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Control of Poa Annua

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Annual bluegrass (*Poa annua*) is a common grass species found on the majority of golf courses in Indiana. It can provide a very dense, uniform, playable turf during the early spring and fall. However, abundant seed head production in mid-to-late- spring detracts from the visual appearance of the turf and greatly reduces putting quality. The low heat and drought tolerance of *Poa* cause further management problems for the superintendent during the summer months. Increased irrigation and fungicide applications are needed to keep it alive during the hot summer months, and often this grass will die despite intensive management.

Before beginning a *Poa* control program, one must have realistic expectations. One hundred percent control is almost impossible, regardless of method you use. Control should not be expected overnight, it may take three or more years to reduce *Poa* to managable populations. More importantly, entire management programs must be focused on *Poa* control; pesticides alone will never suffice.

Poa annua Biology

A good understanding of the habits and life cycle of *Poa* will better enable the superintendent to utilize all the available tools for its control. Annual bluegrass is a winter annual that germinates in the late summer/early fall once soil temperatures fall below 70° F. Seedlings mature in the fall, overwinter in a vegetative state, and produce seed in late spring and early summer. Annual bluegrass is a prolific seed producer. An individual plant is capable of producing more than 360 viable seeds. The seed may lie dormant in the soil for many years before germinating. Annual bluegrass flowers and produces seed over several months and at any mowing height. *Poa* grows well under short days and cool conditions, and it will out-compete all other turf species during late fall and early spring. *Poa* often dies in the heat of the summer.

There are two main types of annual bluegrass found in Indiana. *Poa annua* var. annua is generally found in the southern part of the state. It is a true bunch-type annual with an upright growth habit. *Poa annua* var. reptans is found more to the north; it is a short-lived perennial that is weakly stoloniferous. In addition to these two main groups, *Poa* is a highly variable species with a number of biotypes. This means that a chemical may control *Poa* on one golf course only to have no affect on a neighboring course ten miles away.

Poa annua is favored over other turf species under the following conditions:

- Light and frequent irrigation leading to moist to wet conditions, but *Poa* does not tolerate saturated soils.
- Tolerates and often thrives under low mowing (optimum mowing height is one inch).
- Well-adapted to compacted soils, will grow in compacted soils where other desireable species will not persist.
- Thrives with high-nitrogen and phosphorus levels, early spring nitrogen applications encourages *Poa*.

Cultural Control

For optimum control, cultural control methods must be be used in conjunction with any pesticide program.

Irrigation: Deep and infrequent is the key. Do not water until the first signs of drought stress are seen in the desired species and wet, but not saturate, the rootzone to one inch below the bottom of the root system.

Mowing: Lightweight mowers are favored to reduce compaction and wear. Clipping removal will help reduce the seed source in the soil.

Fertilization: Fall fertilization is recommended. Avoid nitrogen and phosphorus applications when *Poa* is germinating.

Aerification: Aerify as often as feasible to reduce compaction. Avoid aerification when weather is favorable for *Poa* germination, or follow with pre-emergence herbicide application.

Chemical Control

Chemical control of annual bluegrass can be attempted with growth regulators, pre-emergence herbicides, and herbicides that have both pre- and postemergence activity. The following should only be used as a guideline to learn what products and methods are available: When using herbicides, it is very important to learn as much about the product as possible from trade journals, universities, and company representatives. Always apply herbicides according to label instructions.

Growth Regulators

Mefluidide (Embark) can be used to supress *Poa annua* seedheads to improve the appearance of infested fairways. Timing and accuracy of application are very important. Mefluidide must be applied prior to seedhead formation only after spring greenup. It may cause discoloring of the *Poa annua* and the desired species, especially where the sprayer overlaps. Mefluidide should be watered in within eight hours of application and should not be applied to bentgrass putting greens. Mefluidide will not reduce *Poa* populations and may increase the heat and drought tolerance of *Poa*.

Fenarimol (Rubigan) is a systemic fungicide labelled for control of several turf diseases. It is also labelled for gradual reduction of *Poa* populations. It can be used on bentgrass greens. After a soil threshold of fenarimol has been reached, *Poa* gradually begins to thin and brown, allowing bentgrass to fill in slowly. This threshold is reached after approximately ten applications and does not carryover from year to year.

Paclobutrazol (Scott's TGR) is a growth regulator that selectively inhibits the growth of *Poa* and allows the desired species to fill in gradually. The best results are seen when an application is made in the fall — followed by another application in the spring. Paclobutrazol will reduce growth and discolor *Poa* three to five weeks after application; the *Poa* will recover after six to eight weeks. This growth regulator will not inhibit seedhead formation, but the seed stalks are stunted and the seedheads will remain below the turf canopy.

Flurprimidol (Cutless) is a growth regulator safe for use on a number of turfgrass species. *Poa annua* is more sensitive to flurprimidol than other turfgrass species and often results in discoloration and growth reduction. Flurprimidol is recommended to be applied after greenup in early spring and again prior to *Poa* germination in the late summer. Overseeding with desired species is recommended two to three weeks following application.

Pre- and Postemergence Herbicides

Ethofumesate (Prograss) is one of the more recent *Poa* control products to come on the market. Ethofumesate is applied mainly as a postemergence herbicide, but it exhibits some residual pre-emergence control. Ethofumesate can be applied to Kentucky bluegrass, perennial ryegrass, and creeping bentgrass fairways. At time of this publication, ethofumesate was not registered for tees or greens. Two or three applications of ethofumesate applied between September and December are recommended per year. The applications should be approximately four weeks apart. Results may be seen that fall; however, they are usually observed the following spring.

Tricalcium arsenate (TurfCal) is chemically similiar to the phosphate ion; however, *Poa annua* cannot differentiate between arsenate and phosphate in soil. *Poa* takes up the arsenate from the soil and because arsenate does not metabolize within the plant as phosphorus would, the plant weakens and dies. Tricalcium arsenate application rates are highly variable among sites, depending on phosphorus and nitrogen levels, pH, drainage, organic matter, and clay content of the soil. An initial heavy application is needed to build up the arsenic level in the soil, followed by lighter yearly maintenance applications. Tricalcium arsenate may decrease the overall vigor of the desirable species.

Pre-emergence Herbicides

Most pre-emergence herbicides on the market can be used in *Poa* control programs. Application timing is very important, herbicides must be applied in early fall prior to *Poa* germination. Reduced rooting in the desirable species may occur from repeated pre-emergence herbicide use. If overseeding is scheduled, check the label instructions for precautions.

Renovation of *Poa* Infested Fairways

Poa infested fairways are renovated and generally converted to creeping bentgrass, perennial ryegrass, or zoysia. These species are chosen because they can withstand mowing heights of less than 1 inch, which are demanded by golfers for fairway turf. Research and practical experience has shown that Kentucky bluegrass cannot withstand low mowing (less than 1 inch) and is quickly overtaken by the *Poa*. Renovation has traditionally been accomplished by closing the area, killing the area with fumigation or a nonselective herbicide, and reseeding. Fumigation is quite expensive and impractical for large areas, so a nonselective herbicide such as glyphosate is often used. Traditional renovation is still practiced; however, with the release of new *Poa annua* control products, gradual conversion can be accomplished without interrupting play.

Traditional Renovation

Fall is the optimum time of the year for renovation. The area is killed with a nonselective herbicide such as glyphosate and the seedbed is prepared.

Seedbed preparation is of utmost importance in promoting germination. Because nonselective herbicides do not kill the *Poa* seeds in the soil, the quick germinating *Poa* tends to out-compete the desired species. This could leave a larger *Poa* population after renovation than the initial Poa population. The seedbed should be prepared with aerification and intensive verticutting; the more the soil is cultivated, the better. Slit seeding the desired species with an overseeder is a better method than using a drop spreader for seeding. Make at least two passes with the overseeder. Good seed-soil contact is important to insure quick germination. Any practice that improves seed- soil contact will help. Cultural practices favoring the desired species over *Poa* should be initiated immediately.

Renovation with a Selective Herbicide or Growth Regulator

Conversion of *Poa* fairways with a selective herbicide or growth regulator can take up to three years. Though this is longer than the traditional method, it can be more effective and does not interrupt play. There are a number of recommended plans for conversion with any product, depending on the percentage of *Poa* in the fairway. One preferred method is to aerify in two to four different directions; this will improve seed-soil contact. Slit-seed the desired turf species in mid to late August at 2.0-2.5 lbs/1000 ft2. Apply a starter fertilizer to enhance germination. After seedling emergence apply the *Poa* control product of choice following the manufaturer's directions. Begin cultural practices that favor the desired species. Results probably will not be seen that fall; they will appear the following spring.

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