

PRE-EMERGENCE WEED CONTROL IN COOL-SEASON TURF

Pre-emergence herbicides are generally safer to use on turf than post-emergence herbicides because they are being used to control seedlings rather than mature plants. Here are some tips.

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Weeds are a fact of life. No turfgrass area or landscape will remain weed-free without intervention.

To establish and maintain an attractive, healthy lawn, weeds must be controlled. Maintenance practices such as mowing too low, over-irrigation, over-fertilization, using unnecessary heavy machinery, and poorly timed aeration can result in stress conditions that encourage

weed infestations.

A good management program with both cultural and chemical program will help reduce these stress factors. A successful weed control program in cool-season turf results from integrating a recommended cultural practice program and a complete weed control program.

An effective weed control program uses herbicides only when necessary. Producing a dense, healthy stand of

turfgrass is one way to control annual grassy weeds and other broadleaf weeds. Proper mowing height and frequency, fertilization and irrigation are part of the weed control program and should be practiced throughout the growing season.

Turfgrass managers should be familiar with the following steps for a successful weed control program.

1. Knowing the specific weed problems: in relation to weed identification (grassy weeds vs. broadleaf weeds), life cycle of the weeds (annuals vs. perennials).

2. Selection of the right herbicide: in relation to effective weed control, turfgrass tolerance.

The most common annual grassy weeds include large crabgrass, small crabgrass, yellow foxtail, green foxtail, fall panicum, barnyardgrass and goosegrass. Crabgrass and goosegrass are the most troublesome weeds in turf. Crabgrass (*Digitaria spp.*) is among the most difficult weeds to control in turf.

In northern regions, seeds of crabgrasses (smooth and large) begin to germinate in late April to late May and continue to germinate throughout the summer. However, in transition regions, germination can occur as early as late March. Crabgrass germination is related to soil temperature. When the soil temperature reaches 65°F crabgrass begins to germinate.

This varies with the local conditions of soil type, rainfall, and weather in the spring. In general, most



This picture, taken 10 weeks after a pre-emergence herbicide application, shows the effective control of annual grassy weeds.

crabgrass seeds germinate during a six- to eight-week period. And most other annual grassy weed seeds germinate during this germination period.

Selective weed control

The selective control of these grassy weeds and some broadleaf weeds can be obtained with pre-emergence herbicides. Pre-emergence herbicides provide effective control for several weeks or months, depending upon dosage and products.

The effectiveness of these compounds is based upon their ability to provide good weed control, turfgrass tolerance, and long residual control. The primary pre-emergence herbicides for grassy weed control in cool-season turfgrasses are benefin, bensulide, DCPA, oxadiazon, pendimethalin, and siduron (Table 1).

Benefin, Team (a pre-mix combination of benefin and trifluralin), DCPA is also effective in controlling common chickweed, carpetweed and common purslane.

In addition, pendimethalin controls goosegrass, barnyardgrass, fall panicum and some annual broadleaf weeds such as hop clover, yellow woodsorrel and prostrate spurge. Pendimethalin applied during the late summer to early fall can control common chickweed, mouseear chickweed, and henbit. Repeat application at the recommended rate eight weeks after the initial application may prevent goosegrass and heavy infestations of spurge. Oxadiazon controls hop clover, prostrate spurge and speedwell. Oxadiazon is more effective in goosegrass control than DCPA. Pendimethalin and DCPA control prostrate spurge, while benefin and bensulide are ineffective in controlling this weed.

Prodiamine (Blockade) is a new pre-emergence herbicide. It is expected to be in the market in the near future. It is very effective in controlling most annual grassy weeds such as crabgrass, goosegrass, bluegrass and several broadleaf weeds. It provides long residual control of weeds.

Timing applications

Timing is very important for herbicide applications. The best time for annual grassy weed control is to apply before weeds emerge. The key point is that pre-emergence herbicides need to be applied before grasses germinate in the spring. Treatments made too late (i.e. after germination) will not control emerged grassy weeds.

If application timing does not coincide with the normal germination period of annual grassy weeds, weed

Table 1.

Common name, trade names, formulations, and rate of pre-emergence herbicides.

Common Name	Trade Name(s)	Formulation	Recommended Rate (pound active per acre)	Company
Benefin	Balan	2.5G	2.0-3.0	Elanco
		2.5G	"	Lesco
Benefin & Trifluralin	Team (1:2)	2G	1.5-3.0	Elanco
		1G	"	Lesco
Bensulide	Betasan	4E, 7G, 12.5G	7.5-10.0	ICI
		4E, 7G, 12.5G	"	Mallinckrodt
		Lescosan	"	Lesco
		Betamac	"	PBI Gordon
		Weedgrass Preventer	8.5	12.5
DCPA	Dacthal	75WP	10.5	Fermanta
		5G	"	Lesco
Oxadiazon	Ronstar	50WP, 2G	3.0-4.0	Rhone Poulenc
Oxadiazon + Bensulide	Goosegrass/ Crabgrass Control	6.56G	7.5	Scotts
Pendimethalin	Lesco Pre-M Weedgrass Control	60DG,	1.5-3.0	Lesco
		60WDG	"	Scotts
		Halts Crabgrass Turf Weedgrass Control	2.45G	"
Siduron	Tuperson	1.71G	"	Scotts
		50WP	2.0-6.0	Du Pont

control results may be erratic or poor. In general, pre-emergence herbicides should be applied two weeks prior to the expected weed seed germination period. Therefore, the application dates of pre-emergence herbicides will vary from one part of the country to another.

The herbicides should be watered-in so that the chemical can form a barrier in the soil prior to weed seed germination. The resulting chemical barrier should not be disturbed during key weed germination period.

Complementary effects

Post-emergence grass control can complement a pre-emergence weed control program when poor weed control results are obtained. The primary post-emergence herbicides for grassy weed control in cool-season turfgrass are the arsenates: MSMA, DSMA, and AMA. These compounds can be phytotoxic, especially when applied during hot weather. A new post-emergence herbicide, fenoxaprop (Acclaim) is now available for annual grassy weed control. Fenoxaprop is very effective in large crabgrass, goosegrass, fall panicum, giant foxtail, barnyardgrass and other grassy weed control. This compound offers a wider window of post-emergence control than the arsenates with less potential for turfgrass injury. Fenoxaprop is

recommended for use on perennial ryegrass, fine fescue, tall fescue and Kentucky bluegrass turf.

Longevity of pre-emergents

A complete weed control program aims at controlling weeds for the entire season. Season-long control of weed species is dependent upon the activity and longevity of the herbicide in use.

Oxadiazon, pendimethalin, Team and bensulide provide long residual weed control, while benefin is of short residual. On the other hand, DCPA is an intermediate type. Turfgrass managers should keep in mind that soil residual activity is also dependent upon the rate of herbicide being used.

In general, the higher the rate of application, the longer is the residual control over the growing season. Initial application determines the concentration in the soil for pre-emergence activity. It must maintain a critical soil residue level during the growing season for season-long weed control.

Turfgrass managers should keep in mind that application made early in the season may break in the soil to below the threshold level. When this occurs, one can expect less than desirable control following late germinating weeds. Repeat application of certain herbicides may be made 10 to

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12 weeks after the initial application for continued control of late germinating weeds over the entire season.

Turfgrass tolerance

Cool-season turfgrasses vary in their tolerance to pre-emergence herbicides. Siduron is the only pre-emergence herbicide that is recommended for newly-seeded turfgrass. All other pre-emergence herbicides are recommended for use on established fine fescues, Kentucky bluegrass, perennial ryegrass and tall fescue. How-

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ever, bensulide and DCPA can be applied in the spring following a fall seeding of cool-season turfgrasses.

Pendimethalin is not recommended for use on bentgrass or where annual bluegrass is the desired species. Benefin, DCPA and oxadiazon are not recommended for use on fine fescues or bentgrass turf. However, bensulide can be used on bentgrass. Team is recommended for use on most cool-season grasses. It may thin established annual bluegrass turf and fine fescues at rates above 1½ lbs. active ingredient per acre.

It should not be applied in the spring to turfgrass planted the previous fall. Team is not recommended for use on creeping bentgrass. However,

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it can be used on bentgrass fairways.

Reseeding time interval

Time for reseeding is very important in relation to the application date of pre-emergence herbicides. In general, pre-emergence herbicides persist in the soil for a length of time, allowing season-long weed control. Reseeding

interval is dependent upon the herbicide and dosage used (Table 2).

For example, reseeding should be delayed at least six weeks after application of Team at the lower end of recommended rate. However, when using the highest recommended rate, reseeding should be delayed 12 to 16 weeks after the application. When reseeding, it is essential that proper cultural practices such as soil cultivation, irrigation and fertilization be followed.

In summary, a successful pre-emergence weed control program results from selecting the right herbicide and applying it uniformly at the proper time and appropriate dosage. The herbicide selection depends on the weeds to be controlled and the turfgrass to be treated.

Choose the most effective herbicide with maximum safety to the turfgrass. Changing the use of one class of herbicide to another class in a weed management program may provide a broad spectrum weed control in lawns. For crabgrass and other grassy weed control, turf managers and lawn care operators should emphasize a pre-emergence herbicide program along with a good management program. This approach will minimize the competitive advantage of efficient species like crabgrass.

Table 2.

Minimum time necessary for reseeding after various pre-emergence herbicide application.

Common Name	Trade Name(s)	Formulation	Recommended Rate (pound per acre)	Minimum Time Before Reseeding (Weeks)
Benefin	Balan	2.5G	2.0-3.0	6
Benefin & Trifluralin	Team (1:2)	2G	1.5-3.0	6
Bensulide	Betasan	4E, 7G, 12.5G	7.5-10.0	16
DCPA	Dacthal	75WP	10.5	8
Oxadiazon	Ronstar	50WP, 2G	3.0-4.0	16
Oxadiazon + Bensulide	Goosegrass/ Crabgrass Control	6.56G	7.5	16
Pendimethalin	Lesco Pre-M	60DG,	1.5-3.0	16
Siduron	Tuperson	50WP	2.0-6.0	N/A