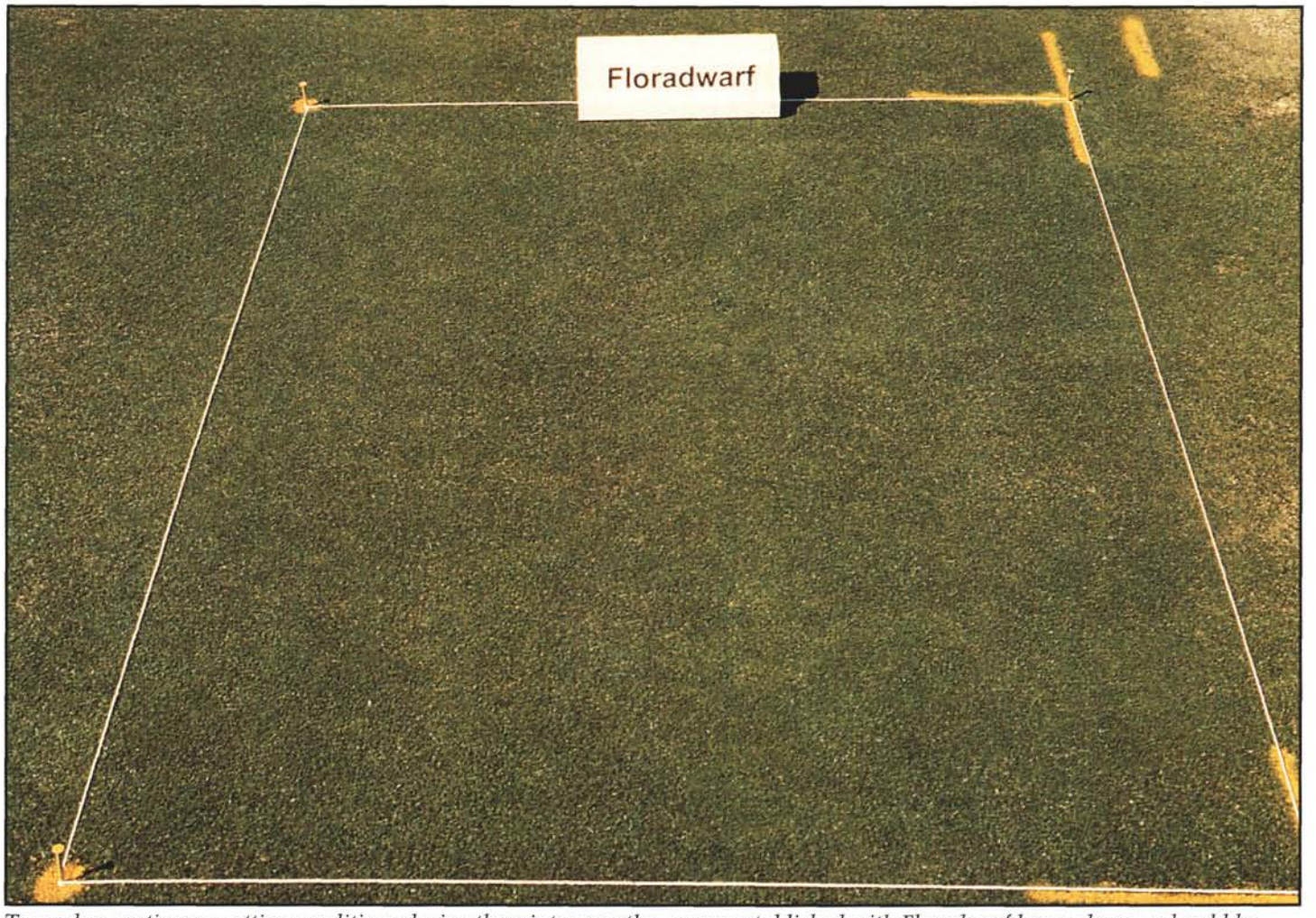
Unleash the Full Potential of New Bermudagrass Cultivars

Research is helping superintendents produce superior putting surfaces with the new dwarf bermudagrasses.

by RICHARD WHITE, Ph.D.



To produce optimum putting conditions during the winter months, greens established with Floradwarf bermudagrass should be lightly vertical mown on a frequent schedule prior to overseeding. This practice improves seed-to-soil contact, thus helping to ensure good germination and establishment.

BERMUDAGRASS is the most highly adapted grass for use on golf greens in hot, humid regions due to its superior heat tolerance and low water consumption. Tifgreen and Tifdwarf bermudagrasses have been the two most popular cultivars planted on putting greens in the southern United States during the past 40 years. Of these two, Tifdwarf has been the dominant choice during the 1980s and early 1990s due to its adaptability to lower cutting heights.

In recent years, golf courses have begun replacing Tifgreen and Tifdwarf with one of several new so-called *vertical or horizontal* dwarf bermudagrass cultivars. This trend is being fueled by three distinct factors. First, many older greens are badly contaminated with off-type bermudagrasses that disrupt uniform putting conditions because of their coarse texture and the likelihood of scalping. Second, golfers desire putting green speeds in the range of 9 to 10 feet, requiring cultivars that tolerate continual mowing at a very low height of cut. Third, turfgrass breeders and sod producers have made cultivars available that are significantly better than the old standbys.

The objectives of ongoing research at Texas A&M University are to determine the performance, mowing tolerance, and pest resistance of experimental and commercially available bermudagrasses on a golf green. We also want to determine the effects of vertical mowing, topdressing, and

nitrogen fertility on performance, thatch development, fall and spring overseeding transitions, and turf quality of five dwarf bermudagrasses.

The studies are located on a 25,000 sq. ft. experimental green at the Turfgrass Field Laboratory on the Texas A&M University Campus in College Station, Texas. The Texas Turfgrass Association provided funding for construction of the USGA specification green. Several Texas-based businesses donated materials used in construction or assisted in construction. The USGA and the Houston Golf Association have provided funding to support this research.

Variety Performance Evaluation

To evaluate the initial establishment rate of the dwarf cultivars, the percentage of plot coverage was rated during June and July 1997. Using Tifgreen and Tifdwarf as standards for the comparisons, the cultivars broke out into two groups. Baby, Champion, Floradwarf, MiniVerde, Mobile, TXDB67, Tif94-18, and TifEagle had coverage similar to Tifdwarf, which rated poorest in the study. Lakewood, MS Supreme, Tif94-21, Tif94-29, and Tifgreen had coverage superior to Tifdwarf. Although establishment from plugs as used in this study may be different from sprigs, the coverage values may be relevant to recovery from stress or pest injury.

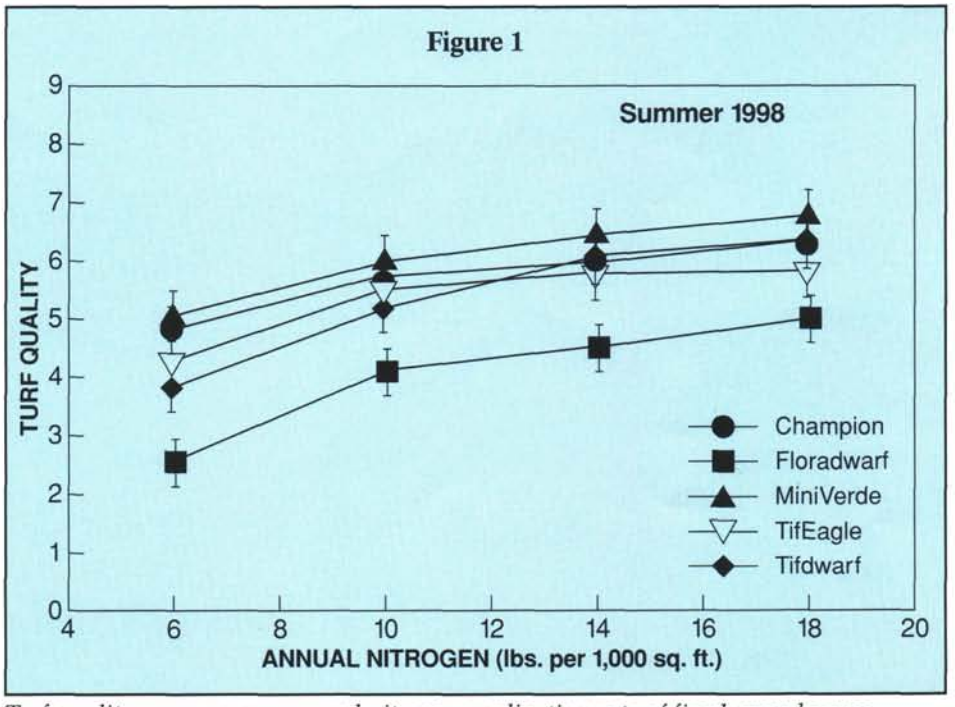
During 1998, turf quality ratings were tabulated to reflect performance during three periods: (1) when overseeded during the winter months, (2) during spring transition, and (3) during the summer months. This data demonstrated that nine of the new dwarf bermudagrasses rated superior overall when compared to Tifdwarf. During the winter months, overseeding with *Poa trivialis* rather than perennial ryegrass produced better ratings. One explanation for the better ratings was that the plots were not cultivated prior to overseeding, so the small seed size of *Poa trivialis* penetrated the dense bermudagrass canopies more effectively. Once in the canopy, the seed was able to germinate and establish in a favorable environment.

Culture of New Bermudagrasses for Golf Greens

Nitrogen requirements of new dwarf bermudagrasses were a major question that we sought to answer when undertaking this research. To determine nitrogen needs, a wide range of fertilizer applications was made. Initially, annual applications of 14 to 18 lbs. of nitrogen per 1,000 sq. ft. were applied. These rates produced superior turf quality ratings during cultivar establishment and grow-in. However, when the long-term effects of nitrogen are considered, increasing nitrogen above 10 pounds annually provided no additional improvement in turf quality except for the quality of Tifdwarf. Tifdwarf demonstrates increased turf quality ratings as annual nitrogen applications are increased from 6 to 14 lbs. per 1,000 sq. ft. When more than 14 lbs. of nitrogen per 1,000 sq. ft. is applied annually, Tifdwarf shows no additional improvement in turf quality.

Across all observations, Floradwarf turf quality received lower ratings than Champion, MiniVerde, TifEagle, and Tifdwarf. The lower performance of Floradwarf was probably due to the combination of high sodium and pH levels caused by irrigating the plot with water containing 250 to 350 ppm sodium. Compounding the poor quality of the irrigation source was the fact that the summer of 1998 was the hottest and driest on record in Texas, so the frequent irrigation required to keep the turf alive resulted in a soil pH reading of 9.4. Under the stress brought on by high sodium and pH levels, only MiniVerde and Tifdwarf appeared to respond to nitrogen application rates of more than 10 lbs. for 1,000 sq. ft.

According to data collected in Texas, judicious control of nitrogen nutrition is an important management strategy for the new dwarf bermudagrasses. In addition to the strong influence of nitrogen on turf quality ratings, it also affects the rate of thatch accumulation. Our work indicates that many of the new dwarfs accumulate thatch more aggressively than Tifdwarf. Between June and August 1998, that accumulation was on average five times greater for Champion, Floradwarf, MiniVerde, and TifEagle than for Tifdwarf at the lowest nitrogen application rate.



Turf quality mean versus annual nitrogen application rate of five bermudagrass cultivars at the Texas A&M University Turfgrass Field Laboratory in College Station, Texas. Vertical bars represent standard error about the mean.

Turf Quality

During this same period, Champion accumulated more than ten times the thatch of Tifdwarf when an annual rate of six pounds of nitrogen per 1,000 sq. ft. was applied. When an annual rate of 18 lbs. of nitrogen per 1,000 sq. ft. was applied, Champion, Floradwarf, MiniVerde, and TifEagle accumulated an average of 14 times more thatch than Tifdwarf. At the highest annual nitrogen application rate of 18 lbs. per 1,000 sq. ft., the new dwarf bermudagrasses produced between 0.25 and 0.33 inches of thatch during a period from

June through August 1998 across all vertical mowing and topdressing regimes.

In general, acceptable summer turf quality was produced with all of the new dwarf bermudagrasses except Floradwarf at an annual nitrogen application rate of 10 lbs. per 1,000 sq. ft. Exceeding the 10 lb. rate dramatically increases thatch accumulation, decreases Stimpmeter readings, and does not substantially increase shoot density. By summer's end, high nitrogen application rates produce mower scalping and poor turf quality that would be visible to superintendents and golfers alike.

Vertical mowing and topdressing regimes used to combat thatch accumulation in the study appear to provide similar control. It should be noted, however, that the results of severe, infrequent vertical mowing, as practiced on some golf courses with Tifdwarf, negatively affected the turf quality of the new dwarf cultivars during 1998. The damage caused by severe vertical mowing when comparing the new dwarf bermudagrasses to Tifdwarf may be due to the unique growth habit of the new dwarf bermudagrasses. These new grasses have a concentration of stolons near the soil that predisposes growing points to mechanical, abiotic, and biotic stresses.

The influence of severe vertical mowing also was evident in the overseeded cultivar quality ratings during the winter of 1997-98. Generally speaking, the ratings were higher for the plots that were lightly vertical mown on a frequent schedule during late summer than for those that were severely vertical mown just prior to overseeding. On the severely vertical mown plots the ratings were low because the emergence of *Poa trivialis* was primarily confined to the deep grooves in the putting surface.

Table 1

Cultivar	Quality	Cultivar	Quality
MiniVerde	6.3	TXDB67	5.1
TifEagle	5.9	Tif 94-18	4.9
Champion	5.8	Tifdwarf	4.5
Mobile	5.5	Tif 94-21	4.2
Floradwarf	5.4	Tif 94-29	4.2
MS Supreme	5.4	Tifgreen	4.2
Lakewood	5.1	Baby	3.9
$LSD_{0.05}$			0.4

$LSD_{0.05}$ — Least Significant Difference at the 0.05 level of probability for comparison of turf quality means

Turf quality means during 1998 of 15 bermudagrass cultivars maintained as a golf green at a ⅛ in. mowing height at the Texas A&M University Turfgrass Field Laboratory in College Station, Texas.

Important Considerations

Answering the question "Are the new dwarf bermudagrasses really superior?" based on work that has been performed to date may be premature. On the one hand, the performance of the new dwarfs has been superior. On the other hand, a few superintendents who are managing some of the new dwarf bermudagrasses in a real world situation have reported problems during the second or third growing seasons. Where poor performance has been observed, the cause of the problem appears to be most strongly associated with nitrogen nutrition.

The greatest attribute of the new dwarf bermudagrasses is clearly their high shoot density at a very low mowing height when compared to Tifdwarf. However, consider a few important points before planting a cultivar that can and should be maintained at ⅛ in. or less. First, low mowing heights require greens that are as smooth as a dining room tabletop and are only moderately to mildly surface contoured. Still, with these physical characteristics, the new dwarf bermudagrasses will have a tendency to scalp even when thatch is kept under control.

Second, the golf course *must* have a budget that reflects high intensity maintenance. Frequent vertical mowing, topdressing, and walk-behind mowing that are needed to properly groom a putting surface established with one of the new dwarf cultivars take plenty of money and manpower. If the budget will not support proper maintenance, then the golf course would be better suited for Tifgreen or Tifdwarf until circumstances change.

The new dwarf bermudagrasses provide golf course superintendents with alternatives to older cultivars such as Tifgreen and Tifdwarf. Several new dwarf bermudagrasses provide good to excellent turf quality at ⅛ in. mowing heights and have been superior to Tifdwarf in performance and evaluation trials. Research is continuing at Texas A&M University to provide golf course superintendents with additional information on which to base cultural recommendations to unleash the full potential of the new dwarf bermudagrasses.

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