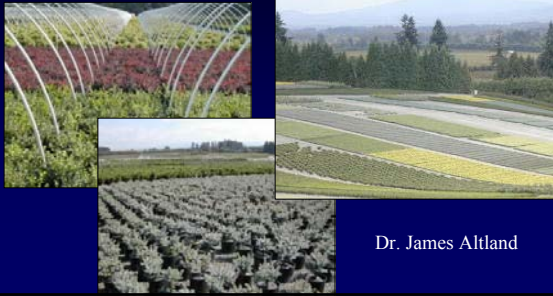




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Management of Container Weeds



Dr. James Altland

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

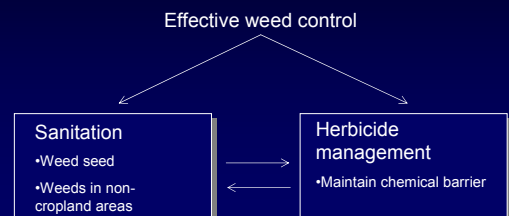
Container weed management

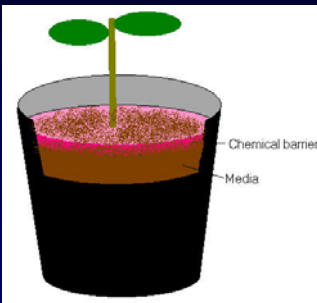
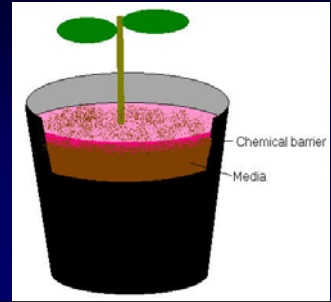
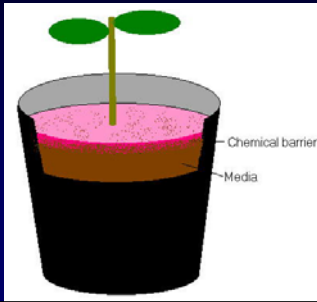
- Understand weed biology
- Understand how weeds propagate and spread
- Use unique aspects of the container environment to disrupt weed establishment



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Container weed management





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.



Bittercress

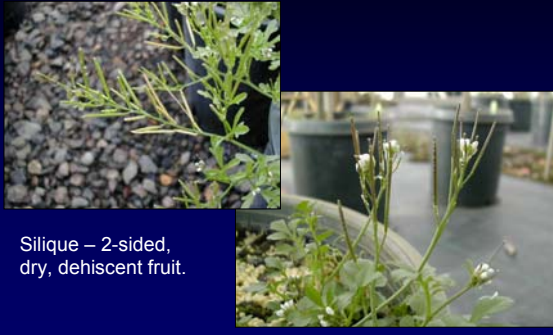
- *Cardamine hirsuta* or *C. oligosperma*
- *C. hirsuta*
 - 80% of flowers with 4 stamen
 - 18% with 5 stamen
 - 2% with 6 stamen
- *C. flexuosa* or *C. stricta*
 - 100% with 6 stamen



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



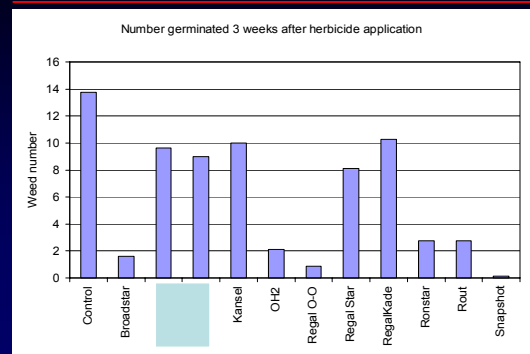
Bittercress seedlings



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

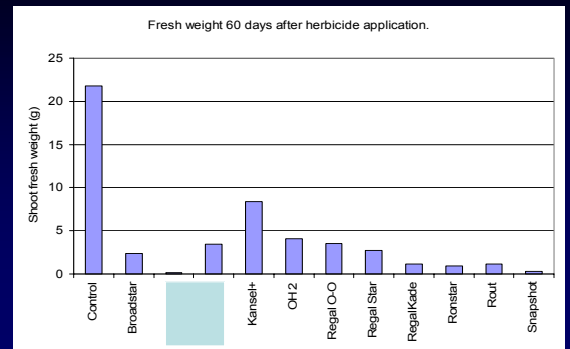


Creeping woodsorrel

- Small clump of foliage
- Spreads by stolons



Oxalis – Expt. 1



Creeping woodsorrel

- Easy to control from seed
- 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

- When containers have oxalis
 - Thoroughly hand weed containers or liners
 - Apply Snapshot at 200 lbs/acre

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

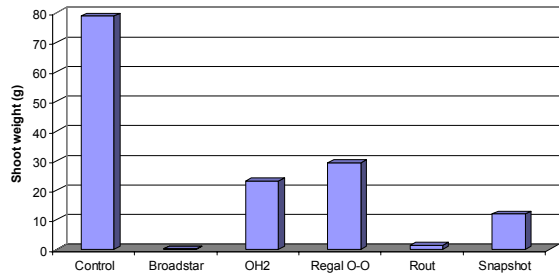
- *Chamaesyce maculata*
- Summer annual
- Seeds germinate within 5 days
- Plants mature in just 4 weeks



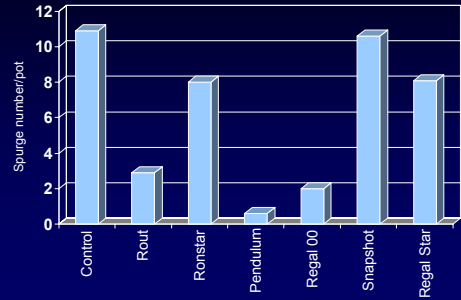
Prostrate spurge

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

Prostrate spurge



Spurge control – 3 months



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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

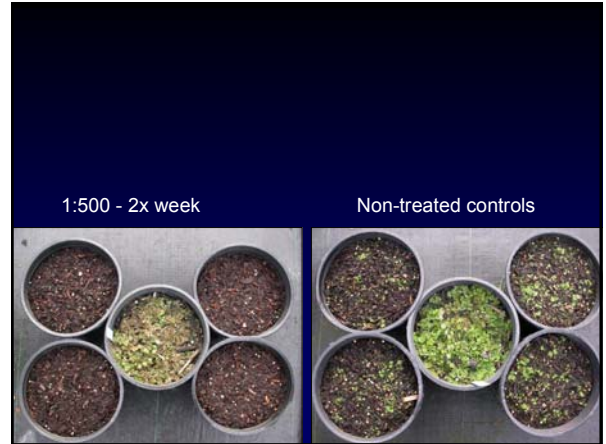
- Greenhouses
 - Sanitize greenhouses prior to crops



Zerotel

- Hydrogen peroxide
- Peracetic acid
- Stabilizers

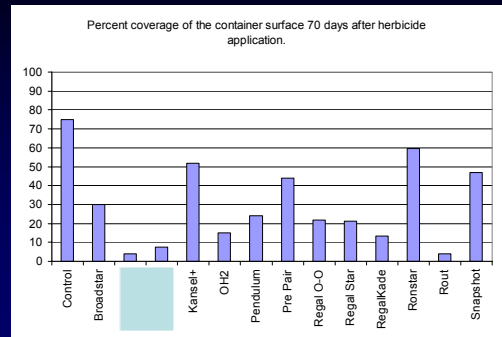
- Kills spores prior or soon after germination.
- Kills gemmae.
- No observable injury on crops tested so far.



Liverwort control - preemergence

- Container stock
 - Preemergence herbicides
 - Do not over water plants
 - Avoid topdressing

Liverwort control - preemergence



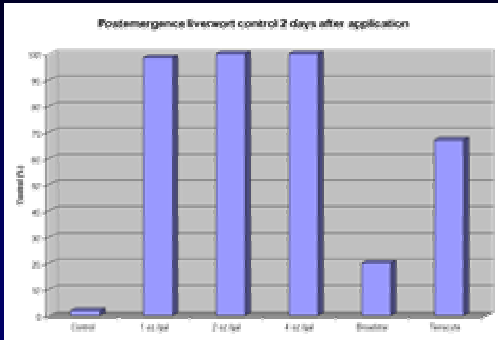
Liverwort control - preemergence

- Propagation, enclosed structures
 - Sterilization of greenhouse structure
 - Bleach (use quickly)
 - Quaternary ammoniums
 - Triathlon
 - Hydrogen peroxide
 - Zerotel

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 Zerolol regularly
 - Kill small liverwort populations
- Container stock
 - Use Pre-herbicides Broadstar, Rout, or Ronstar
 - Avoid over-watering and topdressing fertilizers

Pearlwort – *Sagina procumbens*



Sagina – Latin for fodder, once mis-classified in the spurrey genus.

procumbens - prostrate

Pearlwort seedlings



Pearlwort



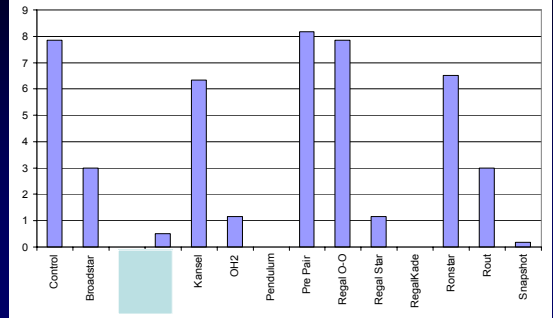
Pearlwort

- 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 prop liners 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-ish



E. ciliatum

Flowers are white to pink
Flowers are bi-lobed

Seed are attached to tuft of hairs and wind dispersed

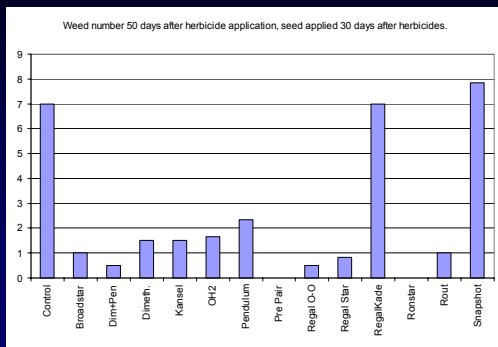


E. ciliatum - NWH

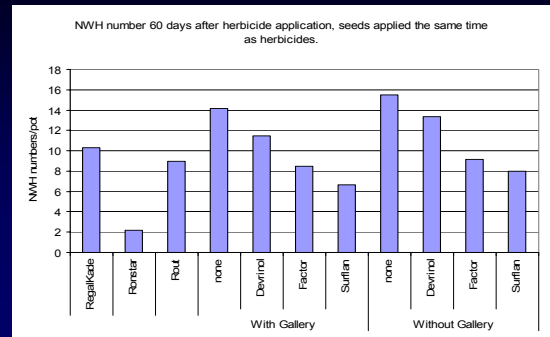
- Seed germinate within 4 days of natural sowing.
- Plants mature and produce new seed in 8 weeks.



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

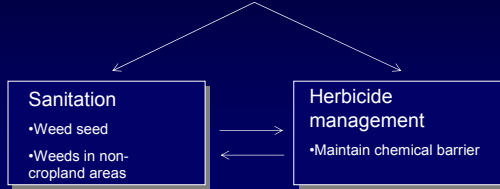
- Sanitation is the cornerstone to any weed management program
- Learn how each weed spreads
 - Prevent the dispersal mechanism
- Herbicides are good tools
 - Alone they are largely ineffective
- Nurseries in Canada



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Total weed management program

Effective weed control



Website

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