

Weed Control During Winter Dormancy on Ultradwarf Bermudagrass Putting Greens

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Introduction

Ultradwarf bermudagrass (*C. dactylon* x *C. transvaalensis*) cultivars are commonly used on golf course putting greens across Tennessee and other areas in the transition zone (Figure 1) and southern United States. These warm-season grasses grow slowly in autumn as temperatures cool and days become shorter. In winter, ultradwarf bermudagrasses go dormant in response to freezing temperatures and are mowed sparingly, if at all. During this dormant period ultradwarf bermudagrass putting greens are subject to weed infestation by species that normally would not persist under putting green management programs (mowing less than or equal to 0.125 inches) as well as some that would (e.g., *Poa annua*; Figure 2).

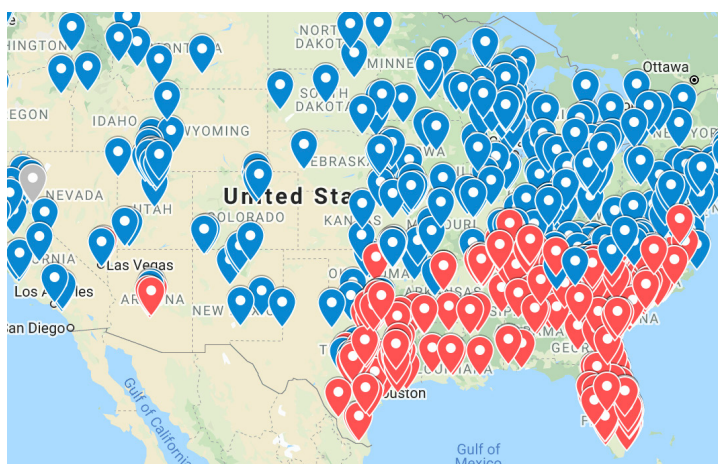


Figure 1: Areas of the United States where ultradwarf bermudagrass (*C. dactylon* x *C. transvaalensis*; red icons) and creeping bentgrass (*Agrostis stolonifera*; blue icons) are common on putting greens. Photo credit: J. Peake.



Figure 2: *Poa annua* infesting ultradwarf bermudagrass (*C. dactylon* x *C. transvaalensis*). Photo credit: J. Brosnan

Poa annua

Poa annua infestations are a common problem in bermudagrass (*Cynodon* spp.) across Tennessee and ultradwarf bermudagrass greens are no exception. Dormant conditions during autumn and winter render bermudagrass noncompetitive against *Poa annua* infestations that reduce turfgrass aesthetic and functional quality. *Poa annua* is the most common grassy weed infesting dormant ultradwarf bermudagrass putting greens.

Poa annua Biology

Poa annua plants emerge in autumn and can persist well into spring before succumbing to summer diseases. Once daily average soil temperatures fall below 70 degrees F in autumn, germination of *Poa annua* seed will begin and continue for the next 2-3 months. One plant can produce thousands of seeds. Failure to control *Poa annua* often leads to the development of a *Poa annua* seedbank in the soil profile.

Poa annua morphology can be highly variable. However, most often plants exhibit a bunch-type growth habit and form distinct patches or clumps (Figure 3). The leaf blade is folded and has a boat-shaped tip (Figure 4). Each ligule is long, membranous and slightly pointed ligule. Plants produce a panicle-type seed head that is triangular in shape with spikelets bunched toward the ends (Figure 5). Seed heads start to emerge in the spring and viable seed can be produced in just a few days after pollination (Figure 6). This feature allows for the production of viable seed, even in situations like putting greens where turfgrass is frequently mowed at low (less than 0.125 inches) heights of cut.



Figure 3: Bunch type of growth of annual bluegrass (*Poa annua*) infesting ultradwarf bermudagrass (*C. dactylon* x *C. transvaalensis*). Photo credit: J. Brosnan.



Figure 4: Boat-shaped leaf tip of annual bluegrass (*Poa annua*). Photo credit: G. Breeden.



Figure 5: *Poa annua* seed head. Photo credit: G. Breeden.



Figure 6: *Poa annua* pollination. Photo credit: J. Vargas.

Herbicide Resistant *Poa annua*

Herbicide resistance occurs when a weed can survive a dose of an herbicide that is normally lethal. More than 230 species of weeds have become resistant to herbicides, and that number continues to increase throughout all types of agricultural crop production and management, including turfgrass. *Poa annua* has been the most common weed to develop resistance in managed turfgrass systems such as golf courses, sod production fields, and sports fields, as well as residential and commercial lawns; ultradwarf bermudagrasses are no exception. Repeated use of pre- or postemergence herbicides without any other diversification in management has selected for *Poa annua* populations with resistance to nearly all herbicidal modes of action labeled for control. It is critically important that diversified weed management practices be implemented preserve effective herbicide options. More information on herbicide resistance in *Poa annua* can be found online at resistpoa.org.

The University of Tennessee Weed Diagnostics Center can aid turfgrass managers and producers in combating *Poa annua* resistance to herbicides. This Center provides several diagnostic tests to determine if *Poa annua* is resistant to either pre- or postemergence herbicides. Results of these diagnostic tests are essential in making optimal, evidence-based, management decisions. The tests also offer the potential to confirm that *Poa annua* will be susceptible to a specific herbicide before resources are allocated to purchase and apply the product. For more information on resistance testing, please visit weeddiagnostics.org.

See Table 1 for herbicidal control options to manage *Poa annua* infestations on dormant ultradwarf putting greens. Given the potential to select for herbicide-resistant weeds by using a single mode of action (i.e., Group #), mixtures of these materials to control *Poa annua* are highly recommended. For more information on herbicide use on putting greens see University of Tennessee Extension publication W 268, available online at extension.tennessee.edu/publications/Documents/W268.pdf.

Horseweed (*Conyza canadensis*) and other winter broadleaves

Another weed species that has increased in prevalence on ultradwarf bermudagrass putting greens during winter dormancy is horseweed (*Conyza canadensis*), also known as marestail. Horseweed has long been a problem in agronomic crops and is not normally found in managed turfgrass areas such as putting greens. One particular reason for this is it does not perform well under mowing; however, juvenile horseweed plants can grow on ultradwarf bermudagrass putting greens due to the lack of (or very limited) mowing in winter.

Horseweed Identification

Horseweed leaves have no petiole and are toothed. Plants have a central taproot that produces a fibrous root system. The flowers are small and white; however, the species does not often produce flowers under conditions found on a putting green. When mature, horseweed is easily identifiable (Figure 7). However, the juvenile rosette stage commonly observed on dormant ultradwarf bermudagrass putting greens is often confused with Sheperds-purse (*Capsella bursa-pastoris* L.) and several other rosette forming plants (Figure 8).



Figure 7: Horseweed (*Conyza canadensis*). Photo credit: J. Brosnan.

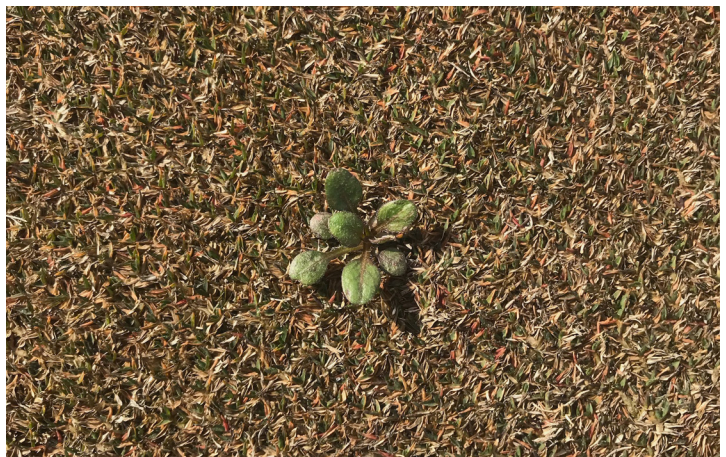


Figure 8: Juvenile horseweed (*Conyza canadensis*) infesting a dormant ultradwarf bermudagrass (*C. dactylon* x *C. transvaalensis*) putting green. Photo credit: A. Adkins

Horseweed Life Cycle

Horseweed seeds germinate throughout autumn and early spring as ultradwarf bermudagrasses are transitioning into (or out of) winter dormancy. Horseweed overwinters as a rosette with infestations most noticeable on putting greens in Tennessee during spring. Under situations where plants are not mowed, horseweed will “bolt” in summer, produce flowers and seed.

Horseweed Control Options

Cultural practices to increase the growth and vigor of turfgrass stands provide defense against weed infestation; however, these practices have little effect against horseweed on putting greens given that the turfgrass is dormant when infestations occur, and routine cultural practices are rarely implemented on dormant turfgrass surfaces.

See Table 1 for herbicidal control options to manage horseweed infestations on dormant ultradwarf bermudagrass putting greens. Given the potential to select for herbicide resistant weeds by using a single mode of action (i.e., Group #), mixtures of these products to control horseweed are recommended. Many of these herbicides also have activity on *Poa annua*. For more information on herbicide use on putting greens see University of Tennessee Extension publication W 268, available online at extension.tennessee.edu/publications/Documents/W268.pdf.

Life Cycle of Winter Annual Broadleaf Weeds

Seeds of winter annual broadleaf weeds germinate from late summer to early autumn; plants grow during the winter and flower in spring. Control measures implemented in autumn are often more effective than those used in spring once flowering begins. Young, actively growing plants are usually much easier to control than fully mature, flowering plants. Many winter annual broadleaf weeds are prolific seed producers. If not controlled, plants will produce seeds in the spring that will remain in the soil until environmental conditions are appropriate for germination. Controlling winter annual broadleaf weeds before seed set will reduce future weed problems. Below are descriptions of several winter annual broadleaves that can be found on ultradwarf bermudagrass greens.

Common Chickweed (*Stellaria media*)

Common chickweed has a shallow root system and is often found in wet, shady turfed areas. Leaves are opposite, shiny and egg-shaped to elliptic (Figure 9). The uppermost leaves have no petiole. Common chickweed is easily identified by the lines of vertical hairs that are present along the stem. Common chickweed is similar in appearance to mouse-ear chickweed (*Cerastium vulgatum*); however, mouse-ear chickweed is a perennial that roots at the nodes, and has oblong leaves with prominent hairs.



Figure 9: Common chickweed (*Stellaria media*) leaf shape and arrangement. Photo credit: G. Breeden.

Parsley-piert (*Aphanes arvensis*)

Parsley-piert seeds germinate near the end of autumn. Seedling plants overwinter and resume growth in the spring before flowering and forming seed. Plants develop a fibrous root system and exhibit a prostrate growth habit that allows them to tolerate frequent mowing at a diversity of heights of cut (Figure 10). Often confused with lawn burweed (*Soliva sessilis*), parsley-piert plants have alternatively arranged lobed-shaped leaves that are often subdivided into three or four additional lobes. Leaves may be petiolate or sessile near the base and covered with small hairs (pubescence).

For more information regarding winter annual broadleaf weeds in turfgrass, see University of Tennessee Extension publication W 205 available at extension.tennessee.edu/publications/Documents/W205.pdf.



Figure 10: Parsley piert (*Aphanes arvensis*) leaf shape and arrangement. Photo credit: J. Brosnan.

Winter Annual Broadleaf Weed Control Options

Many winter annual broadleaf weed species can infest dormant ultradwarf bermudagrass putting greens. See Table 1 for herbicidal control options to manage winter annual broadleaf weeds in dormant ultradwarf bermudagrass greens. Given the potential to select for herbicide resistant weeds by using a single mode of action (i.e., Group #), mixtures of these products to control winter annual broadleaf weeds are recommended. For more information on herbicide use on putting greens see extension.tennessee.edu/publications/Documents/W268.pdf.

Final Thoughts

The use of proper maintenance practices throughout the year will help prevent the encroachment of weeds on ultradwarf bermudagrass putting greens. Control measures should be implemented before these weeds produce seed that can be deposited into the soil seed-bank. There are multiple options for preemergence and postemergence control of weeds.

Always refer to the product label for specific information on proper product use, tank-mix compatibility and turfgrass tolerance. Mention of trade names or commercial products in this publication is solely for the purpose of providing specific information and does not imply recommendation or endorsement by the University of Tennessee Institute of Agriculture. For more information on turfgrass weed control, visit the University of Tennessee's turfgrass weed science website, turfgrassweeds.org.

For more information on herbicide selection, please visit University of Tennessee Mobile Weed Manual (MWM) at mobileweedmanual.com. The manual was developed by UT Extension professionals to assist green industry professionals in selecting herbicides for use in turf and ornamentals. The site provides users with weed control efficacy information for 115 different herbicides, tolerance information for over 2,300 turf and ornamental species, as well as direct links to label and safety data sheet information on herbicides used for turf and ornamental weed management. The MWM app can be downloaded for use on smartphones and tablets via the Apple App Store (<https://apps.apple.com/bn/app/mobile-weed-manual/id1572882654>) and the Google Play Store (https://play.google.com/store/apps/details?id=io.mesur.manual.pr&hl=en_US&gl=US).

Table 1. Herbicide options for weed control on dormant ultradwarf bermudagrass greens. It is highly recommended that herbicides listed below be applied in mixtures with one another to proactively manage herbicide resistance

Preemergence						
WSSA Group #	Active Ingredients	Example Trade Name	Comments	<i>Poa annua</i>	Horseweed	Winter Broadleaves
0	bensulide	Bensumec 4LF	Greens Labeling	Y	N	Y
0 + 14	bensulide + oxadiazon	Anderson's Goosegrass/ Crabgrass Control	Provides PRE control of several weeds	Y	N	Y
3	dithiopyr	Dimension 2EW	Products sold by Corteva AgriSciences restrict use on both creeping bentgrass and bermudagrass putting greens due to the potential for turfgrass injury. Formulations sold by other companies are labeled for use on creeping bentgrass and bermudagrass putting greens. Andersons Golf Products has combination products labeled for putting green use with 0.164% Dimension. Use on Tifgreen (Tifton 328) hybrid bermudagrass may result in injury	Y	Y	Y
30	methiozolin	PoaCure SC	Greens Labeling	Y	N	Y
3	pronamide	Kerb SC T&O	2ee label provides detailed use instructions for applications to control <i>Poa annua</i> on bermudagrass greens	Y	N	Y
Postemergence						
4 + 4 + 4	2,4-D + MCPP + dicamba	Trimec Classic	Label neither allows nor restricts applications to bermudagrass greens	N	Y	Y
14	carfentrazone	Quicksilver T/O	Greens Labeling	N	Y	Y
14 + 4 + 4 + 4	carfentrazone + 2,4-D + MCPP + dicamba	SpeedZone	Label neither allows nor restricts applications to bermudagrass greens	N	Y	Y
4	dicamba	Banvel	Label neither allows nor restricts applications to bermudagrass greens	N	Y	Y
2	flazasulfuron	Katana	Greens Labeling	Y	Y	Y
2	foramsulfuron	Revolver	Greens Labeling	Y	N	N
30	methiozolin	PoaCure SC	Greens Labeling	Y	N	Y
2 + 2	metsulfuron + rimsulfuron	Negate	Label neither allows nor restricts applications to bermudagrass greens	Y	Y	Y
2	metsulfuron	Manor	Label neither allows nor restricts applications to bermudagrass greens	N	Y	Y
3	pronamide	Kerb SC T&O	2ee label provides detailed use instructions for applications to control <i>Poa annua</i> on bermudagrass greens	Y	N	Y
2	trifloxysulfuron	Monument	Label neither allows nor restricts applications to bermudagrass greens	Y	Y	Y

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

Use of trade or brand names in this publication is for clarity and information; it does not imply approval of the product to the exclusion of others that may be of similar, suitable composition, nor does it guarantee or warrant the standard of the product. The author(s), the University of Tennessee Institute of Agriculture and University of Tennessee Extension assume no liability resulting from the use of these recommendations.



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