

APPLICATOR'S LOG

Pre-Emergent Herbicides

By Mary Owen

Athletic field managers are challenged to provide dense, safe playing surfaces. A dense turf results from planting the appropriate grass species, proper fertilization, adequate irrigation, proper pH and proper, timely cultural practices. The identification and management of pest problems should be an integral part of a plan.

Even when you practice all basic techniques, the density of a turf can be compromised by the amount of traffic the field receives. As traffic increases and "rest time" for the field decreases, turfgrass plants may not have an opportunity to replenish and repair themselves. With little or no time for rejuvenation, an overused turf will thin. More light will reach the soil surface. The soil becomes com-

pacted more easily. The turfgrasses' competitive edge is diminished. Ultimately weeds will encroach.

Doors for Weeds

The first line of defense against weed infestation is healthy, vigorous turf. When weeds become a problem, you should begin developing a strategy to manage them by identifying the cause of the infestation. The following situations will open the door for germination and growth of weedy plants in a turf:

- low mowing heights;
- poorly timed aeration and other cultivation practices;
- heavy and frequent traffic;
- intense and concentrated wear;
- too high or too low fertility regimes;
- too high or too low irrigation levels;
- soil compaction.

A defensive weed management strategy should address any problems contributing to the weed infestation.

Success with Pre-Emergents

One tool in a defensive weed management plan is the pre-emergent herbicide. Pre-emergent herbicides are primarily for annual grasses such as crabgrass, goosegrass and annual bluegrass as well as some annual broadleaved weeds such as chickweed and henbit. Pre-emergent herbicides work by interfering with the process of germination and the subsequent progress of seedling development.

The success of a pre-emergent herbicide depends on several factors:

- maintenance of a vigorous and dense turf;
- accurate identification of the weed present or the potential for specific weed invasion;

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- knowledge of the life cycle of the weed (Is it an annual grass? Summer or winter annual broadleaf? Perennial grass or broadleaf?);
- matching the herbicide to the weed to be managed as well as the site and turfgrass conditions;
- proper timing and rate of herbicide application;
- adherence to precautions on herbicide labels;
- proper application techniques and equipment;
- scheduling of practices that cause soil disturbance (soil cultivation, coring, spiking and the like) before pre-emergent herbicide application.

The specific weeds controlled and the degree of control depends upon the herbicide. The herbicide label is the source of specific instructions for the weeds controlled, sensitivity of turfgrass species, rate and timing information, and safety precautions.

Timing

To be effective, pre-emergent herbicides must be present in the soil before weeds germinate. Germination occurs well before any seedling weeds are evident. Crabgrass germinates when soil temperatures warm to 50-55 degrees F for a week or longer, or 55-60 degrees F for three to five days. Monitoring soil temperatures with a soil thermometer should be part of an overall management plan.

The timing of pre-emergent herbicide applications will vary by location and is influenced by latitude, altitude, soil type and climate. In southern regions and in the transition zone, soils may reach these temperatures in early March while in more northern regions this may not happen until mid-May or even later. Applications should be made so the herbicide is present before germination, but not so early as to be degraded to the point of reduced effectiveness.

Some pre-emergent herbicides may be applied in late summer or early fall in cool-season grass-growing areas for management of annual bluegrass and some winter annual broadleaved weeds such as chickweed.

Recent research at several universities, including the University of Massachusetts, shows that late autumn applications of specific pre-emergent herbicides may be effective the following spring in controlling germination and seedling development of some annual grasses such as crabgrass.

Reducing Rates

Research at the University of Georgia on annual-grass control in bermudagrass suggests you may be able to manage annual grasses effectively with reduced rates of herbicides applied in multi-year (three-year-cycle) treatments. Results and efficacy vary by herbicide. The studies show, if you include annual applications of pre-emergent herbicides in your management plan, you may be able to reduce the rate in the second and third year of treatment while maintaining acceptable turf quality.

In cases where control has been less than adequate or on fields with particularly intense traffic, you may have to follow a pre-emergent later in the season with a post-emergent herbicide aimed at emerged seedlings or established weed plants. You should use this sequential-application technique when you've determined that the level of weed infestation is unacceptable or when, according to the site records, a combination of pre- and post-emergent applications has proven to be the most effective.

More research at the University of Georgia has suggested that reduced rates of herbicides may be effective in controlling weeds when a pre-emergent herbicide is followed in a timely manner by a post-emergent application. Such strategies can result in acceptable weed control, reduced levels of pesticides, and reduced expenditures.

Reseeding/Overseeding

Because pre-emergent herbicides work by inhibiting germination and subsequent seedling development, you must factor into the overall management plan the seeding and establishment of desirable grasses. The interval between pre-emergent herbicide application and reseeding or overseeding varies by material. Sprigging may also need to be delayed following pre-emergent herbicide applications. The following list gives a *general range* of times for reseeding or overseeding intervals:

- benefin — 6-16 weeks,
- benefin + trifluralin — 8-16 weeks,
- bensulide — 4 months,
- bensulide + oxadiazon — 5 months,
- DCPA — 60 days,
- ethofumesate — varies by grass,
- metolachlor — 6 months,
- napropamide — 6 months,
- oxadiazon — 4 months,
- prodiamine — 3-6 months,
- pendimethalin — 4-6 months,

- siduron — none.

For specifics about individual materials, application rates, timing and other factors influencing exact intervals, refer to the label of the herbicide. Notice that siduron is the only pre-emergent herbicide labelled for turf that essentially requires no interval between herbicide application and reseeding or overseeding.

If you seed or sprig after the waiting interval following a pre-emergent herbicide application, do so with extra care in all aspects of site preparation. Place seed and/or vegetative parts in good contact with the soil. In some cases it is recommended that the seeding rate be increased. Proper fertility and adequate irrigation are most critical for establishment success.

Turfgrasses vary in their tolerance to specific pre-emergent herbicides, according to grass genera, species and in some cases even by cultivar. Refer to the label for turfgrass tolerance range, mowing height range and degree of turfgrass establishment necessary before application. Any turf under drought stress, heat or cold stress, fertility level, or pest damage may be more susceptible to injury by pre-emergent herbicides. Again, refer to the herbicide label for precautions.

Keep records of cultural practices including applications of pesticides, fertilizers and other materials. Record observations on effectiveness of particular applications of pre-emergent herbicides. Analyzing this information, you can develop or revise a management strategy that focuses on the most effective use of materials and budget dollars and that results in a high quality and safe natural grass playing surface.

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