
BERMUDAGRASS

Integrated Pest Management for Landscape Professionals and Home Gardeners



Figure 1. Bermudagrass

Bermudagrass (*Cynodon dactylon*) is a plant that is grown as a turfgrass or as forage for livestock, but it also can be an invasive weed. It was introduced from Africa (not Bermuda) in 1751 and is widely spread throughout the southwest and southern United States. It is found in most areas of California at elevations below 3,000 feet and is common in gardens, landscapes, turf areas, orchards, roadsides, vineyards, and industrial areas. Bermudagrass also has many other common names including couchgrass, devilgrass, wiregrass, or dogtooth grass.

Improved hybrids of bermudagrass (Tifgreen, Tifdwarf, Tifway, Santa Ana) with fine leaves and a longer season of dark green color have been developed specifically for use as turfgrass. These hybrid varieties do not produce seed, whereas common bermudagrass produces seed that remain viable in soil for at least 2 years.

IDENTIFICATION AND LIFE CYCLE

Bermudagrass is a low-growing, wiry perennial (Fig. 1) that has two types of shoots: those aboveground (stolons) and those below ground (rhizomes). The stolons and rhizomes are capable of rooting in the soil, thus creating new plants as they grow out from the original plant or when they are cut and left on moist soil. In areas where the soil has not been disturbed, rhizomes are shallow (1 to 6 inches). But where the soil has been spaded or tilled deeper than 6 inches, or in sandy soil, under sidewalks, and against solid structures such as building foundations or walls, the rhizomes may be deeper than 6 inches. Leaves are generally smooth and pointed with a conspicuous ring of white hairs at the junction of the blade and sheath. The prostrate stems typically have a papery leaf sheath at each node. The stems root at the nodes in moist soil. Flowering stems are upright and bear a terminal group of three to seven spikelike branches, usually originating in a single whorl on the tips of the stems (Fig. 2a). The

flowering stem is similar to that of large crabgrass (*Digitaria sanguinalis*), but the spikelike branches on large crabgrass originate usually about 1/8 to 1/4 inch apart at the end of the stem, but sometimes they are closer (Fig. 2b). Individual spikes on the flowering stems of bermudagrass originate at the same point, are 1 to 2 inches long, and bear two rows of spikelets along one side of a flattened rachis (the central stem of the spike).

Bentgrass (*Agrostis* spp.), which also occurs as a patch or large mat in a lawn, may be confused with bermudagrass. Creeping bentgrass (*A. stolonifera*), the species most common in turf, has very fine leaves, stems, and stolons and is without rhizomes. When mowing is frequent, bentgrass does not produce a seed head. In areas that are infrequently mowed, it has a bushy panicle that is about 1.5 to 3 inches long (Fig. 2c).

MANAGEMENT

Bermudagrass is not an easy weed to control, especially when it must be controlled selectively within an al-

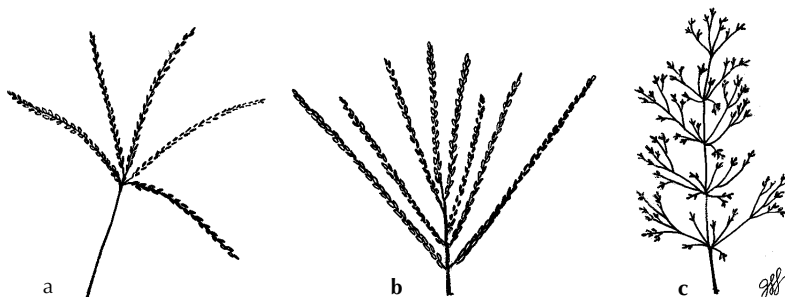


Figure 2. Flowering stems of (a) bermudagrass, (b) crabgrass, and (c) bentgrass.

ready planted turf, garden, or landscaped area. It can be managed nonchemically with a persistent program of removal, or over large areas with cultivation and withholding water during the summer to desiccate the stolons and rhizomes. Mulches of black plastic or geotextile landscape fabric can also be effective over broad areas if light is excluded. Control with herbicides requires careful timing and often more than one application.

Cultural Control

Although bermudagrass tolerates some drought, it grows best when irrigated. If the area where the bermudagrass is growing can be dried in summer without injuring any nearby ornamentals, withhold water to dry the stems and rototill or spade the area two or three times during summer months. This will bring rhizomes to the surface where they dry out. If water is applied during the process or it happens to rain, the bermudagrass will regrow. A single, deep (down to 6 inches) cultivation may be adequate, but the time required to dry the remaining rhizomes still buried in the soil will be increased from weeks to months. Be careful not to cultivate bermudagrass if the soil is moist or the weed will spread because cultivation chops the stems into segments and each segment becomes a new plant. While cultivating and drying can effectively kill established plants and rhizomes, they do not kill seeds in the soil.

Bermudagrass growth can be reduced by increasing shade from trees and tall shrubs. Shaded growth will be fine and spindly; plants are easier to remove than those growing in full sun. Shade from short shrubs or ground covers will not be effective; the bermudagrass will simply grow up through these plants.

Because bermudagrass spreads vegetatively and by seed, it is often spread by clippings from mowing. Compost lawn clippings thoroughly if they are to be used in the landscape to kill seed and vegetative structures and reduce the spread of this weed.

Mulching and Solarization

Mulch can be used in a variety of ways to manage bermudagrass. Black polyethylene applied over bermudagrass to prevent sunlight from reaching the plant can effectively control established plants. Irrigate and mow the grass, place the plastic over the plants, and leave it for at least 6 to 8 weeks in summer. Placing plastic over bermudagrass in winter will not control it. Be sure that the plastic remains intact without holes or bermudagrass will grow through the holes and survive. If ornamentals are planted in holes in the plastic, bermudagrass control is reduced.

Clear plastic mulching (solarization) is effective for eradication of bermudagrass plants and seed if it is applied during periods of high solar radiation. In California's Central Valley, this means during June to August, whereas in coastal areas the best time may be August to September or May to June when fog or wind is most likely to be at a minimum. Before applying the plastic, closely mow the bermudagrass, remove the clippings, and water the area well. It is not necessary to cultivate before solarization, but a shallow cultivation may improve control. Place clear, ultraviolet (UV) protected polyethylene over the area. The plastic should extend roughly 2 feet beyond the bermudagrass stolons to make sure the infested area is covered; it must be maintained intact for 4 to 6 weeks. Shade will reduce the effectiveness of solarization because it limits the amount of radiation. Solarization works most effectively when there is no slope in the land or if there is, the slope has a south or southwest exposure. Temperatures are not as high under plastic placed on a north-facing slope; consequently control is not as effective. After solarization, do not cultivate the area deeper than 3 inches to avoid bringing weed seed into the upper soil layer. (See publications on soil solarization listed in References).

Mulching with products such as wood chips is not effective against bermudagrass because the weed can push up

this mulch. If organic landscape fabrics (geotextile fabrics) are used under the mulch, however, control can be achieved. The fabric must be overlapped so the stolons do not grow between the fabric sheets. If holes or gaps are present in the fabric, control will be reduced because bermudagrass is likely to grow through the holes. Examples of landscape fabrics include DeWitt's Pro 5, Weed Block, and Typar Landscape Fabric.

Chemical Control

Established stands of bermudagrass can be controlled in the landscape with postemergence herbicides. Postemergence herbicides are applied to bermudagrass leaves and stems when they are growing vigorously (from spring to late summer). The time of application and how the herbicides are applied depends on whether it is best to use a selective herbicide or a nonselective herbicide. Because nonselective herbicides that control bermudagrass also kill or injure other grasses, do not apply them to a mixed turf or the other grass species in the turf will also be injured or killed.

Selective Herbicides. Early spring is the best time to apply selective herbicides. Four herbicides that are safe to use near many ornamental plants (see labels for exact species) include sethoxydim (Grass Getter) and fluazifop (Grass-B-Gon, Ornamec), which are available for use by the home gardener, and clethodim (Envoy) and fenoxaprop (Acclaim), which are available for use by licensed pesticide applicators only. In cool season turfgrasses (annual and perennial ryegrasses, bentgrass, fine and tall fescues, and Kentucky bluegrass) triclopyr and/or fenoxaprop can be used by licensed applicators to suppress bermudagrass.

For best control with these selective materials, make an application in spring when new bermudagrass growth is less than 6 inches in length, then reapply the herbicide before the regrowth reaches 6 inches in length. Additional applications may be needed as new growth occurs. There

are limits to how much can be applied in a year (follow the label). Control is increased if the plant is growing well with plenty of leaf area. Plants that are drought stressed, insect damaged, or with dust on the leaves will not be controlled.

Nonselective Herbicides. Nonselective herbicides are generally applied later in spring or summer when bermudagrass is growing rapidly. Nonselective herbicides will injure most plants if sprayed on them, thus care must be taken to avoid contact with desirable plants. Pelargonic acid (Scythe) and glufosinate (Finale) are contact herbicides, which means they kill only green parts of the plant that are contacted, thus they require repeat applications when new growth occurs. (Both materials are available to use around ornamentals in the home landscape.) In addition, there is a product (Grass and Weed Killer), which combines a selective grass herbicide (fluazifop) with a nonselective contact herbicide (diquat), that is sold for use around ornamentals.

Glyphosate (Roundup in its many formulations) is translocated throughout the plant and kills the tops and the roots. For it to be most effective, apply it to vigorously growing bermudagrass that is not stressed. Do not mow the grass for 2 to 3 weeks before applying it and withhold water for 2 to 3 days after an application. For even more effective control, spray the area with glyphosate, leave it for up to 7 days, then cultivate the area to cut surface stolons and bring rhizomes to the surface to dry out. If it isn't cultivated, another application of glyphosate when the weed begins to grow again may be necessary.

Bermudagrass seed will not be controlled with any of the previously mentioned treatments except solarization. If seeds germinate, the seedlings can be controlled with shallow cultivation, hoeing, or a thin layer of mulch. If chemical treatment to kill the seeds is preferred, apply a product containing the preemergence herbicides trifluralin (Treflan), pendimethalin (Pendulum), or

oryzalin (Surflan), or professional applicators can use proflaminate (Factor, Barricade) or dithiopyr (Dimension). These herbicides must be applied before the bermudagrass seeds germinate for effective control. Don't use these materials just before seeding or sodding a new lawn because they also affect germination of turfgrasses.

REFERENCES

Elmore, C. L., J. J. Stapleton, C. E. Bell, and J. E. DeVay. 1997. *Soil Solarization: A Nonpesticidal Method for Controlling Diseases, Nematodes, and Weeds*. Oakland: Univ. Calif. Div. Agric. and Nat. Resources, Publication 21377.

UC IPM Pest Management Guidelines: Turfgrass. Oakland: Univ. Calif. Div. Agric. and Nat. Resources, Publication 3365-T.

For more information contact the University of California Cooperative Extension or agricultural commissioner's office in your county. See your phone book for addresses and phone numbers.

WRITTEN BY Clyde L. Elmore and David W. Cudney. ILLUSTRATIONS: Fig. 2 by Jacqueline Lamer Lockwood. EDITOR: B. Ohlen-dorf. TECHNICAL EDITOR: M. L. Flint. DESIGN AND PRODUCTION: M. Brush. PRODUCED BY IPM Education and Publications, UC Statewide IPM Project, University of California, Davis, CA 95616-8620.

This Pest Note is available on the World Wide Web (<http://www.ipm.ucdavis.edu>)



To simplify information, trade names of products have been used. No endorsement of named products is intended, nor is criticism implied of similar products that are not mentioned.

This material is partially based upon work supported by the Extension Service, U.S. Department of Agriculture, under special project Section 3(d), Integrated Pest Management.

WARNING ON THE USE OF CHEMICALS

Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Confine chemicals to the property being treated. Avoid drift onto neighboring properties, especially gardens containing fruits and/or vegetables ready to be picked.

Dispose of empty containers carefully. Follow label instructions for disposal. Never reuse the containers. Make sure empty containers are not accessible to children or animals. Never dispose of containers where they may contaminate water supplies or natural waterways. Do not pour down sink or toilet. Consult your county agricultural commissioner for correct ways of disposing of excess pesticides. Never burn pesticide containers.

PHYTOTOXICITY: Certain chemicals may cause plant injury if used at the wrong stage of plant development or when temperatures are too high. Injury may also result from excessive amounts or the wrong formulation or from mixing incompatible materials. Inert ingredients, such as wetters, spreaders, emulsifiers, diluents, and solvents, can cause plant injury. Since formulations are often changed by manufacturers, it is possible that plant injury may occur even though no injury was noted in previous seasons.

The University of California, in accordance with applicable Federal and State law and University policy, does not discriminate on the basis of race, color, national origin, religion, sex, disability, age, medical condition (cancer-related), ancestry, marital status, citizenship, sexual orientation, or status as a Vietnam-era veteran or special disabled veteran. The University also prohibits sexual harassment. Inquiries regarding the University's nondiscrimination policies may be directed to the Affirmative Action Director, University of California, Agriculture and Natural Resources, 300 Lakeside Drive, 6th Floor, Oakland, California 94612-3560. (510) 987-0096.