Diseases and heat besiege ultradwarf bermudagrasses

In the real world, these grasses aren't so tolerant of low mowing after all.

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Over the past decade, several new bermudagrass (Cynodon species and hybrids) varieties have been developed for putting greens in the southeastern United States. Most notable are the new hybrid “ultradwarf” bermudagrass varieties, including Champion, FloraDwarf and TifEagle.

These new varieties were developed, in part, to provide superior bermudagrass putting greens, rivaling those of creeping bentgrass (Agrostis palustris). These varieties have greater shoot densities (compared with the old standby, Tifdwarf), a perceived ability to allow faster putting speeds and tolerance of low mowing heights (7). These new varieties have also helped alleviate concerns about Tifdwarf, as producers have focused on delivering the new cultivars in contaminant-free plant material of known origin.

Considering these merits and the fact that a new putting green bermuda-
grass variety had not been released in more than 30 years, the new ultradwarf bermudagrasses enjoyed wide acceptance with many "success" stories published (1,10,11). However, less has been written on the many unsuccessful experiences superintendents have had with these ultradwarf bermudagrasses.

The golf course superintendent, general manager and green committee must seriously consider the requirements of growing an ultradwarf bermudagrass before the new variety is sprigged into the putting surfaces. Champion, FloraDwarf and TifEagle demand complex management practices that are not fully understood and that sometimes seem directly in conflict with each other.

This article is based on observations of the past several years, but most particularly on the results of a scouting program sponsored by Aventis Environmental Sciences during the summer of 2000 on more than 70 golf courses across the panhandle of Florida, into Mississippi and Louisiana and north to Montgomery, Ala.

All of the monitored courses had ultradwarf putting greens, mostly Champion, FloraDwarf or TifEagle, that were experiencing some level of decline in quality. The age of the turf on the monitored putting surfaces ranged from newly sprigged to 4 years old, and they were being mowed at heights ranging from 0.110 to 0.130 inch.

Low-mowing fatigue?
Although the ultradwarfs can tolerate low mowing heights, they do suffer stress under aggressive mowing, although this is not a widely accepted understanding. Ultradwarf canopy temperatures during the hottest months of 2000 reached 142 F. Although bermudagrass is a warm-season species, it cannot maintain good quality at this canopy temperature. Our observations have shown that raising the height of cut from 0.115 to 0.130 lowered canopy temperatures as much as 30 F.

Therefore, the main recommendation for ultradwarf greens under the stress of the summer heat is to increase the height of cut.

But here is a paradox: Superintendents and architects choose an ultradwarf because it is supposed to tolerate low mowing heights and thus support superior putting surfaces. As unfavorable growing conditions require raising mowing heights, the desired attributes of the ultradwarf varieties diminish or disappear.

Diseases inflict damage
Bermudagrass requires full sunlight to produce the best-quality turf. During the rainy season in Florida or when cloudy conditions dominate southeastern U.S. weather patterns, bermudagrass quality dramatically declines. The disease known as bermudagrass decline (Gaeumannomyces graminis var. graminis) tends to flourish under these stressful conditions.

Although the morphology of the ultradwarfs features one to two times the number of shoots per square inch of Tifdwarf (6), they can't always outgrow Gaeumannomyces infection (4). As with Tifdwarf, little relief is gained from fungicide applications. Again, increasing the mowing height provides the best relief. Again, that practice negates the
Curvularia blight on an ultradwarf putting green during early summer.

varieties' most-desired attributes.

During the very hot summer drought of 2000, two additional diseases inflicted widespread damage on ultradwarf bermudagrass putting greens.

Spring dead spot (*Ophiosphaerella herpotricha*) and curvularia blight (*Curvularia* species) — alone and in combination — depleted maintenance budgets and decreased putting green quality on more than 70 golf courses, say two experienced pathologists. Larry Stowell, Ph.D. (Pace Consulting, San Diego), and Phil Colbaugh, Ph.D. (Texas A&M University), provided expert diagnoses for the monitoring program.

On the greens monitored, spring dead spot was the most prevalent disease early in the growing season, whereas curvularia blight was the dominant pathogen from late spring through late fall. Both of these pathogens had the greatest impact on lower-mowed ultradwarf greens (with mowing heights of 0.130 inch), resulting in a major loss of turfgrass vigor and density, while creating sunken patterns and patches in the putting greens. In addition, *Pythium* blight was seen late in the season.

Curvularia blight is known as dog footprint in Japan. Its typical symptoms are brown, circular patches with a diameter of 2-8 inches, about the size of a dog footprint (9). As the disease spreads, the spots coalesce to form irregular patches. These pathogens affect the oldest leaves, causing yellowing of the mat under new leaves.

The fungus grows at cut tips or surface wounds caused by aerification, verticutting and mowing (management practices that are essential to proper ultradwarf thatch management). Under the monitoring program, curvularia blight was the pathogen most often diagnosed as the primary concern, according to Stowell.

Many would say that *Curvularia* species are secondary pathogens that will only invade stress-weakened turfgrass damaged by salinity, low mowing heights, traffic, root pathogens or dysfunctions, nematodes, drought, herbicide injury or growth-regulating fungicides. Others continue to debate which pathogens are truly present. Although this is mostly an academic debate, the problem in the field still exists, and turfgrass managers must still deal with the problem.

Spring dead spot is caused by the pathogen *Ophiosphaerella herpotricha*. 

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in regions where bermudagrass becomes dormant annually under cold temperatures (2). Although spring dead spot reportedly does not occur in Florida, the courses in the Aventis monitoring program frequently experience the temperatures necessary for dormancy in bermudagrass, and this pathogen has caused severe problems.

As with *Gaeumannomyces*, raising the mowing height—a practice unpopular with many golf professionals and club members—may be the only acceptable answer to these diseases. Research is under way to understand how to manage these new diseases, but definitive results are not yet available. Turf managers experiencing these problems have tried, with some success, syringing during periods of extremely high canopy temperatures if a breeze or wind is present to provide surface cooling.

Fungicide programs involving azoxystrobin (Heritage) have also reduced the impact of spring dead spot. Vinclozolin (Vorlan, Curalan, Touche) or iprodione (Chipco 26GT) may reduce secondary invasion of curvularia blight. In replicated trials conducted on four of the courses in the Aventis monitoring program, no differences were seen between the fungicides evaluated when the height of cut was raised. Others have found that increased levels of ammonium sulfate have improved turfgrass vigor, which is also vital to reducing the impact of disease symptoms. Raising the height of cut of the turf appears to provide the most relief and greatest turfgrass improvement.

Although the ultradwarf varieties offer many advantages over conventional putting green varieties, severe summer climatic conditions and these two fungi seem to affect the ultradwarfs much more than the Tifdwarf putting greens. The lower-mowed ultradwarf varieties appear more susceptible, but lower mowing heights alone may be causing the problem because most varieties of bermudagrass have been diagnosed with these pathogens.

**Increased thatch accumulation**

Perhaps the most notable negative attribute of these new bermudagrass ultradwarf varieties is their profuse thatch production. The deleterious effects of thatch—such as blocked movement of nutrients and pesticides, inhibition of drainage, increased occurrence of localized dry spot and the harboring of insects and diseases—are no secret to superintendents. Mandatory cultural practices such as verticutting, topdressing and aerification rid the turf of this nuisance. Research at Texas A&M showed that the ultradwarfs responded differently to verticutting depth and frequency and topdressing amount and frequency (6). This mirrors what is found in the field, where frequent and light verticutting and topdressing appear to keep thatch in check (4).

But then there’s black layer. Light, frequent topdressing can damage rootzone composition. Black layer occurs when water infiltration becomes impeded by different layers within the soil profile or when sand topdressing is layered over thatch. It appears that the dense growth habit of the ultradwarfs
Curvularia blight on an ultradwarf putting green during late summer.

may act as a filter, allowing the finest topdressed sand particles to pass through and thereby creating a particle size differential and subsequent black layer (8).

Another management interaction to be considered is the effect of the increased ammonium sulfate levels on black layer formation because sulfur exacerbates black layer problems. Without question, black layer will be a major problem on ultradwarf bermudagrass putting greens.

**Things to consider**

Although some may disagree, the ultradwarfs clearly require attentive management. John Foy, director of the USGA Green Section’s Florida Region, summed up an excellent review of bermudagrass management by stating that ultradwarfs do require intensive management and thus may not be suited for all courses (4). Other researchers have drawn similar conclusions (5).

When considering an ultradwarf to replace existing turf, one must look at the budget. Was it adequate for maintaining Tifdwarf or Tifgreen? Did you have enough trained staff to maintain the golf course with the “old” grass? Do you have the equipment and equipment management staff to support the current operation adequately? Can (or will) the club provide the additional resources needed to properly manage the ultradwarfs?

Managing ultradwarfs requires additional labor from both the maintenance crew and the shop. Turf equipment managers must maintain equipment more precisely for ultradwarfs. If the equipment manager cannot get a mower with multiple cutting units to cut true at 0.125 inch, the results will be noticeable, and there will be trouble.

Because of increased topdressing frequency, frequent reel grinding and back-lapping will ensue. This will obviously result in increased costs associated with purchasing reels and bedknives and the needed hardware. Furthermore, golf courses without reel-grinding capability must obtain it or avoid using these new varieties altogether.

Those wishing to grow ultradwarfs will find that some additional equipment may be needed as well. Experience has shown that the spinner-type top-
dressers capable of applying small amounts of sand are best suited for the routine frequent topdressings. Machines that can adjust the angle of throw can propel the sand into the turf canopy. Another piece of equipment for managing ultradwarfs is the Graden verticutter, which cuts through thatch, leaving ¼-inch-wide grooves with minimal collateral surface disruption. To date, researchers have not evaluated the merits of either of these pieces of equipment.

**Ultradwarf research**

Experience has shown that ultradwarfs require additional and different management practices compared with the industry standards. Many U.S. researchers are trying to better understand the management needs of the ultradwarfs. Because few golf course superintendents can afford to keep a checkerboard of research plots on their putting greens, most of this research is conducted on unstressed turf at research facilities or on practice greens that don’t have enough play to create the stresses found on golf greens.

Many consumers are driven to have the latest model of automobile or the fastest, most up-to-date computer. The ultradwarfs are not merely the new model year of an old standby. Trading up to an ultradwarf is like trading the old Chevy for a Formula One race car or the old Commodore 64 computer for a main frame. When considering an ultradwarf, superintendents must be prepared to go the distance to produce an acceptable outcome.

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**Literature cited**