Adaptation and Management of Fine Fescues for Golf Course Fairways

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Objectives:

1. *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. *Determine if fine fescues can survive when managed as fairways under acute drought.*
3. *Determine if fine fescue fairways require fungicides at currently-recommended application rates to survive winter snow mold pressure.*

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. We believe that future restrictions will impact golf course management in a very significant way and that the solution to the problem of inputs on golf course fairways will not be changes in management practices, but instead 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.

Figure 1. Application of the plant growth regulator occurred every 200 growing degree days. (photo credit: Maggie Reiter)

Objective 1: The trial consists of 25 mixtures of single cultivars representing five fine fescue species

Figure 2. Mixture plots were established on fairways at three Minnesota golf courses. (photo credit: Maggie Reiter)

('Radar' Chewings, 'Beacon' hard, 'Navigator II' strong creeping red, 'Shoreline' slender creeping red, and 'Quatro' sheep). The plots were established in summer 2012 and a replication of the trial was planted in 2013. To this point, there has not been a significant effect of plant growth regulator application on plot performance (Fig. 1) (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 using a golf cart traffic simulator, has had a significant effect on mixture performance; first year data suggests that the inclusion of slender creeping red or hard fescue is beneficial for turf performance. Divots were removed form the first trial in early August 2013 in order to compare mixtures for ability to recover from damage (divots were filled only with sand). After 12 months of regrowth, no divots had been completely filled in by the fine fescues. Although we will continue to monitor this recovery, and have initiated the same divot removal in the second trial, it is quite clear that this will be a major deficiency of these grasses when used on golf course fairways. Resource savings from utilizing a lower-input grass may need to be shifted to manual refilling on divots on courses that convert to fine fescue fairways.

Objective 2: The same species and mixtures as in Objective 1 will be evaluated under acute drought for a 60 -day period. This trial was delayed due to damage to our rainout shelter and problems with establishment. The trial was seeded in August 2014 in St. Paul, MN and Madison, WI and will receive the acute drought treatment in July and August of 2015. Data collection will include drought stress, recovery from drought, disease incidence, color, and turfgrass quality.

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. 2); and Theodore Wirth Golf Club (Minneapolis, MN). Each of the three trials is arranged in a split-plot design with three replications with the main plot being fungicide treatment (fungicide or no fungicide) and the split plot being fine fescue mixture. After the winter of 2013-2014, there was very little damage from snow mold. One reason for this may be that these grasses are resistant to the pathogen; however, our observations in higher cut fine fescue suggest that snow mold disease can be a problem in these grasses. Therefore, we will inoculate these trials in early November 2014 and also use covers to increase the likelihood of disease.

Summary

- 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 (Figure 3) and slender creeping red fescue were present in mixtures that performed well under traffic stress.
- Snow mold damage was minimal on golf course trials in 2013-2014.
- 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 3: This photo shows a comparison of a 100% sheep fescue plot (left) and a 50:50 hard fescue: Chewings fescue plot. Plots with hard fescue tended to perform better than plots with sheep fescue. (photo credit: Maggie Reiter)