Where irrigation coverage is inadequate to maintain rough during periods of drought, labor-intensive, roller-base sprinklers must be used to prevent drought damage to the grass.

The Rough Dilemma in the Mid-Atlantic Region

Establishing uniform rough and maintaining it through summer heat provides significant challenges for golf course superintendents.

BY DARIN S. BEVARD

Golfer expectations for turfgrass quality have increased since the game's beginnings. Fast, smooth greens, tightly cropped and uniform fairways, and firm, consistent bunkers are expected on a daily basis. Recently, expectations for playing quality and appearance of rough have increased dramatically. These expectations exist in spite of stretched budgets, harsh summer weather, limitations of existing rough grasses, and hundreds of golf carts running through roughs on a weekly basis. Rough is expected to be uniform, dense and, for lack of a better term, pretty, regardless of the vast acreages that often are involved. The larger the area to be managed, the lower maintenance intensity will be. Mowers are used to produce stripes in the rough in a manner similar to fairways. Course officials seem to be especially critical of rough quality in the immediate green surrounds due to the delicate shots played from these areas.

New and renovated golf courses establish uniform rough grasses from seed and sod. This provides a great advantage in rough quality compared to older facilities that paid no more than passing attention to rough conditions until recently. Nonetheless, golfers at older facilities are demanding better rough conditions, and efforts to improve rough are increasing. Unfortunately, establishing better rough grasses into existing, mixed stands of turf has proven to be very difficult, and once rough is successfully established, a myriad of problems awaits the turfgrass manager.

Rough that is under stress can provide good playability and maintain a good appearance as long as cart traffic is regulated.

Obviously, if you have warm-season rough, bermudagrass and zoysiagrass are the logical choices. This article will focus on the challenge of establishing new grasses into existing rough and maintaining cool-season roughs in general in the Mid-Atlantic Region. Choosing the proper turfgrass species, establishing the grass, and maintaining turf quality throughout the growing season are critical to meeting golfer expectations.

BEFORE YOU GET STARTED

Irrigation coverage is an important requisite for successful rough renovation and management. Irrigation systems are now installed with sets of irrigation heads that specifically address the rough, separate from tees, fairways, and greens. Tees, fairways, and greens require less irrigation than rough over the course of the growing season. Roller-base sprinklers and hand watering must be used when older irrigation systems do not provide good coverage. These practices are labor intensive, but necessary. Roughs will decline during extended periods of dry weather if the irrigation system is not designed specifically for rough areas, or labor resources are not available for supplemental watering. Good irrigation coverage is especially critical during establishment to sustain newly emerged seedlings or new sod. Without good rough irrigation coverage, establishment of new seedlings will be difficult, and any progress that is made during the fall and spring can be lost during the summer months.

Initial capital to upgrade the irrigation system is expensive, but in the long term, this can be recovered through more efficient watering that requires less labor. If expectations are high for rough conditions, a proper irrigation program is crucial.

CHOOSING THE RIGHT GRASS

Choosing the right cool-season grass for rough in the Mid-Atlantic Region may be the biggest challenge of all, because there may not be a "right" grass. Generally, perennial ryegrass, Kentucky bluegrass, and tall fescue are used to establish primary rough. Each of these species comes with advantages and disadvantages in terms of establishment, appearance, and maintenance.

Perennial ryegrass is easily established. Seeds are large, and seedlings are aggressive. Rapid seed germination makes ryegrass more competitive with annual bluegrass (*Poa annua*) when seeded in late summer or early fall. Leaf texture is fine, and the grass has a dark green color and good wear tolerance. Perennial ryegrass is very tolerant of most herbicides needed to control weeds throughout the growing season. Perennial ryegrass sounds like the perfect rough grass until weaknesses are discussed.

The biggest weakness of perennial ryegrass is susceptibility to widespread turf loss due to disease. Gray leaf spot is particularly troubling. Control of gray leaf spot is expensive, and disease occurrence is difficult to predict. Perennial ryegrass varieties resistant to gray leaf spot are available and should be used. *Pythium* blight also can be devastating to perennial ryegrass, rapidly thinning the turfgrass stand in a single night. Cold tolerance is marginal.

Kentucky bluegrass is used widely for rough. Its color and texture make it a popular choice, and it performs well alone or in combination with other grasses such as tall fescue or perennial ryegrass. Rhizomes of Kentucky bluegrass increase sod strength and help it to heal from moderate damage without overseeding.

Weaknesses of Kentucky bluegrass include slow germination and weak seedlings. New seedings of Kentucky bluegrass are very successful, but establishing them in existing turf that contains annual bluegrass and other grasses is difficult. In the Mid-Atlantic Region, Kentucky bluegrass can be fickle when growth regulators are applied. Sensitivity to herbicides that are used to control other weeds, such as *Poa annua*, is also a concern. Summer patch incidence has increased on Kentucky bluegrass stands in recent years, and in some instances, this has occurred despite use of preventative fungicide programs.

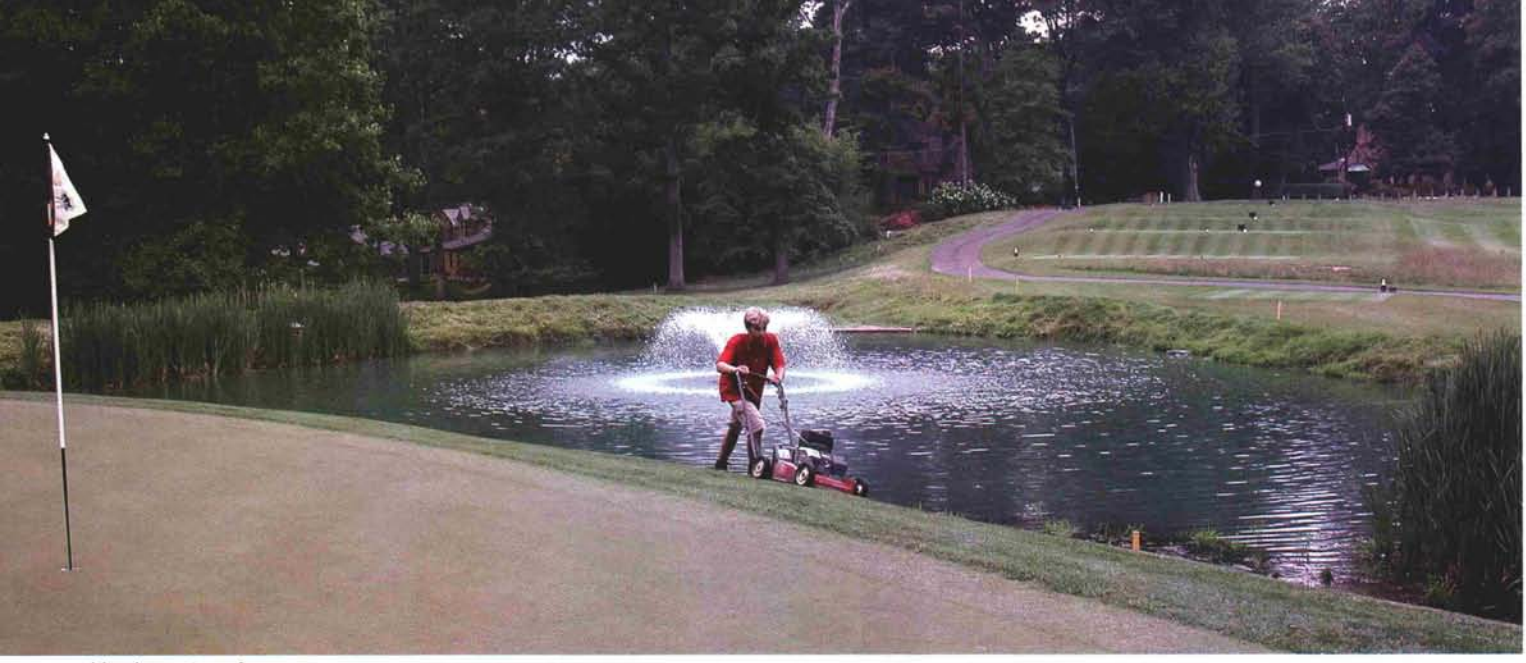
Tall fescue use in rough has increased significantly in the last several years. Finer textured (turf-type) varieties have improved acceptance of tall fescue over its coarse-bladed predecessors. Tall fescue has good color and good traffic tolerance. It germinates quickly, but not as quickly as perennial ryegrass, and its texture is coarser than Kentucky bluegrass and perennial ryegrass. Tall fescue is susceptible to foliar diseases such as brown patch and pythium, but it is not impacted by gray leaf spot in the Mid-Atlantic Region. Soil-borne diseases such as summer patch are not a problem. While tall fescue is prone to some diseases, they are more easily identified and controlled than the diseases that affect perennial ryegrass and Kentucky bluegrass. Some tall fescue varieties are less susceptible to brown patch than others, and they should be used when they are available. Tall fescue is tolerant of most herbicides commonly used for weed control in rough.

Other turfgrasses used occasionally for rough include fine fescues, but their use is sporadic. The introduction of hybrid bluegrasses, created by a cross between Texas bluegrass and Kentucky bluegrass, have raised hopes for roughs, but use of these grasses is still too infrequent to establish a track record. Limited research that has been conducted suggests that hybrid bluegrasses may not perform any better than tall fescue in golf course rough. Ultimately, perennial ryegrass, Kentucky bluegrass, and turf type tall fescue are the primary options for cool-season rough in the Mid-Atlantic Region.

THE ANNUAL BLUEGRASS PROBLEM

Most golf courses have been in existence for many years. For many of those years, expectations for roughs were much lower than they are today. Maintenance was minimal, and the only irrigation they received was along the edges of the fairways. Rough on these older courses generally is composed of a variety of grasses that are not

Poor conditions in the collar to rough transition area can be particularly frustrating to golfers when they need to execute a delicate shot from this turf. When this transition is poor, a shot that misses the green by three or four yards receives a better lie than one that barely trickles off the collar. Sodding usually is the only way to fix this transition problem.



Hand mowing of green surrounds is becoming more commonplace. The opportunity for mechanical damage is greatly reduced on slopes when hand mowing is employed. The problem is that labor and financial resources need to be increased to perform hand mowing.

capable of meeting current expectations on a season-long basis.

Often a primary component of this mix is annual bluegrass. This grass has evolved to perennial forms on greens and even fairways, but the majority of annual bluegrass in the rough is the true annual biotype, which is considered a weed in many northern areas. Annual bluegrass in roughs generally germinates in the early fall, overwinters vegetatively, produces seed in mid-spring, and declines with the first summer heat. Look at it as winter crabgrass! Quality declines in the latter part of June and persists into late September and even October, at which time annual bluegrass readily reestablishes from seed to continue the cycle that leads to annual decline. The role of annual bluegrass in the rough dilemma cannot be overstated.

ESTABLISHMENT

The annual bluegrass problem significantly affects the establishment of desirable new grasses in existing rough. Generally, programs to increase desirable grasses in existing areas of annual bluegrass are performed in late summer or early fall. Rough aeration and interseeding with perennial ryegrass, Kentucky bluegrass, or tall fescue is performed at the very time annual bluegrass germination is most prolific. With the first September rains and cooler temperatures, annual bluegrass seems to jump out of the ground. This weedy grass is better equipped to compete in existing turf stands than the grasses we wish to establish. Intense competition from annual bluegrass both prevents establishment of newly seeded grasses and reduces their ability to spread.

Regardless of which turfgrass is being seeded into existing turf, seeding rates need to be two to three times greater than they would be for newly established areas. Aggressive core aeration and slit seeding can help increase the degree of establishment. Each grass has strengths and weaknesses for establishment. If annual bluegrass is a concern, herbicides for its control should be applied after new seedlings are well established, usually after November 1. Successful annual bluegrass control may require additional seeding in the spring to fill voids that are created.

Because of its slow establishment, Kentucky bluegrass is a poor option for interseeding. Residue from late spring or early summer applications of preemergent herbicides has greater impact on the small seeds of Kentucky bluegrass compared to larger seeds of perennial ryegrass and tall fescue, further complicating the matter. Kentucky bluegrass seedlings also are more sensitive to annual bluegrass herbicides, such as Prograss. Though many try, interseeding to establish Kentucky bluegrass in existing rough generally fails. If Kentucky bluegrass is going to be established from seed, existing turf should be sprayed out with a non-selective herbicide to eliminate the competition.

Tall fescue is better equipped to compete with annual bluegrass than Kentucky bluegrass, but it can still be difficult to establish if seeding is performed after Labor Day. Good establishment of tall fescue from seed in existing stands takes commitment and requires tolerance for poor spring playability for several years. Interseeding turf-type tall fescue can be successful, but it usually takes three to four years to establish a good (not great)

stand of this grass. A seeding rate of 10 lbs. per thousand square feet is recommended.

Of the three grasses profiled, perennial ryegrass establishes itself much better in mixed turf stands due to its fast germination and aggressive seedling vigor. Perennial ryegrass is very tolerant of Prograss applications, even early in its development, providing a good option for annual bluegrass control. In situations where resources are limited, perennial ryegrass produces good rough during the fall, spring, and early summer, compared to tall fescue and Kentucky bluegrass. Problems with perennial ryegrass generally start in mid-July, when summer stress is in full swing. *Pythium*, gray leaf spot, and dollar spot can quickly infect perennial ryegrass, causing a rapid decline in quality. In some years, this decline in quality is less severe than others. It all depends on the weather.

In summary, roughs can be improved through interseeding, but it takes a long-term commitment and a lot of seed. There must be an understanding that the roughs will be only as good as the weakest turfgrass that remains in the population.

In recent years, several golf courses have implemented programs of stripping existing sod from regularly in-play areas and resodding them to provide uniform stands. This practice has been especially common on green surrounds. Kentucky bluegrass and tall fescue have been used alone, but a combination of these two grasses with approximately 85% tall fescue and 15% Kentucky bluegrass has been the most common. Tall fescue alone and in combination with Kentucky bluegrass is performing very well throughout the growing season. The addition of Kentucky bluegrass to tall fescue provides the appearance of a finer-textured rough than turf-type tall fescue alone.

The initial expense of sodding is high, but the results are immediate and dramatic. A uniform, dense rough is provided and greatly improves playability and aesthetics. Sodding defines a distinct edge between rough and fine turf areas. If the expense of aerating and seeding of rough over several years is considered, and given the results provided, sodding becomes a more reasonable option. Remember, every green surround does not need to be sodded at one time. Results achieved from sodding a single green surround can be the impetus for implementing a long-term sodding program to improve other areas.

MAINTENANCE

Although grass species are important, maintenance programs are the biggest factor in overall rough quality. A uniform stand of the right grass is certainly a big help, but available resources to maintain any area of the golf course dramatically impact quality. The resources allocated for rough maintenance usually are the biggest factor in rough quality. Expenditures affect seeding rates and determine whether large areas can be sodded to provide immediate improvement. Irrigation coverage, the use of fungicides to prevent turf loss, and options for herbicide applications to prevent long-term weed encroachment are related to available resources.

With cooler temperatures and moist conditions, annual bluegrass germinates rapidly and fills in voids where existing annual bluegrass died during the summer. The same areas generally will fail during the following summer if corrective measures are not taken.

Basic weed and insect control programs are necessary to maintain good rough. This is not optional. Preemergent herbicides are available to control crabgrass and goosegrass, and post-emergent products can be used for weed escapes. A wide range of herbicides are available to control clover, sedges, and broadleaf weeds. Regular programs that include broadcast and spot spray applications help keep weeds out of rough. The extent of the treatments generally is determined by available resources.

Long residual insecticides have simplified control of white grubs, which are the primary insect problem of roughs in the Mid-Atlantic Region. Late June or early July applications can provide season-long control. Without insecticide applications, damage from white grubs, as well as from the animals that use them as a food source, should be expected.

The biggest addition to rough programs in recent years is the use of fungicides. Expectations are driving this trend for better or worse. In many cases, golf course superintendents are expanding fungicide treatments into roughs without an increase in budget. The result is less intense maintenance for other areas of the golf course in favor of fungicide applications in roughs. However, one or two properly timed fungicide applications during the summer months can dramatically limit rough decline if annual bluegrass is not a significant component of the turf population.

Disease susceptibility is one factor that makes turf-type tall fescue attractive for roughs. The primary pathogen — brown patch — can easily be diagnosed and treated. Summer patch in Kentucky bluegrass requires multiple preventative treatments, and these treatments are not always successful. Gray leaf spot can seriously thin stands of perennial ryegrass before one even realizes the disease is present.

Good fertility programs are needed to maintain thick, healthy rough. Adequate nitrogen fertility in roughs usually leads to golfer complaints during the spring and early summer because of the difficulty of the rough, requiring a delicate balancing act to satisfy both the golfers and the grass. If adequate fertility is not provided, the appearance and quality of the grass will suffer.

Highly trafficked areas require special maintenance attention. Good traffic regulation can spread wear to limit concentrated traffic damage, but areas that receive concentrated golf cart traffic or walk-on/walk-off areas need higher rates of nitrogen to maintain expected conditions. More aggressive aeration is also needed to combat compaction in highly trafficked rough areas.

One final trend that has emerged is the hand-mowing of roughs around green surrounds. The goal is to limit mechanical damage that occurs from riding mowers being used under moist conditions. The mechanical stress damage from hand mowers is far less than that of riding machines, especially on sloped areas. Obviously, many courses do not have the resources to hand-mow greens, much less hand-mow green surrounds.

Summer patch can cause severe thinning in stands of Kentucky bluegrass, even when fungicides are applied. In this photo, the tall fescue in the center of some of the patches is not affected.

CONCLUSION

Many different factors affect rough quality. In the Mid-Atlantic Region, disease pressure during the summer months can produce a rapid decline in rough quality. This is especially true if annual bluegrass is a primary component. Perennial ryegrass, Kentucky bluegrass, and turf-type tall fescue all have strengths and limitations. Tall fescue is holding up best to environmental stress in the Mid-Atlantic Region where reasonable irrigation coverage is present. At this point in time, it seems to be the best option for roughs, and tall fescue should be included as part of rough turfgrass populations. Regardless of the grass established in rough, at some point there is a good chance it will be the wrong choice.

The bottom line is that, as expectations rise for roughs, more inputs must be earmarked for rough maintenance. This includes capital to establish better grasses and more money in operating budgets to implement more intense rough maintenance programs. Unfortunately, many golf courses do not have the financial resources or the grasses in place to keep up with this trend. Nevertheless, expectations continue to grow. Establishing rough that meets these new expectations requires commitment to the programs and funding of resources that are needed to implement them. There are no shortcuts in this process, and there is no perfect cool-season grass for roughs. The expectations for roughs beg the question of whether limited resources should be used to maintain uniform conditions in a turfgrass area that is supposed to impose a penalty for errant shots. This is the basis of the rough dilemma.

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