

Patches of bermudagrass in tall fescue and zoysiagrass are easily identified by differences in color and leaf texture (above, dormant bermudagrass in a tall fescue lawn).



Bermudagrass control in tall fescue and zoysiagrass

In situations where Bermudagrass covers a large percentage of a given turfgrass area, complete renovation should be considered over selective removal.

By Greg Breeden, James T. Brosnan, Thomas J. Samples

Bermudagrass (*Cynodon spp*) is commonly selected for use on Tennessee athletic fields and golf courses for its aggressive growth (providing fast recovery from wear and tear) and tolerances to heat, drought and traffic stress. These same characteristics, however, also render Bermudagrass an extremely difficult-to-control weed in tall fescue (*Festuca arundinacea*) and zoysiagrass (*Zoysia spp.*) stands.

Infestations of Bermudagrass in tall fescue and zoysiagrass commonly take the shape of distinct patches, easily identified by differences in color (during periods of active growth and

dormancy) and leaf texture. In zoysiagrass turf, differences in morning dew patterns also help identify areas of Bermudagrass contamination. Bermudagrass will invade any area of a tall fescue or zoysiagrass stand that has been weakened by diseases, insects, other types of weed competition or any type of stress.

BERMUDAGRASS GROWTH AND IDENTIFICATION. Bermudagrass is a mat-forming perennial grassy weed that aggressively spreads by both rhizomes and stolons. This extensive network of below- (rhizomes) and above-ground (stolons) vegetative

Bermudagrass has a hairy ligule.

Bermudagrass seedheads have three to seven spikelets.



propagules makes bermudagrass extremely difficult to control. In many instances, bermudagrass can be desiccated on the soil surface with certain herbicide applications, only to regenerate over time from below-ground rhizomes. Additionally, aggressive above-ground growth from stolons allows bermudagrass to advance into additional areas of desirable turf.

Bermudagrass can be misidentified as other grassy weeds. For example, similarities in leaf texture often cause many to wrongly identify Bermudagrass populations as nimblewill (*Muhlenbergia shreberi*).

However, Bermudagrass has a hairy ligule, while the ligule of nimblewill is membranous. Bermudagrass also has a deeper root system than nimblewill and persists in drier, sunnier environments.

Bermudagrass can also be confused with zoysiagrass; however, zoysiagrass leaves are rolled in the bud and often have hairs along the leaf blade, while bermudagrass has a folded veneration and has no hairs on the leaf blade. Bermudagrass seedheads have three to seven spikelets, which can be 1 inch to 2 inches long.

CULTURAL PRACTICES TO PREVENT BERMUDAGRASS INFESTATIONS.

The best method of preventing Bermudagrass infestations is to maintain a healthy, dense turf. Implementing the proper cultural practices required to maintain tall fescue and zoysiagrass turf will reduce the likelihood of Bermudagrass encroachment. For information on the proper cultural practices used to maintain tall fescue and zoysiagrass turf in Tennessee, see UT Extension publication PB1038, Lawn Fertilization and Management. Additional information can also be found at <http://tennesseeturf.utk.edu>.

Additional tactics, including the following, can be taken to discourage Bermudagrass encroachment and spread in tall fescue and zoysiagrass.

Inspect all new materials. Inspect all soil, compost, plant material and seed brought onto a property to be sure that they are free of Bermudagrass. Pay special attention to ensure that no vegetative structures (rhizomes or stolons) are present in these materials.

Increase mowing heights when possible. Increasing the canopy height will improve the rooting and photosynthesis of the desirable turf, resulting in a healthier stand that is less susceptible to Bermudagrass encroachment. Additionally, the taller canopy will shade any Bermudagrass present in the stand, which will reduce its ability to spread.

Maintain proper fertility. For tall fescue, fertilize two times annually, once in the spring and once in the fall. Always avoid fertilizing tall fescue during the summer. For zoysiagrass, fertilize during the summer to deliver less than 3 lbs. nitrogen/M/year. Zoysiagrasses have lower nitrogen requirements than Bermudagrass. Thus, fertilizing at the proper rate will maintain adequate density while reducing the likelihood of Bermudagrass encroachment and discouraging the spread of any Bermudagrass present in the stand.

Water deeply and infrequently. Irrigate to a depth of about 6 inches, approximately twice a week. Shallow, frequent irrigation favors Bermudagrass.

Pay attention to flower beds and other landscaped areas. Keep these areas free of Bermudagrass contamination. Use heavy mulch or deep edging to keep Bermudagrass from establishing. Edging material should

be at least 6 inches into the soil.

HERBICIDE OPTIONS FOR BERMUDAGRASS CONTROL. There are limited herbicide options for controlling Bermudagrass in tall fescue and zoysiagrass. Be aware that if the applications are successful, numerous voids (bare areas) will be left in the turf canopy after Bermudagrass has been removed. These voids will be susceptible to future weed infestations and should be re-seeded with a high-quality turfgrass cultivar. Check the herbicide label for information regarding the time required between seeding and applying a herbicide.

In many instances, a single application of the herbicides listed below will cause severe Bermudagrass injury, causing a void to develop in the canopy; however, Bermudagrass can usually grow out of this injury over time. Thus, multiple herbicide applications and proper cultural implementations will be required to achieve complete control.

OPTION NO. 1 — FUSILADE II FLUAZIFOP PROGRAM.

Make sequential applications of Fusilade II at 3–6 oz./acre + Turflon Ester at 32 oz./acre, on 4-week intervals, for Bermudagrass control in tall fescue and zoysiagrass turf. Sequential applications of fluzifop are labeled for Bermudagrass control in tall fescue and zoysiagrass. Research has shown that tank-mixing fluzifop with triclopyr will improve weed control efficacy and reduce undesirable turf injury. Do not apply Fusilade II applications when the desired turfgrass is under any type of stress, due to the increased potential for herbicide injury.

Recent research at The University of Tennessee has found that Bermudagrass is most susceptible to these treatments when transitioning into winter dormancy in fall and in spring once green tissue is present. Often the process of transitioning into winter dormancy can begin before visual signs of the transition (i.e., changes in turf color) are apparent. We've observed that applications of fluzifop + triclopyr are most effective once the average daily air temperature falls below 72F. These applications treatments will need to be applied throughout multiple growing seasons to obtain complete control.

OPTION NO. 2 — ACCLAIM EXTRAFENOXAPROP PROGRAM. Sequential applications of Acclaim Extra at 20–28 oz./acre fenoxaprop

+ Turflon Ester triclopyrat 32 oz./acre, on 4-week intervals, are labeled for Bermudagrass suppression in tall fescue and zoysiagrass turf. Research at The University of Tennessee has observed that programs incorporating Acclaim Extra fenoxaprop tend to be less effective than those delivering Fusilade II fluzifop. Do not apply Acclaim Extra fenoxaprop if the desired turfgrass is under any type of stress, due to the increased potential for herbicide injury to occur. These applications will need to be applied throughout multiple growing seasons to obtain complete control.

OPTION NO. 3 — GLYPHOSATE SPOT TREATMENT PROGRAMS.

Spot treatments of glyphosate (Roundup Pro or similar) can be utilized to control Bermudagrass in an array of different warm- and cool-season species. Precise applications are required, since glyphosate (a non-selective herbicide) will kill any desirable turf that it contacts, in addition to weedy areas of Bermudagrass contamination. Bare areas present after application will need to be reseeded to prevent future weed infestations and improve the overall aesthetic quality of the turf stand.

FINAL THOUGHTS. Controlling Bermudagrass in warm- and cool-season turf is difficult. All herbicide programs involve making sequential applications over multiple growing seasons for complete control. In situations where Bermudagrass covers a large percentage of a given turfgrass area, complete renovation should be considered over selective removal. For more information on renovating tall fescue turfs, see UT publication W238, Weed Control During the Seeded Establishment of Cool-Season Grasses.

Always refer to the product label for specific information on proper product use, tank-mix compatibility and turfgrass tolerance. For more information on turfgrass weed control, visit the University of Tennessee's turfgrass weed science website, <http://tennesseeturfgrassweeds.org>. **GCI**

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Filling the void

Superintendents share their best-kept secrets for divot repair.

By Scott Kauffman

For golf generations, divots have been the bane of golfers and superintendents, making divot repair and divot management programs an integral part of golf course maintenance practices. In a 1941 installment of the "Greenskeeper's Reporter," a story even quoted three greens chairmen as saying, "divots were the 'No. 1 pest.'"

Oddly enough, despite this high-profile place in turf maintenance annals, little research had been done on the methods and materials used to control this "pest" – at

least until a recent study by the University of Illinois.

Among the findings published in 2005 by the GCSAA, respondents spent an average \$3,671 in labor and materials to repair divots on course tees, \$4,240 on fairways and \$3,383 on range tees. There was a wide range in annual divot-related expenditures, ranging from \$500 to \$33,000, according to the GCSAA.

Seven years later, vast differences continue to exist in the scope of superintendents' turf practices in regards to divot repair. For

example, superintendent Jason Adams of Blue Hill Country Club in Canton, Mass., takes a measured approach to repairing his private course divots, including the use of a special mix supplied by New England Specialty Soils.

Adams says one critical tip in ensuring healthy divot repair is picking the “right mix that works



Divots cost courses thousands in repair through labor and materials - finding the right fill mix is critical to help fix them quickly.

for you.” In the case of Blue Hill, Adams uses an 80-10-10 mix of sand, peat and compost material, respectively. He also dedicates an individual every day to fill in divots not only on range tees, but the entire course as well.

Another key practice that Adams employs is making a point to give par-3 holes and range tees a “little extra moisture” a couple times a day just to “keep the mix a little bit on the moist side.”

Another ingredient Adams finds helpful is the EarthWorks Renovate Construction Mix.

Adams mixes in the amendment with his seed-soil mix and finds the extra source of minerals heals his turf quicker.

“For us we feel like we get quicker germination when we mix the Renovate in with the seed soil mix,” Adams says.

On the Southern California coast, superintendent Steve Thomas of the Resort at Pelican Hill implemented several changes to his divot repair regimen after Pelican Hill completely renovated its upscale courses in 2006-07 and converted the property from a ryegrass-Bermudagrass fairway mix to 100 percent Tifway 2 Bermudagrass fairways. For instance, Thomas now uses straight sand to fill in fairway divots that no longer need to be overseeded.

Thomas is experimenting with a darker custom divot blend to help speed up recovery because the darker compost material tends to “heat up the ground temperature and help the Bermuda recover a little quicker.”

In fact, when Thomas drew up the pros and cons of fully resodding Pelican Hill’s fairways with Bermudagrass the first one he came up with was divot repair, especially in the winter months when the Bermuda goes semi-dormant.

“So we fill (the divots) as fast as we can with sand,” says Thomas, who’s entering his 10th year at the Tom Fazio-designed resort course. “We still overseed the tees so we send a crew out typically as a second job and fill the tee-tops, particularly on the par-3s that get a lot of iron play. Our second jobs are usually around 9-10 o’clock. There’ll be some play, but we’ll go behind them and take care of the divots from the day before.”

Besides the new Tifway 2 fairways, two other noticeable changes to Thomas’ daily divot repair schedule are painted sand and re-filling divot boxes. Nei-

ther of these divot practices is deployed anymore.

Thomas stopped painting divot sand for cosmetic reasons as a cost- and labor-savings measure. He also got rid of his “tacky” divot boxes because golfers never utilized them, or didn’t know what to do with them, according to Thomas.

“We tried to use them in different locations but (golfers) seemed to ignore them, kick them and just put their drinks on ‘em,” says Thomas, who’s in his 10th year as Pelican Hill’s superintendent. “We just never really gotten use out of them. So our guys will do the balance of the divots in-house. We get pretty good control that way.”

At one of Florida’s newest private golf clubs, Bella Collina in Montverde, Fla., superintendent Jeff Helms doesn’t have anywhere near the budget or crew that Thomas enjoys. So Helms goes about his daily divot drudgery the old-fashioned way: divot-by-divot, and hoping members and guests fill in their part, too.

Helms relies on the golfers to replace and fill fairway divots due to his short staff situation. For the tees, especially during the winter overseed months, Helms goes out 1-2 times per week and simply fills in divots with Florida’s ubiquitous green divot sand – mixed with a 5-to-1 ratio of sand to ryegrass seed in large 5-gallon buckets.

“It’s not a big science project going on out there,” says Helms.

But it works for Bella Collina for now. And probably dozens of other cash-strapped superintendents driven to control those dastardly divots. **GCI**

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