

Department of Plant Sciences

PREEMERGENCE HERBICIDE SELECTION FOLLOWING WINTER STRESS

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Bermudagrass (*Cynodon* spp.) is a commonly used warm-season turfgrass on golf courses, athletic fields, and residential and commercial lawns across Tennessee. This species grows aggressively during summer and provides high-quality turf when supplied with adequate nutrition, sunlight and irrigation.

Winter Damage

Warm-season turfgrasses such as bermudagrass can be subject to low-temperature damage during harsh winter weather. This damage, often termed “winterkill,” can be the result of several factors, including:

- Formation of ice crystals in crown tissue.
- Alternating cycles of warm and cold weather disrupting dormancy.
- Prolonged exposure to sub-lethal temperatures.

What temperatures are sub-lethal?

Sub-lethal temperatures harmful to bermudagrass vary by cultivar and management intensity. As a general rule, bermudagrass maintained at lower heights of cut (i.e., golf course putting greens) are more sensitive to low temperature stress than stands maintained at higher heights of cut. Research has reported that temperatures to injure bermudagrass on golf courses range from 17 to 23 F (Anderson et al. 2002). When temperatures are forecasted to fall below this range, many turfgrass managers

will cover sensitive areas (such as putting greens) with a layer of pine straw, a synthetic cover or a combination of the two (Figure 1, Figure 2). Covers are usually left in place until temperatures warm above this range.



Figure 1. A bermudagrass putting green being covered with a synthetic cover to protect from winter damage. Photo courtesy of Rod Lingle, CGCS.



Figure 2. A bermudagrass putting green being covered with pine straw to protect from winter damage. Photo courtesy of Rod Lingle, CGCS.

Testing turf for winterkill?

Winterkill is not a uniform event. Certain areas of turf are more prone to winter damage, including shaded sites, areas on north-facing slopes, and poorly drained locations.

It is often beneficial to test these problematic areas for winter damage before the initiation of spring green-up. This process allows individuals to make plans for dealing with areas of turf that may be slow to green-up in spring, recover only from encroachment by surrounding stolon and rhizome growth, or identify sections of turf that will need complete renovation altogether. More information on testing turf for winterkill can be found in UT Extension publication, “[D 4: Testing Turf for Winterkill](#).”

PRE Herbicide Use

Preemergence (PRE) herbicides are commonly used to control annual grassy weeds of bermudagrass, particularly smooth crabgrass (*Digitaria ischaemum*). In Tennessee, applications of PRE herbicides are commonly made in late February through March, prior to smooth crabgrass germination. This timing can be problematic since the full extent of bermudagrass damage from winter stress is often unknown during this time.

Given the severe winter weather experienced across Tennessee and most of the United States in 2013-2014, turfgrass managers should be aware of several considerations when making decisions about PRE herbicide use this spring.

Root Inhibiting Herbicides

Many of the PRE herbicides used for smooth crabgrass control work by affecting root growth, including prodiamine (e.g., Barricade), pendimethalin (e.g., Pendulum), dithiopyr (e.g., Dimension) and indaziflam (e.g., Specticle). Applications of these

herbicides for PRE weed control may slow the rate of bermudagrass recovery in thin areas affected by winterkill (Figure 3). Turfgrass managers may want to consider alternative herbicide programs in situations where winter damage is expected to be severe.



Figure 3. Compromised bermudagrass root growth following PRE herbicide treatment in sites affected by winterkill.

Oxadiazon Programs

Oxadiazon (e.g., Ronstar) is a PRE herbicide that does not affect bermudagrass root growth. Turf managers should consider using this herbicide in commercial turfgrass sites (i.e., nonresidential) subject to winter damage. Applications of this material will not affect establishment from sodding, sprigging or plugging in situations where winterkill is severe enough to warrant re-establishment.

PRE-POST Tank Mixtures

Another strategy to control smooth crabgrass and other summer annual weeds would be to avoid applying PRE herbicides at traditional spring timings. If winter damage is a significant concern, turfgrass managers may want to let bermudagrass fully green-up before applying PRE herbicides. Delaying applications allows individuals to fully assess the extent of winter damage before applying herbicides that could compromise recovery.

Delaying applications will likely allow smooth crabgrass seedlings to become established in bermudagrass turf. The degree of infestation will vary based on the growing environment and history of PRE herbicide use at the site. Herbicides such as dithiopyr (e.g., Dimension) and sulfentrazone + prodiamine (e.g., Echelon) can control newly germinated smooth crabgrass plants prior to tillering and provide residual control for the remainder of the growing season. Should plants mature beyond the 1-tiller stage, tank mixtures of PRE herbicides with postemergence materials (POST), such as quinclorac (e.g. Drive XLR8), can be very effective. University of Tennessee researchers found that several PRE and

POST herbicide mixtures applied to tillering smooth crabgrass plants in May effectively controlled infestations for the duration of the growing season. See UT Extension publication, "[W 146: Crabgrass Species Control in Turfgrass](#)," for more information on herbicides with PRE and POST activity against smooth crabgrass.

Reference

Anderson, J., C. Taliaferro, and D. Martin. 2002. Freeze tolerance of bermudagrasses: Vegetatively propagated cultivars intended for fairway and putting green use, and seed-propagated cultivars. *Crop Sci.* 42:975-977.

Disclaimer

This publication contains herbicide recommendations that are subject to change at any time. The recommendations in this publication are provided only as a guide. It is always the herbicide applicator's responsibility, by law, to read and follow all current label directions for the specific herbicide being used. The label always takes precedence over the recommendations found in this publication.

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