



A putting green of Tifdwarf "off color" during a cold snap.

Bentgrass or Bermudagrass Greens — What Is Right For Florida?

This Is A Regional Story, But There Are Lessons Here For Everyone!

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SOME SAY Florida is the golf capital of the world. They may be right. Within its borders are close to 800 golf courses. Flags wave over 280 courses in south Florida, and Palm Beach County by itself boasts 130 of them. And there is no indication of any decline in the booming market of golf course construction. Within the next year eight to 10 new courses will open in the Palm Beach area alone.

Each fall, as they do to other winter resort areas, visitors flood to south Florida from the north. Golfing and social activities gradually reach full swing by January, and continue full tilt

into March or April. Then, shortly after Easter, the activity begins to decline, and life slowly returns to a more normal pace.

As demands for smooth, true, lightning-fast putting greens increased over the past few years, more and more courses have tried to sustain bentgrass greens, because so many believe the bermudagrasses available today can't satisfy those conditions. Because of this belief, more and more courses have become afflicted with a bentgrass mentality, and superintendents of the area are running on a vicious treadmill.

Little more than 20 years ago, Monty Moncrief, Southeastern Director of the USGA Green Section, wrote an article entitled, "Tifdwarf — Bermudagrass for Championship Greens," discussing the merits of Tifdwarf bermudagrass, a new strain developed through the efforts of Dr. Glenn W. Burton, of the USDA Georgia Coastal Plain Experiment Station. In the late 1960s, Tifdwarf was being favorably compared with northern bentgrasses for its superior putting qualities. Golfers, particularly northern golfers, have always preferred bentgrass for putting green excellence. Unfortunately, bentgrasses are also cool-season

Some Comparisons of Growth Factors and/or Requirements of Bermudagrass and Creeping Bentgrass for Golf Greens in the South

Prepared by Dr. Jeff Krans, Agronomist

Growth Factors or Requirements	Bermudagrass	Creeping Bentgrass
Optimum soil temperature for shoot growth	80-95° F	60-75° F
Optimum soil temperature for root growth	75-95° F	50-65° F
Growth limiting soil temperature	100-110° F	80-95° F
Lethal soil temperature (direct high-temperature kill)	120° F	100-110° F
Optimum response to nitrogen fertilization	April-September	March-May and again in September-November
Detrimental response to nitrogen fertilization	November-March	June-August
Acceptable pH range	5.0-7.0	6.0-6.5
Acceptable phosphorous levels	Low to high	Low to medium (excess phosphorous influences <i>Poa annua</i> competition)
Optimum potassium levels	Medium to high (low temperature survival)	Medium to high (high temperature survival)
Acceptable soil texture	Loam or sand	Sand
Irrigation capacity	Conventional irrigation adequate	Automatic syringing and irrigation required
Air circulation	Not critical	Required
Cultivation practices	May to September	April and May
Fertilizer application	Granular	Granular and liquid
Pesticide tolerance	Very good	Poor (especially under high temperatures)
Disease susceptibility	Low	High

grasses, and by nature are ill suited to the semi-tropics. In south Florida, there is only a short period of time when environmental conditions are favorable for active growth.

But before any judgments are made, a further review of the current situation for bentgrass and bermudagrass would be in order.

PLAYING two major golf championships — the U.S. Amateur and the PGA Championship — in south Florida last August put the spotlight on trying to maintain a combination of bentgrass and bermudagrass greens through the summer. Unfortunately, television coverage of the PGA Championship only highlighted the worst possible end result of this proposition. While the Amateur was more fortunate, concessions were nevertheless made, and the greens were not as fast as officials had hoped, but the mixed stand situation is only part of the picture.

Bentgrass is used in south Florida to overseed bermuda-based greens in winter. The USDA classifies south Florida in zone 10 for plant hardiness. This means that seasonal changes are relatively indistinct, and while light frost may occur, freezes are rare. Thus, the primary reason to overseed — in order to provide an acceptable turf coverage while the bermudagrass base is dormant, is really not a consideration, because true winter dormancy does not occur. Last winter, for example, only two frosts were recorded during the entire season.

But with approximately 95 percent of the golf courses part of real estate developments (an amazing number of those in the upper price range), aesthetics is a big consideration. Because just a few days when the greens are off color might have a negative impact on sales, the developers and real estate agents want to see green greens all the time. Even after the membership takes over, the concept of winter overseeding tends to be so ingrained that it is continued.

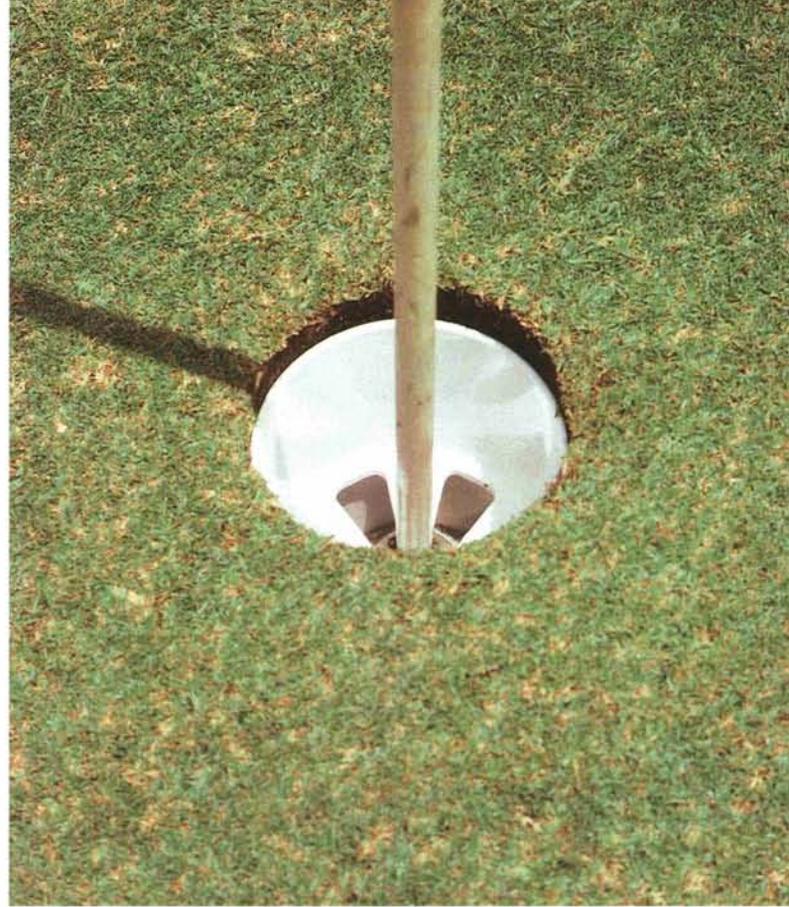
At some south Florida courses, the extremely heavy play that occurs during the winter makes it necessary to overseed to prevent the base bermuda from wearing out when it is in a slow-growth phase. When this is the case, bentgrass overseeding is not recommended because it does not tolerate the heavy play either. Ryegrasses must be used for a successful overseeding to survive the entire season when daily play is in excess of 250 rounds. Thus again, bentgrass overseeding in south Florida is conducted primarily for aesthetic considerations, and because of the perception of significantly superior surface playability.

Overseeding with bentgrass, however, presents some special problems. Because of its relatively slow rate of establishment, seed-bed preparation and seeding must be done earlier in the fall. To assure a mature stand by early January, greens should be overseeded between mid to late October and November. Overseeding during this time of the year is a crap shoot, because environmental conditions are neither predictable nor stable. The fall of 1986 is an excellent example, when both daytime and nighttime temperatures were extremely warm — upper 80s to low 90s and mid to upper 70s, respectively — and persisted into December. These temperatures are more favorable to the continuation of active bermudagrass growth. As a result, overseeding was very difficult because of competition from the bermudagrass base turf. Also, Florida's hurricane season lasts until November, and more than one overseeding has been washed out by a late-season storm. Ryegrasses tend to be easier to work with, because seeding can be done in December, when environmental conditions have finally begun to moderate.

Bermudagrass reaches its best condition in mid-fall, when the results of all the summertime management programs and practices can be enjoyed. However, if the greens are to be overseeded with bentgrass, they will not be in their best condition, or the course may close for a period of time for the bentgrass overseeding process, when the members return. This can certainly create a negative impression that often lingers through the season, and is not the best way for the course superintendent to greet the returning membership, or to make friends. Courses that overseed with ryegrasses must also go through the establishment process, but historically, play tapers off during December. Thus the golfers initially get good bermuda greens



A mixed stand of bentgrass and bermudagrass, maintained throughout the year, on a Florida putting green in early September.



The best that can be produced in a combination bentgrass-bermudagrass putting green turf.

in mid-fall, and then come back to good winter greens in January.

ONCE winter overseeding is established, management practices are not radically different for bent or rye greens. Ryegrasses have not provided comparable quality to bent overseedings, especially for afternoon play, because of rye's extremely aggressive growth. By mid-afternoon the ryegrass has grown enough to cause the greens to be shaggy and slow. Continuing development of finer-leaved varieties is resulting in a change in this situation. Also, reduced seeding rates, better fertility management, and mixes of ryegrass with *Poa trivialis* or other cool-season varieties has further narrowed the perceived quality gap.

By the end of February and into March and April, there is no denying that bentgrass is in very good shape, providing outstanding putting greens, but when winter is over and environmental conditions are more favorable to active bermudagrass growth, it becomes necessary to begin the transition back to bermudagrass. Management practices (aerification, verticutting, topdressing, and increased fertilization) must be implemented to accomplish a complete yet gradual transition.

Over the past couple of years, a few courses have followed a passive management approach of not actually trying to force bentgrass out, but at the same time, not really trying to maintain it. The bermuda gradually became the dominant grass, but some large areas of bentgrass persisted well into the mid-summer. Then, almost like clockwork, the remaining bent burned out and bare areas resulted. While the majority of the membership was in the north, the year-round residents once again had to endure less than acceptable quality putting surfaces. For the ryegrass courses, transition is much easier and is over within a few weeks.

In the past four or five years, a few courses in south Florida have tried to maintain their bentgrass overseeding, or a mixed stand, throughout the year, believing that by maintaining a certain percentage of bentgrass through the summer, the greens would not require as much time and effort to re-establish bent for the winter season. Furthermore, for Tifgreen (328) bermudagrass, which has a slightly coarser leaf blade and more open texture, if some bentgrass could be maintained through the summer, it might be possible to realize an improvement in the putting quality of these greens.

Mixed or polystands of different turf varieties is nothing new. Bentgrass/*Poa annua* greens have been with us for years, and will probably continue, but in every case showing long-term success, the turf varieties are basically quite similar in their growth requirements and environmental adaptation. As far as these factors are concerned, bentgrass and bermudagrass are definitely on opposite ends of the spectrum. The comparison chart prepared by Dr. Jeff Kranz, of Mississippi State University, provides an excellent breakdown on some of the major factors that affect growth and management of these two species.

THE THIRD WAY bentgrass is being used in Florida is in a pure monostand. Presently, a handful of courses pursue this route. Each is a new course that made a commitment from the beginning by building USGA greens, or modified versions, along with specifically designed irrigation systems. Also, money — another critically important resource — has not been a factor.

An effort to maintain pure bentgrass greens was made some 30 years ago in the Miami area. After some initial success, all of the greens were lost over a weekend during the first summer.

Much knowledge has been gained since then regarding bentgrass management, along with tremendous improvements in available pesticides and other management tools. Nevertheless, environmental conditions in Florida have not changed and cannot be ignored.

Bentgrass greens are maintained in other areas that have less than ideal summertime conditions. Some courses in the Southwest endure daytime highs well above 110 degrees, but nighttime temperatures usually drop in the desert. In addition, how long do these conditions persist during the summer? In the Phoenix-Tucson area of Arizona, winter overseeding occurs during late September, and transition back out does not happen until June, or even July. In an interesting comparison with south Florida, by April soil temperatures are 80 degrees or better, and they remain elevated well into November and even December. In other words, for at least seven to eight months, conditions are not favorable for active growth for a cool-season type turf for a good portion of Florida.

Humidity is another major factor. The western areas have virtually no humidity compared to the stifling mugginess of a Florida summer. Not only does continued high humidity greatly increase potential disease activity, it also reduces the effectiveness of syringing.

Fred Klauk, golf course superintendent of the Tournament Players Club, in Ponte Vedra, Florida, has been heavily involved with bentgrass for some time. The Tournament Players Club is not typical of the bentgrass courses in Florida, because it is a resort-type operation, with heavy play throughout the year, and is the site of the Tournament Players Championship. Klauk recently made some interesting comments on trying to maintain high-quality bentgrass greens in Florida. He stated, "Due to a consistently high disease potential, it was necessary to conduct a very intensive fungicide program throughout most of the year. The cost of this program was running \$800 to \$1,000 per week. Furthermore, by mid-summer, all bentgrass growth activity and recovery from damage (ball marks, traffic, and mole crickets) had ceased. It became virtually impossible to provide the quality putting surface desired during the late summer to early fall."

Klauk further stated, "The constant pressure and tremendous amount of time required to keep the bentgrass alive resulted in almost overwhelming stress

for every member of the staff. Personnel burnout may be as hard to manage as the agronomics of the situation." Due to the various considerations, it has been decided that the best approach for the Tournament Players Club is to convert all the greens back to Tifdwarf bermudagrass. Bentgrass will be used to oversee the greens for the winter, but there will definitely be no attempt to hold the bent through the summer.

JUST LIKE bentgrasses, bermudagrass is not a native plant to North America. Most bermudagrasses originated in eastern Africa. Bermudagrass varieties have been introduced and are now widely distributed throughout most of the warm, humid, tropical, and sub-tropical areas of the world. While the exact date of this introduction to the United States is not clear, there are reports of bermudagrasses having been found along the coast of Georgia by the mid 1770s.

During the late 1950s and through the 1960s, Dr. Burton, working in cooperation with the USDA and the Georgia Coastal Plain Experiment Station, along with support from the USGA Green Section, released several hybrid bermudagrass varieties. These Tif-series continue to be extremely popular throughout the sunbelt.

Tifgreen (328) and Tifdwarf are the two varieties best suited for putting greens. They are both dark green, have high shoot density, fine leaf blade texture, and good tolerance to close mowing. They both also stand up to low temperatures, but once soil temperatures drop to 50 degrees, they lose their green color. A major difference between Tifgreen and Tifdwarf is that Tifdwarf is somewhat more sensitive to cooler temperatures, and it develops a purplish-black appearance.

Southerners are always disheartened to hear comments about bermudagrass greens being inferior to bentgrass greens. But it is true. Compared to bentgrasses, bermudagrasses have a very stiff leaf blade and aggressive growth. They are typically slow to putt, and are frequently grainy.

This situation is further compounded on Tifgreen greens. The grass cannot tolerate a mowing height below 3/16ths of an inch for very long without harming its health and quality. It seems that, particularly in south Florida, a lot of SOS calls are received during August and September from courses with Tifgreen bermuda greens. This is the tail

end of the rainy season, when environmental stresses are quite high. Even though the grass is in a period of active growth, carbohydrate reserves have become depleted because of a constantly intensive growth rate since April or May. In the pursuit of speed, the greens invariably have been maintained at 5/32ds or even at 1/8th of an inch. Turf coverage thins, weeds invade, and usually an algae crust develops. If the height of cut is raised and sound agronomic practices are followed, complete recovery can be achieved. Unfortunately, Tifgreen bermudagrass cannot provide a putting surface comparable to modern bentgrasses.

What about Tifdwarf? When it was first released, in 1965, Tifdwarf greens were compared favorably to bentgrass greens. The Tifdwarf could be mowed at 1/8 of an inch and produce a very fast putting surface. As a matter of fact, at this height, the greens were often considered too fast for the high handicapper.

Cold hardiness is a concern with all warm-season turf species. Evaluations over the years have proved that Tifdwarf is actually more winter-hardy than Tifgreen bermuda. While Tifdwarf goes off color easily, it also greens up rapidly. In areas where true winter dormancy occurs, Tifdwarf will begin recovery one to two weeks earlier than Tifgreen bermuda. But, in south Florida, winter dormancy is about as important as a fur-lined parka.

Whenever top-flight amateurs and professional golfers putt bermudagrass greens, there is always talk about grain. Knowing which way is west, or if any large bodies of water are nearby, is supposed to help determine how much break to allow for reading the line of putt. Because Tifdwarf initially exhibited such a naturally low (and slower) growth habit, it was felt that only a minimal amount of topdressing and verticutting were required. However, now it has been found that Tifdwarf greens respond very nicely to these practices. During periods of active shoot growth, a light application of topdressing should be applied every three to four weeks, and light vertical mowing done every seven to ten days. When shoot growth activity is reduced, these practices can be done when it becomes necessary to smooth and true-up the putting surfaces. But when good management practices are followed, grain is really no longer a factor on Tifdwarf greens, and putting speed increases.

It has been my observation that the new groomer-type attachments to green mowers can be a tremendous asset in managing bermudagrass greens. Both the speed and surface trueness can be improved without having to sacrifice mowing height or turf health.

Initially it was felt that less fertilization would be required because Tifdwarf showed a very good dark green color. However, in order to realize maximum appearance and playability, a good, well-balanced fertility program is recommended. The old rule of thumb of supplying .75 to 1.0 pound of nitrogen per 1,000 square feet per growing month is still quite applicable. Also, just as with bentgrasses, maintaining a 1:1 or even a 1:2 ratio of nitrogen to potassium is extremely beneficial for good root development and improved stress tolerance.

The use of Tifdwarf was quite popular during the early to mid-1970s. However, because of a problem with the development of areas of contamination/mutation, its popularity declined. But when clean planting stock is used, and with careful monitoring of the putting surfaces, any off areas that develop can

easily be cut out and replaced, thus providing a very uniform appearance and playing surface.

WITHOUT A DOUBT, bentgrasses will continue to be used for winter overseeding. It must be realized and accepted, however, that there are limitations, such as establishment timing, rate of establishment, wear tolerance, and spring transition, which reduce its suitability for a large number of courses that overseed. A few courses that have overseeded with bent have now gone back to ryegrass mixtures with truly excellent results.

As far as maintaining bentgrass in Florida during the summertime, either as a mixed bent/bermuda stand or as a pure surface, the odds are against long-term success with existing bentgrass varieties and management technology. Human nature can be such that when it is supposedly not possible, someone will try to prove it can be done. Golf course maintenance costs continue to increase to meet the demands and expectations of the players, but are they realistic and environmentally responsible?

Past criticism of bermudagrass greens has been legitimate. In recent years, however, great strides have been made, particularly in the management of Tifdwarf. I have had the opportunity to observe many truly superior Tifdwarf putting surfaces that are smooth, true, and fast. For the northern two thirds of Florida, winter overseeding is necessary to provide color and protection to the base bermuda while it is dormant. In south Florida, it is truly debatable that overseeding is necessary at all for a good number of courses. Explaining to the members that while the greens may go off color during the winter, playability is not affected (and actually, greens putt faster), would definitely cut down on operating costs and player inconvenience.

The primary objective of golf course turfgrass management is to provide a good, consistent playing surface. Given the environmental conditions of Florida, using a turfgrass species that is properly adapted is the intelligent and logical approach to accomplishing this goal. Perceptions of superior bentgrass playability will continue, but we do not expect orange trees to thrive in Minnesota, nor should we expect bentgrass to thrive in Florida.

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