

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 complexation. 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 pre-emergence 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 thresh-



old 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 pre-emergence 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 pre-emergence 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 chemi-



cal 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**

Thomas L. Watschke is Professor of Turfgrass Science, The Pennsylvania State University.

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 aeration 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 aeration 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 aeration 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."

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**

Dirt on dirt

BY ERIC SCHRODER

Player safety is the number one goal when choosing and using your infield mix, whether it's providing a good base in Cincinnati for Sean Casey's knees, true hops for a prized Class A shortstop in northeast Ohio, or your field.

Greg Elliott of the Lake County Captains and Doug Gallant of the Cincinnati Reds discussed soil compositions and infield skin maintenance at last December's Ohio Turfgrass Conference in Columbus. Here's a recap of their presentations:



"You must know what you have," Elliott said, "so get a professional soil test. Once you know what you have you can determine what needs done with what materials." His Eastlake Ballpark, 16 miles northeast of Cleveland, and winner of consecutive Sally League Field of the Year awards, features a sandy clay/loam mixture: 58% sand, 22% silt, 20% clay.

Gallant reported that Great American Ball Park infield soil mixture is 71% sand, 13% silt, 16% clay, with

10% of the volume including Turface soil conditioner that's blended at the plant. Don't till your soil amendment too deep, like 8 or 10 inches, because it won't do you any good," said Gallant.

"Soil conditioners can help level your surface and better manage moisture, which limits rainouts and delays," Elliott said. "It's extremely important to use one of these products. This year we are going with Quantum Turf, a new red-clay product from Moltan."

Calcined clay products are inorganic amendments formed by expanding clay at high temperatures (calcining). MuleMix, Turface, Klawog, and Pro's Choice among others all manufacture calcined clay products. Diamond Pro makes a vitrified clay product, which reduces absorption rates and allows water to pass through to the base soil.

"We use 10-15 bags of conditioner every four days. We like to keep 1 to 2 tons in the top 3 inches. Pro League Red (Turf) has smaller particles that Gallant said is better for passing water. The vitrified Diamond Pro product "acts as a barrier between infield clay and the players, holds moisture, and helps drainage."

"Without these products the surface would be more sticky, and less playable," Gallant said. He added that to topdress in Cincinnati he uses a 50/50 mix of Turface and Diamond Pro products (the products are not mixed nor spread together however).



Maintenance

Gallant said his routine infield skin maintenance includes a first-thing-in-the-morning "tickle" which he describes as "light scratching." Then he comes in with a groomer, followed by a drag mat (from Beacon Athletic, about (continued on page 18)



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(continued from page 11) \$100). "A broom can work better than the cocoa mats especially during dry conditions," Gallant said.

"We also like the stiff, waffle mats, which have a beam to fill empty spots and level high spots," he said. "When you're dragging, go slow. Pick up the drag at different points on the infield to disperse loose material. Then rake parallel with your grass edges. I also recommend using bases with plugs that you can drag right over.

"Keep your top 1/4 inch loose, especially if you can't water. Your players will be able to tell the difference," Gallant said. "One other thing: if you edge and keep your grass/dirt interfaces clean, it can go a long way toward making your field look better."

"Controlling your moisture levels is the most important thing," Elliott added. "Each manager has to learn what works for his or her field. You can't control soil composition always, but you do control time for repairs and maintenance."

For managing lips, Gallant said use a garden hose to blow product back into the dirt, then rake the grass up. Ask coaches and players to rake out their lips a few times a week.

Water management

"We hand water six to ten times a day depending on conditions," said Elliott. "Water management is the key to success while dealing with any soil. Over watering can result in muddy, wet conditions, potentially causing an injury. Under-watering can create cement like conditions resulting in injury.

We use hoses to hand water the skin while the team is in town and skin heads while they are gone. The skin heads allow us the freedom to keep the moisture consistent so we are not forced to over water before the team returns."

"Water is everything to dirt; your soil needs it as much as your turf," Gallant said. "At Great American, during a game day, we're puddling the infield every hour until about 2 PM, when we start backing off watering."

Gallant bought skin tarps for his infield dirt use only, which he said were especially useful during Reds' road trips. "We puddle the infield, put the tarp on, and then we don't have to water it when the team's out of town," he said. Gallant says it cost \$4,000 for his customized tarps, but he thinks most managers would be able to use an old tarp and cut to fit their fields.

"If the infield dirt sticks to my foot, it's too wet to work," Gallant said. Once it's ready, gently work your dirt in one direction to open some air channels, Gallant recommended. Use drying agents for puddles (put the agent right in the puddle and then scrap it out, it's reusable) because it changes your soil profile, he said.

To prevent having to do more work than necessary, Gallant recommended daily maintenance, minimizing wind and water erosion, monitoring foot and vehicle traffic, and keep all mechanical dragging at least 12 to 18 inches from grass edges. **ST**

Eric Schroder is editor of SPORTSTURF.

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