Fine Fescue Fairways

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Most golf course fairways in Wisconsin sport a preponderance of the superintendent's arch nemesis, annual bluegrass. Relief may finally be in sight. One of the surest ways to rid a system of *Poa annua* is to stop irrigating and fertilizing. This may work; unfortunately the creeping bentgrass or Kentucky bluegrass usually dies out too, providing the superintendent an opportunity to seek out a course with less *P. annua* (or 100% *P. annua* depending on one's inclination).

Fine fescues have long been known for their tolerance to dry, infertile soils. In the 1800's golf courses lacked irrigation systems. Mowing was performed using horse-drawn reel-mowers. Fertilization was slim to nonexistent. Fine fescue was the grass of choice for fairways because it could withstand the infrequent mowing and lack of irrigation and fertility.

Humankind is constantly searching for improvements regardless of the situation. "New" is often synonymous with "superior". As golf evolved throughout the 20th century, particularly after WWII, Kentucky bluegrass came to be favored over fine fescues partly because it retained its green color better during the summer than fine fescues. Recently creeping bentgrass has come to be the elite standard for fairways in the northern U.S. But elite grasses bring elite problems: more chemicals to control diseases, more irrigation water, increased fertility, and expectations of continuously lower mowing heights (many superintendents are now under pressure to maintain bentgrass fairways at 3/8").

Golf courses will remain subject to public scrutiny as

our society continues to develop environmental awareness across many levels. The need to develop golf courses on poor soils plus restricted use of water, fertilizer, and pesticides will dictate management changes compared to what we now take for granted. Fine fescues, now restricted to golf course roughs, may once again take their place on fairways. I was always taught fine fescues couldn't survive the low heights of cut typical of a fairway, but the teaching was perhaps not from a broad enough perspective. Dr. Beard's 1973 publication, Turfgrass: Science and Culture, points out that red fescue provides an excellent fairway turf at heights between 0.5 and 1.0 inch. Most recent textbooks, however, indicate a minimum height of 1.5 inches is required for fine fescues. If one doubts the ability of fine fescues to succeed at less than 1" height, all one has to do is visit Europe, where fine fescues are used not only on fairways but are routinely mixed with bentgrass for greens.

Types of fine fescues

As an extension specialist I constantly find myself providing recommendations to people for grass types to grow in adverse situations. My recommendations for shaded sites usually rely heavily on fine fescues. Invariably, I need to explain the types of fine fescues, then discuss what makes one type different from another before the client feels sufficiently comfortable to purchase seed. While their extremely fine textured leaves characterize all fine fescues, distinct differences do exist among the primary four turfgrass types.

Creeping red fescue, often simply called red fescue, includes two subspecies: strong creeping red (*Festuca rubra ssp. rubra*) and slender creeping red (*F. rubra ssp. trichophylla*). The strong creeper is more rhizomatous than the slender creeper; the two types also have different numbers of chromosomes. Both subspecies have reddish lower sheaths and produce reddish inflorescence ("seedheads"). The creeping red fescues exhibit the widest range of color variation, ranging from light to very dark green varieties.

Chewings fescue (*F. rubra ssp. commutata*) is closely related to creeping red fescue and is sometimes lumped in descriptions as red fescue. Unlike the

creeping red fescues, however, Chewings fescue has a bunch type growth habit. It is capable of excessive tillering, however, and Turgeon points out in his book Turfgrass Management that it is capable of producing a dense turf at heights of approximately one inch.

Hard fescue (*F. longifolia*) has a bunch type growth habit but may be a good candidate for Wisconsin fairway turf. Several times when I have accompanied Dr. Mike Casler (UW-Agronomy department) on collecting trips we have found large patches of fine fescue growing in what are otherwise *P. annua*, bentgrass or Kentucky bluegrass fairways. What's really exciting is when we find a large patch of fine fescue, one foot or more in diameter, growing amidst *P. annua* which has been killed by snow mold. The hard fescues are often distinguishable due to their dark bluish/grayish green color. Mixtures of fine fescues often include hard fescue because they tend to retain their color further into the summer than creeping red or Chewings fescue.

Sheep fescue (*F. ovina*) is another fine fescue, which is routinely entered into evaluation trials. A very dark blue-green color, only one cultivar of sheep fescue is commercially available. While it probably has the greatest tolerance of dry, acid soils of any of the fine fescues, it is not adapted to intensive culture and is used primarily for soil stabilization.

So what are we doing with fine fescue?

One of the ways we are attempting to make a difference is to breed turfgrasses adapted for Wisconsin conditions. The turfgrass breeding program is led by Dr. Mike Casler. Since 1997, we have been collecting fine fescue plants from older Wisconsin golf courses (pre-1950) for breeding purposes. The goal is to develop low input turfgrasses for Wisconsin fairways which can withstand sub-freezing conditions, low fertility and sandy soils, acidic pH, minimal irrigation, and snow mold diseases. Unfortunately, worthwhile breeding efforts take time to yield usable material, and testing methods need to be worked out in advance of breeding commercially viable cultivars.

In February 1998 I submitted a proposal for a fine fescue trial to the National Turfgrass Evaluation Program (NTEP). I proposed maintaining the turf as a fairway situation, with fertility limited to 0.2-0.5 lb/1000 ft^2 per growing month and irrigation only as needed to prevent drought stress. The turf was to be mowed between 0.5 to 1.0 inch height, two to three times weekly. Fungicides were not to be applied. NTEP not only accepted the proposal, but also called to ask if I would install a second trial and subject it to traffic. Since we may learn very little from a field research program unless we kill some turf, I said sure, then began scrambling to figure out how to simulate a uniform level of golf cart simulated traffic on 79 varieties of fine fescue.

Fortune favors those prepared. Within a week of finding out my proposal had been accepted by NTEP, Tom Schwab told me the Biological Sciences Engineering department at UW-Madison (I still call it the Ag Engineering department) was seeking proposals for class projects. I described my vision for a traffic simulator, explained the need, and sent the proposal to BSE. I was excited, not to mention surprised, when they called and said they had accepted my proposal as one of the class projects for autumn 1998. They liked it because they said it was "unique" and presented new challenges. Dr. Kevin Shinners was the instructor in charge of the project. One of the first things I did was have him visit the O.J. Noer Facility to give him a flavor of turf research. I believe Kevin left the O.J. Noer Facility not only with a better understanding of the type of traffic simulator I wanted but a very favorable opinion of the facility and the turfgrass industry in Wisconsin. Another thing I did right away was using the Noernet to collect data on the number of carts rented during a typical Wisconsin golf season. The number varied greatly but I was able to get a decent average. The plan was to emulate the number of golf carts a fairway turf might be subjected to in

Figure 1. Golf car traffic simulator ready for research at the Noer Facility.

Figure 2. Chewings fescue golf turf at Whistling Straights.

between the end of the cart path and the open fairway.

I made several visits to the BSE class and to Kevin Shinners during autumn 1998 to check on the progress of the traffic simulator and provide feedback on the construction. By December the traffic simulator was ready (Figure 1). The traffic machine has two articulated frames and will be pulled by a utility cart. Two axles of end-to-end wheels provide uniform traffic across the five-foot wide plots. The majority of the wheels and tires were graciously donated by Club Car of Racine, WI. Four 50 gallon barrels were used to provide the proper loading—when filled with water, these barrels, plus the steel frame assembly, match the weight of a typical golf cart carrying two passengers and clubs. The BSE department provided most materials while I supplied funding for a few pieces not in the BSE inventory.

When construction was completed, Kevin told me two significant pieces of information. First, if he were to build a second machine he would have to charge a minimum of $5000 to cover costs. Since it was a class project my total cost was only $500, which shows what can be done at the university if the right contacts and opportunities are found. Second, building the traffic simulator was a lot of fun. Kevin apparently told his department chair that working on turf equipment was more exciting than working on traditional agriculture equipment. This was good news for us in the turf program, as we will always need political support for our program as it competes with programs based on edible commodities for resources including funding. Kevin and the BSE department thought highly enough of the contraption they showed it at a meeting of the agriculture engineers at Dane County Coliseum (Figure 1).

The NTEP plots were planted in early September 1998. Initial mowing was at 3/4 inch. This spring we raised the mowing height to 7/8 inch and applied a broadleaf herbicide. Plots are filling in nicely and will be on display for field day. Traffic simulations will begin spring 2000. Over the next several years we hope to be able to provide crucial information about the ability of various fine fescue species and cultivars to tolerate fairway conditions in Wisconsin. Fine fescue fairways are already gaining cautious use across the U.S. Widow's Peak in Massachusetts gained notoriety in the mid 1990's for planting fine fescue fairways; the nine hole Highland Links Course at the environmentally fragile Headlands of the Cape Cod National Seashore also was planted to predominantly fine fescue fairways and roughs. In Wisconsin, Whistling Straights has pioneered the use of fine fescue fairways using Chewings fescue maintained at 15/16 inch (Figure 2).

The future of fine fescue golf turf

There is little question fine fescue fairways will play differently compared to bluegrass or bentgrass. During summer, the turf will likely be browner than most people are used to, and the non-irrigated surfaces will cause more ball bounce. The reduced thatch and dry soil will impact golfer's swings, likely resulting in shallower divots. Disease management may be an important issue, as leaf spot (*Bipolaris sorokiniana*) and net blotch (*Drechslera dictyoides*) diseases can be severe to fine fescues and little breeding has been performed with these diseases in mind. Red thread (*Laetisaria fuciformis*) and dollar spot (*Sclerotinia homeocarpa*) may also be a problem on unfertilized, non-irrigated fine fescue fairways. Still, with the public demand for more golf courses, a great market for links style courses, and a public cry for environmentally sustainable golf courses, fine fescue fairways are likely to become more commonplace. With well-drained, non-irrigated fairways in Wisconsin, some superintendents may finally have an avenue to thwart *P. annua*.