

**R**egrassing/replanting/renovation of putting surfaces is a hot topic of discussion at golf courses anywhere bermudagrass is the base turf. Along with surface contamination problems that impact the type of conditioning that can be provided, the availability of new and better-adapted cultivars is the primary reason this work is being conducted or contemplated. Regrassing putting greens is not a popular proposition because of the disruptions and cost. Yet, this is a capital improvement project that will have to be faced at a number of courses over the next few years. Various aspects of this renovation work will be reviewed in this article, along with guidelines to help in determining when regrassing should be performed.

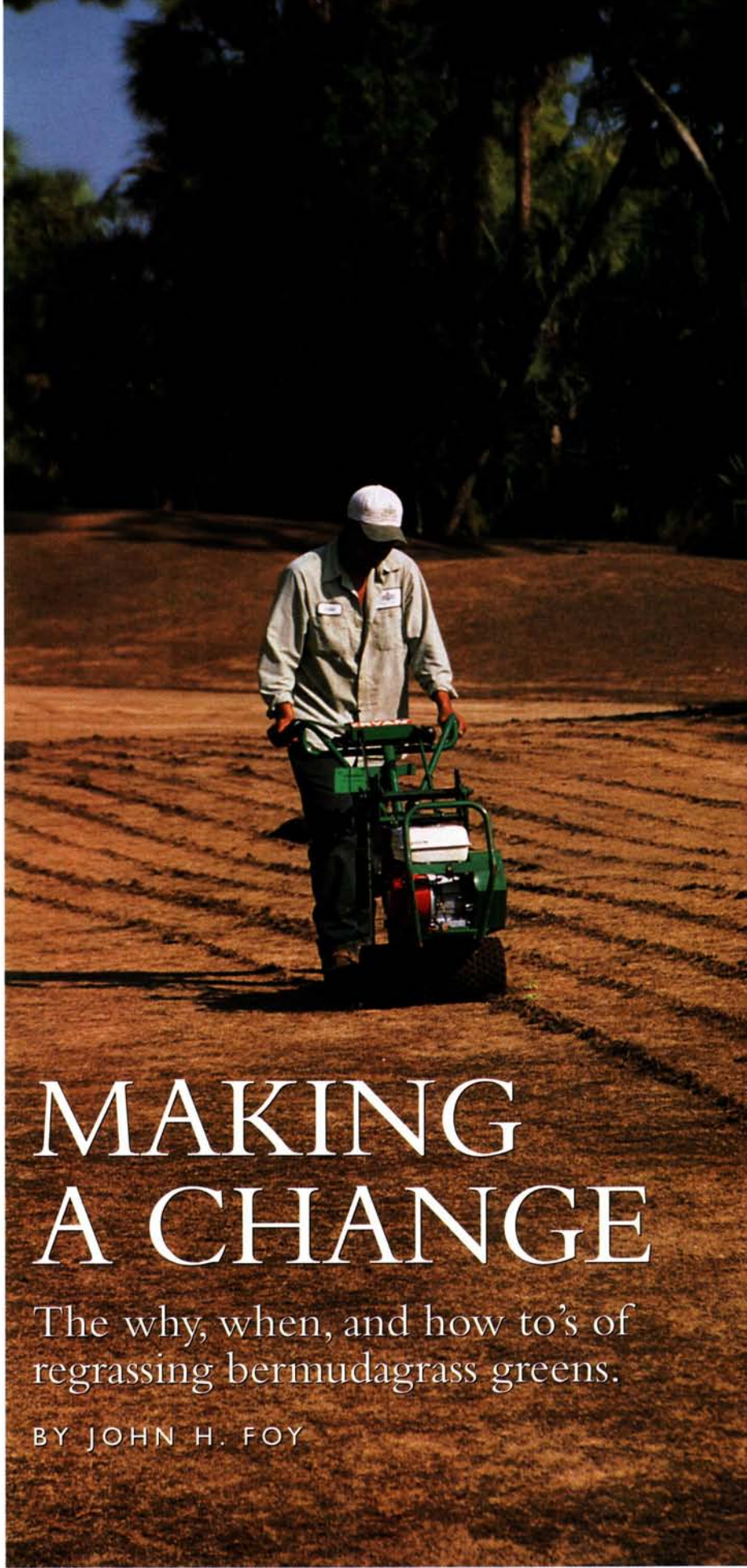
### WHY REGRASS?

Tifgreen, the first improved hybrid bermudagrass cultivar for putting greens, was released in 1956. In 1965, Tifdwarf bermuda was introduced, and for the past 35 years it has set the standard for bermudagrass putting greens. With the management tools and knowledge available today, good quality conditioning for general play can be provided with Tifdwarf greens. Championship putting green conditioning can also be produced and maintained for short periods of time. Golfer expectations and demands, however, are pushing Tifdwarf to its limit.

Although Tifdwarf has long been the standard, new *ultradwarf* cultivars such as Champion, Floradwarf, Mini Verde, and Tif Eagle became available in the late 1990s and are challenging Tifdwarf's dominance. When compared to Tifdwarf, these cultivars have finer leaf texture, increased density, and are able to tolerate lower heights of cut. These characteristics make it possible to provide a smoother, truer ball roll, and fast to very fast putting speeds, if desired. While there's no such thing as a perfect low-maintenance putting green turfgrass, and probably never will be, the ultradwarfs have raised quality standards in hot, humid regions. Many regrassing projects have been inspired solely by the opportunity to convert to one of these new cultivars.

The development of areas or patches of turf that exhibit different morphological characteristics is a phenomenon noted early on with both Tifgreen and Tifdwarf bermudagrass. The cause or source of these "off-type" areas has been studied

Removal of existing turf cover is the first step in the strip-and-till portion of the regrassing process.



# MAKING A CHANGE

The why, when, and how to's of  
regrassing bermudagrass greens.

BY JOHN H. FOY

**If encroachment control efforts are not utilized on an annual basis, encroachment quickly gains the upper hand.**

and debated, but not totally resolved. There is a general consensus that they are the result of either contaminants in the planting stock or genetic mutations. Within five to seven years after establishment of Tifdwarf putting surfaces, small off-type areas typically begin to appear in the base turf. Initially, this is primarily an aesthetic issue, but over time these off-type areas often develop differences in texture, growth habit, and tolerance of both mechanical and environmental stresses. Selective control of these off-type grasses is not feasible, and with each passing season there is a progression in both the size and number of off-type areas.

During the summer rainy season, particularly in Florida, some of the off-types show susceptibility to environmental stresses such as high temperature, humidity, and reduced sunlight intensity. When an additional stress factor such as a low height of cut or verticutting is added to the equation, the off-types rapidly decline and may take from a few weeks to a couple of months to recover. As the off-type areas increase in size and numbers, adjustments in programs and practices have to be made, and more often than not, management decisions are based on their impact on the off-type areas. As a result, it becomes progressively more difficult to provide consistently acceptable playing surfaces.

Another common surface contamination problem is encroachment of the fairway/rough bermudagrass into the perimeters of the greens. During the summertime, the aggressive growth habit of both the hybrid and common bermudas allows them to encroach into and dominate Tifdwarf. Although these bermudas can survive at putting green height, they cannot be managed to provide a good quality putting surface. The rate of encroachment corresponds to the length of the growing season, and in South Florida can be as much as two feet per year.

At one course where encroachment went unchecked for more than ten years, it was found that a third of the original putting green surface area had been lost. The large reduction in useable area caused a severe decline in both the playing quality and aesthetic characteristics. The head golf professional at this course described the greens as “bland circles that have only front, middle, and back hole locations.”

Encroachment control measures such as sub-surface barriers, mechanical edging, or resodding of perimeters do help and are recommended. Yet,

if control efforts are not utilized on an annual basis, encroachment quickly gains the upper hand.

As encroachment occurs, mowers typically adjust their mowing pattern inward, resulting in a progressive loss of useable putting surface. Often it is not recognized as a problem for several years, and then it is too late. And, unfortunately, it is not simply a matter of mowing back out to the original perimeter of the green. After severe encroachment has occurred, renovation and replanting are the only effective solution.

## **WHEN IS REGRASSING NEEDED?**

Bermudagrass is a hardy species, and rarely does total putting green failure occur due to off-type and encroachment contamination. With adequate fertilization and irrigation, increased cutting heights, and other management adjustments, it usually is possible to maintain full turf coverage on even a severely contaminated green. For courses that cannot afford renovation or feel it is too disruptive, there is the option of simply lowering their expectations. Slower greens and lack of uniformity may not be too large a price to pay. In today's highly competitive golfing environment, though, most courses find it necessary to provide nothing less than top quality putting greens to attract and keep golfers.

Since environmental conditions play a major role in turf health and green performance, it is difficult to predict accurately when regrassing should be performed. Ideally, regrassing is done before there is a pronounced deterioration in conditioning and quality. Based on experience, when 30% to 40% of the total putting surface area has become contaminated, providing consistent and acceptable conditions becomes a real challenge. This is especially true during periods of adverse weather. When surface contamination exceeds 50%, it is almost impossible to provide a top quality putting surface.

Because of surface contamination problems, many courses regrass their putting surfaces on a 10- to 15-year cycle. At courses where fast to very fast putting speeds are demanded, the cycle can be even shorter. On the other side of the coin, if simply having a green turf cover is acceptable to the majority of golfers, greens can be nursed along for 20 years or more. Annual overseeding can mask contamination and extend the serviceable life of bermudagrass greens if the winter months are the primary focus. Additional spread of surface contamination occurs, however, with



routine changing of hole locations. Also, a point can be reached where consistent and acceptable overseeding results no longer can be produced.

Without question, the ultradwarf bermudagrass cultivars have raised the bar as far as the level of conditioning that can be provided. Along with being used almost exclusively on new courses, the ultradwarfs are the primary choice when older courses choose to regrass. And, the decision to regrass is often based on more than just agronomics. Most golfers (and all golf course superintendents) want very much to have the best greens they can. Like it or not, this promotes a great deal of competition among neighboring courses. As Americans, we tend to look to technology to give us an “edge,” whether it is an oversized titanium driver or a new grass.

Whether a course uses one of the latest and greatest ultradwarfs or one of the old standbys, the primary focus and justification for regrassing is usually to reestablish a uniform monostand of turf on the green. Addressing other agronomic problems or limiting situations is advisable for achieving truly successful results over the short and long term. For a further and more detailed review of the various factors that affect putting green performance, refer to the article “Helping Your Greens Make the Grade” (*Green Section Record*, March/April 1998, and on the USGA website at [www.usga.org/green](http://www.usga.org/green)). If a sound foundation is not present, regrassing putting surfaces is analogous to putting new carpet over a rotted sub-floor.

### REGRASSING VERSUS REBUILDING: WHAT IS THE BEST OPTION?

Until the mid-1980s, fill soil generated from lake excavation was used to construct “push-up” greens at most courses in Florida. Often this fill soil was primarily sand, and given the hardy nature of Tifgreen and Tifdwarf bermudagrass, it

was possible to maintain turf coverage and acceptable conditioning. With escalating demands and expectations, however, heights of cut have been pushed lower and lower. It was not so long ago that the standard height of cut was 0.186 inches. Only for tournaments or special events was the height brought down to 0.155 inches, and then for just a few days. Today, the standard is about 0.125 inches, and at some courses with ultradwarf greens, a height of cut of 0.100 inches or less is being maintained for extended periods of time. Although these new cultivars can tolerate extremely low cutting heights, close mowing still exerts significant stress on the turf and weakens the root system. To ensure that healthy turf can be produced over the long term, it is very important that rootzone physical characteristics not be a limiting factor.

When visiting courses that are considering renovation and currently have old push-up greens, the Green Section agronomist’s first suggestion usually is to completely rebuild them in accordance to the USGA’s guidelines. Yet, it is understood that this may not be an option or absolutely necessary in all cases. Based on experience, the basic criteria for having good bermudagrass performance over the long term are a homogenous high-sand-content rootzone mix and adequate or unrestricted subsurface drainage. At courses where drainage is not a problem, complete reconstruction of push-up greens may not be absolutely necessary. A regrassing process known as the “strip-and-till” method has been utilized successfully and is an option for both push-up greens and those built in accordance with USGA recommendations.

Following are the basic steps in a strip-and-till regrassing process:

- Remove the existing turf cover by cutting it as deeply as possible with sod cutters and then removing it by hand or scraping it off with a small front end loader.

While simply regrassing is the most common process, in some cases total green reconstruction is necessary.

- On older greens, excavate and remove an additional 2–4 inches of rootzone material to eliminate excessive thatch and organic matter.
- Add a layer of sand or rootzone mix approximately equal in depth to the amount of material removed into the green wells. Laboratory testing should be conducted to determine the best suited materials for installation.



A common problem with bermudagrass greens is the development of *off-type* surface contamination. Once 30% to 40% contamination exists, providing consistent and acceptable conditioning can be a major challenge. Regrassing is the only solution.

- Use a heavy-duty tractor-mounted rototiller to thoroughly incorporate the added materials as deeply as possible into the underlying rootzone. Rototill the entire surface multiple times in various directions at a slow ground speed and with a high operation RPM to mix the materials as uniformly as possible.
- The new rootzone mix is compacted and roughly shaped, making sure to provide surface drainage and adequate hole locations.
- Fumigation of the rootzone mix is strongly recommended when regrassing bermudagrass greens, killing any of the old bermuda that may be present and eliminating soil-borne pest organisms such as nematodes and diseases.
- After re-compacting the rootzone mix and final shaping, sprig with the desired bermudagrass cultivar to establish the new turf cover.

As with construction of new putting greens, laboratory testing of materials is an extremely important step with a regrassing project. Core samples of existing greens should be submitted to an accredited physical soil testing laboratory for complete evaluation. Assessment of physical and performance characteristics is needed to determine the best suited sand and/or amendments to incorporate into the existing profiles. The goal is to create a homogenous rootzone mix with

characteristics (porosity, particle size range, moisture retention, and saturated hydraulic conductivity) that meet USGA guidelines.

When evaluating rootzone characteristics, care must be taken not to overemphasize the saturated hydraulic conductivity value (also referred to as SHC, infiltration rate, perc rate, and Ksat). The current USGA green construction recommendations detail two ranges of Ksat. The “normal” range is 6 to 12 inches per hour. The “accelerated” range is 12 to 24 inches per hour. Generally it is recommended that rootzones with Ksat values in the accelerated range be used in situations where irrigation water quality is poor or cool-season turfgrasses are being grown out of their range of adaptation. The accelerated range is often recommended in areas with high annual rainfalls. Yet, when rootzones have perc rates of 16 inches or more per hour, the greens are more difficult to manage and often require a much longer period of time to achieve full maturity. Until some natural organic matter accumulation occurs, high infiltration-rate greens are often droughty and require more frequent fertilization. This is a case where faster is not always better.

Since bermudagrass is a warm-season species, warm daytime and nighttime temperatures are desired for maximum growth and establishment. Thus, the ideal time for planting and grow-in of bermudagrass putting surfaces is June to July. When unavoidable weather delays make it impossible to complete the planting process until August or even September, there is a risk of missing the re-opening date and experiencing damage during the winter months. Also, since late summer is the peak of the hurricane season in Florida and the Gulf Coast area, it is desirable to have renovation projects completed as early as possible. A good construction contractor usually can take care of the soil work portion of a regrassing job in four to eight weeks. Thus, to plant the greens in early to mid-summer, regrassing projects should begin in April or in early May at the very latest.

## OTHER CONSIDERATIONS AND EXPECTATIONS

Use of one of the new ultradwarf cultivars is one of the big reasons for a surge in regrassing projects with bermudagrass greens. As expected, it has been necessary to go through a learning curve with regard to determining the best or optimum management programs. Although the ultradwarfs

are bermudagrasses, some adjustments in programs and practices are necessary relative to what is routinely performed with Tifdwarf greens. At facilities where premium quality conditioning and fast to very fast putting speeds are expected, ultradwarf greens are the best option. If the necessary equipment, budget, and time are limited or not available, though, difficulties can be experienced in maintaining a healthy turf cover and reaching the full potential of these new cultivars. While Tifdwarf is gradually being replaced as the standard for bermuda greens, it still has a place and is a viable option.

Test plots for the On-Site Evaluation of Bermudagrass for Putting Greens program were established in 1998 at eight golf courses across the southern portion of the U.S. This program was sponsored by the National Turfgrass Evaluation Program (NTEP), the United States Golf Association (USGA), and the Golf Course Superintendents Association of America (GCSAA) to help provide information and guidance in turf selection. Thus far none of the new ultradwarf cultivars has been found to be significantly superior to the others, though slight regional and time-of-year differences have been noted. Surveying other courses in the area and evaluating a couple of cultivars under site-specific conditions is recommended to assist in determining the best cultivar for use in a regrassing project.

The ultradwarf cultivars can tolerate and actually need to be maintained at lower heights of cut compared to Tifdwarf. However, cutting height alone cannot provide the dramatic increases in putting speeds possible with the ultradwarfs. The greatly increased shoot density of the ultradwarfs (compared to Tifdwarf) provides a smoother and truer ball roll, but this same density results in increased resistance to ball roll. Thus, to produce fast putting speeds, practices such as double cutting and/or rolling of the greens must also be employed.

The lower heights of cut do require that additional care be exercised with surface slopes or contours. Sharp contours or ridge lines are easily scalped or gouged by the mowers when a height of cut is 0.125 inches or less. Also, when fast putting speeds are maintained, surface slopes in excess of 3% result in reduced useable hole location area and more penal play characteristics. According to Tom Marzolf, Senior Design Associate with Fazio Golf Course Designers, it is now their policy to have hole location areas with

slopes ranging from 0.5% to a maximum of 2.5% when speeds of 9.5 feet or faster will be maintained.

Finally, full turf coverage and smooth surface conditions can be developed fairly quickly following regrassing of bermuda greens. With Tifdwarf, 90 to 120 days typically is required to complete the grow-in and develop an acceptable playing surface. With the ultradwarfs, higher sprigging rates in the range of 35 bushels per 1,000 sq. ft. can be used, and full turf coverage can be established in as little as 60 to 80 days. Greens then can be reopened to play, but additional time must be allowed to develop a fully mature surface. Along with smoothing surface imperfections, a primary aspect of the maturing process is

development of a slight amount of organic matter or "pad" in the upper rootzone. This helps provide some nutrient and moisture retention and is needed for surface resiliency. A common complaint with both renovated and new greens is that they are hard and don't hold well-played approach shots. With bermudagrass greens, one to two full growing seasons typically is required to develop a mature condition. A proactive education program for golfers on what can be expected following regrassing is advisable to help minimize complaints.

As with all other assets, periodic renovation or upgrading of golf courses is a necessary proposition. Regrassing bermudagrass greens falls into this category and is likened to replacing a roof or a carpet in a house. An understanding of why and how regrassing is being undertaken can help ease the pain.

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While the surface may appear to be clean, viable bermudagrass and pests such as nematodes can survive the regrassing process. Therefore, soil sterilization is strongly recommended.