



*Cosmetic striping by lightweight mowers has been a strong point for bentgrass, but it also does wonders for improved bluegrasses. This fairway was mowed at a bench setting of  $\frac{5}{8}$  inch. Briar Ridge C. C., Shererville, Indiana.*

# A Case for Bluegrass Fairways

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**T**HE LAST U.S. Open Championship played on Kentucky bluegrass fairways was in 1955 at Green Gables Country Club in Denver, Colorado. While many golfers aspire to greatness, few reach the degree of skill required for that or any other championships played at scratch. Many golfers couldn't care less, preferring a more leisurely, recreational game involving minimal practice. This doesn't mean they don't care how they strike the ball, only that they have neither the will nor the skill to perfect their game. Why, then, must such a high population of northern golfers be subjected to the trials and tribulations of

closely mown bentgrass fairways when we now have the means to produce beautiful, dense turf capable of being mown at a more comfortable playing height?

Kentucky bluegrass was, in the not too distant past, the principal turfgrass species used for golf course fairways in the northern United States and Canada. In recent years, however, it has been replaced at many locations by bentgrass or perennial ryegrass in an effort to produce more closely mown championship conditions desired by low-handicap golfers. Some folks, though, just can't cope with firm half-inch playing surfaces any better than they can cope with

firm, fast championship greens. But no one, it seems, wants a *non*-championship course.

Bluegrasses have gotten a bum rap during this Age of Champions due to the poor performance of the common types used in years gone by, the survivors of an era without irrigation when the turf could become dormant during hot, dry summers and resume active growth in the fall, then repeat the dormancy routine in the winter. They were, like common bermuda, pasture types cut down for golf and lawn use. They were the workhorses, though, receiving little more care than mowing, a little fertilizer and perhaps some type of rudimentary irrigation to



This *Poa annua* infestation of a bluegrass-perennial ryegrass fairway in Minnesota illustrates the need for control measures to suppress colonization.

stave off summer dormancy, and with no pest control other than weed killer. It is no wonder that those fairways cannot compete with the dense swards of close-cut, coddled bentgrass and ryegrass seen today.

As a species, *Poa pratensis* is a winter-hardy, sod-forming perennial. It has a wide range of color from deep blue-green to apple green, the former being preferred by Americans. The shade of green is less a factor in large-scale plantings than in side-by-side plot comparisons, however. Its principal drawback for golf turf is its inability to sustain sod density under close mowing.

The demise of bluegrass fairways began when golfers began to complain about "cuppy lies." These were thin spots or small depressions (not divots) in otherwise uniform turf mowed at an inch or higher. Rather than work at improving the sod density, it was more expeditious to simply lower the height of cut to that in the depressions. This resulted in a loss of sod density and, with irrigation, opened the door for weed invasion, especially *Poa annua* and crabgrass.

The irrigation pattern is still visible on some fairways — fairly good turf on the edges but *Poa annua* down the middle.

Today, the options available for northern fairway species are fairly well limited by the desired height of cut. Bentgrass for  $\frac{3}{8}$ -inch cut or below, perennial ryegrass for  $\frac{3}{8}$ - to  $\frac{3}{4}$ -inch cut, and bluegrass above that — if the new cultivars can take it. Perhaps a combination of bluegrass and ryegrass is appropriate. Bentgrass is, of course, the preference of champions and would-be champions — the strikers of the ball. Non-champions and never-will-be-champions — the sweepers of the ball — prefer a higher cut where they find more margin for error. These are the folks who get no joy at all from playing croquet over a closely mown fairway.

P. J. Boatwright, former director of USGA championships, once said that championship golf requires firm, tight fairways from which to hit well-controlled shots to firm, fast greens. Bentgrass fulfills those requirements and presents a delightfully cosmetic

appearance. It is winter hardy and can be grown in a wide climatic range, extending into the old crabgrass belt if grown under a high level of maintenance. That includes a well-distributed water supply, adequate drainage, reasonable disease prevention, lightweight mowing (clipping collection preferred), minimum vehicular traffic, and aggressive thatch management.

Perennial ryegrass was assumed to be an alternative species that would provide acceptable playing conditions for most golfers, since it can form beautiful, firm turf that can withstand a height of cut from about  $\frac{3}{8}$ - to  $\frac{3}{4}$ -inch or above. When it is good, it is very good, but it has major problems in some areas. It is a bunch grass (non-spreading) and is subject to winterkill in areas where snowfalls may alternate with thaw-and-freeze cycles, which can kill or severely damage the crowns of the individual plants. Since the crown of a bunch grass is the area from which all above- and below-ground growth originates, turf loss is inevitable. Winterkill usually occurs in low areas or surface depressions where free water collects around the crown. When the water freezes, ice crystals formed within the crown tissue rupture cell walls to kill that part of the plant. Two Milwaukee area clubs lost almost all of their ryegrass fairway turf a few winters ago. (*Poa annua* has the same problem, so turf loss can be expected somewhere in the Great Lakes Region every winter.)

These episodes of winterkill are not due to lower temperature alone, because perennial ryegrass performs well in South Dakota, where winter precipitation is low. But in Minnesota, Iowa, Wisconsin, northern Illinois and Indiana, perennial ryegrasses are not very dependable on a long-term basis. That leaves golf operations with only two options — bentgrass or Kentucky bluegrass — as permanent fairway turf.

If new cultivars of bluegrass can withstand a  $\frac{3}{4}$ -inch height of cut, there is no reason for not using them on new or existing fairways. They have many positive attributes, including excellent sod density that supports the ball quite well. Their rhizomes, or spreading underground stems, provide good divot recovery. They respond to a high level of maintenance quite well (and may require it) — much better than old common types.

According to some authorities in the field, for a cultivar to withstand  $\frac{3}{4}$ -inch mowing it must be aggressive. This trait was evaluated in the 1985 National Turfgrass Evaluation Program in which the cultivars of major turf species were compared side by side. Those which rated an 8 or 9 can be considered most likely to tolerate a  $\frac{3}{4}$ -inch cut. In this evaluation, the 8s and 9s (9 is best) were A-34, Mystic, Princeton 104,

Sydsport, and Touchdown. Some which rated 7 cannot be ignored, however, because of other outstanding characteristics. There may be additional aggressive types that were not entered by the producers.

Selection should not be based on aggressiveness alone, because all cultivars have some weaknesses that may override this characteristic in some localities. The national program lists 42 test sites, so specific information on disease incidence, percentage of turf cover through the year, etc., is best obtained from data gathered where growing conditions are similar to those of a specific course. National averages are much less important than regional performance.

Seed blends, rather than monostands, have the best performance records in most turf plantings because they reduce the likelihood of a single disease, insect, or environmental stress wiping out the entire population. To go one step further, many seed people think that perennial ryegrass blends should be added to bluegrasses, partly as a nurse crop and partly as a companion grass in mature turf. The percentage of ryegrass should be fairly low to give the slower-growing bluegrasses an opportunity to develop. Ratios of bluegrass to ryegrass range from 70:30 to 80:20 to 85:15, although an extremely low ryegrass population may lead to a patchy or clumpy condition later on. The recommended seeding rate in new plantings generally is about 175 pounds per acre. Mixtures for interseeding existing fairways may have a higher percentage of perennial ryegrass, perhaps 50%. August is the preferred planting time, allowing adequate grow-in before winter.

The genetic color of each cultivar is important in seed mixtures, the goal being a uniform appearance. These data are presented in the National Test reports. It is also advisable to stay with aggressive types, because they can over-grow the more passive grasses under mowing stress. Unfortunately, all but two of the tests (at Lincoln, Nebraska, and Winnipeg, Manitoba) were maintained under a homeowner maintenance regime in which the height of cut was 1½ inches or more. This makes the extrapolation of some data to the level of golf course maintenance a bit risky.

The same cultivar selection process should be used for perennial ryegrasses. One important characteristic with this species is appearance after mowing. Some cultivars have extremely tough fibers in their leaves that leave a ragged, stringy surface even when mowed by sharp reels and bedknives.

Some authorities believe that the new bluegrass blends can be planted without a nurse crop of perennial ryegrass when adequately mulched and irrigated. Germination time is about two weeks, but the develop-

ment of spreading growth is not too different from that of bentgrass — about five weeks or so after planting. Irrigation procedures are similar for all seedings, aimed at keeping the soil surface moist until root development is well underway. The Dr. Pepper watering schedule fits well. It calls for a daytime drink at 10:00 a.m., 2:00 p.m., and 4:00 p.m. If the soil profile is moist initially, there is no real need for night watering, except in areas where the wind blows all the time.

Mowing operations on bluegrass-ryegrass mixtures should begin early on at a fairly low cut, as reported by Drs. Brede and Duich (*Agron. J.* 1984. 76(5): 711-714). This apparently enables more direct sunlight to penetrate the canopy of the fast-growing ryegrass to help the bluegrass along. They found no advantage to this practice in monostands of either species.

The key to producing high-quality playing surfaces is the level of maintenance they receive. John Price, a former golf course superintendent at Southern Hills Country

Club in Tulsa, Oklahoma, once said, after being asked how he kept such excellent common bermudagrass fairways, that he *voluntarily* gave them the same degree of intense maintenance as that *required* by the hybrids. Few superintendents have been able to follow this philosophy with the bluegrasses. Some have, and their golfing clientele enjoys the results.

When bentgrass became the "in" species at private clubs and some public courses, the first recommendation was to reduce fairway acres to cut operational cost. Lightweight mowers require more manpower than 7-, 9-, or 11-gang setups; large-scale fungicide applications were anticipated, and most centerline irrigation systems could not adequately cover the existing fairway widths uniformly. It helped. Acreages are now well below 30 at many courses, but that has created a demand for better quality intermediate and primary roughs. The individual mowing units are narrow, so they fit the vertical contours in the terrain quite well. The results are attractive, striped

*A half-inch bentgrass fairway does not eliminate bad lies. This imbedded ball (new) was found in an otherwise excellent fairway — apparently given up for lost.*



bentgrass surfaces fit for a champion — but not necessarily enjoyable by a sweeper.

The same quality is being produced with perennial ryegrass *and* with Kentucky bluegrass if you look in the right places: Eagle Ridge in the Galena, Illinois, area and Wedgewood Valley near the Twin Cities, to name a couple. These courses, and many farther west where disease pressure is low, have good sod density year after year while keeping mowing heights under an inch.

The height of cut, incidentally, is a relative number, since it is set using the absolute, measured distance between the bottom of the rollers or skids and the cutting edge of the bedknife. The actual mowing height depends on the consistency of the turf surface and the amount of support it gives, relative to the weight of the cutting units. The lightweight triplexes and five-plexes “float” over the surfaces, but the heavy old gangs really dig in. The “float” of the lightweights over dense bluegrass should help

sustain leafiness on the surface by not gouging into the stemmy area below.

Soils on which high-quality bluegrass is to be grown should be near neutral, pH 6.5 - 7.5, and well supplied with phosphorus and potash. Recommendations for achieving these levels can be made by state or commercial soil testing laboratories experienced in the fertility needs of turfgrasses.

Bluegrass does not perform well in saline or alkaline conditions, so electrical conductivity and sodium absorption ratios should be checked in areas where these conditions may exist. Attempts to correct saline/alkali problems are seldom feasible unless the soil has adequate internal drainage. In some areas iron deficiency can cause chlorosis in bluegrass turf due to high pH and perhaps high phosphorus levels. This can be overcome with spray applications of ferrous sulfate or chelate or with an application of conventional fertilizer to which an iron source has been added.

Nitrogen requirements for high-class bluegrass are 3 or 4 pounds per 1,000 square feet, with one application being a temperature-dependent slow-release material in the late fall/early winter, when the grass is dormant or nearly so. Soluble sources are not recommended for dormant applications because of runoff risks and the possibility of stimulating excess growth during winter-time thaw periods. This late fall application provides for the needs of early spring growth without having to run heavy equipment over the soft soil. An easily remembered schedule is the Holiday Routine — Memorial Day, Labor Day, and Thanksgiving Day. Lighter, more frequent applications are, of course, preferable or at least equally desirable.

Mowing height and frequencies have been studied from coast to coast, but it is difficult to determine the appropriate procedure due to climatic, varietal, and cultural differences. The main consideration is to mow when no more than one-third of the leaf tissue is removed. This equates to from three to even five operations per week, depending on height of cut, fertility level, and other factors. Continual close, frequent mowing does reduce potential root development, especially in older cultivars and even Merion, which could tolerate some degree of close mowing.

Reduced root depth and vigor will affect irrigation requirements. Overwatering is undesirable since high moisture levels at the surface aid and abet the invasion of *Poa annua*, bent, and other weeds. It may be difficult to follow the old regime of heavy and infrequent watering today because of demands for day-to-day playing consistency, but it is still an admirable ideal.

Susceptibility of all fairway turf to disease or insect damage is a major consideration because of the area involved and the cost of plant protectants. This is a sizeable budget factor where *Poa annua*, perennial ryegrass, or bentgrass is predominant.

Bluegrasses are not pest free. Rusts, smut, *Fusarium* blight, as well as other common diseases may become problems, but they are treatable, just like those infecting other species.

The most persistent problem in bluegrass fairways is the invasion of bentgrass, even though *Poa annua* is a formidable competitor. Both can make headway when sod density is reduced, but there are more opportunities to suppress *Poa annua* than bent. The difficulty with bentgrass control is its general characterization as a desirable species, rather than as a weed, so its selective elimination from bluegrass turf has not been adequately researched. The most obvious control method is the use of an eradicant such as glyphosate as a spot treatment. Regrassing

Bluegrass fairways mowed well over an inch with mid-weight mowers look good but lack adequate ball support.



existing fairways to bluegrass can follow the same procedures as used for bentgrass. *Poa annua* is the most likely invader here, but the use of ethofumesate is limited to specific cultivars. Among them, however, are several of the desirably aggressive cultivars listed earlier. Nevertheless, *Poa annua* control procedures should be approached with care to avoid injury to its cousin. Plant growth regulators may help the suppression of *Poa annua*, but we know little about their selectivity in *Poa pratensis* cultivars. Their use at this time should be approached with a great deal of caution.

Bent fairway turf without high-intensity aeration equipment is unthinkable in most cases, but circa-1950 rolling stock is still used on bluegrass. Here again, ryegrass gets a better deal because it should be interseeded every year, often broadcast over freshly aerated surfaces where a great deal of soil is brought to the surface to act as a sort of

topdressing. Aggressive bluegrass growth will produce thatch, and most thatch management programs are based on intensive aeration. Microorganisms in the soil slowly decompose the accumulation of plant debris while the soil adds some degree of firmness to the surface. The holes in the soil offer an entryway for water and air penetration into the root zone and easy growing for new roots formed around the perimeter of the hole. The more deep holes the better, for growth above as well as below the soil line.

Worth mentioning here are earthworms, since their casts are visible and distressing at low mowing heights. They can be a major problem in closely mown perennial ryegrass, because it lacks the ability to grow over these little mounds like bentgrass. Worm casts are seldom a problem when the turf is mown at  $\frac{3}{4}$ -inch or higher. They may be down there someplace, but out of sight, out of mind. Earthworms are valuable creatures in thatch reduction and general soil health,

and they deserve some degree of praise rather than condemnation.

Kentucky bluegrass fairways still have a place in American golf. They are quite applicable to the game played by week-enders, vacationers, and those who just enjoy a round of golf in the great outdoors. If sod density can be kept high, the sweepers will enjoy the extra margin for error provided by a  $\frac{3}{4}$ - to  $\frac{1}{16}$ -inch cut (under an inch!). Adequate aeration and core breakup can minimize thatch buildup and add firmness to the playing surface for would-be strikers. Overall operating costs can be lower than bentgrass or perennial ryegrass, since disease and insect pressures are generally lower, flaws are less visible, and reseeding is not a daily (divot repair) or annual (ryegrass) affair. Like any other facet of golf course maintenance, however, you get what you are willing to pay for, and you can't get champagne out of a beer keg.

*Many years of turning heavy tractors and gang-mowers on the approach to the green created severe compaction in this dense soil. The approaches to greens are often double irrigated, from both the green and fairway programs. The *Poa annua* which overran the bluegrass just couldn't withstand disease and environmental extremes.*

