

Pre-emergence weed control

by W.M. Lewis, Ph.D.

■ Pre-emergence herbicides are just part of an integrated turfgrass weed management program.

A successful program begins with cultural practices: proper mowing height and frequency, amount and frequency of fertilization, needed irrigation, and insect and disease control.

What's available—Pre-emergence herbicides are primarily applied in the spring for controlling smooth and large crabgrass and goosegrass. Many, however, will control other summer annual weedy grasses such as foxtails, barnyardgrass, crowsfoot and fall panicum. They also provide pre-emergence control of annual bluegrass when applied in the fall or spring, depending on location.

Several herbicides or herbicide combinations are registered for pre-emergence application in well-established grasses (Table 1). Grassy weeds are the target weeds for all, except isoxaben (Gallery).

Many herbicides are formulated on fertilizer carriers.

Some herbicides are limited to use by certified pesticide applicators.

Oxadiazon (Ronstar) is not registered for use on home lawns.

Herbicide selection—Know turfgrass tolerance for cool-season grasses (Table 2) or warm-season grasses (Table 3), and the grassy weeds expected on the site. Then check herbicide effectiveness on those weeds (Table 4).

Method or ease of application, granular or spray, safety and cost may also influence the choice.

Perhaps one overlooked factor in selecting a herbicide is the tolerance of trees and ornamentals. Most labels list tol-

continued on page 60

TABLE 1

EXAMPLES OF COMMON AND TRADE NAMES OF PRE-EMERGENCE HERBICIDES

Common name	Company	Trade name and formulation
Atrazine	Ciba-Geigy Security	AAtrex 80W, 4L, 90DG Purge II 2L
Benefin	DowElanco Lesco	Balan 2.5G, 60DF 2.5 Benefin Granular
Benefin + oryzalin	DowElanco	XL 2G
Benefin + trifluralin	DowElanco	Team 2G
Bensulide	ICI Lesco PBI/Gordon	Betasan 4E LF, 3.6G, 7G, 12.5G Lescosan 4E, 7G Bensumec 4LF
Bensulide + oxadiazon	Scotts	Goosegrass/Crabgrass Control 6.5G
Dithiopyr	Monsanto	Dimension 1EC
DCPA	ISK Biotech	Dacthal 75W, 6F
Isoxaben	DowElanco	Gallery 75DF
Metolachlor	Ciba-Geigy	Pennant 7.8E
Napropamide	ICI Lesco	Devrinol 50WP, 2G, 5G Devrinol 5G Ornamental
Oryzalin	DowElanco	Surflan 4AS
Oxadiazon	Rhone-Poulenc	Chipco Ronstar 2G, 50WP
Oxadiazon + benefin	Regal	Regalstar 1.5G
Pendimethalin	Lesco Scotts	Pre-M 60DG Halts 1.71G Southern Weedgrass Control 2.45G Turf Weedgrass Control 1.71G Weedgrass Control 60WP
Siduron	Du Pont	Tupersan 50W
Simazine	Ciba-Geigy	Princep 80W, 4L, 90DG, 4G

AS = aqueous suspension, DF = dry flowable granule, DG = dispersible granule, E or EC = emulsifiable concentrate, F = flowable, G = granular, SL = soluble liquid, W or WP = wettable powder. Check tolerance tables and product labels for tolerance of specific turfgrasses. Several of the above herbicides are formulated on a fertilizer carrier. These products are not included in the listing.

Source for all tables: Dr. Lewis

ELSEWHERE

**Potassium
and grass,
p. 64**

**On Poa
trivialis,
p. 68**

TABLE 2

TOLERANCE OF ESTABLISHED COOL-SEASON TURFGRASSES TO PRE-EMERGENCE HERBICIDES

Herbicide	Kentucky Bluegrass	Tall Fescue	Fine Fescue	Perennial Ryegrass
Benefin	T	T	M	T
Benefin + oryzalin	NR	T	NR	NR
Benefin + trifluralin	T	T	M	T
Bensulide	T	T	T	T
Bensulide + oxadiazon	T	T	NR	T
DCPA	T	T	M	T
Dithiopyr	T	T	T-M*	T
Napropamide	NR	T	T	NR
Oryzalin	NR	T	NR	NR
Oxadiazon	T	T	NR	T
Pendimethalin	T	T	T	T
Siduron	T	T	T	T

T = tolerant when used properly according to the label; M = marginally tolerant, may cause injury or thinning of the turf; NR = not registered for use on this turfgrass.

* Dithiopyr may cause injury to certain varieties of chewing fescue.

TABLE 3

TOLERANCE OF ESTABLISHED WARM-SEASON TURFGRASSES TO PRE-EMERGENCE HERBICIDES

Herbicide	Bahia-grass	Burmuda-grass	Centipede-grass	St. August-inegrass	Zoysia-grass
Atrazine	NR	T	T	T	T
Benefin	T	T	T	T	T
Benefin + oryzalin	T	T	T	T	T
Benefin + trifluralin	T	T	T	T	T
Bensulide	T	T	T	T	T
Bensulide + oxadiazon	NR	T	NR	NR	T
DCPA	T	T	T	T	T
Dithiopyr	T	T	T	T	T
Metolachlor	T	T	T	T	NR
Napropamide	T	T	T	T	NR
Oryzalin	T	T	T	T	T
Oxadiazon	NR	T	NR	T	T
Pendimethalin	T	T	T	T	T
Siduron	NR	NR	NR	NR	T
Simazine	NR	T	T	T	T

T = tolerant when used properly according to the label; NR = not registered for use on this turfgrass.

erant ornamental species. This opens up another possibility of selecting a single herbicide for grassy weed control in the turf and in ornamental plant beds.

Caution should be followed where fine fescues are growing. Certain pre-emergence herbicides, if applied, will thin stands of fine fescues.

A few herbicides—for example, Balan 60 DF, Betasan and Dimension—may be applied to bentgrass maintained as a lawn.

If bermudagrass areas have been overseeded with annual or perennial ryegrasses, a spring application of Pre-M, Surfian, Team or XL will thin the overseeded grasses. Do not apply these herbicides unless the thinning can be tolerated.

Atrazine and simazine are applied in warm-season grasses for winter annual broadleaf and annual bluegrass control.

Herbicide labels emphasize application to healthy well-established turf, and caution about application to turf weakened due to winter climatic conditions, drought or other stress factors.

Certain pre-emergence herbicides may be applied for grassy weed control when seeding or sprigging turfgrasses, or during establishment following emergence (Table 5).

Herbicide rates may vary with geographic region. Labels will give specific information on rates for the turfgrass, for the weeds to be controlled, for sequential or split applications, for the site of application, and for any regional restrictions or precautions.

Timing—Pre-emergence herbicides are best applied at least two weeks before expected weed seed germination. In areas with a crabgrass history, pre-emergence herbicides are applied in the spring when soil temperatures approach 53° F. Goosegrass germination is usually two or more weeks later than crabgrass.

Crabgrass and goosegrass germinate first in thin, open stands of turfgrasses. Germination is delayed and/or reduced in dense stands. Moving from the South to the North, crabgrass may initially germinate from late January into May and continue through the season.

Since all summer annual weedy grasses do not germinate at the same time, split applications, eight weeks apart, are encouraged to maintain effective control throughout the season.

Our research has shown that split applications generally out-perform single applications for goosegrass control and late-season crabgrass control. (However, a single pre-emergence application of Dimension has controlled crabgrass

throughout the season in a number of states.)

In certain parts of the country, pre-emergence applications can begin six to eight weeks before expected crabgrass germination; under cool soil temperatures little, if any, degradation occurs during this period.

Reseeding interval—The time between application and reseeding may affect herbicide choice. Herbicides that control annual weeds may also affect new seedlings of desirable turfgrasses.

The overseeding or reseeding interval depends on herbicide characteristics and the rate applied (Table 6). When reseeding,

TABLE 4

ANNUAL GRASSY WEED CONTROL RATINGS FOR PRE-EMERGENCE HERBICIDES

Herbicide	Crabgrass	Goosegrass	Annual Bluegrass
Atrazine	P	P	E
Benefin	G	F	G
Benefin + oryzalin	G	F-G	G
Benefin + trifluralin	G	P-F	G
Bensulide	G	P	G
Bensulide + oxadiazon	G	G	G
DCPA	G	P	G
Dithiopyr	G	G	G
Metolachlor	F-G	F	F-G
Napropamide	G	G	G
Oryzalin	G-E	G	G
Oxadiazon	G	G	G
Pendimethalin	G-E	G	G
Siduron	G	F	NR
Simazine	P	P	E

Weed control effectiveness: E = excellent (90-100%), G = good (80-90%), F = fair (70-80%), P = poor (<70%), NR = not registered

TABLE 5

PRE-EMERGENCE HERBICIDES FOR USE WHEN ESTABLISHING TURFGRASSES

Situation	Herbicide
Cool-season turfgrasses seeded the previous fall	Balan 60 DF, Betasan, Bensumec, Lescosan, Dacthal, Ronstar, Tupersan
New turfgrass seedlings when 1 to 2 inches in height	Dacthal
New seedlings of cool-season grasses	Tupersan
Sprigging bermudagrass	Chipco Ronstar 2G, 50WP*, Atrazine, Princep
Sprigging zoysia	Tupersan

* Ronstar 50WP has a 2(ee) recommendation in the following states: AL, AZ, AR, CO, FL, GA, HI, LA, MD, MS, NC, NM, SC, TN, TX AND VA

TABLE 6

OVERSEEDING OR RESEEDING INTERVALS

Weeks after application	Pre-emergence herbicide	Rate: Pounds active per acre
6	Balan 2.5G, 60DF, XL 2G	2
8	Dacthal 75W, 6F Team 2G	10.5 2
12	Dimension 1EC	0.5
12 to 16	Balan 2.5G, 60DF Team 2G XL 2G	3 3 3
16	Betasan 4E, etc. Pre-M 60DG Ronstar 2G, 50W Surfilar 4AS Weedgrass Control	10 3 4 3 4 to 6
24	Devrinol 50WP, 2G, 5G Pennant 7.8E	3 4

proper management practices such as soil cultivation, irrigation and fertilization must be followed. Also, turfgrass seeds should be placed in contact with the soil.

Herbicide carriers—Herbicides may be formulated as dry granules including fertilizer carriers or sprayable products. Sprayable herbicides are primarily applied in a water solution; certain ones may also be applied in liquid fertilizer (Table 7). Adequate mixing in the spray tank and agitation during application is absolutely essential, as is uniform spray distribution.

Pre-emergence herbicides need rainfall or irrigation to move them off the sprayed turf foliage into the upper soil levels where weed seeds germinate. If at least one-half inch of rain doesn't fall within a week after application, irrigation is advisable.

Pre-emergence broadleaf control—Herbicides principally applied for annual grassy weeds will provide pre-emergence control of certain winter annual and summer annual broadleaf weeds.

Isoxaben (Gallery 75 DF) is a pre-emergence herbicide for control of certain broadleaf weeds in established turfgrasses. Gallery is applied in the late summer or early fall for winter annual broadleaf weeds, and in early spring for summer annual broadleaf weeds. Because Gallery is a pre-emergence herbicide, it does not control established weeds. These should be controlled with post-emergence herbicides. Certain perennials—for example, dandelions and plantains—are controlled from seed. Gallery will fit into a weed management program to supplement the pre-emergence herbicides which are primarily used for the control of annual grassy weeds.

—Dr. Bill Lewis is in the Crop Science Department at North Carolina State University, Raleigh, N.C. All tables used supplied courtesy of the author.