WINTER WEED CONTROL

Northern style

Turfgrass that is established and maintained properly, is healthy turfgrass and doesn't provide "room" for weeds to compete and spread.

By FRANK S. ROSSI, Ph.D.

Ground ivy control research finds timing is more important factor.

The coexistence of turfgrass and weeds is the basis of the age-old tip for controlling weeds in turf: maintain a healthy, dense stand of turf that prohibits weeds from establishing.

This is based on two important ecological concepts space and competition. Therefore, the foundation of a turfgrass weed management program must be to implement management programs that favor the competitive advantage of turf, while minimizing bare areas where weeds can invade.

Understanding the ecological concepts then aids the turfgrass manager when addressing the aesthetic and functional expectations. For example, while we understand the environmental benefits of a well managed lawn turf, essentially lawn management is focused on a high aesthetic demand; the lawn has to look good! In contrast, sports turf or golf turf is focused equally on aesthetic and functional quality, in that, not only does it have to look good, put it must sustain regular surface disruption that results in gaps where weeds can invade.

It follows then that a lawn turf should be easier to keep weed free because less gaps should occur, yet, it seems almost the opposite. Lawn managers and homeowners spend much more time managing weeds than a sports or golf turf manager. Why? Most likely it is related to the regular attention paid by sports and golf turf managers to maintain a dense vigorous stand under regular surface disruption. In contrast, many lawn managers visit the lawn intermittently, and often, do not have direct control over the key cultural practices like mowing and watering that sustain a dense healthy turf.

Where Does Weed Management Start?

These ecological principles will always work in your favor as a turf manager if the proper decisions are made during turfgrass establishment regarding site preparation, soil modification, turf selection, and establishment procedure. Visualizing an integrated weed management program as a triangle (see next page), it becomes clear that proper site assessment, soil modification, and species selection form a solid foundation for the life of the stand. Whereas, mistakes at establishment, limits options to pesticide use and consequently an unstable foundation, evident in the inverted triangle.

Continuing to visualize an integrated weed management approach, the primary cultural practices of mowing, watering and fertilizing should focus on maximizing root growth. The ability to establish and sustain a healthy root system will always make the turf more forgiving of environmental, biological and traffic stress. For example, maintaining a higher than usual height of cut (3" or greater) will promote deep rooting and shade the soil surface. Irrigating judiciously, so as to avoid a moist soil surface

that will encourage weed seed germination. Finally, the most efficient fertilization programs for cool season turf is focused in the fall. This approach is based on maximizing energy production under cooler temperatures without the surge in top growth associated with spring conditions. Still, if turf density is low in spring, a fertilization will be needed to increase density (to fill the space with turf!).

Characterize Your Weed Management.

In keeping with traditional Integrated Pest Management (IPM) programs, it is vital to map and monitor weed populations (as well as turf species). Maintaining records of populations over time provides unique insight into the response of the turf and the weeds to different environmental conditions and management programs. For example, you may have decided to change a fertilizer program to a more water soluble source and notice from your mapping that patches of annual bluegrass have become established. Following a dry year, you may notice increase in clover populations. Over time this information can assist with weed management programs.

Still, the cornerstone of an IPM approach is the establishment of thresholds. Weed thresholds are slightly different than for other pests, in that we must have an aesthetic and a functional threshold. An aesthetic threshold for weeds could be defined as the point at which the number of weeds in a turf reduces the visual quality below an acceptable level. Subsequently, the functional weed threshold is the point at which the number of weeds present reduces the functional quality (soil stabilization, traction, elasticity, etc.) below an acceptable level.

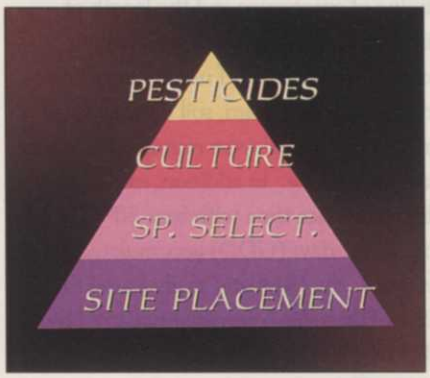
As you might imagine establishing thresholds can be subjective. Do you establish visual weed thresholds with "curb appeal"? That is do you evaluate the visual quality from a distance, or by standing over the turf? What season do you determine threshold? Is there any tolerance for weed invasion or must the turf be 100% weed free? The same questions arise for functional quality. How many dandelions or prostrate knotweed plants can you have in a soccer field before the players game is affected? How many patches of clover are tolerated in a golf course rough area before you hear complaints of playability? How many crabgrass or broadleaf plantain plants can a lawn tolerate before soil movement is increased?

Viewing weed management from this perspective will challenge the turf manager to communicate with their clientele to assist in establishing thresholds. It has been my experience that this dialogue with our clientele (homeowners, athletes, coaches, and golfers) is rarely conducted. We assume it must be 100% weed free and do not share the responsibility of establishing thresholds with the persons who receive our service. It follows then that when questions regarding pesticide use arise, we are unprepared to explain how we conduct an IPM program for weeds. Furthermore, we must have a realistic basis for decision making prior to implementing a management program designed to reduce or eliminate weed populations. This will become more important as chemical pesticide use becomes more restrictive.

Timing is everything

The old adage that "timing is everything for a successful life" rings true when considering chemical weed control. First, we must decide whether we will chose a preventative approach with preemergence herbicides, or a curative approach with postemergence herbicides. Clearly the preventative approach requires less labor and knowledge, as monitoring and mapping efforts are not used reveal threshold populations. This approach is widely used, primarily as a result of the "zero threshold" that exists for weed populations. The curative approach might be more labor and

Think of weed management as a triangle. At its base it starts with proper site and species (or variety) selection. Then comes



necessary cultural practices like watering, fertilizing and mowing. Finally, if weeds remain a problem, we use herbicides as tools.

knowledge intensive, in that it will require timely monitoring (you'll have to know when weeds might emerge or flower) as well as knowledge of how to identify the major cool season weeds. Additionally, research has indicated that effective postemergence control relies on proper timing, often based on the growth stage of the weed.

Effective preemergence control, usually of summer annual grass weeds such as crabgrass and goosegrass, relies on understanding the seed germination and emergence time. In essence, this can be viewed as "seed bank management". Regarding germination, not all weed seeds in the soil will germinate every year. Plants have de-

veloped dormancy mechanisms for a percentage of their seeds that keep them viable for many years (waiting for the right time and space). For example, research indicates less than 50 percent of the crabgrass seed produced in the previous fall will germinate in the spring. However, turf areas with a history of crabgrass invasion will have a high percentage of seed viable from several years of production. The management question is then, how long do you have to use a preemergence herbicide before the seed bank is depleted? I am unaware of research that might address this question.

Emergence time has recently been investigated by researchers at the University of Maryland and currently here at Cornell. This research provides new insight into the timing of emergence and the length of time that **crabgrass** seeds germinate in a season. In a dense turf under a medium maintenance program, soil temperatures greater than 73^0 F were required for significant emergence. In addition, monitoring the emergence time with base 50^0 F growing degree days (GDD) accumulated from March 1, the Maryland study found that 25% of the total emergence occurred by 200 GDD, 75% by 600 and 100% by 1100. This suggests that under average turf density, germination and emergence can occur for 10 to 12 weeks depending on the season. This has enormous implications on timing of preemergence applications in the early spring. Simply, if applied to early, the effectiveness of the preemergence herbicide may dissipate and allow breakthrough.

Postemergence timing has received increased attention over the last decade as new materials have become available, hard to control weeds have emerged, weed tolerance levels have declined, and the use of preemergence herbicides come under question. First and foremost, the key to effective postemergence control is proper identification, followed by understanding weed biology so as to time applications for maximum effectiveness.

Interesting research on yellow nutsedge control has indicated that effective long term control requires a systemic herbicide to eliminate the surface vegetation (the leaves) and to be translocated to the forming nutlet (perennial storage organ), thus preventing it from emerging the following year. Consequently, the most effective application timing, based on the information above, is late June, early July when day length begins to shorten. This event apparently triggers the translocation of energy in the nutsedge plants from the leaves to the nutlets. Effective materials such as Basagran and Manage will provide long term control applied at this time.

Successful control of **perennial broadleaf weeds** is best accomplished in the late summer, early fall. Certain materials such as Confront, have been shown to provide activity on broadleaf weeds down to 37^0 F. Still, most of our clientele is not willing to wait until this time of year for control. Therefore, effective timing of spring applications is needed. Researchers at Purdue University have reported that spring control of **dandelion** is most effective when based on a simple growing degree day (GDD) model. They concluded that formulation of Weedone and time of application were critical for maximizing control. If using the ester formulation of Weedone, it is best applied around 100 to 150 base 500 F GDD, while the amine formulation should be applied much later at 250 to 300 GDD. This is useful not only for control, but also for minimizing potential vapor drift resulting from applying the ester formulation later in the spring when conditions could favor volatilization.

Historically hard to control weeds such as **ground ivy** (creeping charlie, gill-over-the-ground, etc) could also be more effectively controlled using some research on improved timing. A three year study at the University of Wisconsin-Madison indicated that any herbicide formulation that included 2,4-D as an active ingredient would control ground ivy if applied at full bloom in the spring or immediately following the first frost in the late summer early fall. The results were dramatic, however,

Researchers at Purdue University have reported that spring control of dandelion is most effective when based on degree days.

there does not appear to be an easy explanation. Unfortunately, wild violet, another hard to control weed, in the plots was not controlled using the same approach.

Developing an integrated approach

Turfgrass managers should regularly strive for more resource efficient management programs that incorporates a knowledge-based approach of biology and ecology to maximize turf health and maintain adequate density. This information is then utilized through effective monitoring and mapping of plant populations and taken together serve as the basis for weed control decisions. As the industry continues to improve our overall communication skills, we will have a more open dialogue for establishing thresholds and making more cooperative decisions regarding weed management that will include herbicide use and possibly biological/organic based approaches as well. **LM**

Frank Rossi is an assistant professor of turfgrass science and extension turfgrass specialist at Cornell University

WINTER WEED CONTROL

Southern style

Winter broadleaf weeds are an opportunity or a headache for the turfgrass manager. If control is late, customers should expect multiple applications and slow results.

By BERT McCARTY

Early spring is a great time to be in the southern United States. Everyone is stirring after a long chilly winter, and the blooming dogwoods, azaleas, redbuds, and others plants help renew the faith of warmer times ahead. However, for the professional turfgrass manager, late winter and early spring often rings in the new season with a deluge of irate customers calling about winter weeds.

This time is when winter annual weeds really begin to grow, eventually producing flowers. By their nature, winter weeds usually do not die until hot temperatures of early summer. Until then, these weeds are an eyesore for homeowners and because of their maturity, difficult to control for the professional turfgrass manager.

Usually, multiple applications are required to control these which really drive up labor costs. One also needs to be formulating and applying a strategy for preemergence crabgrass control at this time.

With numerous customers, the logistics of performing these duties really separate the turf pros from the Johnny-come-latelies.

A weed management program

Weed management is an integrated process where good cultural practices are employed to encourage desirable turfgrass ground cover as well as the intelligent selection and use of herbicides (Table 1).

The first step to successful weed management is proper identification. Due to mowing of flowers and seedheads, turfgrass managers are forced to identify weeds on the basis of the vegetative structures, such as ligules, leaves and stems. An excellent weed identification guide is Weeds of Southern Turfgrasses, a publication available through Clemson University for $8.00 per copy. Call 864-656-3261 for ordering information. This publication is also available through the Cooperative Extension Services in Georgia, Alabama, and Florida.

Winter weeds germinate in late summer through early fall when daytime temperatures consistently drop in the 70's. These grow throughout the winter months, and flower or produce seedheads during late winter and early spring. Winter weeds are sneaky in that they blend with the turf in the fall and early winter months and do not become noticeable until late winter when growth spurts, along with seedheads and flowers, produce a ragged appearing turf.

Scouting

Information on which weeds, where they occur, and relative level of occurrence are needed in making informed management decisions on if and which control option(s) to consider. Scouting simply means breaking the service area into logical sections or units and determining which weeds are present and at what level. Normally for lawns, these sections are broken into front, back and side yards. Due to visibility, front lawns generally require control implementation first followed by the sides, and finally, by the back yard section. Golf courses are sectioned into tees, fairways, greens, and roughs for each hole. Roughs receive least attention for weed control while greens and tees receive the most. Weed cover patterns can be as elaborate as estimating the percent weed cover for each unit or more realistically, involve a rating system of being widespread, spotty or in a single patch. Threshold levels needed before treatment justification is generally determined by the owner or manager of the turf site.

Henbit (*Lamium amplexicaule* L.) has greenish to purplish, tender, four-sided stems.

Optimum scouting timing for winter weed control is in early fall (September/October) with a follow-up in early spring (March/April). The fall scouting allows early detection and pressure level assessment of each. The early spring scouting indicates which weeds were not controlled and where they can be expected to occur the following winter season.

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TABLE 1. WINTER WEED MANAGEMENT SCHEDULE FOR WARM SEASON TURFGRASSES

LATE SUMMER

To build root carbohydrates, apply winterizing fertilizer which supplies adequate potassium and mow at the upper recommended mowing height. Apply preemergence herbicides for annual bluegrass if scouting the previous spring warrants it. Scout and map areas with crabgrass to pinpoint herbicide needs for the following spring.

EARLY/MID FALL

If needed, apply postemergence herbicides for annual bluegrass control.

MID FALL

If needed, apply postemergence herbicides for broadleaf weed control.

EARLY WINTER

Reapply postemergence herbicides for broadleaf weeds and annual bluegrass, if necessary.

WINTER

Calibrate and repair sprayers; evaluate the previous year's weed control strategies; plan for the upcoming year's strategy.

LATE WINTER

Apply preemergence herbicides for crabgrass control. Apply postemergence herbicides for broadleaf weed control for new customers.

EARLY SPRING

Apply preemergence herbicides for goosegrass control. Repeat broadleaf weed control application, if necessary, for new customers. Follow-up scouting for remaining winter weeds for formulating the upcoming fall control strategies.

SUMMER

Maintain optimum fertility, watering, and mowing height and frequency to encourage healthy, thick turf stands which helps discourage weeds and other pests.

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Herbicide Selection and Use

Preemergence herbicides are applied prior to weed seed germination and prevent development of the germinating seed. If applied after germination, preemergence herbicide effectiveness greatly diminishes. Preemergence herbicides should be activated by _ to _ inch rainfall or irrigation after application.

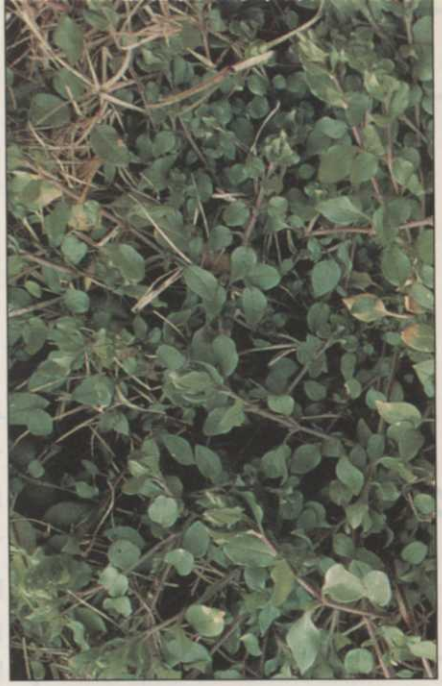
Postemergence herbicides generally are effective only on visible weeds. Young (two to four-leaf stage) and actively growing weeds are the most susceptible and require least amount of herbicide. At this stage, herbicide uptake and translocation are favored and weeds have less developed, more tender root systems. Waiting later results in poorer translocation of applied materials in plants, more difficulty controlling mature plants, and possible setback of turf during green-up.

Postemergence herbicides should only be used when weeds are actively growing. This primarily occurs with temperatures between 40 and 80%F. Applications outside this temperature range are too slow to either be effective or result in excessive turf damage.

Broadleaf Weed Control

Preemergence broadleaf weed control is provided by the herbicide Gallery. Gallery must be applied before broadleaf weeds germinate. Gallery should be tank-mixed with another preemergence herbicide such as prodiamine (Barricade), dithiopyr (Dimension), pendimethalin (Pendulum), or oryzalin (Surflan) if annual bluegrass or other grasses are expected.

Atrazine (AAtrex) and simazine (Princep T&O) are the backbone products for postemergence winter weed control for warm-season turfgrasses such as centipedegrass, St. Augustinegrass, zoysiagrass, and bermudagrass. These materials should be used in mid fall (October/November) for optimum control timing. A follow-up application may be needed three weeks later for total control. These herbicides become less effective when applied after January. Also, if these are applied during spring green-up, temporary set back of turfgrasses should be expected.



Chickweed (*Stellaria media* (L.) Cyrillo) is a mat-forming, many-stemmed winter annual.

For those broadleaf weeds that these herbicides do not effectively control, a single or combination application of 2,4-D, 2,4-DP, MCPP, MCPA or dicamba are needed (Table 2). These herbicides are selective, systemic, foliar-applied herbicides. Several considerations are noted before using one or more of these materials. First, few broadleaf weeds, especially perennials, are controlled with just one of these herbicides. A two or three-way combination is generally necessary for satisfactory results. Control also depends on the maturity of the weed. Younger weeds are easiest and cheapest to control. Applications should ideally be initiated in November to take advantage of these younger, more succulent plants. Waiting until March or April to attempt control requires sequential applications spaced 10 to 14 days apart. This increases labor and herbicide costs and equipment wear and tear. Later applications also may delay turfgrass green-up and require longer for herbicides to work.

Until recently, these herbicide combinations were used as the main control chemicals for broadleaf weeds. New chemistry such as triclopyr and clopyralid (Turflon and Confront) have been intro-

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duced as alternatives to the traditional materials mentioned above. Although this new herbicide chemistry provides a wider array of materials to choose from, economics and turf tolerance must still be considered before use.

Grass Weed Control

In winter, the predominant annual grass weeds are annual bluegrass and clumps of ryegrass that escape from an intended overseeding site. Annual bluegrass can be effectively controlled with postemergence herbicides, assuming the turf is not overseeded with ryegrass or is a cool-season grass. In non-overseeded turf, atrazine (AAtrex), simazine (Princep T&O), and pronamide (Kerb) provide excellent control of annual bluegrass and ryegrass. The key to the use of these materials is timing. The first applications should be applied in

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Speedwell (*Veronica* spp.) begins low-growing, then grows tall. Flowers are small, blue/white.

TABLE 2. SUSCEPTIBILITY OF WINTER BROADLEAF WEEDS TO TURF HERBICIDES

Weed	Atrazine/ Simazine	2,4-D	Mecoprop (or MCPP)	Dicamba	2,4-D + MCPP	2,4-D + 2,4-DP	2,4-D + MCPP + dicamba	2,4-D + triclopyr	Triclopyr + clopyralid
Betony, Florida	E-F[1]	F	F	F-E	F	F	F-E	—	—
Black Medic	—	P	F	E	F	E	E	—	E
Buttonweed, Va.	—	E-F	F	F	F	E-F	E-F	F-P	—
Chamberbitter	E	—	—	—	—	—	—	—	—
Chickweed	F	F-P	E-F	E	E	E	E	E-F	E
Clover, hop	E	F	E	E	E	E	E	E	E
Clover, white	E	F	E	E	E	E	E	E-F	E
Daisy, English	—	P	F	E	F	F	E	—	—
Daisy, oxeye	—	F	F	F	F	F	E-F	—	—
Dandelion	E-F	E	E	E	E	E	E	F-E	—
Dock, broadleaf & curly	F	F	F-P	E	F	F	E-F	F	E
Garlic, wild	—	E-F	P	E-F	E-F	E-F	E-F	—	—
Geranium, Carolina	—	E	E-F	E	E	E	E	—	—
Henbit	E	F-P	F	E	F	E-F	E	E	—
Ivy, ground	—	F-P	F	E-F	F	F-E	E-F	—	—
Parsley-piert	E	P	E-F	E-F	E-F	P	E-F	E	—
Pearlwort	—	E-F	E-F	—	E-F	E-F	E-F	—	—
Pennywort (dollarweed)	E	E-F	E-F	E-F	E-F	E-F	E-F	—	—
Pepperweed	—	E	E-F	E	E-F	E	E	—	—
Plantains	F-P	E	F-P	P	E	E	E	F-P	E
Shepherd's-purse	—	E	E-F	E	E-F	E-F	E	—	—
Speedwell, corn	E	F-P	F-P	F-P	F-P	F-P	F-P	—	—
Spurweed (lawn burweed)	E-F	F	E-F	E	E-F	F	E	E	E
Strawberry, Indian mock	—	P	F	E-F	F	P	E-F	—	—
Thistles	—	E-F	F	E	E-F	E-F	E	—	—
Vetch, common	—	G	G	G	G	G	G	G	G
Violets	—	F-P	F-P	E-F	F-P	F	F-P	F-P	E-F
Woodsorrel, yellow	F	P	P	F	F-P	F-P	F-P	—	E-F
Yarrow	—	F	F-P	E	F-P	F	E-F	—	—

[1] E = excellent (>89%) control; F = Fair to good (70 to 89%); G = good control sometimes with high rates, however a repeat treatment 1 to 3 weeks later each at the standard or reduced rate is usually more effective; P = poor (<70%) control in most cases. Not all weeds have been tested for susceptibility to each herbicide listed.

These are relative rankings and depend on many factors such as environmental conditions, turfgrass vigor or health, application timing, etc., and are intended only as a guide.

TABLE 3. ESTABLISHED SOUTHERN TURFGRASS TOLERANCE TO POSTEMERGENCE HERBICIDES (REFER TO HERBICIDE LABEL FOR SPECIFIC SPECIES LISTING)

Herbicide	Bahiagrass	Bermuda-grass	Carpetgrass	Centipede-grass	St. Augustine-grass	Zoysiagrass	Overseeded Ryegrass	Tall Fescue
Broadleaf Weeds								
atrazine (Aatrex)	NR[1]	I-NR	I[3]	S-I	S-I	I	NR	NR
bentazon (Basagran)	S	S	S	S	S	S	S-I	S
bromoxynil (Buctril)	S	S	S	S	S	S	S	S
2,4-D	S	S	I	I	I-NR	S	S-I	S
2,4-D+dicamba	S	S	I	I	I-NR	S	S-I	S
2,4-D+2,4-DP	S	S	I	I	I-NR	S	I-NR	S
2,4-D+MCPP	S	S	I	I	I-NR	S	I-NR	S
2,4-D+MCPP+dicamba	S	S	I	I	I-NR	S	I-NR	S
2,4-D+MCPP+2,4-DP	S	S	I	I	I-NR	S	I-NR	S
dicamba (Vanquish)	S	S	I	I	I-NR	S	I	S
MCPA+MCPP+2,4-DP	S	S	I	I	I-NR	I	I-NR	S
MCPP	S	S	I	I	I-NR	S	I	S
imazaquin (Image)	NR	I-S	I	NR	S	S	NR	NR
simazine (Princep T&O)	NR	I-NR	I	S-I	S-I	I	NR	NR
Grass Weed Control								
asulam (Asulox)	NR	S-I[2]	NR	NR	S-I	NR	NR	NR
diclofop (Illoxan)	NR	S	NR	NR	NR	NR	NR	NR
DSMA, MSMA	NR	S	NR	NR	NR	I	NR	I
fenoxaprop (Acclaim)	I-NR	I-NR	NR	NR	NR	I	I	NR
metribuzin (Sencor)	NR	S-I	NR	NR	NR	NR	NR	NR
pronamide (Kerb)	NR	S	NR	NR	NR	NR	NR	NR
sethoxydim (Vantage)	NR	NR	NR	S	NR	NR	NR	NR

[1]S=Safe at labeled rates; I=Intermediate safety, use at reduced rates; NR=Not Registered for use on and/or damages this turfgrass.
[2]Asulam is labeled for 'Tifway' (419) Bermudagrass and St. Augustinegrass.
[3]Carpetgrass tolerance to herbicides listed has not fully been explored.
These are relative rankings and depend on many factors such as environmental conditions, turfgrass vigor or health, application timing, etc., and are intended only as a guide.

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mid fall when weeds are small and easiest to control. A second application in January will be necessary to control the second flush of germination that normally occurs at this time, especially with annual bluegrass. Atrazine and simazine have the added benefit of also controlling many winter annual broadleaf weeds such as lawn burweed, chickweed, and henbit (Table 2). However, as mentioned earlier, if control is attempted later in March or April, problems with herbicide efficacy and turf safety may occur.

Annual bluegrass (*Poa annua* L.) is a common winter annual grass weed.

Postemergence grass weed control in cool-season turfgrasses has previously been limited to various members of the organic arsenicals such as MSMA, DSMA, or CMA (Table 3). Specific formulations (e.g., CMA) and rates are necessary for use on most cool-season turfgrasses or unacceptable levels of injury may result.

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TABLE 4. PREEMERGENCE HERBICIDE EFFICACY RATINGS

Herbicide	Crabgrass	Goosegrass	Annual bluegrass	Common Chickweed	Henbit	Lawn Burweed	Corn Speedwell
atrazine (Aatrex)	F[1]	P	E	E	E	E	E
benefin (Balan)	G-E	F	G-E	G	G	P	E
benefin+oryzalin (XL)	E	G	E	L	L	—	—
benefin+trifluralin (Team)	E	G	E	L	L	—	—
bensulide (Betasan, PreSan)	G-E	F	F	P	P	P	P
bensulide+oxadiazon	E	G-E	—	—	—	—	—
DCPA (Dacthal)	G-E	F	G	E	F	P	G
dithiopyr (Dimension)	E	G-E	G-E	G	—	—	—
fenarimol (Rubigan)	P	P	G	P	P	P	P
isoxaben (Gallery)	F	P	F	E	L	—	—
metolachlor (Pennant)	G	F	—	—	—	—	—
napropamide (Devrinol)	G-E	G	G	E	P	E	E
oryzalin (Surflan)	E	G-E	E	L	L	—	P
oxadiazon (Ronstar)	G	E	G	P	P	P	G
pendimethalin (Pre-M)	E	G-E	G-E	E	L	—	E
prodiamine (Barricade)	E	G-E	G	G	G	G	G
pronamide (Kerb)	F	P	G-E	E	P	P	E
simazine (Princep T&O)	F	P	E	E	E	E	E

[1]E=Excellent, >89% control; G=Good, 80 to 89% control; F=Fair, 70 to 79% control; P=Poor, <70% control; L=Listed on the label; — = Data not available.

These are relative ratings and depend on many factors such as environmental conditions, turfgrass vigor or health, application timing, etc., and are intended only as a guide.

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In addition to the organic arsenicals, Fluazifop (Fusilade T&O) maybe used on tall fescue and zoysiagrass to control annual grassy weeds and suppress bermudagrass. Applications should be in spring when weeds are small and prior to the summer stress period.

Sethoxydim (Vantage) controls many annual grasses in centipedegrass and fine fescue. Spring applications are best due to cooler temperatures and younger weeds which are easier to control.

Chlorosulfuron (TFC 75DF) controls tall fescue selectively in Kentucky bluegrass and fine fescues. Low rates (1 to 5 oz/a) and spot treatments help minimize turf phytotoxicity.

Fenxoaprop (Acclaim) may be used on Kentucky bluegrass, fine fescues, zoysiagrass, and perennial ryegrass to control most annual grass weeds and to suppress bermudagrass encroachment. Spring applications are best and the turf should not be under moisture or heat stress when treated.

Preemergence Crabgrass Control

As discussed earlier, turf managers should also be formulating their crabgrass control strategies during late winter. Crabgrass seeds begin to germinate when soil temperatures reach 53_F for several consecutive days. This timing often coincides with peak flowering of redbud trees.

The effectiveness of preemergence herbicides varies because of many factors. These factors include the timing of herbicidal application in relation to weed seed germination, the soil types, environmental conditions (e.g., rainfall and temperature) during and immediately following application, the target weed species and biotypes and cultural factors (e.g., aerification) following application. Generally, preemergence herbicides are most effective for annual grass control although some annual small seeded broadleaf weeds also are suppressed (Table 4).

Repeat applications of preemergence herbicides usually are necessary. When exposed to the environment, most herbicides begin to degrade. Usually, the level of degradation that occurs from 60 to 75 days after application reduces the herbicide level in the soil to the point that its effectiveness on germinating weed seeds is lost. Repeat applications approximately 8 to 10 weeks apart, therefore, become necessary for prolonged preemergence weed control.

Summary

In conclusion, winter broadleaf weeds can be an opportunity or a headache for the professional turfgrass manager. If control is not attempted until spring, customers should expect the need for multiple applications and slow results. There are also restrictions on the use of many of these materials around trees and shrubs. Success, however, can be achieved with the combination of proper turfgrass management practices supplemented with appropriate herbicide use. **LM**