How to get the most out of your preemergence herbicides

BY **THOMAS L. WATSCHKE**

Successful weed control using preemergence herbicides is somewhat analogous to playing cards against a "stacked deck." What that means is to attain complete control of the target weed is essentially impossible given all of the factors that are in play that can impede your success.

When you break it down, preemergence herbicides need to have a lot of things go right in order for them to deliver high levels of weed control. The most common cause of failure is poor timing of application. Regardless of what the target weed might be, preemergence herbicides must be on the ground and "activated" by water (irrigation or rainfall) before the beginning of the germination process. This "activation" refers to the process of having enough water available to release the needed concentration of the applied herbicide chemistry into soil solution.

In addition to positioning the proper amount of herbicide into soil solution (referred to as the threshold level requirement), the activation process also creates an unbroken chemical barrier in the upper soil profile where the bulk of the seed of the target weed is located. The label rate for the preemergence herbicide is not the amount required for initial control; rather it is the rate that has been determined to be necessary to provide control for the duration of the germination period of the targeted weed species.

For example, most preemergence herbicides are applied at a rate that is approximately 30 to 40% more than is needed for control. However, this rate is necessary since the actual soil concentration of the herbicide can begin to decline within the first hour of application. This decline in concentration is in response to the environmental pressures that act upon the herbicide chemistry. These pressures include photo-degradation (typically UV wavelengths), volatilization, dissolution, microbial degradation, chemical barrier breakage (due to earthworms or mechanical intervention), and the possibility of chemical complexion. In any event, what it means is that a lot of things have to go right in order to get control that remains high throughout the germination period.

Best timing

Therefore, since getting the product on the ground with proper timing is the most crucial step for success, all possible information should be accessed to determine the best timing. For crabgrass control, forsythia bushes are often used as a good indicator for application timing. The important point about forsythia is that the best timing is when the first flower petals fall, not full bloom. Petal fall actually coincides well with soil temperature.

Monitoring soil temperature in the upper half inch of the soil is therefore an excellent way to determine proper timing of application.

Once the soil temperature is consistently above 50 F (when measured in the morning before direct sunlight hits the measurement site), it is time to get the preemergence herbicide on the ground. If preemergence applications for crabgrass control are made too early (bloom rather than petal fall), there is a risk that the threshold level previously referred to, will not be sustained throughout the germination period due to the action of the degradation factors previously discussed.

If the threshold level is not maintained, then the weed seed can germinate and the seedling will develop and compete with the desired turfgrasses. Such a phenomenon is commonly referred to as "break through." If break through actually happens, you will know it because seedling crabgrass will be visible in the turf stand in August. Observing mature, large crabgrass plants in the turf stand in August however, is NOT breakthrough, but is an indication that "escapes" have occurred which are most likely due to natural or mechanical breakage of the chemical barrier, or initial problems with proper timing of application.

In recent years, research at Penn State and a number of other universities has shown that using a split application strategy for preemergence herbicides can be advantageous. It appears that such a tactic is successful because it addresses the concept of providing a consistent threshold level of preemergence herbicide for the duration of the weed's germination cycle. However, there does not appear to be a definitive recommendation regarding the rates to use when splitting the application.

In many years, the one application label rate can be split into two equal parts with half the rate applied with the proper timing discussed earlier, followed by the second half applied approximately four weeks later. In areas where crabgrass pressure can be extreme, better success has been found by using the full-recommended rate for the initial application, followed by a half rate approximately four weeks later.

Often times on athletic fields, the target annual grassy weed is goosegrass rather than crabgrass. Sometimes goosegrass ends up being the target as a result of its tolerance for compacted soil conditions, but goosegrass also has an indeterminate germination pattern that creates a unique problem for preemergence herbicides. While crabgrass generally stops germinating at some point during the summer, which takes the onus for control off the back of the preemergence herbicide, goosegrass continues to germinate until soil temperatures become low enough to preclude germination (usually in early fall). Consequently, it very difficult to sustain a threshold level

of preemergence herbicide throughout most of the growing season.

Tactics v. goosegrass

However, there are some tactics that can be used. First, since goosegrass does not germinate as early as crabgrass (generally three weeks later), the initial application of preemergence herbicide can be delayed, which will then allow the threshold level needed for control the chance to persist longer into the growing season. Secondly, a split application at a rate at least half the initial application (usually full label) must be made approximately four weeks later.

Even employing these preemergence tactics is often not enough to provide satisfactory goosegrass control. As a result, follow-up control for preemergence escapes usually requires the use of a post-emergence annual grassy weed control herbicide such as Acclaim Extra. Often this post-emergence control can be achieved using spot treatment applications for those locations where goosegrass germination is persistent. The mechanical abuse that often occurs on athletic fields imparts significant pressure on preemergence herbicides to do their job (due to the physical breakage of the chemical barrier that is needed for preemergence control).

There can be no doubt that controlling annual grassy weeds with preemergence herbicides is a formidable challenge. There are several highly efficacious products available for your use, but they are all subjected to the same external forces previously discussed that get in the way of their controlling abilities. Mother Nature does not generally favor the success of preemergence herbicides, therefore it is up to the turfgrass manager to do everything possible to ensure their success. Such things as herbicide choice, proper timing of application, appropriate split application rates and timings, sufficient water to provide herbicide activation, adequate fertilization to encourage turf competition, and the management of wear and mechanical stresses all will enhance the level of control that preemergence herbicides are capable of providing. ST

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Ohio St. studies coated sand

At the Ohio Turfgrass Conference last December, results were released of an Ohio State turf study on Nitamin coated sand in core aerification and topdressing applications when compared to traditional sand. Results of the research, conducted by the Ohio Turfgrass Foundation facility at OSU, demonstrated quicker turf recovery in core aerification applications and improved turf color and density in topdressing applications with the coated sand. Georgia Pacific and its local distributor released study results.

Dr. Karl Danneberger, professor at the Ohio State University's turfgrass science department, said, "We wanted to determine if backfilling coring holes with the coated sand versus traditional sand would enhance core hole recovery. Indeed, our experiments showed that after 11 days, the Nitamin-treated areas showed approximately two holes visible per plot as compared to approximately 10 holes per plot on the traditional sand-treated areas."

The core aerification study was initiated on a 3-year-old L93 bentgrass fairway established on native soil and mowed at 0.5 inches. On August 10, 2004, plant growth regulator treatments were applied to the turf at different rates. Three days later, the OSU research team set up 3 x 6 feet in area plots in a randomized block design and aerified them with 5/8-inch tines. After aerification, the team removed cores and allowed the plot area to settle and dry for three days. Then the core holes were filled with either the coated sand or traditional sand.

To evaluate the effectiveness in topdressing applications, the OSU team compared the two sands at different rates and judged the results based on color and density. Dr. Danneberger said, "We discovered that applying the coated sand at a rate of 1.5 pounds per 30 square feet provided better color and density than traditional sand applied at the same rate. The lower rate of the coated sand applied at 0.75 pounds per 30 square feet also performed comparatively well."


Left: Coated Sand vs. Right: Straight Sand, 2 weeks post application

The topdressing study was conducted on creeping bentgrass turf established on a USGA green constructed rootzone maintained at 0.125 inches. The plots measured 6 x 5 feet and the treatments were replicated three times in a completely randomized design. ST