
ANNUAL BLUEGRASS

Integrated Pest Management for Home Gardeners and Landscape Professionals



Figure 1. Annual bluegrass.

Annual bluegrass, *Poa annua*, (Fig. 1) is one of the most common weeds of turf, ornamental plantings, and gardens in the United States. Commonly referred to as "Poa," it is a particular problem in golf course greens and fairways throughout the world. It also can be a weed in vegetable crops and agronomic crops. Though present in tree and vine crops in California, it is usually not a significant problem. The genus *Poa* consists of about 200 species worldwide. Their typical "boat-shaped" leaf tips (Fig. 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 turf. Kentucky bluegrass (*Poa 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 (*Poa trivialis*) is a less desirable turf/weed species that does well in moist, shaded areas, but lacks heat and drought tolerance. Annual bluegrass is a weedy species that, unlike Kentucky and rough bluegrass, is able to survive low

mowing heights (less than 1 inch) and still reseed. Annual bluegrass is native to Europe but is distributed worldwide.

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. *repens*). While the two types are not easy to distinguish from 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 germinate readily under optimum conditions. Depending on the site there may 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 may be more common in lawns and parkways (although both types can be found under either of these conditions).

Annual bluegrass starts germinating in late summer or fall as soil temperatures fall below 70°F and continues to germinate throughout winter. This allows several flushes of germination at any one site throughout winter. Annual bluegrass grows to a

height of 6 to 8 inches 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 and vary from 1 to 3 inches in length with typical *Poa*, boat-shaped leaf tips. The inflorescence (flowering structure) is a terminal panicle that varies from 1 to 4 inches in length. Seed head initiation can start as soon as plants are 6-weeks old in early fall and continue until early summer, but most seed heads are formed in spring.

The annual form of annual bluegrass is a rapid and prolific seeder. Each small plant can produce about 100 seed in as few as 8 weeks. Viable seed can be produced just a few days after pollination, which allows the plant to reseed even in frequently mowed turf. The seed is amber colored and about 1/16 inch long.

Annual bluegrass has a fairly weak, shallow, root system and needs available moisture from rainfall or frequent irrigation to survive. It grows well in moist areas in full sun. However, it can also do well in semi-shaded conditions. Annual bluegrass can also grow in compacted soil conditions. In coastal regions or in moderate temperature areas where turf is frequently irrigated, annual bluegrass may persist all year. In warmer areas, it usually dies in summer.

IMPACT

Annual bluegrass can be a major weed problem for turf and landscape managers. In turf it forms a weak sod that provides poor footing for athletic fields and golf courses. In addition,



Figure 2. Annual bluegrass leaf tip.

unsightly seed heads of annual bluegrass reduce the aesthetic quality of the turf. Because of its winter growth habit, it is more competitive than warm-season turf cultivars (common bermudagrass, zoysiagrass, and hybrid bermudagrass) 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 is most obvious in bermudagrass and bentgrass. In the cool season, annual bluegrass grows faster than warm-season turf cultivars, which gives infested turf an undulating or irregular surface in as little as 2 days after mowing.

When annual bluegrass infests ornamental plantings, it forms a dense mat that can reduce the vigor of desirable landscape plants by reducing available nutrients in the soil surface. Because of the dense seedling infestations that can occur, hand-pulling or hoeing to remove annual bluegrass is often futile as new flushes of seedling plants germinate after the older seedlings are removed. Hoeing or hand-weeding must be done frequently to be successful. Thus, controlling it manually is very expensive in commercially maintained landscapes and not always successful. In established woody shrubs and trees, annual bluegrass probably has little detrimental effect but may 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. Seeds are spread by mowing, foot traffic, birds, and cultivation.

MANAGEMENT

A primary method of control is the prevention of new infestations. Mowers and cultivation equipment should be thoroughly cleaned before moving from infested to weed-free areas. If solitary plants of annual bluegrass are found, they should be removed before seed production starts. Isolate small areas with infestations until control can be accomplished. Maintain turf and ornamental areas properly to

assure maximum vigor, which helps these plantings become as competitive as possible and slows invasion of the weed. Dense turf and ornamentals shade the soil surface, making the establishment of annual bluegrass seedlings difficult.

Overwatering, especially in shady areas, will predispose turfgrass to annual bluegrass invasion. Use deep and infrequent irrigation to discourage the development of the shallow-rooted annual bluegrass populations. Withhold water until the desirable species are beginning to show drought stress. Avoid fertilization and don't aerate turf during the peak of annual bluegrass germination. Avoid cultural practices and use patterns that might tend to promote soil compaction.

Turfgrass

No single control procedure has been successful in controlling annual bluegrass in turfgrass. Early removal of solitary infestations has been suc-

cessful when practiced diligently. Open spots should be overseeded to establish a vigorous turfgrass. Removal of grass clippings may help to reduce the number of seed that reach the soil. Check the irrigation output to be sure shady areas are not getting too much water.

Preemergent herbicides such as benefin, bensulide, DCPA, dithiopyr, oxadiazon, pendimethalin, and prodiamine have been successful in limiting germination of annual bluegrass, but they must be applied before weed seeds germinate to be effective. Pronamide is also available for preemergent use, but it can only be applied to warm-season turf. These herbicides (with the exception of pronamide) will not control emerged plants. To limit bluegrass germination during winter, apply preemergent herbicides in late summer or early fall, when soil temperature drops below 70°F. Where the perennial type is a large component of the bluegrass population, preemer-

TABLE 1. Summary of Herbicides for Annual Bluegrass Control

Site	Material	Applied to soil before weed seed germinates	Applied to actively growing plants	Readily available to home gardeners
Turfgrass	benefin	X	—	yes
	bensulide	X	—	yes
	DCPA	X	—	no
	dithiopyr	X	—	no
	ethofumesate	—	X	no
	fenarimol	—	X	no
	glyphosate	—	X	yes
	oxadiazon	X	—	no
	pendimethalin	X	—	yes
	prodiamine	X	—	no
	pronamide	X	X	no
Ornamentals	benefin/trifluralin	X	—	yes
	benefin/oryzalin	X	—	no
	glufosinate	—	X	no
	glyphosate	—	X	yes
	nananoic (pelargonic) acid	—	X	yes
	oryzalin	X	—	yes
	oxadiazon	X	—	no
	pendimethalin	X	—	yes
	prodiamine	X	—	no
	X = yes			
— = no				

gent herbicides will be of little or no benefit.

Postemergent herbicides can limit growth of annual bluegrass but have been of little benefit when used as the sole method of control. Ethofumesate has been used in perennial ryegrass, Kentucky bluegrass, and dormant bermudagrass to reduce annual bluegrass infestations. Pronamide can be used in warm-season turfgrass for established annual bluegrass, but it is slow acting (15–21 days). Repeated applications of the fungicide fenarimol have been reported to reduce the annual type of annual bluegrass infestations.

Annual bluegrass infestations often become so severe that complete renovation is necessary. This can be done by fumigation followed by replanting with a desirable turf species or by spraying the entire area with a nonselective herbicide such as glyphosate. Planting and establishment of the desired species should take place during late spring and summer so that a solid cover of new

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.

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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 ornamentals. Prevention of germination and seeding 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, is generally not useful unless continued throughout the germination period.

Mulching with landscape fabrics can be effective if the fabric is overlapped so that no light is allowed to reach the soil. Use a polypropylene or polyester fabric or black polyethylene (plastic tarp) to block all plant growth. Rock or organic mulches can be used over the top of the synthetic fabrics. Organic mulches should be at least 3 inches thick. If seed of annual bluegrass gets into the mulch, it may germinate and establish, just as if it were in soil. In these cases the annual bluegrass plants can be easily removed by hand. Mulch thickness will need to be replenished periodically to maintain cover and eliminate light penetration to the soil.

Preemergent herbicides such as oryzalin, oxadiazon, pendimethalin,

prodiamine, or a combination of benfen plus trifluralin or benfen plus oryzalin can be used to limit seedling germination in sites where use of these materials is permitted. Make the application before seed germinates 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 are 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. Spot treatment with glufosinate, glyphosate, nananoic acid, or other nonselective herbicides can reduce annual bluegrass populations, but one must be careful not to spray or let these herbicides drift onto desirable plants, or the plants will be injured. Other materials, such as fluazifop and sethoxydim, are available but are not effective for annual bluegrass control.

REFERENCES

- Gibeault, V. A. and N. R. Goetze. 1973. Annual meadow-grass. *J. Sports Turf Res. Inst.* 48:48-53.
- Lloyd, M. C. and E. R. McDonald. 1992. Effectiveness of bensulide in controlling two annual bluegrass subspecies. *Weed Tech.* 6:97-103.
- Mitich, L. W. 1998. Annual bluegrass (*Poa annua* L.). *Weed Tech.* 12:414-416.

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.

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