COMMON WEEDS IN OREGON CONTAINER CROPS

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Weeds compete with commercial crops for nutrients, water, and light. Competition from weeds is particularly important in container crops due to the crop’s limited root volume. Weeds also harbor insects, disease organisms, and vertebrate pests. Marketable nursery crops must be free of weed, insect, and pathogen pests.

Effective weed management involves a combination of sanitary and cultural practices, along with proper use of preemergence herbicides. For a thorough description of weed control practices, see OSU Extension publication EM 8823, *Weed Control in Container Crops*.

**Sanitation**

Weed control in container production must be preventive. A common characteristic of weeds in containers is their ability to produce seed prolifically. Practices that minimize the number of weed seeds in the production system will improve weed control. The most effective weed management is provided by using sanitation to reduce weed seed numbers in the production system, while maintaining an effective chemical herbicide barrier to prevent growth of the few seeds that elude sanitation efforts.

**Herbicide use**

For instructions on safe herbicide use, consult your local OSU Extension agent or refer to the *Oregon Pesticide Safety Education Manual: A Guide to the Safe Use and Handling of Pesticides* (EM 8850).

Weed control in container production is achieved primarily through use of preemergence herbicides. Preemergence herbicides are applied before weed emergence to prevent weed growth, in contrast to post-emergence herbicides, which kill weeds after they have emerged and are growing. Herbicide selection should be based primarily on three criteria: the crop to which the herbicide will be applied, target weed species, and herbicide solubility.

**How to use this guide**

The images in this guide will help you identify weeds of container crops. Most weeds in containers can be identified by physical characteristics such as leaf shape, flower structure, and plant habit.

This guide presents cultural and sanitary control options for each species. It describes life cycle, reproduction, and morphology in the context of how these factors affect control. By understanding these factors and by manipulating the container/greenhouse environment, you can reduce weed vigor and the degree of infestation. Where appropriate, supplement these cultural and sanitation practices with labeled chemical herbicides.
Cardamine hirsuta, hairy bittercress
Brassicaceae, mustard family

A—Seedlings
B—Rosette
C—Mature plant
D—Flowers
E—Seed pods

2 Cardamine hirsuta
Hairy bittercress is a winter annual that reproduces by seeds. It typically germinates throughout fall and winter. In cool environments created by overhead irrigation, however, bittercress can germinate year-round.

**A—Seedlings.** Bittercress cotyledons are small and round, while first true leaves are simple and slightly lobed. Fertilizer prills provide a size scale.

**B—Rosette.** Bittercress initially forms a rosette with deeply lobed foliage.

**C—Mature plant.** Mature habit is a small clump 6 to 8 inches tall and wide. During warm summer months, bittercress generally is smaller than in cool winter months.

**D—Flowers.** Flowers occur in clusters called racemes. Individual flowers are white with four petals. There is confusion in distinguishing between *C. hirsuta* and *C. oligosperma. C. hirsuta* flowers have a variable number of stamen. Most flowers have four stamen (80 percent), some have five (18 percent), and a few have six (2 percent). *C. oligosperma* always has six stamen.

**E—Seed pods.** Seed pods are called siliques. Siliques are dry, two-sided, dehiscent fruit. Bittercress siliques are cylindrical and up to 1 inch long and $\frac{1}{16}$ inch wide. Bittercress can project seeds several feet from the mother plant.

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**Control**

One bittercress plant can produce up to 5,000 seeds in just 5 weeks (Bachman and Whitwell, 1995). Ability to project seeds several feet from the mother plant makes sanitation paramount. Eliminate bittercress and other weeds from gravel and surrounding areas.

Bittercress is most problematic from fall through early spring.

Preemergence herbicides provide effective control; however, they must be applied prior to seed germination. Preemergence herbicides applied prior to overwintering will prevent severe infestations. Apply herbicides at least 3 weeks before covering plants with plastic or placing them in overwintering structures. (See labels for specific details.)
Oxalis corniculata, creeping woodsorrel
Oxalidaceae, oxalis family

A—Seedling
B—Leaves
C—Mature plants
D—Flower
E—Seed pod
Oxalis is a cool-season perennial that reproduces by seeds and spreads within containers by stolons.

A—Seedling. Oxalis cotyledons are small and round, while first true leaves have cloverlike foliage.

B—Leaves. Oxalis leaves are trifoliate, with three heart-shaped leaflets palmately attached to the petiole. Leaflets are green to purple and pubescent, especially around the margins.

C—Mature plants. Mature habit is a spreading clump 4 to 6 inches tall. Plants spread quickly over the container surface with an intricate network of stolons, making hand weeding difficult and ineffective.

D—Flower. Oxalis flowers are yellow with five petals, five stamens, and one pistil.

E—Seed pod. Seed pods are cylindrical, up to 1 inch long and 1/16 inch wide. Seed pods are ridged and hirsute (hairy). Seed from oxalis can be projected several feet from the mother plant, speeding dissemination throughout container production areas.

Control

Once established in containers, stolons and deep taproots make hand pulling difficult.

Plants start flowering just 4 weeks after germination (Doust et al., 1985), so life cycles are short, enabling oxalis to spread throughout the container system rapidly.

Similar to bittercress, the ability of creeping woodsorrel to project seeds several feet from the mother plant makes sanitation a priority. Eliminate all weeds from surrounding areas.
Marchantia polymorpha, liverwort
Subdivision Bryophyte

A—Thalli
B—Gemmae cups
C—Mature plants
D—Fruiting plants
Liverworts are not vascular plants, but instead are primitive, spore-bearing bryophytes.

A—Thalli. Liverwort thalli (leaflike structures) grow prostrate over the substrate surface.

B—Gemmae cups. Gemmae cups form on the surface of liverwort thalli. Gemmae cups contain vegetative diasporas (clonal fragments) called gemmae. When splashed from the mother plant, they reproduce genetically identical plants. Gemmae can be splashed up to 18 inches from the mother plant. This is the primary mechanism by which liverwort spreads in container systems.

C—Mature plants. Plants continue to spread and grow on top of each other. Like shingles on a roof, the overlapping plants shed water from pots, making irrigation and fertilization less efficient and problematic.

D—Fruiting plants. Liverwort are unisexual. Each plant is either male or female and contains either male or female gametangiophores. Female gametangiophores emerge from liverwort thalli to a height of 1 inch. The top of the gametangiophore contains fingerlike projections resembling a palm tree. Male gametangiophores generally are shorter, and the top is more disk shaped.

Control

Liverwort control requires strict management of environmental and cultural conditions. Liverworts thrive in environments with high fertility, excess substrate moisture, and high humidity. Avoid topdressing fertilizers. Incorporating or dibbling controlled-release fertilizers reduces liverwort growth compared to topdressing.

Irrigate crops according to plant need instead of following fixed irrigation schedules and rates. If possible, use a mulch or coarse bark to reduce moisture on the container surface. Improve air circulation around the container surface to decrease localized relative humidity.

Herbicides containing flumioxazin, oxadiazon, or oxyfluorfen have been reported to be effective for preemergence liverwort control (Svenson, 1998; Fausey, 2003).

Regardless of the herbicide used, however, control will be poor if cultural and environmental conditions favor liverwort growth.
Sagina procumbens, pearlwort
Caryophyllaceae, pink family

A—Seedling
B—Young plants
C—Mature plant
D—Flower
E—Flowers

8 Sagina procumbens
Pearlwort is a perennial that spreads by seeds. Seed are small ($\frac{1}{64}$ inch diameter) and are believed to move throughout the nursery by clinging to clothes and wet hands.

**A—Seedling.** Seedlings are small with linear leaves. Fertilizer prills provide a scale to seedlings’ small size.

**B—Young plants.** Recently germinated pearlwort plants look like small green spiders. Foliage is linear, sessile (without petioles), and arranged oppositely along the stem.

**C—Mature plant.** At maturity, pearlwort forms a prostrate mat of variable size. It may look like moss, but it is a vascular plant in the pink family (Caryophyllaceae). The presence of flowers confirms its classification.

**D—Flower.** Pearlwort flowers have four green sepals, which are larger than the smaller white petals. Four stigma curl from the top of a single ovary.

**E—Flower.** Flowers are less than $\frac{1}{8}$ inch in diameter. They are solitary on small pedicels, but are numerous on a single plant. An index finger provides a scale to the small size of individual flowers.

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**Control**

There are few control recommendations for pearlwort. Current OSU research shows that coarse substrates inhibit pearlwort establishment and growth (Altland, 2004). Because seeds are so small, in coarse substrates they are likely to be flushed so deeply below the container surface that they cannot germinate and establish. Most nurseries use substrates that are too fine. In addition to causing a host of other problems, fine substrates promote pearlwort germination and establishment.
Senecio vulgaris, common groundsel
Asteraceae, sunflower family

A—Seedlings
B—Young plant
C—Mature plant
D—Flowers
E—Seed heads

10 Senecio vulgaris
Common groundsel is an annual that germinates and grows throughout the year, although it is most prolific during the cool fall and spring seasons.

A—Seedlings. Seedlings have linear cotyledons, while first true leaves are slightly lobed or scalloped.

B—Young plant. Foliage is dark green, alternately arranged along the stem, and pinnately lobed. Leaves have sparse numbers of long hairs. In Oregon, common groundsel often is infected with a rust fungus that produces bright orange spots on the foliage.

C—Mature plant. Mature habit is variable, but generally occurs as a clump 12 to 24 inches tall and wide. Plants often are branched with an erratic form.

D—Flowers. Flower heads are cylindrical, ¼ to ½ inch long and ¼ inch in diameter. Flowers are disk-type, yellow, and surrounded by a black-tipped involucre (leafy bracts surrounding an inflorescence).

E—Seed heads. Seed heads are spherical and white. Seeds are achenes attached to a feathery pappus (the white part), which aids in wind dispersal.

Control

The key to common groundsel control is sanitation. Because seeds are readily dispersed by wind, just a few plants near the nursery can infest the entire container operation. A wind break surrounding the nursery will prevent seeds from blowing in from outside.

Common groundsel often is resistant to atrazine and other triazine herbicides. Princep (simazine) is among this group, so control may be poor when this product is used.
Northern willowherb is an annual. It germinates and grows throughout the year, although it generally flowers mid- to late summer.

A—Seedlings. Cotyledons are deltoid in shape, while first true leaves are round. Subsequent leaves develop the more typical linear shape.

B—Young plants. Plants initially grow with very short internodes and densely spaced foliage arranged oppositely along the stem. Foliage is 4 to 6 inches long, linear, and slightly serrated. Sometimes foliage develops a red to purple tint.

C—Mature plants. Plants grow up to 5 feet tall at maturity. They are branched at the base, but rarely so higher along the stem. Foliage and stems can be green, red, or purple.

D—Flowers. Flowers are solitary and occur on pedicels 1 to 2 inches long. Flowers have four white to pink bilobed petals.

E—Seed pods. Seed pods are narrow and approximately 2 inches long. Pods split open at maturity to expel seeds, which are attached to a white tuft of hairs that aid in wind dispersal.

Control

Seeds from northern willowherb are disseminated by wind; thus just a few plants can quickly infest the entire container system. To prevent introduction of seeds from outside the nursery, remove existing plants from non-cropland areas and establish a physical barrier around the nursery.
Epilobium ciliatum, northern willowherb

A—Seedlings

B—Young plants

C—Mature plants

D—Flowers

E—Seed pods
**Poa annua**, annual bluegrass

*Poaceae, grass family*

A—Seedlings. Annual bluegrass is monocotyledonous (it has only a single emerged cotyledon).

B—Foliage. Foliage is blue-green. Leaf tips are keeled and resemble the tip of a canoe.

C—Mature plant. Plants form small clumps 4 to 6 inches tall and wide.

D—Inflorescence. Annual bluegrass inflorescence is pyramidal shaped and white in color.

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**Control**

Annual bluegrass is more problematic on gravel floors than in pots. Nonetheless, when allowed to grow on gravel, plants quickly make their way into containers. Remove annual bluegrass from gravel floors with postemergence herbicides, and prevent further germination by applying insoluble preemergence herbicides directly to the gravel. Products containing prodiamine are labeled and well suited for this purpose.

Use preemergence herbicides prior to weed germination to prevent infestations in containers. To control existing populations of annual bluegrass, use grass-selective postemergence herbicides. (Check labels for crop tolerance.) Products containing clethodim (Envoy) provide better postemergence annual bluegrass control than those containing sethoxydim or fluazifop (Vantage or Fusilade, respectively).
Prostrate spurge is a summer annual. It is reported to be one of the most difficult-to-control weeds in container production. In Oregon, it seems to prefer warm climates, and it is most problematic in hot greenhouses or during unseasonably warm summers.

**A—Seedling.** Seedlings have round cotyledons.

**B—Foliage.** Foliage is arranged oppositely along the stem. Most conspicuous is the red blotch that occurs on the upper leaf surface.

**C—Mature plants.** Mature habit is prostrate and spreading. A single plant can grow up to 30 inches in diameter. In closely spaced containers, weeds spread by growing over the sides and into other containers, where they deposit seeds.

**D—Flowers.** Flowers are inconspicuous and difficult to see without magnification. They occur in axillary clusters along the stem.

**E—Cut stem.** Similar to other plants in the family Euphorbiaceae, stems exude a milky sap when cut.

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**Control**

Prostrate spurge is one of the most difficult-to-control weeds in container production. Seeds germinate within 5 days after release from the mother plant (Krueger and Shaner, 1982) and mature in just 4 weeks. Because of rapid germination, apply preemergence herbicides soon after potting.

Preemergence herbicides must be applied prior to spurge germination.
**Prostrate spurge**

A—Seedling

B—Foliage

C—Mature plants

D—Flowers

E—Cut stem
Literature cited


Weed terms

Achene—A single-sided, dry fruit that does not split open.

Axil—The position between a leaf and stem.

Bryophyte—Any of a division of nonflowering plants comprising mosses and liverworts.

Cotyledon—A seed leaf; the first leaf (or leaves) from a sprouting seed. Monocotyledonous plants have one seed leaf; dicotyledonous plants have two.

Dehiscent—Fruit that opens at maturity.

Deltoid—Triangular-shaped.

Diaspore—An easily detached propagule from a plant.

Gametangiophore—Flowerlike, spore-bearing structures on liverworts.

Gemmae—An asexual reproductive body (clonal fragment) that becomes detached from its parent plant.

Hirsute—Hairy.

Involucre—A whorl of bracts situated below and close to a flower or flower cluster.

Keel—A central ridge on the back or outer surface of a folded leaf.

Palmate—A leaf arrangement in which the leaves radiate outward from a single point on a stem, somewhat like the fingers of a hand; a leaf with lobes radiating outward from a single point.

Pappus—Modified petals in the form of bristles, hairs, or awns that remain attached to seed. Often aids in seed dispersal. Common in the family Asteraceae.

Pedicel—The stem of an individual flower.

Petiole—The stem of a leaf.

Pinnate—A leaf arrangement in which the leaves are arranged along a stem; a leaf with lobes arranged along a central midrib.

Pistil—The female sexual organ of a flowering plant.

Pubescent—Covered with fine, soft, short hairs.

Raceme—An arrangement of flowers along a stem on individual stalks about equal in length.

Rosette—A compact cluster of leaves arranged in an often basal circle.

Sepal—The outer, leaflike part of a flower.

Serrate—Notched or toothed on the edge.

Sessile—Stalkless and attached directly at the base.

Silique—An elongated capsule with two separate valves.

Stamen—The male, pollen-bearing part of a flower.

Stigma—The part of the female sex organ that receives pollen; often sticky when receptive.

Stolon—A horizontal stem that roots at the nodes.

Thallus—A simple vegetative body undifferentiated into true leaves, stems, and roots.

Trifoliate—Having three leaves or leaflets.

Vascular—A plant having a specialized system (xylem and phloem) for moving water and nutrients through the plant.
For more information


*Weed Control in Container Crops* (EM 8823)

Many OSU Extension Service publications may be viewed or downloaded from the Web. Visit the online Publications and Videos catalog at http://eesc.oregonstate.edu.

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