Title: Adaptation and Management of Fine Fescues for Golf Course Fairways

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Objectives: (1) To determine if the plant growth regulator trinexapac-ethyl improves performance and divot recovery of fine fescue species and mixtures on low-input golf course fairways; (2) To determine if fine fescues can survive when managed as fairways under acute drought; and (3) To determine if fine fescue fairways require fungicides at currently-recommended application rates to survive winter snow mold pressure.

Start Date: 2012

Project Duration: four years

Total Funding (over entire project duration) $74,133

Summary text:

Golf course fairways in the north central region primarily consist of species that require high inputs of water, pesticides, and nitrogen fertilizer. Golf course superintendents continue to be affected by governmental regulations restricting the use of chemical and water inputs on managed turfgrass. Future restrictions will impact golf course management in a very significant way and the solution to the problem of inputs on golf course fairways could include the use of lower-input grasses. Low-input fine fescue species should be able to withstand the pressure from typical turfgrass stresses while producing acceptable turf and excellent playing quality—all with fewer overall inputs of pesticides, water, and fertilizer. Due to limited research on these species in fairway settings, superintendents are wary to begin using fine fescues. This research project is investigating a few key areas where research-based information is lacking.

Objective 1: The trial consists of 25 mixtures of single cultivars representing five fine fescue species (‘Radar’ Chewings, ‘Beacon’ hard, ‘Navigator II’ strong creeping red, ‘Shoreline’ slender creeping red, and ‘Quatro’ sheep). To this point, there has not been a significant effect of plant growth regulator application on plot performance (trinexapac-ethyl was applied every 200 growing-degree days at the label recommended rate to half of the plots). Traffic, which is applied 3 days each week during the summer using a golf cart traffic simulator, has had a significant effect on mixture performance; results to date suggest that the inclusion of slender creeping red or hard fescue is beneficial for turf performance. Mixtures with large proportions of strong creeping red fescue were very susceptible to dollar spot caused by *Sclerotinia homoeocarpa*. Divots were removed from this trial and no entries had full divot recovery within 12 months; this is a major weakness of fine fescues on fairways in the northern United States and will need to be addressed if these grasses are to be used on a wide scale.

Objective 2: The same species and mixtures as in Objective 1 were evaluated under acute drought for a 60-day period in August 2014 in St. Paul, MN and Madison, WI and received the

60 d drought treatment in July and August of 2015 (Fig. 1). Mixtures that included significant proportions of hard fescue and sheep fescue tolerated drought best and maintained adequate turf color (Fig. 2). Mixtures that contained higher proportions of strong creeping red fescue and slender creeping red fescue performed poorly at both locations.

Objective 3: The same fine fescue species and mixtures as in Objective 1 are also being evaluated on three golf course in Minnesota: Northland Country Club (Duluth, MN); The Cragun's Legacy Courses (Brainerd, MN) (Fig. 3); and Theodore Wirth Golf Club (Minneapolis, MN). Since establishment in 2013, we have seen little disease pressure in untreated plots (no fungicide). These grasses may be resistant to snow mold pathogens; however, our observations in higher cut fine fescue suggest that snow mold and snow scald disease can be a problem in these grasses.

Summary Points

- Use of a plant growth regulator does not appear to have a significant effect on performance of fine fescues in a fairway trial.
- Hard fescue and slender creeping red fescue were present in mixtures that performed well under traffic stress.
- Hard fescue and sheep fescue were present in mixtures that performed well under acute drought stress.
- Snow mold and snow scald damage was minimal on golf course trials.
- Results from this project should assist in developing optimized mixtures for use on golf courses in the northern United States, ultimately leading to overall reduced inputs of water, fertilizer, and pesticides

Figure 1: Drought trials were established under a rainout shelter in St. Paul, MN (pictured) and Madison, WI. The rainout shelter was used to withhold precipitation for 60 days. (photo credit: Maggie Reiter)

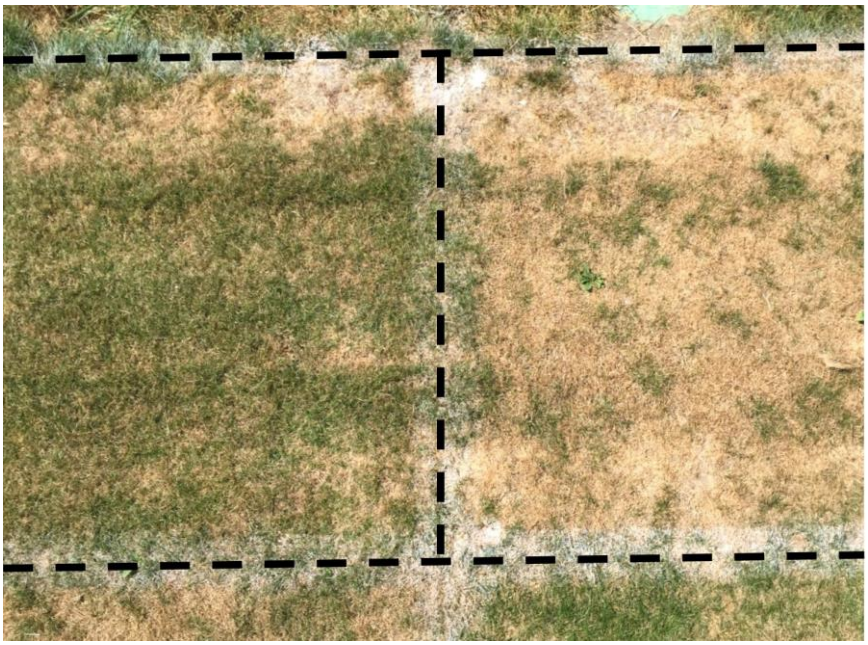

Figure 2: This photo shows a comparison of a 50:50 hard fescue:sheep fescue mixture (left) and a 100% strong creeping red fescue plot (right). This photo was taken after 30 days of drought in Madison, WI. Plots with hard and sheep fescue performed better than plots with strong creeping red fescue. (photo credit: Maggie Reiter)

Figure 1. Plots at each golf course site were covered to increase disease pressure. (photo credit: Maggie Reiter)