

HERBICIDES FOR DIFFICULT WEEDS IN COOL SEASON TURFGRASSES

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Most weeds can be controlled selectively in turfgrass areas with herbicides. However, a few weeds are extremely difficult to control. When turf becomes weak and thin these weeds invade and take over. Therefore, vigorously growing, competitive turf will help reduce weed problems and this is extremely important when the invading weeds are those which are difficult to control. To make grass grow at its best use adapted and improved turfgrasses, properly fertilize, mow and water, control insects and diseases, reduce traffic, etc. To have a successful weed control program, you must couple good management with the use of herbicides.

Sterilization of Soil

Weeds which are extremely difficult to control selectively might best be controlled before grass is established. These could include such weeds as annual bluegrass, bentgrass, nimblewill, quackgrass, velvetgrass, veronicas, etc. There are soil fumigants that will kill vegetative material and weed seed in the soil. Most weeds in turf come from seed already present in the soil. Some of the fumigants presently in use are: metham (VAPAM, VPM), methyl bromide (DOW-FUME), and methyl-isothiocyanate (VORLEX). Depending on the material used and weather conditions, seedings have to be delayed for a few days to three weeks. Use of fumigants may be costly and should be handled carefully as they can be harmful. However, they can accomplish the job more quickly than employing tillage and fallowing techniques which may require several months or more to reduce weeds and weed seed in the soil.

Renovation Chemicals

There are chemicals that are not selective and will kill all vegetation on contact. Those herbicides which persist in the soil for only a short time or do not interfere with grass seedings are helpful for turf renovation. This technique is especially valuable for areas

containing those weeds which are extremely difficult to control selectively. Materials such as glyphosate (ROUNDUP) and paraquat (PARAQUAT CL) are useful for this purpose. These chemicals are also useful for spot treatment of weeds. Glyphosate has provided consistent and complete kill of most grasses and broadleaf weeds and does not interfere with the establishment of grass from seed. Seedings made within a week after the use of paraquat, especially in a thatchy area, may produce a slightly reduced grass stand.

Specific Difficult Weed Problems

Goosegrass — This annual grass is not as easily controlled as is crabgrass. Since it germinates a few weeks later than crabgrass, better results might be obtained with preemergence herbicides if they are (1) applied later in the season and closer to the time of goosegrass germination so that a higher chemical concentration is present and (2) applied at the normal rate and time used for crabgrass control followed by a half-rate applied about six weeks later or just before the expected period of germination. We have found oxadiazon (RONSTAR) to be the most effective herbicide for preemergent control of goosegrass. However, oxadiazon is presently suggested for use only in Kentucky bluegrass turf. One can expect considerable bentgrass injury if used on putting greens.

Annual bluegrass (*Poa Annua*) — There is no simple or easy method of control. The best approach will include proper management, use of correct grass species or varieties, and the aid of chemicals as a tool for the elimination of annual bluegrass. Preemergent herbicides such as benefin (BALAN), bensulide (BETA-SAN, PRE-SAN, etc.), DCPA (DACTHAL) and oxadiazon (RONSTAR) are suggested for use in preventive programs. We have had good results with bensulide. These preemergent herbicides are only effective if applied before annual bluegrass germi-



Sterilizing soil and reseeding after weeds have been removed can make a big difference in the appearance of turf. Background, left, is sterilized soil; background, right, shows growth after weed-free seeding; and foreground shows normal weed cover.



Patch-like appearance of annual bluegrass in this Kentucky bluegrass lawn works its way into turf stands throughout the northern half of the country. *Poa annua* is the bane of many turf managers.

nates. They do not kill established plants.

Since some annual bluegrass plants live for several years, one can easily see why preemergent herbicides will show good results only if used in a preventive program where the initial amount of annual bluegrass can be tolerated. Annual bluegrass seed can germinate from spring through fall, although peak germination usually takes place in late summer. For the preventive program to be successful, a herbicide barrier must exist in the turf during the entire germination period. A full herbicide rate is suggested for late summer (August) with a half-rate in early spring (March-April). If crabgrass and other annual summer grasses are a problem, then a full spring rate should be used or an additional half-rate should be applied in late spring. Other materials such as maleic hydrazide and chlorflurenol (MH + CF, PO-SAN) are used in an attempt to prevent annual bluegrass seed production and reduce the plant population. This technique has had some success but it depends upon (1) the amount and longevity of viable seed already present in the soil and (2) seed yields being eliminated during the entire growing season.

Endothal (ENDOTHAL) and linuron (LOROX) are two herbicides suggested for postemergence control of annual bluegrass. With these compounds, one can expect some turfgrass discoloration or injury. Usually the injury is temporary and the grass recovers. Linuron is only suggested for use in Kentucky bluegrass turf since other grasses (bentgrass, fescue, and ryegrass) can be seriously injured. These postemergent herbicides might provide the best results if used at low rates and at frequent intervals so that a gradual removal of annual bluegrass takes place. This would be especially true in turf areas where the annual bluegrass population exceeds 15 percent. One could tolerate 15 percent brown turf, as dead annual bluegrass plants, but could you tolerate half your turf being dead because half of it was annual bluegrass. If turf contains more than 50 percent annual bluegrass, you might consider renovation chemicals as discussed earlier. A postemergent program will require proper management to encourage the perennial grasses to fill in and the use of a preemergence herbicide to prevent the establishment of bluegrass plants from seed. As can be seen, there is no simple or easy method for annual bluegrass control.

Bentgrass as a Weed — Under some situations, bentgrass can be considered a weed. It is very difficult to control selectively. As was discussed for postemergence annual bluegrass control, endothal or linuron in Kentucky bluegrass turf might offer the best chance of success. Others have suggested the use of endothal or silvex (presently banned from use) at high rates in Kentucky bluegrass during the hot summer. Some suggest control by the use of leaf herbicides accompanied by very close mowing of the bentgrass - Kentucky bluegrass turf in the fall.

Nutsedge — Selective control of nutsedge in cool-season grass areas can be obtained by using bentazon (BASAGRAN) or the methanearsonates, such as: AMA, DSMA, MAMA, MSMA, etc. Two applications of either material at low rates and at a 10-day interval are more effective than a single high rate. Control is usually more complete when treatments are made in early summer rather than late spring. Possibly this is related to timing the herbicide application with the emergence of most plants from nutlets (tubers). The methanearsonates are used at the same rates and with

the same techniques suggested for their use in postemergence crabgrass control. Some turfgrass discoloration can be expected. However, if crabgrass is present, then one should choose these materials to obtain control of both crabgrass and nutsedge since bentazon does not control crabgrass. However, if no crabgrass problem exists, the material of choice should be bentazon. It is more effective and most grasses are more tolerant of it. It can also be used in seedling turfgrass (not perennial ryegrass) and will provide some control of annual broadleaf weeds.

Broadleaf Weeds — To control most weeds, use a mixture of 2,4-D with either one or two of the following: dicamba (BANVEL), dichlorprop (2,4-DP), or mecoprop (MCPP). With difficulty to control broadleaf weeds, one can make a second application about three weeks later and probably achieve better results. In putting green turf to control clover, chickweed, or pearlwort, one might consider dicamba or mecoprop. Knotweed or red sorrel may best be controlled with mixtures containing dicamba while oxalis may best be controlled with mixtures containing dichlorprop.

Creeping speedwell — Researchers in New York and Pennsylvania have obtained good control of this weed by using DCPA (DACTHAL). They applied DCPA at the rate of 12 pounds active ingredient per acre in the spring to established stands of creeping speedwell. They had slightly better results with 6 pounds in May and another 6 pounds in June. Check the label or consult recent recommendations as to the need for follow-up treatments. Endothal has been used in the past for control but some turfgrass discoloration can be expected and some weed regrowth will usually occur.

Prostrate Spurge — Earlier trials in California and more recent ones in Rhode Island have shown that DCPA (DACTHAL) will provide preemergent control of spurge. Siduron (TUPERSAN), another preemergent herbicide, also provided some spurge control but the results were not as consistent as those obtained with DCPA. The rates and timing of these preemergent herbicides were similar to those used for crabgrass control. In trials with postemergent treatments, the most effective material with the least potential for injury to cool season turfgrasses, especially putting green bentgrasses, was bromoxynil (BROMINAL, BUC-TRIL). This herbicide is generally used for seedling broadleaf weed control in new grass seedings. The optimum rate appears to be 1 to 2 pounds per acre which

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A slicer-seeder does renovation seeding after vegetation has been killed by herbicides.

water intake. This inability of the roots to absorb water, or for the plant to transport it to or through its system, may result from a shallow, poorly branched root system; diseased vascular system, or, from a reduced or restricted soil water supply. Limited soil moisture may be the result of a "dry" soil (not enough water) or of a frozen or partially frozen soil (water unavailable to the root because of its physical state). Thus, the roots simply cannot take in enough water to offset that being lost by the plant and it "desiccates" or dries up — it wilts. Although more serious during periods when the soil is "on the dry side" or partially frozen, desiccation on high windswept sites may occur at any time. The increased air movement causes excessive transpiration and under limited or reduced soil moisture conditions, the plants may die unless protected.

In late winter-early spring, before the irrigation system has been activated, damage from desiccation may be severe. Water hauled in spray tanks or by other means and applied to critical sites will preclude or minimize loss.

Protective Measures

Techniques and procedures that protect, avoid and correct the damage that occurs in late winter-early spring are well known to and understood by the golf course superintendent. For the most part, protective measures relate to production of a healthy, vigorous grass and to the control, to the extent possible, of the soil-plant environment. When these factors are adversely impacted by anomalous conditions of weather, poor construction, or inadequate equipment and supplies, the responsibility for loss of turfgrass must be shared.

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is higher than that suggested for use in new grass seedings. DCPA and bromoxynil will be tested more completely next season. We should then know more about their effectiveness for spurge control and safety to various turfgrasses.

Remember

Although herbicides will control weeds, new weeds may appear in turf from seed in the soil. If turf is neglected, retreatment may be necessary after a year or so. If a dense, vigorously growing stand of grass is maintained, weeds should not be a major problem. Remember, weeds are the result of poor turf rather than the cause. A successful program combines good management with the use of herbicides.

The pesticides listed in this article may be classified "for restricted use only" in accordance with regulations. It is unlawful to use any pesticide for other than the registered use. Read and follow the label. The trade names used in this article are for identification purposes and no product endorsement is implied, nor is discrimination intended against similar materials. The information in this article was presented at the New Jersey Turfgrass Expo '80.

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