

WEED MANAGEMENT IN ANNUAL COLOR BEDS

Joseph C. Neal

Department of Horticultural Science

Establishing and maintaining quality annual color beds requires a plan to prevent and control weeds. Weeds compete with ornamental plants for water, light, and nutrients reducing aesthetic quality and plant growth. To minimize these problems, a weed management program should be developed and implemented prior to planting. A successful weed management program involves the following:

- Understanding weeds (identification and life cycle)
- Understanding the available weed management options
- Site preparation—eliminate perennial broadleaf weeds and sedges before planting
- Implementing a combination of effective methods to prevent and control weeds

Know Your Enemy

The first steps in developing a successful weed management program is to identify your weeds and to determine how difficult they may be to control after planting. This requires knowledge of their life cycles, methods of reproduction and spread, and susceptibility to different control strategies. Several pictorial guides are available for identifying weeds (refer to suggested references).

Most weeds found in color beds have one of three life cycles: summer annual, winter annual, or perennial. The weed’s life cycle provides information on timing of germination and method of reproduction. Annual weeds live for one growing season and are divided

into two types—summer annuals and winter annuals.

Summer annual weeds germinate in the spring (about when the dogwoods bloom) and continue throughout the summer months. They flower and produce seed prior to the first frost. Common summer annual weeds include grasses such as barnyardgrass, crabgrass, and goosegrass; and broadleaves such as annual lespedeza, carpetweed, common purslane, morningglories, pigweed and spurge.

Winter annual weeds germinate in late summer and early fall, overwinter as small dormant but green plants, then flower and produce seed in spring or summer. Winter annual weeds usually die with the onset of warm weather. Common winter annual weeds include annual bluegrass, annual sowthistle, common chickweed, hairy bittercress, and henbit.

Perennial weeds live longer than two years and are classified according to their method of reproduction as simple or creeping. Simple perennials spread by seed, they have no natural means of spreading vegetatively. The roots are usually fleshy and can grow very large. Examples include common dandelion, curly dock, buckhorn and broadleaf plantain, and pokeweed. Creeping perennials reproduce by above ground stems (stolons) or below ground stems (rhizomes). Of course,

Distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914. Employment and program opportunities are offered to all people regardless of race, color, national origin, sex, age, or disability. North Carolina State University, North Carolina A&T State University, U.S. Department of Agriculture, and local governments cooperating.

most perennial weeds can also reproduce by seed. Examples include nutsedge, bermudagrass, red sorrel, ground ivy, and pennywort (dollarweed)..

Annual weeds are generally more easily controlled in landscape beds than are perennials. Therefore, before planting it is important to document the weed species present in the landscape beds and adjacent areas. If difficult to control weeds are present, efforts should be made to control them before planting.

Pre-Plant Site Preparation

When perennial weeds or difficult-to-control annual weeds are present in the landscape bed, they should be controlled before planting. By far, the most common site preparation measure is to treat the bed with glyphosate about 2 weeks before planting then rototill before planting. This will control most emerged weeds, but does not affect seeds in the soil nor will it control weeds that are not actively growing at the time of treatment. Some particularly hard to control weeds such as nutsedge, mugwort and Florida betony will not be controlled by these treatments

Although labor-intensive and expensive, manual removal of simple perennial weeds is practical because they do not spread by underground structures. Cultivation (rototilling) will kill many simple perennial weeds and kill some annual weeds. However, soil cultivation stimulates weed seed germination. Repeated cultivation can be used to deplete the soil seedbank by repeatedly stimulating weed seed germination then killing the emerged weeds before they can set new seed. This process takes time and is generally not practical for landscape beds. Manual removal of creeping perennials is difficult to impossible. Therefore, creeping perennial weeds are generally best controlled by the application of a non-selective, systemic herbicide such as glyphosate.

When particularly difficult-to-control weeds are present in beds and other measures have not or will not provide acceptable control, soil pasteurization may be an option. There are two options to kill weed seeds in the soil – *solarization* and *chemical fumigation*. *Solarization* is a process that uses energy from the sun to heat the soil in an effort to kill weed seeds. In the summer when days are longest and sunlight (and temperatures) is at a maximum, rototill the bed then cover with clear plastic. Leave the plastic in place for six to eight weeks. Small-seeded

annual weeds can be reduced by solarization but it does not work as well on larger weed seeds or perennial weed propagules that are often deeper in the soil and avoid the killing temperatures.

If the site is heavily infested with perennial broadleaf weeds or sedges, *soil fumigation* may be considered. Because fumigation kills by using toxic chemicals, *this is an option of last resort*. If chemical fumigation is to be done, it is important that care be given to each stage of the fumigation process to ensure the safety of the fumigator and the effectiveness of the treatment. Soil preparation is the key to successful fumigation. Kill living vegetation with glyphosate, then cultivate to a depth of 6 to 8 inches several weeks before you intend to fumigate. Cultivate again immediately before fumigation. At treatment time, the soil should be free of clods and fresh organic debris, moist enough for seed germination, and have a temperature greater than 50°F at the 6-inch depth. Since most fumigants are inactivated by high levels of undecomposed organic material (such as leaves or grass), organic debris should be removed or allowed to decompose before fumigation. If the soil is not moist, properly prepared and free of fresh organic matter, there may be weeds that the fumigant will not kill. While the soil should be moist, wet soils are not sufficiently aerated to allow free movement of the fumigant within the soil and will result in poor control.

Two fumigants are available: metham sodium (Metham) and dazomet (Basamid). Metham Sodium is a liquid while Basamid is in granular form; however, the active ingredient in both products is methylothiocyanate which is released as a gas after the material is applied to the soil. Since Metham Sodium is a liquid and may be applied as a spray, injected or as a drench. Basamid is a granule and is applied with a spreader then rototilled into the soil. After application, irrigate the soil with sufficient water to saturate the surface. To increase effectiveness, cover the area with plastic sheeting. Seven days later, remove the plastic and cultivate to a depth of 2 inches. Do not plant until 14 to 20 days after treatment. If the soil is cold and wet you will have to wait longer. Always refer to product label for details and precautions. Your County Cooperative Extension Agent is a good source of advice concerning which technique would be best for you. If you have never fumigated soil before, have an experienced pesticide applicator help the first time you fumigate. Fumigants are highly toxic chemicals that must be handled properly to be both safe and effective.

Keep it Clean

After preparing the planting bed, try not to re-introduce weeds. Clean equipment such as tillers or tractors before using them in the area. Do not add top soil unless it is absolutely necessary. Use only well composted organic amendments. Composts coming from certified composting facilities are generally weed-free. Also, control weeds around the beds to prevent weed introductions and encroachment.

At Planting

Weeds occupy open spaces. Designing the color bed to utilize all the bed space will increase competition and reduce the sunlight reaching the soil surface which will decrease the weed population. Proper soil conditioning and amendments, in concert with quality plant selection and maintenance will minimize seedling weed emergence later in the season.

An essential part of a weed management program is use of mulch. Mulches control weeds by depriving them of light. Organic mulches e.g., pine needles, pine bark, hardwood bark, leaf mold (old leaves), etc. may be used. For bedding plant areas that are to be transitioned two or three times a year, relatively fine-textured mulch is generally used and incorporated into the soil before re-planting.

What about toxic mulch? Organic matter left in piles and not turned to provide proper aeration will become anaerobic — producing many compounds that are toxic to bedding plants. Such mulches have a “bad” odor. Do not use anaerobic mulches in landscape beds. Additionally do not use pine straw as a mulch for pansy and viola beds. Pine straw mulch reduces the growth and quality of pansies; but it has not been reported to reduce growth of other bedding plant species — just pansies.

After Planting

Regardless of how carefully a bed is prepared and planted, weeds will emerge, even through the mulch. Consequently, sanitation is an essential part of any weed management program. Remove weeds when they are young, before they go to seed. Remove or control perennial weeds before they can spread. Control weeds in areas around the bed to reduce weed seed and vegetative spread into landscape beds. To reduce the need for hand weeding, it is often desirable to use a preemergence herbicide to control annual weeds.

Preemergence Weed Control

Preemergence herbicides are applied after planting but before weeds emerge and provide residual control of weed seedlings. Since preemergence herbicides will not control emerged weeds, they should be applied before weeds germinate or all existing weeds must be killed prior to herbicide application. With annual flower beds, preemergence herbicides should be applied after transplanting to weed-free soil. It is generally best to mulch the bed before herbicide application. Granular formulations of herbicides are safer to bedding plants than spray formulations. Bedding plant foliage should be dry at the time of application to prevent herbicide granules from sticking to the foliage. Irrigate after treatment to wash granules off of the plants and to “activate” the herbicide. When bedding plants establish quickly only one herbicide application is typically needed. A dense plant canopy will deter weed growth. However, if bedding plants do not provide complete ground coverage, or if yellow nutsedge is the target weed, a second herbicide application may be necessary about eight weeks after the initial treatment.

Choosing the right herbicide

The proper herbicide for each situation will be dictated by the plant species located in the bed, weed species, and future use. Table 1 provides some general information about herbicides commonly used in landscape color beds. Table 2 provides guidelines on which bedding plants are listed on preemergence herbicide labels. Use this chart to select possible herbicides for use, then check herbicide labels for specific use-instructions, precautions, and weeds controlled.

Postemergence Weed Control

As stated previously, hand weeding will be a part of any landscape weed management program. However, some weeds can be controlled after emergence with herbicides. Postemergence herbicides are applied to weeds after they have emerged. Characteristics of postemergence herbicides that should be considered before selection and use are:

1. Systemic versus Contact
2. Selective versus Non-selective
3. Timing

Postemergence herbicides can be classified as systemic or contact, and selective or non-selective. Systemic herbicides such as Roundup-Pro and Finale are absorbed and move through the plant. These are useful for controlling perennial

weeds. For best control, the weeds must be actively growing so the herbicides can move throughout the plant. Contact herbicides such as Reward and Scythe kill only the portion of the plant that is actually contacted by the herbicide. Contact-type herbicides control small annual weeds but only burn-back perennial or large annual weeds. Thus, good spray coverage is important.

Selective herbicides only kill specific plants. The only selective herbicides recommended for use in bedding plants are the postemergence, grass control herbicides, Sethoxydim, Fusilade II, Acclaim and Envoy. These herbicides only kill grasses while broadleaves are unharmed. Check the labels for each herbicide for labeled bedding plants, susceptible weeds and special precautions. For example: Envoy controls annual bluegrass, whereas the other products do not. Acclaim will control crabgrass and other annual grasses but will not control most perennial grasses. For perennial grass control Fusilade II, Sethoxydim or Envoy are preferred. Generally, these herbicides may be applied directly over the top of bedding plants, but check the label for precautions as certain species and varieties have shown sensitivity to one or more of these herbicides. Careful attention to application uniformity and dose are needed because over-dosing plants (or too high a concentration of spray adjuvant) can result in damage to bedding plants. Additionally, some surfactants can injure tender foliage and flower petals, especially if applied during hot weather. Read the label carefully and use only recommended spray adjuvants or surfactants.

Non-selective postemergence herbicides such as glyphosate (Roundup-Pro, Touchdown, and many other trade names), Finale (glufosinate), Reward (diquat) and Scythe (pelargonic acid) have the potential to kill or injure any plant they contact. However, they may be used as spot sprays around color beds, avoiding contact with desirable vegetation. If tall weeds emerge in beds, and hand weeding is not feasible, it is sometimes possible to wipe them with a concentrated solution of glyphosate (33% by volume in water). Of course care must be taken to avoid glyphosate contact with the bedding plants.

Following these 7 rules will help ensure that you get maximum effectiveness from postemergence herbicides.

1. Apply the correct dose
2. Multiple applications are may be required to control perennial weeds

3. Use the type and amount of surfactant specified on the label, if needed
4. Apply when air temperature and humidity are favorable
5. Treat weed at proper growth stage
6. Avoid mowing 3 or 4 days before and after herbicide application
7. Allow plenty of drying time (check the label for specified times)

It is important to develop a weed management strategy that encompasses all 12 months of the year and utilizes all available options. These include preventative measures such as organic and inorganic mulches, preemergence herbicides, and sanitary practices that prevent weed seeds and vegetative parts from spreading. Weed management in color beds can be accomplished with mulch, preemergence herbicides and/or hand weeding, if perennial weeds are controlled before planting.

Note: Always use pesticides according to directions on the label. Use of trade names does not imply endorsement by the N.C. Cooperative Extension Service or the N.C. Agricultural Research Service of the products named nor criticism of similar products not mentioned.

Suggested References - Weed Identification Guides

Weeds of Southern Turfgrass

Publication Distributions Center

IFAS Building 664

P. O. Box 110011

University of Florida

Gainesville, Florida 32611

(904-392-1764) call for cost and shipping information

Turfgrass Pest Management Manual

North Carolina State University

Department of Crop Science

Box 7620

Raleigh, NC 27695-7620

\$12.00

Make check payable to: *Crop Science Extension*

Weeds of the Northeast

Cornell University Press

P. O. Box 6525

Ithaca, NY 14851-6525

607-277-2211

\$29.95 plus \$5.00 shipping

Table 1. Preemergence herbicides commonly used in landscape beds.

Trade Name	Active Ingredients	Comments
Barricade 65 DG, or Regalkade 0.5G	proflamizone	Fairly broad spectrum weed control including annual grasses, spurge, chickweed, henbit, oxalis and others. Granule (Regalkade G) is much safer than the spray (Barricade). Only a few bedding plants are on the label.
Pendulum 2G	pendimethalin	Fairly broad spectrum weed control including annual grasses, spurge, chickweed, henbit, oxalis and others. Granular formulation much safer than spray. Safe on many herbaceous ornamentals.
Dacthal 75WP	DCPA	Preemergence control of crabgrass, spurge, dodder, and several other annual weeds. Shorter residual control than other herbicides listed here.
Devrinol 2G or 50DF	napropamide	Somewhat narrow spectrum of weeds controlled – annual grasses primarily. Safe on many herbaceous ornamentals but labeled for few.
Snapshot TG	isoxaben + trifluralin	Broader weed control spectrum, but can injure many bedding plant species. Check the label carefully before use in color beds. Broad spectrum weed control. Injurious to many bedding plants. The granular formulation (XL) is much safer than the spray.
Surflan, XL	oryzalin, oryzalin + benefin	Broad spectrum weed control. Injurious to many bedding plants. The granular formulation (XL) is much safer than the spray.
Pennant Magnum	s-metolachlor	Preemergence control of yellow nutsedge, annual grasses and a few broadleaf weeds. Labeled for use on only a few bedding plant species.
Preen	trifluralin	Controls annual grasses and a few broadleaf weeds. The weakest weed control of the herbicides listed here but also the safest herbicide on herbaceous ornamentals.

Table 2. Preemergence Herbicides Registered for Use on Common Bedding Plants

TABLE LEGEND:
R = Registered for this species. Can be applied over the top.
R* = Registered for some species; check label for details.
I = Registered, but research indicates injury can occur.
x = Research or label indicates that injury is likely.
No Entry = the herbicide is not labeled for use on that species.

Common Name	Genus	Baricade	Dacthal	Devrinol	Pendulum2G	PennantMagnum	SnapshotTG	Surflan	Treflan/Preen	XL
Ageratum	<i>Ageratum</i>		R		R	R			R	
Balsam	<i>Impatiens</i>				R	R	x		R	
Begonia, fibrous	<i>Begonia</i>	x			R		x	x	R	
Cabbage, Ornamental	<i>Brassica</i>				R					
Chrysanthemum	<i>Chrysanthemum</i>	R		R	R	R	R	R	R	R
Cockscomb	<i>Celosia</i>				R*		x			
Coleus	<i>Coleus</i>		R				x			
Cosmos	<i>Cosmos</i>		R						R	
Dusty miller	<i>Senecio</i>				R	R			R	
Geranium	<i>Pelargonium</i>		R	R		R		R*	R	
Globe amaranth	<i>Gomphrena</i>	x					x	x		x
Impatiens	<i>Impatiens</i>				R	R	x	R*	R	R*
Kale, Ornamental	<i>Brassica</i>									
Lantana	<i>Lantana</i>	x	R	R	R*		x		R	
Marigold	<i>Tagetes</i>		R		R*	R	R*	R	R	R
Melampodium	<i>Melampodium</i>	x						x		
Moss-rose	<i>Portulaca</i>		R		R			R*	R	R
Nicotiana	<i>Nicotiana</i>								R	
Pansy	<i>Viola</i>	x	x		R	R	x	x		R*
Pepper, ornamental	<i>Capsicum</i>									
Periwinkle (vinca)	<i>Catharanthus</i>				R		R		R	
Petunia	<i>Petunia</i>			R	R	R	R	R	R	R
Salvia (scarlet sage)	<i>Salvia</i>				R			R	R	R*
Snapdragon	<i>Antirrhinum</i>		R		R	R		R	R	R
Strawflower	<i>Helichrysum</i>		R							
Sunflower	<i>Helianthus</i>		R						R	
Sweet alyssum	<i>Lobularia</i>						R		R	
Sweet potato	<i>Ipomoea</i>									
Sweet William	<i>Dianthus</i>		x		R	R		R	R	R
Verbena	<i>Verbena</i>				R*		R*	R*	R	
Zinnia	<i>Zinnia</i>		R	R	R	R	R*	R*	R	R

Updated June 2007. Human errors can occur and labels change. Check the herbicide label before use.