure 1. Fine fescue fairway trail in St. Paul, Minnesota that includes entries from the 2013 National Turfgrass Evaluation Program Fine Fescue Test.

Figure 2. Individual fine fescue plants were planted in both New Jersey and Minnesota. These plants will be subjected to wear in order to identify top performing genotypes (photo credit: Austin Grimshaw).

Figure 3. Consumers visited turfgrass plots in both New Jersey and Minnesota to take part in surveys. (photo credit: Jingjing Wang)

Figure 4. Preliminary studies have found some fine fescues can suppress the growth of weeds. This figure shows the effect of a number of Chewings fescue germplasm collections on the growth of white clover in a laboratory study.

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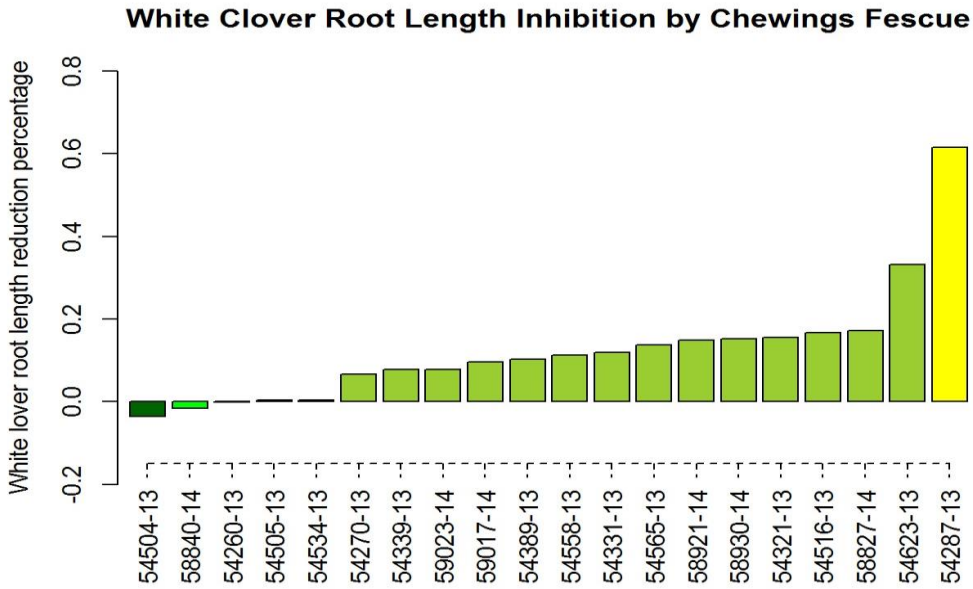

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