

Going for the Gold with Bermudagrass Greens: Part II

While the basics remain the same, tools have become available to help “fine-tune” the conditioning of bermudagrass putting surfaces.

by JOHN H. FOY



A faster rate of organic matter accumulation is a concern with the ultradwarfs. If not properly managed starting at establishment, a problem can quickly develop. The accumulation in this photo developed in a little over six months.

GOING FOR THE GOLD with bermudagrass greens is certainly achievable today. Over the past several years, further refinements in management programs and new techniques such as growth regulator treatments have become available! These updated management strategies have made it possible to provide a level of quality more in keeping with current demands and expectations. With proper resources and good management, outstanding playing surfaces for regular and championship play can be provided with bermudagrass greens.

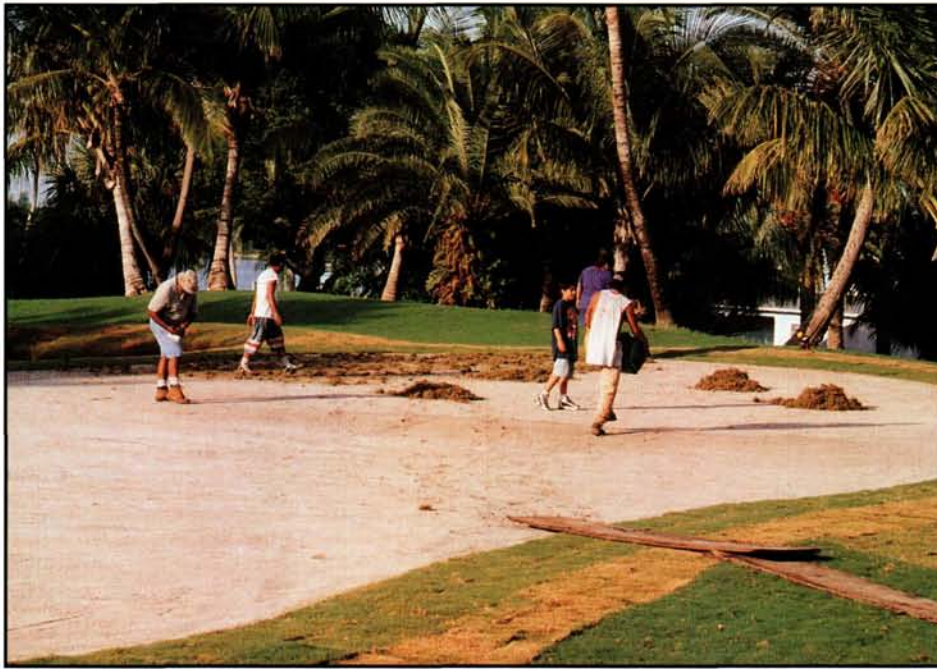
New bermudagrass cultivars called “ultradwarfs” are also available now. These new bermudagrasses are further raising the standards of putting green quality on golf courses throughout the hot, humid regions of the country.

Updated Management Strategies for Bermudagrass Greens

Spoon feeding fertilization: Relative to other turfgrasses, the bermudagrasses have a higher fertilization requirement to produce and maintain a dense, green turf cover. The rule of thumb with Tifdwarf and Tifgreen putting surfaces has been to supply 1 lb. of actual nitrogen per 1,000 sq. ft. per month during the growing season. While not fully supported by university research, the practice of nitrogen to potassium fertilization ratios in the 1:1 to even 1:2 range has also been found to produce the best results at most courses. To supply this amount of nutrients, applications of granular fertilizers on a schedule of every 2 to 4 weeks has been the standard regime for

many years. Yet at times, difficulties have been encountered in trying to maintain a constant shoot growth rate and consistent playability.

Spoon feeding, generally consisting of spray applications of low rates of readily available nutrients on a frequent basis, has been a common practice with cool-season turfgrass putting greens for many years. With bermudagrass putting greens in Florida, it took the persistence of an abnormal and adverse weather pattern to produce a change in fertilization practices. With the onset of the El Niño weather pattern and a prolonged period of excessive rain, it was difficult to follow standard fertilization programs. Besides not being able to apply and water-in granular fertilizer materials, fertigation was not an option either because supplemental irrigation



At a growing number of courses around the state of Florida, conversion to one of the new ultradwarf bermuda cultivars has or will be made in the next few years.

was not needed. Thus, out of sheer desperation, spray application fertilization programs were undertaken at courses around Florida. It was quickly realized that spoon-feeding was a viable strategy for maintaining bermudagrass greens.

Along with being able to manage shoot growth rates more effectively, another positive aspect of spoon-feeding is that total annual fertilization rates have been reduced. At a few courses, spoon-feeding programs are being practiced exclusive of all other methods. However, some concerns do exist about being able to supply and maintain adequate nutrient availability with this approach and in turn sustaining uniform growth. A more common and, in my opinion, safer strategy is to maintain a nutrient base with once-a-month applications of a complete type granular fertilizer that contains a slow-release nitrogen source. It is suggested to supply 0.5 lbs. of actual nitrogen per 1,000 sq. ft. with each application. Then, in between and on an every-5-to-10-days schedule, spoon feed 0.1 to 0.25 lbs. of nitrogen per 1,000 sq. ft. per application. Regular soil and tissue nutrient testing should be performed to ensure that adequate and balanced nutrition levels are maintained.

Double cutting and rolling: With Tifdwarf, and even more so with Tifgreen putting greens, there are times when an elevated height of cut must be maintained to ensure turf survival.

In Florida during the summer rainy season, sunlight intensity is reduced due to the persistence of overcast skies. The bermudagrasses have a high sunlight requirement, and just a few days of heavily overcast weather can negatively impact health and quality. If a height of cut of $\frac{3}{32}$ " or less is being maintained, turf density and health begin to decline and rapid invasion of algae can be expected. Double cutting and/or rolling are practices that can compensate for a higher height of cut and continue to provide a smooth ball roll and medium to fast putting speed.

In the past, double cutting and/or rolling of putting surfaces were practices that were reserved for tournaments or special events. However, in an effort to accommodate golfer demands for fast to very fast putting speeds, these practices are being conducted on a routine basis at more and more courses. At one club in Naples, Florida, double cutting the greens is typically performed more than 200 days a year. Obviously, this consumes a significant number of additional manpower hours and reduces the life expectancy of the mowing units. More time also is required to complete course preparations each morning. The members, however, are very supportive and accept the additional cost incurred because they are provided with top quality putting green conditioning.

During the early to mid-1990s, roll-

ing increased in popularity. In addition to increasing putting speeds, this practice produces a marked improvement in surface smoothness with bermudagrass greens. A concern with rolling putting greens, however, was the increase of soil compaction and its effect on turf health over the long term. In a study conducted at North Carolina State University, it was found that no change in compaction occurred with high-sand-content USGA-type rootzone mixes, even when daily rolling was conducted for 70 consecutive days.²

It has been my experience that the best results are achieved when bermudagrass greens are rolled two to four times per week. Care does need to be exercised when the turf is not actively growing or is under stress because of the excessive wear that can occur around the perimeters of the putting surfaces.

Topdressing: Sand topdressing of putting surfaces is a basic management practice that goes back to the links courses of Scotland. Along with having an important role in rootzone management, topdressing produces a smoother, more consistent surface and faster putting speeds. In applying topdressing, the rule of thumb is to try to match the frequency and amount of material with the growth rate of the turf. During the summertime, when active bermudagrass growth is occurring, topdressing every two to four weeks has been the standard regime used at most courses. However, because of equipment limitations it was difficult to accomplish light applications in a timely and efficient manner. Along with inconveniencing golfers, a few days were required for the sand to work down into the turf canopy and for a good playing surface to redevelop.

Improvements in application equipment have been made so that very light dustings of sand can be made and all the greens topdressed in a few hours. With these light applications, brushing or even overhead irrigation can be performed to work the sand down into the turf so that most golfers can't tell that a topdressing has been performed. Furthermore, the use of dry material facilitates application and incorporation into the turf. At the courses where premium quality conditioning is being maintained, the putting surfaces are dusted on a 5-to-10-day schedule. With more frequent topdressing, however, extra attention must be given to maintenance of the mowing units to keep them in precise operating condition.

Growth regulator treatments: Uniform turf growth is needed to ensure the persistence of good coverage and recovery from traffic and wear damage. Excessive shoot growth rates, however, negatively affect playability and, in particular, reduce putting speeds. Thatch accumulation also is a concern with high growth rates. As mentioned earlier, spoon feeding fertilization programs can help manage the growth rate of bermuda putting surfaces. However, during the summer months, difficulties with rapid growth and inconsistent conditioning can occur. Especially during the mid to late afternoon, a noticeable decline in putting speeds can be a problem. Conducting a second midday mowing of putting greens is not an option, nor is it a practical solution at most courses.

In the early 1990s, the turfgrass growth regulator trinexapac-ethyl (Primo) rapidly gained popularity as a management tool for bermudagrass fairways and tee surfaces. Monthly treatments slowed down shoot growth rates, mowing frequency was reduced, and there were less turf scalping and clipping accumulation problems. Additional benefits of the trinexapac-ethyl treatment program are increased density and a darker green color with reduced fertilization. The use of a growth regulator on bermudagrass fairways has become widely accepted and is now a standard practice at courses throughout Florida.

When discussions about using a growth regulator on bermudagrass putting surfaces first started, I had a number of reservations about this practice. However, testing of low-rate applications was undertaken and it was found that more consistent and faster putting speeds could be maintained at the same or even a slightly higher height of cut. A "dwarfing" effect also occurs, such that turf density is increased. Trinexapac-ethyl treatments also help mask off-type surface contamination. In 1996, a label revision was made that allows use of this growth regulator on Tifdwarf and Tifgreen greens.³ As with fairways, treatment of bermuda putting surfaces with growth regulators has become a widely accepted practice. At the vast majority of courses in Florida, treatments are being conducted on a regular basis throughout the growing season and no adverse side effects have been noted. The ability to effectively manage growth has had a significant positive impact on being able to produce and maintain

consistent conditioning of bermudagrass putting surfaces.

Experiences with the Ultradwarf Bermudagrass Cultivars

There is simply no way around the fact that over the past 10 to 15 years, golfer expectations and demands have risen dramatically. Even with the knowledge and management tools available today, meeting these demands with Tifgreen bermudagrass greens is

ences between the cultivars, all the ultradwarfs have a higher shoot density and finer leaf blade relative to Tifdwarf. They also have exhibited excellent tolerance to a $\frac{1}{8}$ " height of cut for extended periods of time. At a few courses, heights of cut of $\frac{1}{10}$ " or even less are being maintained. The improved performance characteristics of the ultradwarfs make it possible to provide an extremely smooth ball roll and, when desired, fast to very fast putting speeds. Although additional



Check the temperature of bermudagrass sprigs. If excessive temperatures build up in shipment, sprig viability and turf establishment will be affected.

an almost impossible challenge. Tifdwarf is also being pushed to its limits. Furthermore, while a degree of success has been achieved in maintaining bentgrass putting greens in hot, humid regions, it is not an environmentally and economically sound approach. Thus, there is lots of interest in new bermudagrass cultivars that have improved performance characteristics and are better adapted for meeting current demands.

Since the 1980s and continuing through the 1990s, efforts have been underway by turfgrass breeders, producers, and golf course superintendents to develop or select improved bermudagrasses for putting greens. This resulted in the introduction of new cultivars that are now being commonly referred to as *ultradwarfs*. While there are genetic and morphological differ-

time is needed for thorough evaluation of these new cultivars, generally it is agreed that one or more of them will replace Tifdwarf as the standard on putting greens in hot, humid regions.

Champion, FloraDwarf, and TifEagle are the commercially available ultradwarfs, and the cultivar MiniVerde was released recently. In 1997, the first full set of ultradwarf (Champion) putting greens was established in Florida on the Cypress Course at Bonita Bay East in Bonita Springs. Since then, ultradwarfs have been used for replanting or on new greens at nearly 100 courses around the state. No doubt this number will increase rapidly over the next few years, given the number of courses where replanting is needed to address surface contamination problems and with new construction continuing at a fast pace.

Concerning management of ultradwarf putting surfaces, they still are all bermudagrasses and, as such, a lot of the basics are similar to what is required to produce and maintain premium quality conditioning with Tifdwarf. Yet, there are also some differences that have been identified. The following is a summary of experiences with managing ultradwarf greens at several courses around Florida over the past two to three years.

Planting and establishment: The hybrid bermudas do not produce viable seed and thus must be established via vegetative means. Sprigging has been and continues to be the standard planting process.⁴ While there is some debate over the exact size of a bushel, sprigging rates in the range of 20-30 bushels per 1,000 sq. ft. typically have been used with the ultradwarfs. At a few courses, however, it was observed that the establishment of full turf coverage was slowed down significantly with a low sprigging rate. It is being recommended with TifEagle that sufficient material be uniformly spread over the soil surface so that there are no open voids greater than 3". This is a good guideline since sprigging rates can be subjective, and after being mechanically cut in, it is very difficult to gauge the actual amount of material used. Full turf coverage can be established in as little as six to eight weeks with the ultradwarfs.

A major difference that has been noted with the grow-in of ultradwarf greens is the need to start mowing at a significantly lower height of cut. As with Tifdwarf, mowing the greens is initiated 10 to 14 days after sprigging. However, instead of starting out at about $\frac{3}{8}$ ", the mowers need to be set up in the range of $\frac{3}{32}$ " to $\frac{3}{16}$ ". Then the height of cut needs to be lowered progressively to $\frac{1}{8}$ " and maintained at this height through the grow-in process. For quite a few people, this has taken some getting used to. Furthermore, the ultradwarfs need and respond to frequent verticutting, spiking, and topdressing during grow-in.

Thatch/biomass management: A concern that was identified early on with the ultradwarfs was their faster rate of thatch/biomass accumulation relative to Tifdwarf. While there is some debate over terminology, it is still a fact that the ultradwarfs can produce a distinct and significant organic mat layer between the turf surface and rootzone mix. The bottom line is that this is an important management con-

sideration, and from the start, programs need to be geared to not allowing an excessive organic matter accumulation to develop. Prevention is the key to ensuring long-term successful results with the ultradwarfs.

Based on experiences at a number of courses and on university research, nitrogen fertilization has a very important role in the management of thatch/biomass accumulation and turf quality.⁵ While certainly not a new concept in turfgrass and putting green management, it has taken a little bit of time to determine the best programs for maintaining good turf quality without causing excessive growth and organic matter accumulation. At this time, a program of supplying 0.5 to 1.0 lb. of actual nitrogen per 1,000 sq. ft. per month during the growing season is suggested. The frequency of applications is as important as the amount of nitrogen being supplied. Spoon feeding programs are the standard approach being used at the vast majority of courses with ultradwarf putting surfaces. While granular fertilizer applications also are being made, the very dense turf cover of the ultradwarfs can cause problems with getting the materials down into the canopy. This is true even with mini- or micro-blend formulations. As far as the other macro- and micronutrients are concerned, ultradwarf requirements appear to be fairly consistent with those of Tifdwarf. An increased incidence of leaf spot disease activity has been observed on TifEagle putting surfaces when adequate potassium levels are not maintained.

Along with careful nitrogen fertilization, frequent and light verticutting/grooming and topdressing are needed with the ultradwarfs to maintain optimum turf quality and prevent excessive organic matter accumulation. During the growing season, these practices need to be conducted on a weekly basis. Unlike Tifdwarf, severe verticutting or excessive topdressing rates can be very detrimental to the ultradwarfs. As with granular fertilizer applications, some difficulties have also been encountered with incorporation of topdressing sand due to the very dense canopy of the ultradwarfs. Light verticutting or use of groomer attachments to open up the turf canopy prior to topdressing is a common and successful strategy being used at a number of courses. Another option that is gaining popularity is using rotary fertilizer spreaders to apply dried and bagged topdressing sand. This approach allows

very light applications in an efficient and timely manner.

With astute fertilization and adherence to good topdressing and verticutting regimes, thatch/biomass accumulation with the ultradwarfs can be managed effectively. Thus, additional coring, relative to what is routinely done with Tifdwarf putting surfaces, has not been required. In the Central and South Florida areas, three coring operations during the growing season with $\frac{1}{2}$ " diameter or larger tines has been adequate for management of rootzone physical characteristics. As with Tifdwarf greens, however, care does need to be exercised during late summer and early fall with mechanical operations. During this time, intense environmental stress also occurs and recovery from damage is delayed. Furthermore, as with Tifdwarf greens, periodic water injection cultivation (WIC) or small-diameter aeration is very beneficial and encouraged.

Other considerations: In this article it will not be possible to cover in detail every aspect of managing ultradwarf bermudagrass putting surfaces. In fact, we are still in the learning process with these new cultivars. There are a few other management factors to consider, though.

First, it is well established that bermudagrass has very poor shade tolerance. Early on with the ultradwarfs, it was speculated that their increased shoot density and finer leaf blade would provide a degree of shade tolerance. This has turned out not to be the case. At several courses that have converted to one of the ultradwarfs, problems have been experienced with maintaining a dense, good quality turf in all the same areas where shade was a problem before. Full sunlight exposure, all day long, is an absolutely essential ingredient in maintaining top quality bermudagrass putting surfaces. This is true regardless of the cultivar. Furthermore, the ultradwarfs also are negatively impacted when sunlight intensity is reduced by heavy overcast conditions. Maintaining a slightly higher height of cut during the rainy season is advisable, but on the positive side, it is still possible to provide a good quality playing surface.

Next, the ultradwarf cultivars Champion, MiniVerde, and TifEagle all possess improved cool-temperature color retention and growth relative to Tifdwarf. Thus, for courses in South and even Central Florida, the need for winter overseeding is further reduced.

When cold nighttime temperatures do occur, some loss of green color results. However, with the return of milder temperatures, it is possible to produce a rapid greenup response. By not having to overseed, golfers do not have to put up with the disruptions and inconvenience of the fall establishment and spring transition operations.

For North Florida and the Southeast, a period of winter dormancy will still occur, and at facilities where moderate to heavy play is hosted during this time, interseeding/overseeding programs will still be necessary. The increased density of the ultradwarfs has been perceived as an obstacle to overseeding establishment, but successful results have been achieved at a number of courses. It also should be pointed out that at a couple of courses, satisfactory results have been experienced by not overseeding, but covering the putting surfaces dur-

ing times when freezing temperatures are expected.

Finally, an additional attribute that has been noted with the ultradwarfs is increased resistance to fairway/rough bermuda encroachment. Encroachment of coarse-textured bermudagrass into the perimeters of Tifgreen and Tifdwarf putting surfaces is an age-old problem that results in a progressive loss of usable surface area. With the combination of increased density and being maintained at lower heights of cut, at least so far, encroachment problems have not been experienced on ultradwarf greens.

As to the life expectancy of ultradwarf putting surfaces, only time will tell. Yet, it is reasonable to expect them to at least be equal to the 10- to 20-year life of Tifdwarf putting surfaces. With more control and emphasis being placed on production quality control

and turfgrass certification, we hope it will also be possible to avoid or reduce the contamination problems that have plagued bermudagrass courses in the past.

Summary

Maintaining extremely fast putting speeds at all courses with bermudagrass greens is not being encouraged or condoned. Yet, the standards of conditioning and quality have been raised and the benchmark continues to be set by bentgrass greens. For southern golf courses with bermudagrass greens, providing comparable conditioning has always been a challenge. With the knowledge and tools available today, however, it is possible to maintain a smooth, true ball roll and a consistent putting speed throughout the course. As discussed in this article, there are practices that can be used to produce faster putting speeds if there is a commitment to providing the necessary resources.

Furthermore, while it is still early in the game, the new ultradwarf bermudas are providing a more level playing field for southern golf courses. At the courses where they have been used, the golfers have been pleased with the improved playing surfaces. It should be stressed that the ultradwarfs do require intensive management and thus may not be suited for all courses. There is still not a perfect grass, but at courses where premium quality putting green conditioning is expected or demanded, the ultradwarf bermudas are an option that merits strong consideration.

Literature Cited:

- ¹Foy, John H. (1991). *Going for the Gold with Bermudagrass Greens*. USGA Green Section Record. Vol. 29, No. 4, pp. 1-4.
- ²Hartwiger, Chris (1986). *The Ups and Downs of Rolling Putting Greens*. USGA Green Section Record. Vol. 34, No. 4, pp. 1-4.
- ³DiPaola, Joe & Shepard, Dennis (2000). *Regulate Growth and Improve Turf Quality*. *Golf Course Management*. March, 2000, pp. 56-59.
- ⁴Elsner, Earl & McWhorter, Doug (1999). *Bermudagrass Sprig Heat Tolerance*. USGA Green Section Record. Vol. 37, No. 5, pp. 7-9.
- ⁵White, Richard (1999). *Unleash the Full Potential of New Bermudagrass Cultivars*. USGA Green Section Record. Vol. 37, No. 5, pp. 16-18.



More frequent light topdressing is another means of providing a smooth, true ball roll and medium to fast putting speeds.

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