

Selecting Perennial Ryegrasses for Use on Golf Courses

Despite some problems, perennial ryegrasses remain attractive.

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AS WE ENTER the year 2000, the perfect turfgrass still eludes us. Nowhere is this more evident than in fairway grasses. As we become comfortable with one species or group of cultivars, new problems (or old ones revisited) occur which make turfgrass managers and researchers continue the search for improved turfgrasses. This pattern has been particularly evident in the Mid-Atlantic region from the late 1960s to the present.

Prior to the 1980s, Kentucky bluegrass (and mixtures with annual bluegrass) was the predominant turfgrass

species used on golf course fairways in the Mid-Atlantic region and throughout most northern and transition zone areas. Extensive breeding efforts for Kentucky bluegrass in the 1960s and 1970s resulted in numerous improved cultivars from which to select for use on golf course fairways. However, agronomic problems and changing attitudes on both fairway quality and maintenance inputs resulted in the shift from Kentucky bluegrass towards the use of other species. There were several problems associated with Kentucky bluegrass use:

- The increasing incidence of summer patch disease in the late 1970s resulted in devastating losses of turf. This disease was probably the most important factor in the decline of Kentucky bluegrass. Fungicidal control was both very expensive and inconsistent.

- Increasing demands for lower and lower mowing heights, for which Kentucky bluegrass cultivars were not well adapted.

- Persistent problems with annual bluegrass encroachment. Not only were herbicide control programs erratic, but lower mowing heights intensified the rate of annual bluegrass encroachment into Kentucky bluegrass fairways. *Poa annua* simply became more competitive as the Kentucky bluegrass declined.

- The slow germination and relatively low seedling vigor of Kentucky bluegrass resulted in slow establishment and recovery when damage from summer patch or other causes occurred.

- There was increasing pressure to reduce fairway maintenance inputs for environmental and economic reasons. Kentucky bluegrass had the reputation of requiring high inputs of water, fertilizer, pesticides, and labor compared to some alternative species.

As summer patch problems became more widespread in the late 1970s and early 1980s, extensive overseeding with perennial ryegrass became a standard practice in many transition zone areas. Perennial ryegrass is not affected by summer patch, and thus masks the problem in Kentucky bluegrass. Also, due to its fast germination rate and high seedling vigor and low seed cost, cover of damaged areas could be accomplished very quickly compared to Kentucky bluegrass overseeding.

At that time, however, there were few outstanding cultivars of perennial ryegrass available, and its use was limited to overseeding in Kentucky bluegrass areas damaged by summer patch. Mowing quality was poor for most cultivars, especially in spring. With the



Gray leaf spot can devastate fairway turf. The result is a patchy, poor quality turfgrass stand.

increasing interest in perennial ryegrass for overseeding, however, breeding efforts greatly expanded in the late 1970s and 1980s. The number of cultivars entered into the National Turfgrass Evaluation Program (NTEP) were evidence of this fact. The number of cultivars entered in the 1982, 1986, 1990, 1994, and 1999 NTEP perennial ryegrass trials were 47, 65, 123, 98, and 134, respectively.

As improvements in perennial ryegrass were made through breeding programs, it became the predominant fairway grass in the Mid-Atlantic region.

Kentucky bluegrass use has virtually disappeared. Developments that led to widespread perennial ryegrass use included:

- The improvement in cultivars for mowing quality and shoot density.

- The ability to withstand the lower mowing heights demanded for fairways.

- The availability of endophyte-containing cultivars, which helped minimize surface-feeding insect problems.

- The development of the herbicide ethofumesate, which allowed for virtually complete

control of annual bluegrass in fairways with no harmful effects to perennial ryegrass.

- The continued improvements in fungicides available for control of the major disease problems of perennial ryegrass.

Perennial ryegrass fairways were not without problems; however, the problems were generally predictable and thus were manageable. For example, the most important problem of perennial ryegrass fairways prior to the early 1990s was the disease brown patch. Extensive research at numerous universities clarified the specific conditions when this disease was most likely to be a problem, and determined which cultural practices would help minimize it, which fungicides were effective, and how individual fungicides were best used. As a result, brown patch of perennial ryegrass fairways became a

controllable problem, albeit at a relatively large expense.

Two problems in the 1990s, however, have caused many golf course superintendents to reevaluate the use of perennial ryegrass on fairways in many of the areas where its use has been widespread. First, extensive loss of fairway turf due to ice damage occurred in the winter of 1993-1994. More devastating, however, was the extensive outbreak of gray leaf spot in the late summer of 1995. Superb perennial ryegrass fairways, as well as large areas of roughs, were decimated in a matter of

perennial ryegrass would still be the preferred fairway grass at many courses if gray leaf spot problems were minimized or eliminated.

Although we increasingly understand how to manage and control gray leaf spot with fungicides in perennial ryegrass fairways, the ultimate means of minimizing damage from this disease will be genetic resistance. Unless cultivars are identified with an inherent resistance to gray leaf spot, the trend will continue towards the use of other species on fairways. Efforts are being made at the University of Illinois and

Rutgers University to identify genetic resistance in perennial ryegrasses to gray leaf spot. Until breakthroughs are made, however, screening of current cultivars is the quickest means of obtaining some improvements in resistance to this disease. One of the great values of the National Turfgrass Evaluation Program is the increased likelihood of obtaining disease resistance data, due to the numerous locations where these cultivars are being evaluated. The NTEP is currently sponsoring



Under light gray leaf spot pressure, a number of perennial ryegrass varieties demonstrated a level of resistance. However, under intense disease pressure, all varieties were affected the next year by this destructive disease.

perennial ryegrass trials at the University of Maryland, University of Illinois, and Rutgers University that are specifically designed for obtaining gray leaf spot data. These test plots were seeded in the fall of 1999. Each university is managing the tests to maximize the potential for gray leaf spot outbreaks. Hopefully, extensive gray leaf spot data will become available in the next two years. Some data currently is available through testing done at the University of Maryland.

days despite the extensive use of preventative fungicide programs for other diseases. Activity of this disease continued through the late fall, affecting not only existing turf but also the seedling turf from renovation efforts. While it was hoped that this was a one-year phenomenon, problems with gray leaf spot continued in subsequent years. This disease has supplanted brown patch as the major disease problem of perennial ryegrass.

As a result, there has been increased interest in and use of zoysiagrass and creeping bentgrass for fairways. Even Kentucky bluegrass is being revisited, although long-term questions about the performance of this grass remain unanswered. With improvements in irrigation technology, equipment, and cultivars, creeping bentgrass particularly has gained favor. However, peren-

The University of Maryland has been involved with all of the NTEP perennial ryegrass trials that have been conducted thus far. Due to their widespread use on fairways in this region, we have maintained our perennial ryegrass trials as close to fairway conditions as possible. Plots are mowed three times weekly at 1/2 inch, are moderately irrigated and fertilized, and are sprayed

on a preventative basis with fungicides, except on rare occasions when we are attempting to obtain brown patch data. In August 1997, an outbreak of gray leaf spot hit our 1994 NTEP perennial ryegrass trial. Fortunately, during that summer we had not been using any fungicides with gray leaf spot activity in our spray rotation. Striking differences occurred among cultivars as the disease continued to develop through September (Table 1). While no cultivars were totally unaffected, there appeared to be such a range of susceptibilities among cultivars that superintendents should be able to select some cultivars that have better resistance to the disease.

Due to the striking cultivar differences that occurred in 1997, we continued this test through the fall of 1998 without spraying fungicides that might have activity on gray leaf spot. A very severe outbreak of gray leaf spot occurred in the summer of 1998, even more severe than the 1997 occurrence. Unfortunately, virtually all cultivars were affected, with none of the cultivars having less than 30% of the plot area blighted by this disease. No significant differences among cultivars could be identified. Thus, there is obviously a long way to go before cultivars with true resistance to gray leaf spot are available. It is clear, however, that a severe outbreak of gray leaf spot may be delayed through careful selection of currently available cultivars, allowing time for the implementation of an appropriate fungicide program that could substantially reduce the loss of turf. Also, if cultivars are used that have been shown in our trials to develop the disease more slowly, fungicide programs that are implemented may be much more effective as well.

In selecting perennial ryegrass cultivars for golf course use, superintendents should first look for general performance (quality) data from test locations in their geographical regions. There is no point in using cultivars that have improved resistance to gray leaf spot if they are otherwise inferior or poor cultivars. Second, use data collected from tests which received maintenance similar to that which the areas to be seeded will receive. For example, if fairways are to be seeded, use data from trials maintained at fairway mowing heights. If roughs are to be seeded, then data from tests mowed over 1 inch should be used for selecting cultivars. General performance of cultivars can differ greatly with mowing height.

Table 1
Gray Leaf Spot Incidence in 1997 on Perennial Ryegrass Cultivars in 1994 NTEP Trials at the University of Maryland (% plot area diseased)

Name	%	Name	%	Name	%
DLP 1305	83.3	Esquire	16.3	Riviera II	10.7
Pennfine	81.7	WX3-93	16.3	PS-D-9	10.3
Figaro	80.0	Prelude III	16.0	PST-2CB	10.3
DSV NA 9401	43.3	Blazer III	15.7	Roadrunner	10.0
Omni	41.7	Cutter	15.7	Chapparral	9.7
Linn	40.0	Edge	15.7	Prizm	9.7
DSV NA 9402	38.3	Express	15.7	Spell Bound	9.7
Wind Star	35.0	Mardigras	15.7	Passport	9.3
Saturn	33.3	WX3-91	15.7	Excel	9.0
APR 066	32.7	TOP Hat	15.3	R2	9.0
Citation	30.0	Wind Dance	15.3	APR 124	8.7
LRF-94-C8	25.7	SR 4400	15.0	Buccaneer II	8.3
Navajo	25.0	Williamsburg	15.0	Sonata	8.3
Night Hawk	25.0	Top Gun	14.7	Academy	7.7
SR 4200	25.0	Panther	14.3	KOOS 93-6	7.7
Advantage	24.3	Protocol	14.3	Precision	7.7
Elf	22.7	Nobility	14.0	Brightstar II	7.3
Nine-O-Nine	22.3	Saturn II	13.7	Radiant	7.3
Stardance	22.0	Sunshine	13.7	Secretariat	7.3
Pegasus	21.3	Assure	13.3	Wizard	7.3
Morning Star	21.3	Stallion Select	13.3	Calypso II	7.0
Dancer	20.0	WVPB-PR-C-2	13.3	Accent	6.7
Achiever	20.0	Blackhawk	13.0	Caddieshack	6.3
Legacy II	19.3	Stallion Supreme	13.0	Laredo	6.3
ASP400	19.0	Catalina	12.7	Palmer III	6.0
Head Start	18.7	Imagine	12.3	Line Drive	5.3
Repel III	18.7	Monterey	12.0	Majesty	4.7
BAR ER 5813	17.7	Premier II	11.7	Quickstart	4.7
Omega3	17.7	MVF-4-1	11.3	Pennant II	4.3
Brightstar	17.0	CIS-MBH	11.0	Ascend	3.3
CAS-LP23	16.7	SR 4010	11.0	Divine	2.3
Vivid	16.7	Manhattan 3	10.7	APR 131	1.7

After the top performing cultivars for each situation have been identified, then further refine the list by selecting the cultivars that have better gray leaf spot resistance (or any other characteristic that may be important at the individual golf course, such as brown patch resistance, genetic color, etc.). Selection of cultivars that show reduced susceptibility to gray leaf spot may be particularly important for roughs, as they are unlikely to receive fungicide applications and the disease usually starts in these higher-cut areas. Since outbreaks of gray leaf spot generally begin in the higher-cut roughs, problems in fairways may be reduced if more resistant cultivars are used in roughs.

Although the 1990s have been difficult for perennial ryegrasses in the Mid-Atlantic region, we should not totally

abandon this grass or forget some of its advantages. As improvements in gray leaf spot resistance are identified, and as the management of this disease improves, there are many golf courses where this may still be the most desirable grass for fairway and rough use. Also, as history tends to repeat itself, it would not be surprising if some "new" problem attacks our other desired turfgrass species, making the perennial ryegrasses an attractive alternative once again.

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