

ANNUAL BLUEGRASS

Integrated Pest Management for Home Gardeners and Landscape Professionals

Annual bluegrass, *Poa annua*, (Figure 1) is one of the most common weeds of residential and commercial turfgrass, ornamental plantings, and gardens in the United States. It is native to Europe but is distributed worldwide. Commonly referred to as “Poa,” it is a particular problem in golf course greens and fairways, but it can also be a troublesome weed in vegetable and agronomic crops grown in cool climates. Though present in tree and vine crops in California, it usually isn’t a significant problem. The genus *Poa* consists of about 200 species worldwide. Their typical boat-shaped leaf tips (Figure 2), which curve up like the bow of a boat, are a distinguishing characteristic of the genus.

Three members of the genus *Poa* are commonly found in turfgrass sites in California. Kentucky bluegrass, *P. pratensis*, is a common cool-season turf species that is well adapted to cool, well-watered sites such as coastal and intermountain areas. Rough bluegrass, *P. trivialis*, is a less desirable turf species that does well in moist, shaded areas but lacks heat and drought tolerance, so it is short-lived and is generally considered a weed. Annual bluegrass is a weed species that, unlike Kentucky and rough bluegrass, is able to survive low mowing heights of less than 1 inch and still reseed. A fourth species, bulbous bluegrass, *P. bulbosus*, is sometimes found as a weed in Northern California turfgrass.

IDENTIFICATION AND LIFE CYCLE

Annual bluegrass is a misnomer because there are two plant types of annual bluegrass—a true annual, *P. annua* var. *annua*, and a perennial type, *P. annua* var. *reptans*. While the two types aren’t easy to distinguish from



Figure 1. Annual bluegrass.



Figure 2. Annual bluegrass leaf tip.

each other, the annual type is more upright in its growth habit and produces more seed than the lower-growing perennial type. The annual type also tends to produce a higher percentage of dormant seed. The perennial type produces seed that germinates readily under optimum conditions. Depending on the site, there might be a predominance of one type or a mixture of both. The perennial type is common in such sites as golf course greens, while the annual type tends to be more common in lawns and parkways, although both types can be found in either of these situations.

Annual bluegrass is a cool-season grass weed that starts germinating in late summer or fall as soil temperatures fall below 70°F (Figure 3). It continues to germinate throughout winter, allowing several flushes of germination at any one site throughout the season. An-



Figure 3. Annual bluegrass seedling.



Figure 4. Leaf blades that are crinkled part way down are a key characteristic of annual bluegrass.

nual bluegrass grows 6 to 8 inches high when left unmowed. It has light green flattened stems that are bent at the base and often rooted at the lower stem joint. Leaf blades are often crinkled part way down (Figure 4) and vary from 1 to 3 inches long with typical *Poa* boat-shaped leaf tips. The inflorescence (flowering structure) has branched seed clusters (panicles) that are 1 to 4 inches long (Figure 5). Seed clusters, also called seed heads, (Figure 6) can form as soon as plants are six weeks old; although this can occur from early fall through early summer, most seed heads are formed in spring.

PEST NOTES

Publication 7464

University of California
Agriculture and Natural Resources
Statewide Integrated Pest Management Program

May 2012

The annual form of annual bluegrass is a rapid and prolific seeder. Each small plant can produce about 100 seeds in as few as eight weeks. Viable seed can be produced just a few days after pollination, which allows the plant to reseed even in frequently mowed turf. The small seed is amber colored and about 1/16 inch long.

Annual bluegrass has a fairly weak and shallow root system and needs frequent rainfall or irrigation to survive. It grows well in moist areas in partial shade to full sun and tolerates compacted soil conditions. In coastal regions or in moderate temperature areas where turf is frequently irrigated, annual bluegrass can persist all year. In warmer areas, it usually dies in summer.

IMPACT

Annual bluegrass can be a major weed problem in home lawns and is a continual nuisance for turf and landscape managers. Because it is a grass weed growing in turfgrass, selectively removing it is very challenging. In turf it forms a weak sod that provides poor footing for athletic fields and golf courses. In addition, unsightly seed heads of annual bluegrass reduce the aesthetic quality of the turf and disrupt the smooth rolling surface of putting greens.

Because of its winter growth habit, it is more competitive than warm-season turf cultivars (e.g., common and hybrid bermudagrass, buffalograss, St. Augustinegrass, and zoysiagrass) during the cool season. This accounts for the severity of annual bluegrass invasions during winter. Although annual bluegrass can be a problem in all turf species, it visually blends into many cool-season turf species (e.g., Kentucky bluegrass, tall fescue, and perennial ryegrass) and is most obvious in closely mowed species, such as bentgrass and bermudagrass, especially the dwarf hybrids. In cool seasons, annual bluegrass grows faster than warm-season turf cultivars, which gives infested turf an undulating or irregular surface in as little as two days after mowing.

When annual bluegrass infests ornamental plantings, it forms a dense mat that lowers the vigor of desirable landscape plants by reducing available nutrients in the soil surface. In established woody shrubs and trees, annual bluegrass probably has little detrimental effect but can be aesthetically distracting.

Once a few annual bluegrass plants become established in turf or ornamental areas, spread can be rapid because of its prolific and rapid seed production. Mowing, foot traffic, birds, and cultivation all spread seed.

MANAGEMENT

A primary method of control is preventing new infestations. Maintenance gardeners frequently spread weeds from site to site when weed seeds contaminate mowers, string trimmers, and aerifiers. Cleaning landscape equipment after use in infested sites can help prevent annual bluegrass from spreading to uninfested areas.

If solitary plants of annual bluegrass are found, they should be removed before seed production starts. Isolate small areas of infestation until control can be accomplished. Hand pulling or hoeing to remove annual bluegrass can be effective as long as it is done frequently. Because dense seedling infestations are common, open areas where old plants have been removed will often have new flushes of seedling plants, hence the need for frequent attention. Controlling annual bluegrass infestations manually is very expensive in commercially maintained landscapes and usually not practical or successful. However, it can be very appropriate for home gardeners.

Maintaining turf and ornamental areas properly assures their maximum vigor, which helps these plantings become as competitive as possible and slows invasion of the weed. A dense sward of turf and closely spaced ornamentals shade the soil surface and make the establishment of annual bluegrass seedlings more difficult.



Figure 5. The annual bluegrass inflorescence is branched with three to eight flattened florets in each spikelet.



Figure 6. Annual bluegrass inflorescence emerging from the leaf sheath.

Turfgrass

No single control procedure has been successful in controlling annual bluegrass in turfgrass. Early removal of solitary infestations has been successful when practiced diligently. Open spots should be overseeded to establish a vigorous turfgrass. Removal of grass clippings might help reduce the number of seeds that reach the soil.

Overwatering, especially in shady areas, will predispose turfgrass to an-

nual bluegrass invasion. Use deep and infrequent irrigation to discourage the development of shallow-rooted annual bluegrass. Try withholding water until the desirable turf is beginning to show drought stress, rather than keeping the surface moist. Avoid fertilization and don't aerate turf during the peak of annual bluegrass germination. Also, avoid cultural practices as well as use patterns that tend to promote soil compaction.

Preemergent herbicides such as benefin, bensulide, dithiopyr, oryzalin, oxadiazon, pendimethalin, and prodiamine and their combinations such as benefin/oryzalin have been very successful in limiting germination of annual bluegrass. They should be applied a few weeks before weed seeds germinate to be most effective, as they have no effect on emerged plants (Table 1). Ethofumesate and pronamide are also available for preemergent use and have some post-emergent activity on both varieties of *Poa annua*, but these herbicides can't be used in all turf species. Although most of these products may be used on residential lawns, some of the products aren't available for homeowner purchase and can be applied only by commercial applicators. To limit bluegrass germination during winter, apply preemergent herbicides in late summer or early fall when soil temperatures drop below 70°F. Where the perennial type is a large component of the bluegrass population, pre-emergent herbicides will be of little or no benefit.

There are a few relatively new post-emergent herbicides that control annual bluegrass, and none of them can be used in all turf species. They are usually applied to warm-season turfgrass species. These herbicides can be used on residential lawns by licensed or certified applicators, but they have been of little benefit when used as the sole method of control. Foramsulfuron, sulfosulfuron, and trifloxysulfuron can be used only on warm-season turfgrass species. Ethofumesate can be used in dormant bermudagrass, creeping bentgrass, Kentucky bluegrass, tall fescue,

Table 1. Summary of Herbicides for Annual Bluegrass Control.

Herbicide	Trade name	Applied to lawns?	Applied on ornamentals?	Available to home gardeners?
Preemergents—apply before weed seeds germinate				
benefin	Balan 2.5 G	yes	yes	no
benefin/oryzalin	Amaze Grass & Weed Preventer, XL 2G, Primera One OB-2G	yes	yes	yes
benefin/trifluralin	Team	no	yes	no
bensulide	Bensumec, Pre-San	yes	no	yes
dithiopyr	Dimension, Preen Southern Weed Preventer	yes	yes	yes
ethofumesate	Poa Constrictor	yes	no	no
oryzalin	Surflan, Weed Impede	yes	yes	yes
oxadiazon	Ronstar	yes	yes	no
pendimethalin	Pendulum, Pre M, Scotts Halts	yes	yes	turf only
pendimethalin/dimethenamid	Freehand	no	yes	no
prodiamine	Barricade	yes	yes	yes
pronamide	Kerb	yes	no	no
trifluralin	Vegetable & Ornamental Weeder, Preen Garden Weed Preventer, Treflan	no	yes	yes
Postemergents—apply to young weeds				
clethodim	Envoy	no	yes	no
ethofumesate	Poa Constrictor	yes	no	no
foramsulfuron	Revolver	yes	no	no
pronamide	Kerb	yes	no	no
sulfosulfuron	Certainty	yes	no	no
trifloxysulfuron	Monument	yes	no	no
Nonselective postemergents—apply to weeds (will kill turf and ornamentals)				
diquat	Diquat, Reward	n/a	n/a	yes
glufosinate	Finale	n/a	n/a	no
glyphosate	Roundup, Kleenup, Remuda, etc.	n/a	n/a	yes
nonanoic acid	Scythe	n/a	n/a	yes

perennial ryegrass, and St. Augustine to reduce annual bluegrass infestations. Pronamide can be used in warm-season turfgrass for established annual bluegrass, but it is slow acting (15 to 21 days).

Annual bluegrass infestations often become so severe in commercial turfgrass that complete renovation is necessary. This can be done by spraying the entire area with a nonselective herbicide such as glyphosate followed

by replanting with a desirable turf species. Planting and establishment of the new turfgrass should take place during late spring and summer so that a solid cover of new turf can be obtained before the annual bluegrass germination period. Choose a species and variety that will compete well with bluegrass. Then preemergent herbicides can be used in late summer or fall to further limit annual bluegrass from establishing.

Ornamentals

Annual bluegrass can be controlled by various methods in ornamental plantings. Preventing germination and seedling is very important. Hand removal or spot spraying of solitary plants will save time and money in the long run. Cultivation or hand hoeing, although possible under some circumstances, generally isn't useful unless continued throughout the germination period because seed that is buried in the soil is brought to the surface where it germinates.

Mulching with landscape fabrics can be effective if the fabric is overlapped so no light is allowed to reach the soil. Use a polypropylene or polyester fabric or use a black polyethylene (plastic tarp) to block all plant growth. Plant-derived products (i.e., organic mulches) or rock can be used over the top of the synthetic fabrics.

When used alone, plant-derived products should be 2 to 3 inches thick, depending on the coarseness of the mulch. Finer materials can be less thick than coarser ones. If seeds of annual bluegrass get into the mulch, they can germinate and establish, just as if they were in soil. In these cases annual bluegrass plants can be easily removed by hand or with a hoe. Mulch thickness will need to be replenished periodically to maintain cover and eliminate light penetration to the soil.

Preemergent herbicides such as dithiopyr, oryzalin, oxadiazon, pendimethalin, pro-diamine, and trifluralin or a combination such as benefin/oryzalin, benefin/trifluralin, or pendimethalin/dimethenamid can be used to limit seedling germination in sites where use of these materials is permitted (Table 1). Some of these products may be available only to commercial applicators. Make the application before seeds germinate in fall when soil temperatures go below 70°F. Preemergent herbicides will be of little benefit if established annual bluegrass plants or the perennial type of bluegrass is already present. However, if the existing bluegrass is removed, a preemergent herbicide can be applied to control seedlings that germinate later.

Few postemergent herbicides are registered for use in established ornamental

plantings. Clethodim, fluazifop, and sethoxydim are selective for grass weeds and safe on broadleaf ornamentals, but only clethodim has any effect on annual bluegrass. Spot treatment with diquat, glufosinate, glyphosate, nonanoic acid, or other nonselective herbicides can reduce annual bluegrass populations in ornamental beds, but extreme care is needed to prevent herbicide spray or drift onto desirable plants, or the herbicides will injure the plants. Clethodim and glufosinate are available only to licensed applicators at this time.

REFERENCES

- Gibeault, V. A., and N. R. Goetze. 1973. Annual meadow-grass. *J. Sports Turf Res. Inst.* 48:48–53.
- Kopec, D., and K. Umeda. 2004. *Poa annua* control in turf. Paper read at the 11th Annual Maricopa County Short Course, Aug. 25, 2004, Phoenix.
- Lloyd, M. C., and E. R. McDonald. 1992. Effectiveness of bensulide in controlling two annual bluegrass subspecies. *Weed Tech.* 6:97–103.
- Mahady, M. M. 1999. *Poa annua* control in bermudagrass fairways. *Proc. Ann. Calif. Weed Sci. Soc.* 51:44–48.
- Mitich, L. W. 1998. Annual bluegrass (*Poa annua* L.). *Weed Tech.* 12:414–416.
- Mitra, S. 2006. Sulfonylurea herbicides: Key to a successful overseeding program. *Proc. Ann. Calif. Weed Sci. Soc.* 58:18–23. ❖

AUTHORS: M. LeStrange, UC Cooperative Extension, Tulare Co.; P. M. Geisel, Statewide Master Gardener Coordinator, UC Cooperative Extension, Glenn Co.; D. W. Cudney, Botany and Plant Sciences emeritus, UC Riverside; C. L. Elmore, Plant Sciences emeritus, UC Davis; and V. A. Gibeault, Botany and Plant Sciences emeritus, UC Riverside.

TECHNICAL EDITOR: M. L. Flint

EDITOR: M. L. Fayard

ILLUSTRATIONS: Figs. 1-6, J. K. Clark.

This and other Pest Notes are available at www.ipm.ucdavis.edu.

For more information, contact the University of California Cooperative Extension office in your county. See your telephone directory for addresses and phone numbers, or visit <http://ucanr.org/ce.cfm>.

University of California scientists and other qualified professionals have anonymously peer reviewed this publication for technical accuracy. The ANR Associate Editor for Urban Pest Management managed this review process.

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.

Produced by **UC Statewide Integrated Pest Management Program**
University of California, Davis, CA 95616



University of California
Agriculture and Natural Resources

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.

Pesticides applied in your home and landscape can move and contaminate creeks, rivers, and oceans. Confine chemicals to the property being treated. Avoid drift onto neighboring properties, especially gardens containing fruits or vegetables ready to be picked.

Do not place containers containing pesticide in the trash or pour pesticides down the sink or toilet. Either use the pesticide according to the label, or take unwanted pesticides to a Household Hazardous Waste Collection site. Contact your county agricultural commissioner for additional information on safe container disposal and for the location of the Household Hazardous Waste Collection site nearest you. Dispose of empty containers by following label directions. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways.

ANR NONDISCRIMINATION AND AFFIRMATIVE ACTION POLICY STATEMENT

The University of California prohibits discrimination or harassment of any person in any of its programs or activities. The complete nondiscrimination policy statement can be found at <http://ucanr.org/sites/anrstaff/files/107734.doc>. Inquiries regarding the university's equal employment opportunity policies may be directed to Linda Marie Manton, Affirmative Action Contact, University of California, Davis, Agriculture and Natural Resources, One Shields Avenue, Davis, CA 95616, (530) 752-0495.