Management of Container Weeds

Container vs. field production

- **Containers**
  - No seed bank
  - Bark substrates are free of weeds initially
  - Isolated substrate volume
  - Irrigated daily
  - No postemergence herbicides
  - No cultivation

- **Field crops**
  - Abundant seed bank
  - Abundant weed seeds and perennial propagules
  - Soil is continuous
  - Irrigated weekly or less
  - Many postemergence herbicides (directed apps.)
  - Cultivation equipment is common and efficient

Container weeds

- Seed have some sort of active dispersal mechanism
  - Wind-blown
  - Explosive dehiscence
  - Splashed with water
- Germinate in low light levels
- Germinate in moist environments
- Short life cycles
- Prolific seed producers
- Small seeds

Container weed management

- Understand weed biology
- Understand how weeds propagate and spread
- Use unique aspects of the container environment to disrupt weed establishment

Effective weed control

- Sanitation
  - Weed seed
  - Weeds in non-cropland areas
- Herbicide management
  - Maintain chemical barrier
Consistent message

- Sanitation
  - Eliminate the weed source

- Culture
  - Use practices that inhibit germination and slow weed growth

- Chemical
  - Use proven effective herbicides
  - Or substitute herbicides with mulch

Bittercress – Cardamine sp.

- Cardamine hirsuta or C. oligosperma

- C. hirsuta
  - 80% of flowers with 4 stamen
  - 18% with 5 stamen
  - 2% with 6 stamen

- C. flexuosa or C. stricta
  - 100% with 6 stamen
**Bittercress**

- *Cardamine hirsuta* or *C. oligosperma*.
  - Greek, literally translates to bitter cress
- Family Brassicaceae
  - Mustard family
- Winter annual, short-lived, rapid life cycle
  - Most problematic from October – April
  - Single plant can produce 5000+ seed
  - The crux of the problem

**Bittercress seedlings**

Silique – 2-sided, dry, dehiscent fruit.

**Bittercress**

- Seed germinates within 5 days
- Can produce new seed within 5 weeks
- Explosive dehiscence
  - Shoots seeds up to 3 feet

**Bittercress**

- Sanitation is very important
  - Control on gravel, weed fabric
  - Sanitize ground between crops
  - Remove debris, spilled bark, leaves, etc.
  - If necessary, spray with postemergence herbicide to kill germinated weeds
  - Use preemergence herbicides beneath containers

**Bittercress seedlings**

- Require little substrate for germination
- Germinate readily in
  - Gravel
  - Drain holes
  - Weed fabric
Bittercress seedlings

Chemical control

- Most problematic in cool season
- Troublesome in over-winter structures
- Apply preemergence herbicide 3 weeks prior to covering containers for winter

Bittercress – Expt. 1

Bittercress

- Keys to success
  - Sanitation
    - no weeds on gravel or near containers
  - Preemergence herbicides
    - Apply soon after potting
    - Apply prior to overwintering

Creeping woodsorrel

- Oxalis corniculata
  - Greek osys - sour
  - Corniculata -horned
O. corniculata vs. O. stricta

Creeping woodsorrel
Seed dissemination
• Seed are forcefully expelled up to 10’ from mother plant.
• Seed are ridged and sticky

Creeping woodsorrel
• Small clump of foliage
• Spreads by stolons

Creeping woodsorrel
• Easy to control from seed

Oxalis – Expt. 1
Shoot fresh weight (g) 60 days after herbicide application.

Most infestations come from liners!!!!
• Liners come infested with oxalis
• Regenerate from roots and stolons
• Most pre-herbicides will not control regeneration from roots
Creeping woodsorrel

- Keys to control
  - Do not allow plants to grow near containers
  - Check liners for infestations
  - Use preemergence herbicides to prevent new infestations
  - Use Snapshot at 200lbs to follow up on handweeding

Prostrate spurge

- Chamaesyce maculata
- Summer annual
- Seeds germinate within 5 days
- Plants mature in just 4 weeks

Prostrate spurge

- The most difficult-to-control species in the southeast
- Becoming more problematic in Oregon
- Seed dispersal?
  - Wind dispersed in similar species.
**Prostrate spurge**

![Graph showing spurge control over 3 months](image)

**Spurge control – 3 months**

<table>
<thead>
<tr>
<th>Shoot number/pot</th>
<th>Control</th>
<th>Broadstar</th>
<th>OH2</th>
<th>Regal O-O</th>
<th>Rout</th>
<th>Snapshot</th>
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</thead>
<tbody>
<tr>
<td>Shoot weight (g)</td>
<td>80</td>
<td>70</td>
<td>60</td>
<td>50</td>
<td>40</td>
<td>30</td>
</tr>
</tbody>
</table>

**Marchantia polymorpha**

- Lower plant form (Hepatophyta)
- Reproduces sexually by spores
- Reproduces asexually by gemmae

**How do they spread?**

- Gemmae splash from irrigation or rain drops.
  - Gemmae can splash up to 1 meter.
- Liverwort produce microscopic spores

**Liverwort control??**

- Prevention is the best method.
- Make the container environment inhospitable for liverwort.
  - Reduce moisture
  - Reduce humidity
  - Remove nutrition on the container surface.

**Preemergence liverwort control**

- Greenhouses
  - Sanitize greenhouses prior to crops
Zerotol
• Hydrogen peroxide
• Peracetic acid
• Stabilizers

• Kills spores prior or soon after germination.
• Kills gemmae.
• No observable injury on crops tested so far.

Liverwort control - preemergence

• Container stock
  – Preemergence herbicides
  – Do not over water plants
  – Avoid topdressing

Liverwort control - preemergence

Killing existing liverwort

• Mogeton
  – Being registered by Crompton/Uniroyal
  – Co-registration with U.S. and Canada
  – Provides excellent post liverwort control
  – Little or no injury to ornamentals

• Terracyte at high rates
  – Labeled for 15 lbs/1000 ft²
  – Most effective early in the year (before April)
Burn-down of juvenile liverwort

Liverwort control
  • Keys to success
  • Greenhouse
    – Sterilize greenhouse
    – Use Zerotol regularly
    – Kill small liverwort populations
  • Container stock
    – Use Pre-herbicides Broadstar, Rout, or Ronstar
    – Avoid over-watering and topdressing fertilizers

Pearlwort – *Sagina procumbens*

Pearlwort seedlings

Pearlwort
Pearlwort

- Substrate particle size
  - Seed are extremely small.
  - When coarse substrate is used, seeds fall too deep in pores, cannot germinate.

Pearlwort – Expt. 2

Weed number 50 days after herbicide application, seed applied 30 days after herbicides.

Pearlwort

- Easy to control from seed with herbicides.
- Pearlwort already established in propagation is extremely difficult to control.
- What’s the solution?
  - Better weed control in propagation

Northern willowherb

- a.k.a. fireweed
- Perennial
- Germinates year round
  - Forms a rosette over cold winter months
  - Grows upright and flowers in spring/summer

E. ciliatum

- Plants grow 2 to 4 feet tall.
- Foliage and stems can be purple
- Flowers are white to pink
- Flowers are bi-lobed
- Seed are attached to tuft of hairs and wind dispersed
**E. ciliatum - NWH**

- Seed germinate within 4 days of natural sowing.
- Plants mature and produce new seed in 8 weeks.

**Fireweed – Expt. 2**

**NWH – sprayed herbicides**

**NWH**

- Keys to success
- Cultural control
  - Do not allow NWH in or around the nursery to bloom and produce seed.
- Chemical control
  - Products containing oxadiazon (Ronstar)

**Summary**

- Sanitation is the cornerstone to any weed management program
- Learn how each weed spreads
  - Prevent the dispersal mechanism
- Herbicides are good tools
  - Alone they are largely ineffective
- Nurseries in Canada
Total weed management program

Effective weed control

Sanitation
- Weed seed
- Weeds in non-cropland areas

Herbicide management
- Maintain chemical barrier

Website
- http://oregonstate.edu/dept/nursery_weeds/