Timing is everything for an effective weed management program

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In turfgrass management we are fortunate to have many effective tools (herbicides) for the control of weeds. In general, the herbicides are very effective and have broad windows of application. However, like all other management inputs, to obtain the maximum benefit from a minimum of effort and expenditures, careful attention to product choice, dosage, application uniformity and the timing of these applications are essential. Optimizing when you implement your weed management program will improve scouting results and efficiency, weed control, and turfgrass safety.

Weed scouting

Making informed management decisions requires information. In this case, in order to control weeds you must know what species are present, their relative abundance (has the infestation exceeded your "threshold" for acceptable turf quality?), and where the infestations occur.

Weed scouting need not be a labor intensive or time consuming process. The first step is to divide the area into management units. In lawn care this may be as simple as front, back and side yards. In golf courses obvious management units are tees, fairways, roughs, and greens for each hole. The second step is to determine the intensity of management and what weed or amount of weed cover will be acceptable in that particular site. The third step is to scout the property.

In Cornell University's integrated pest management (IPM) program, we have found that a simple inventory of the species, followed by highlighting the more important or prevalent species, combined with noting when patterns of weed cover are present, i.e. are weeds throughout, spotty, or in a patch somewhere, will provide adequate information for decision-making.

Scouting is best done when all weeds are present and when turf quality concerns can be addressed to improve turf density before weeds germinate. The late summer or early fall has proven to be the best time to scout. Then, summer annual weeds, both monocot and dicot, are mature, perennial weeds are present, and winter annuals are germinating. Also, cool-season turfgrasses are actively growing and can fill gaps left by dying weeds. Also, turf can be successfully overseeded at this time of the year. A follow-up scouting in late spring can identify weeds that escaped fall or spring treatments and seedling summer annual weeds can be treated when they are small and easier to control.

Weed control

Many herbicides are available for controlling turfgrass weeds. Getting the most out of these products requires that they be applied when they can do the most good. Optimum timing of herbicide applications are influenced by many interrelated factors including:

Photo provided by Dr. Joseph C. Neal, Cornell University
large crabgrass

- Weed species and physiology — particularly time of emergence, development and seasonal variation in sugar translocation within the plant;
- Climatic factors — temperature and moisture primarily;
- Turfgrass species and management — warm season versus cool-season species, mowing height, irrigation, fertility, cultivation events, etc.; and
- Herbicide chemical properties and mode of action — each family of herbicides kills plants in different ways and they decompose in the soil at different rates.

To understand how these factors influence herbicides efficacy, different weed control strategies and categories of herbicides must be discussed separately.

Annual grass control

Crabgrass and goosegrass are the most common summer annual grass weeds in turf and are typically controlled with preemergent herbicides. Ideally, preemergent herbicides should be applied about two weeks prior to weed germination. Crabgrass germinates when the soil temperature is between 55 and 60 degrees Fahrenheit. Goosegrass has an absolute requirement for 65 degrees Fahrenheit to germinate, so it emerges later than crabgrass.

Unfortunately, predicting when soil temperatures will reach these critical levels with adequate soil moisture present is an inexact science. Instead we use indicator species to tell when weather is conducive to germination. In warm season turf, preemergent herbicides should be applied by the time dogwoods are in full bloom. In cool-season turf the soil warms more slowly and application may be delayed until shortly after the dogwood blooms fade. In the northeastern U.S. we use forsythia in full bloom as an indicator for the application of preemergent herbicides.

Recent research has shown that with the newer, longer-residual preemergent herbicides there is greater flexibility in the application time. Dormant season (January and February) applications of pendimethalin, Barricade, Dimension, and Ronstar, have controlled crabgrass as well as mid-March treatments. Additionally, Dimension has the added flexibility of controlling crabgrass after it has emerged thereby extending the effective window for application by several weeks. However, once tillers form on crabgrass, Dimension alone does not provide adequate control.

Postemergent control of crabgrass may be accomplished with Acclaim or MSMA. Both products are best applied early in the season to young, about one-tiller, crabgrass. At this time, control is usually superior to later treatments. Lower rates may be used to obtain this control, and more favorable weather conditions will reduce the potential for turfgrass injury. It may also be desirable to tank-mix a low dose of a preemergent herbicide with the postemergent treatments to prevent subsequent crabgrass germination and emergence.

Postemergent control of goosegrass is more difficult. MSMA is ineffective and Acclaim is less active than on crabgrass. Acclaim applications should be made before goosegrass has reached the three-tiller stage, with the earlier the better. Applications to larger mature goosegrass plants will be ineffective.

Nutsedge control

Nutsedge is often mistaken for a grass. With a few notable exceptions, most grass control herbicides do not control nutsedge. In certain warm-season turfgrasses metolachlor (Pennant) may be used preemergently to suppress yellow nutsedge; however, nutsedge is usually controlled postemergently.

Basagran or MSMA are applied to young actively growing nutsedge plants with the optimum timing for these treatments based on uniformity of the emergence and the physiology of nutsedge tuber formation. Tubers sprout over an extended period of time, from late spring to mid summer. Treatments should be delayed until most plants have emerged. However, tubers are formed when days begin to shorten: after June 21st. Delaying treatments much past July 1st will allow the plants to produce tubers which will infest the turf next year. Also, delaying treatments to mid-summer increases the likelihood

Photo provided by Dr. Joseph C. Neal, Cornell University
yellow nutsedge

and severity of turfgrass injury from the available herbicides. Therefore, the first Basagran or MSMA treatment should be made in mid to late June and followed with a second application in about 14 days.

Broadleaf weed control

Optimum timing for postemergent broadleaf weed control is when weeds are actively growing, there is adequate soil moisture, daytime temperatures are moderate (between 50 and 80 degrees Fahrenheit), and when turfgrass recuperative potential is highest. Additionally, the inherent susceptibility of the weeds must be considered. The weather conditions which favor weed growth and maximum control are usually encountered in the fall or spring. Choosing between these times depends upon the other two factors. Cool-season turfgrasses have a higher recuperative potential in the fall and can fill gaps left by dead annual broadleaf weeds more rapidly and therefore should be treated in the fall. Conversely, annual broadleaf weeds in warm season turf should be treated in the spring, several weeks after greenup, for the same reasons.

The fall is also a preferred time to treat many perennial broadleaf weeds because many are inherently more susceptible to herbicides in the fall; for example, mugwort (or chrysanthemum weed), healall and ground ivy are better controlled in the fall than in the spring. Exceptions to this rule are poison ivy which is best controlled in early summer, and seedling summer annual broadleaves (such as spurge and knotweed) which are easier to control in the late spring when they are young.

Annual broadleaf weeds may also be controlled preemergently but herbicide choice and application timing must be tailored to the species.

Winter annual broadleaves such as chickweed and henbit, germinate in late summer or fall when the soil temperatures begin to cool. Therefore, preemergent herbicide applications for winter annual weeds should be made in late summer.

Summer annual weeds such as knotweed, spurge and oxalis can germinate over an extended period of time in the spring and summer. Knotweed (Polygonum aviculare) germinates very early in the spring, often a month before crabgrass emerges. Consequently, many preemergent treatments applied to control crabgrass or goosegrass miss knotweed. To avoid this mistake, map the affected areas in late summer and consider late fall applications of Gallery or pendimethalin. Oxalis germinates over an extended period of time from early spring to late summer, but not as early as knotweed. Spurge emerges later in the season, late spring through mid-summer. Therefore, early spring crabgrass control treatments may miss these weeds. When spurge or oxalis are the problem, follow-up early summer preemergent treatments may be necessary to supplement spring crabgrass treatments.

Turfgrass safety

To reduce the potential for injury to established turf, avoid herbicide applications when turfgrasses are under stress (heat, drought, disease, etc.).

When turfgrass safety decisions are being made, two aspects of seedling turfgrass safety must be considered: the interval from herbicide application to seeding and the tolerance of seedling turfgrasses to herbicides.

Photo provided by Dr. Joseph C. Neal, Cornell University
Common dandelion

Most preemergent herbicides have treatment-to-seeding intervals of three to four months. However, there are a few exceptions to this standard: Tupersan, Dacthal, Balan and Gallery all have shorter intervals. Similarly, most preemergent herbicides should not be applied to newly seeded turf until that turf is established. Again a few exceptions exist to this rule. Tupersan may be used at the time of seeding in cool-season turf. Dacthal may be applied after the second mowing. Finally, Gallery may be applied after the seedling turf has tillered.

Postemergent herbicides may also injure seedling turf. Phenoxy herbicides, Confront and Dicamba, should not be applied until after the third or fourth mowing and turfgrass seed should not be introduced into treated areas for two to four weeks after an application. Acclaim and MSMA should be applied only to established turf; with a few exceptions which are discussed in detail on the herbicide labels.

As with any pesticide application, the label is the law. For any questions concerning a herbicide's specific use, turfgrass managers should consult the label for instructions for each turf species. ■