

Nursery Series

Weed Control in Container Nurseries

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Presence of weeds in containers has a significant negative impact on the finished quality and growth of ornamental crops. Controlling weeds in a container nursery can be a major expense. In 2001, North Carolina State University reported that hand weeding costs averaged \$420/1,000 three-gallon pots over four months.



Traditionally, weeds have been controlled by hand weeding, which is labor-intensive; however, cost-effective alternatives are now available.

Loose-fill mulches form a layer over the media surface that reduces the germination of weed seeds and minimizes water evaporation. Mulch materials can be easily added at the canning process. Ideal mulch materials should be cost effective, easy to apply, resistant to decomposition and commercially available. In addition, mulch materials should not release significant levels of toxic substances (e.g., zinc and lead). Currently, the most common materials are PennMulch™ and Wulpak™. PennMulch™ is a pelleted fiber mulch made from recycled newsprint, and Wulpak™ is a pelleted product made from wool by-products.

Physical Barriers

An alternative to chemical weed control or hand weeding is to use a physical barrier to weed germination. Barriers typically fall into two broad categories: mulches or disks.

Disks cover the media surface and form a physical barrier through which weeds cannot penetrate, but they still allow water, air and nutrients to penetrate into the container media. Examples include disks made from geotextile (e.g., Tex-R-Geodisc™), coco fiber and plastic. Concerns with these materials include cost and the ability to keep these products on the media surface during windy conditions. These products often leave a gap around the container edge or near the stem that weeds often exploit.



Coco fiber weed disk

Chemical Control

Chemicals are the most popular method of controlling weeds in nurseries. While use of sterilized media might be an option in greenhouse or liner operations, the volume of media used in a typical container

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operation means this approach is not cost effective. The most effective method of weed control in a container nursery is the use of an appropriate preemergence herbicide.

Preemergence (Woody Plants)

While preemergence herbicides are an integral part of an effective weed management program, users should remember that most products are not labeled for use inside enclosed structures such as greenhouses and hoop houses. Preemergence herbicides are applied to the media before weed seed germination. After being activated by rainfall or irrigation, these herbicides form a barrier at or just below the media surface. When the roots or shoots of germinating seeds come in contact with the herbicide barrier, their growth is inhibited. Most preemergence herbicides are cell division inhibitors affecting the emerging root and shoot, which are sites of rapid cell division. Weeds that have already emerged (visible) are not consistently controlled because their growing point has escaped contact with the herbicide. The primary target of preemergence herbicides is annual grass, but many small-seeded annual broadleaves will be controlled.

When selecting the proper herbicide, a grower must consider the weeds to be controlled (e.g., grassy weeds versus broadleaf weeds) and the crop tolerance to the herbicide. Proper weed identification is critical to a successful management program. Images of common weeds found in Arkansas nurseries can be found at http://www.aragriculture.org/horticulture/ornamentals/nursery_production/weed_id/default.asp. Once proper weed identification has been completed,

growers can match selected weeds with the appropriate herbicide (http://ohioline.osu.edu/b867/pdf/b867_3.pdf; <http://www.aces.edu/pubs/docs/A/ANR-0465/>). Read and follow the label directions for the specific herbicide used.



Typical belly-grinder applicator for granular herbicides

In general, granular formulations are used more frequently than sprayable formulations in Arkansas. While granular formulations tend to be more expensive than sprayable formulations, they tend to be better suited for small container growers in Arkansas. The most common granular herbicides used in container woody plant production are OH2

Trade Name	Active Ingredient	Weeds Controlled	Site of Action
OH2	oxyfluorfen + pendimethalin	grasses and broadleaves	protox inhibitor + microtubule assembly inhibitor
Broadstar	flumioxazin	grasses and broadleaves	protox inhibitor
Regal O-O	oxyfluorfen + oxadiazon	grasses and broadleaves	protox inhibitor + protox inhibitor
RegalStar	oxadiazon + prodiamine	grasses and broadleaves	protox inhibitor + microtubule assembly inhibitor
Ronstar	oxadiazon	grasses	protox inhibitor
Rout	oxyfluorfen + oryzalin	grasses and broadleaves	protox inhibitor + microtubule assembly inhibitor
Snapshot	trifluralin + isoxaben	grasses and broadleaves	microtubule assembly + cell wall synthesis inhibitor
Showcase	trifluralin + isoxaben + oxyfluorfen	grasses and broadleaves	microtubule assembly + cell wall synthesis + protox inhibitor

Table 2. Recommendations for Common Granular Preemergence Herbicides for Woody Container Crops

Trade Name	Product Rate/ 1,000 Square Feet	Comments
OH2	2.3 pounds	Do not apply to wet foliage. Apply overhead irrigation to remove granules. Do not apply while plants are producing a new flush of growth. Do not use on heath, 'Snow' or 'Hino Crimson' azalea, dwarf winged euonymus or potentilla.
Broadstar	3.5 pounds	Do not apply to wet foliage. Can severely injure a variety of annual bedding plants and herbaceous perennials, including hosta and daylily.
Regal O-O	2.3 pounds	Do not apply to wet foliage. Apply overhead irrigation to remove granules. Do not apply while plants are producing a new flush of growth. Injury is expected to herbaceous plants or to plants with leaf orientation that might trap granules.
RegalStar	4.5 pounds	Do not apply to wet foliage.
Ronstar	2.3 to 4.6 pounds	Do not apply to wet foliage. Injury is expected to herbaceous plants with leaf orientation that might trap granules. Sensitive varieties include Pieris, several azalea cultivars, cotoneaster, crapemyrtle, heath, hemlock, hibiscus, rhododendron, Norway and white spruce, ajuga, lirioppe, mondo.
Rout	2.3 pounds	Do not apply to wet foliage. Apply overhead irrigation to remove granules. Do not apply while plants are producing a new flush of growth.
Snapshot	2.3 to 4.6 pounds	Do not apply to ajuga, dwarf winged euonymus, hydrangea, Iberis, 'Prince of Wales' creeping juniper, certain rhododendrons.
Showcase	2.3 to 4.6 pounds	Do not apply to wet foliage. Do not apply to ajuga, dwarf winged euonymus, hydrangea, Iberis, 'Prince of Wales' creeping juniper, certain rhododendrons.
Read and follow all manufacturer label directions.		

and Rout (Table 1 and Table 2). Repeated use of the same herbicide or herbicide in the same chemical family will lead to a shift in weed populations. Manufacturers of the new granular herbicide called BroadStar claim this as an advantage of this herbicide since the active ingredient is in a different class than currently registered herbicides. One study in 2001 reported average herbicide cost per three-gallon pot per year for OH2, RegalKadeG (1.5 pounds/1,000 square feet), Regal O-O, Snapshot TG and Treflan at \$0.05, \$0.05, \$0.05, \$0.08 and \$0.01, respectively.

To be most effective, preemergence herbicides should be applied to a media surface that is free of weeds. Read and follow label directions carefully as some products may recommend a waiting period before applying the chemical following canning or transplanting. In Arkansas, two to three applications are required during a growing season.

Preemergence (Herbaceous Perennials)

In general herbaceous plants tend to be more sensitive to herbicides than woody plants, and for this reason, the number of chemical weed control options with herbaceous plants is limited. The most common choice is to use Pendulum 2G (pendimethalin); however, Kansel + (oxadiazon + pendimethalin on a fertilizer carrier) or Corral 2.68G (pendimethalin) may be an option.

Postemergence Herbicides

Postemergence herbicides are generally not an option in a container nursery because of the tremendous number of varieties we are dealing with and the age or size of the crops. Directed sprays to small grass weeds are an option. Tall weeds must be

manually removed. Postemergence grass herbicides that may be considered include Fusilade II (fluazifop; 0.4-0.6 ounce/1,000 square feet + surfactant), Ornamec (fluazifop), Envoy (clethodim; 0.5%-1% + 0.25% nonionic surfactant) and Vantage (sethoxydim). Read and follow label instructions.

Weed Control Under Containers

Containers should be placed on covered ground using gravel, black plastic sheeting or woven weed-fabric. Covered ground will make for a cleaner

production area and minimize weed establishment. The easiest time to deal with existing weeds in a container production area is between crop cycles. Prior to placing container crops on covered ground, herbicides containing prodiamine (Barricade, Factor or Endurance) can be applied to provide up to eight months of weed control. Once containers are placed on the covered ground, herbicides that fall between containers will serve to provide varying degrees of weed control.

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