



Goosegrass. Photo courtesy: Rhone Poulenc.



Spurge, an annual broadleaf weed.



Crabgrass.

# Drought and Stress Complicate Preemergence Weed Control

If you had to rank the top cultural practices necessary to maintain turf on golf courses and sports fields, weed control would undoubtedly be near the top.

Mowing, irrigation, drainage, fertilization, compaction relief and renovation would have to come before weed control. But the next major hurdle after achieving cover on high-use, recreational turf is the quality of that cover, and weed control leads the pack when it comes to professionally maintained turf.

Quality in turf management means uniformity. In standard lawn care, that may be interpreted as a neat appearance. While appearance is important in golf and sports turf, uniformity is essential for playability and safety, two of the highest goals set by superintendents and sports turf managers. The ultimate achievement and the highest form of professionalism comes from providing all three.

That's a huge challenge when the large size of high-use, recreational turf areas is taken into account. Greenskeepers were appropriately named at one time, because they were most concerned about the quality of greens. Today their concern for quality extends beyond greens to all parts of the golf course, because new technology has enabled them to achieve higher standards for larger areas.

Turf managers at stadiums, parks and universities are incorporating much of the technology developed for golf courses into all types of sports fields. Furthermore, manufacturers are now developing products for both golf courses and sports turf, as the two large turf markets expand at

an amazing clip and standards for these markets continue to rise. This is proving to be a major benefit to golf and sports turf, since they face limitations not experienced in residential or commercial turf.

Preemergence weed control is a perfect example. The demand for recreational turf is endless. In many cases, renovation and reseeding cannot be restricted to certain times of the year due to use patterns. Maintenance practices for weed control must fit into an increasingly smaller window of time. Herbicides can't interfere with seeding, sodding or transition in the fall or spring. This is forcing superintendents and sports turf managers to rethink previous weed control products as well as cultural practices that encourage weed encroachment.

Turf managers are gaining a clearer understanding of the effects of irrigation, aeration, verticutting, fertilizing, overseeding and mowing on weed infestation as research agronomists delve more deeply into these areas. Superintendents and groundskeepers are realizing that all these practices have some impact on root development and growth of the desired turfgrass. By adjusting each practice to

encourage the health of the turf, it can best compete with annual grasses and broadleaf weeds.

The purpose of preemergence herbicides is to prevent germination of hard-to-control annual grasses such as crabgrass, goosegrass, and annual bluegrass. By establishing a chemical barrier in the top 1/2 inch of soil during peak germination periods, these products interrupt the growth of weed seedlings and prevent them from becoming established.

The key to their effectiveness is timing. Crabgrass begins to germinate when temperatures average more than 55 degrees F. for two weeks in the spring. For the next four to six weeks the majority of the crabgrass seed will germinate. If the herbicide is there to disrupt growth, it will prevent the establishment of most of the crabgrass seedlings.

The peak germination period for goosegrass is generally three to four weeks later than crabgrass. It also extends for four or more weeks. This often necessitates a second application of herbicide to lengthen the life of the chemical barrier in the soil.

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## Drought and Stress

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Annual bluegrass produces seedheads during the summer. This seed begins to germinate primarily from late summer into the fall. If you treat the soil with preemergence herbicide in late summer you can reduce the spread of this weed, which is tough to control with postemergence herbicides.



Drop spreaders are preferred over cyclone-type spreaders for granular applications on fine turf.

To maintain effectiveness throughout peak weed-germination periods, manufacturers have placed emphasis on lengthening the residual of their products. They discovered that these products were also controlling other grassy weeds such as fox-tail and barnyardgrass, in addition to annual broadleaf weeds such as prostrate and spotted spurge, oxalis, and knotweed. Fall applications were controlling henbit, chickweed and dandelion.

By using preemergence herbicides, turf managers were making new headway with their postemergence weed control programs. Products such as benefin (Balan), bensulide (Betasan), DCPA (Dacthal), oryzalin (Surflan), oxadiazon (Ronstar), pendimethalin (Lesco Pre-M and Scotts Weedgrass Control) and siduron (Tupersan) were found on more and more golf courses, stadiums, universities, parks and resorts.

Most recently, herbicide manufacturers have found that they can lengthen residual activity and increase the number of weeds they control by combining different preemergence herbicides. This allows the rates of the individual components to be reduced without sacrificing the level of control. Examples are Elanco Team and XL, Regal's Regalstar, and Scotts Goosegrass/Crabgrass Control.

If you are late applying preemergence herbicides, some relief is available. A few of the herbicides have a postemergent effect on crabgrass in the one- or two-leaf stage. A postemergent herbicide called fenoxaprop (Acclaim) provides selective control of crabgrass in established turf. However, it has no residual activity, so many turf managers are applying it in combination with preemergence herbicides.

One large area of concern to superintendents and sports turf managers is the effect

of aerification on the herbicide barrier. The latest feedback from university turf specialists is that the degree of control lost by aerification does not justify withholding this valuable technique while preemergence herbicides are in place. On the other hand, severe verticutting is not advised.

The most obvious concern about preemergence herbicides is their effect on reseeding and overseeding. Only siduron will control some annual weeds without affecting the germination of desirable grasses. But siduron's activity is one of the shortest, and it can harm bermudagrass. Siduron may be used when reseeding cool-season turfgrasses.

The other preemergence herbicides will prevent germination of grass seed. Activated charcoal applied at a rate of 250 to 300 lbs. per acre will tie up some preemergence herbicides in case seeding is necessary during the residual period. Since the herbicides stay in the top 1/2 inch of soil and do not leach down further into the root-zone, removing treated turf with a sod cutter before resodding or seeding should also remove the herbicide.

New research has raised the question of whether preemergence herbicides signifi-

rect these other stresses through aerification, pest control, proper irrigation, mowing higher, and adjusting soil pH and nutrient levels before applying the herbicides.

The researchers found that oxadiazon has the least impact on rooting since plants absorb this material primarily through stems and foliage instead of roots. However, a group of preemergence herbicides known as dinitroanilines (DNAs), function through root uptake, and therefore have the greatest potential for root pruning. For this reason, manufacturers of these chemicals do not recommend their use on new sod or spring treatment on tall fescue seeded in the fall. DNA compounds include benefin, oryzalin, pendimethalin and trifluralin. These products are effective when used according to label instructions and are less expensive.

Extension turf specialists agree that a severe infestation of annual grasses will hamper the establishment of sod or new turf more than preemergence herbicides will. In areas with severe annual grassy weeds, one option is to fumigate the seedbed before installing sod or sowing seed, and to insist on quality weed-free sod and seed. Once the turf has established a good root structure, preemergence herbi-



Boom sprayers and spray pattern indicators keep overlap to a minimum.

cantly hamper the knitting of new sod and the root development of young turf. Turf specialists at Texas A&M University in College Station and Virginia Polytechnic Institute and State University in Blacksburg caution that some preemergence herbicides add to other stresses placed upon young turf or sod to inhibit root growth.

This effect may have been amplified by drought during the past two years in golf and sports turf. Other factors known to contribute to root pruning are nematodes, compaction, acidic soils, overfertilization, excessively low mowing, diseases, and potassium deficiency. If annual weeds are a problem in your area, it's important to cor-

rect these other stresses through aerification, pest control, proper irrigation, mowing higher, and adjusting soil pH and nutrient levels before applying the herbicides.

Dr. James Beard, professor of turfgrass science at Texas A&M, reminds turf managers that even though turfgrasses are perennials, their root systems tend to be annual in nature, especially for warm-season turfgrasses. Carbohydrates stored in the roots during late summer and fall are depleted over the winter, causing dieback of roots. In the spring, roots must regenerate before they can adequately support new growth of foliage and stems.

Placing additional stress on turfgrasses in late winter and early spring can slow transition and possibly thin turf over a period of

time. This is one reason why turf managers need to be careful with early spring applications of preemergence herbicides combined with fertilizers, cautions Dr. B. J. Johnson, weed control specialist with the University of Georgia in Athens. If these products are timed to prevent germination of crabgrass, the nitrogen stimulation can disrupt the transition of bermudagrass since it is too early.

Spring transition of warm-season turfgrasses is complicated further when they are overseeded with cool-season turfgrasses. The overseeded grass tends to shade the dormant warm-season turf in the spring and to delay its transition. Light verticutting to expose the dormant turf to sun and heat also opens up the turf for germination of annual weeds.

This will not stop the turf industry from overseeding. The decision to overseed is made for a reason: to provide an actively growing surface when the primary turfgrass is dormant. With this decision comes the responsibility to take extra steps in the spring to help the bermuda recover.

The same is true for preemergence weed control. It serves a definite purpose. If that purpose is valuable to the facility, then the turf manager must take the extra steps necessary to help the turf recover from any stress-related side effects. Once the threat of annual weeds subsides, then measures must be taken to bring turf back to full cover and quality.

The tremendous use of golf and sports turf today predisposes it to weed encroachment. The demand for recreational turf outpaces the natural ability of turf to recover and maintain density. At the same time, standards applied to turf are tougher to meet.

The only option to restricting use or lowering standards is to expand our knowledge of all available cultural practices so they can be applied for the greatest benefit of the turf. Preemergence herbicides by themselves cannot be expected to solve annual weed problems. Their use must be coordinated with all other cultural practices.

Sports turf is not as permanent as standard lawn turf. It needs to be replenished and renovated frequently. Sprigging, reseeding, and sodding come with the territory. Golf and sports turf also requires much greater attention when it comes to nutrition, irrigation, drainage and compaction. Managing sports turf is a constant battle of balancing stresses to maintain cover and quality.

Undoubtedly, there are some complicated decisions to be made based upon our growing knowledge of turf, chemicals and cultural practices. You now have important tools at your disposal. When used properly, they provide levels of turf cover and quality not possible a decade ago. But each of these tools has its own set of restrictions. Turf managers must learn what these restrictions are to use the right tools effectively. That's what professionalism is all about. ☉

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