Killing perennial weeds

James Altland

Oregon State University
Today’s talk

• Issues with perennial weeds

• Generalized concepts in perennial weed management

• The major offenders
Weeds

- Plants that are successful colonizing disturbed, but potentially productive, sites and maintaining their abundance with repeated disturbance.

  Liebman et al.
• Annual weeds
  – Short life cycles, prolific seed producers
  – Susceptible to control measures
  – Defy control by large numbers

• Perennial weeds
  – Persistent, defy control through ability to regenerate from vegetative propagules and underground storage organs.
Contact herbicides

• Not translocated
• Kills tissue immediately after being absorbed.
  – Cell membrane disruption
  – Burning
  – Necrosis of stem and leaf tissue
Translocated herbicides

- Absorbed by foliage and other green tissue
- Moved throughout plant along with photosynthates
- Moved to growing points
- *Can* control the complete plant
Translocated herbicides

• Require living, functioning plants.

• Environmental conditions that favor plant growth also improve effectiveness
  – High light
  – adequate soil moisture
  – moderate temperatures
Which type?

• **Contact herbicides**
  – Faster action
  – Safer around ornamentals
  – Will not kill roots (perennials)

• **Translocated herbicides**
  – Slower action
  – More effective across all weed types
  – Greater potential injury to ornamentals
Contact herbicides
Contact herbicides
Contact herbicides
Contact herbicides
Cultivation
Cultivation

The deeper you cultivate, the more damage is done.
The deeper you cultivate, the more damage is done.
Cultivation

4
Translocated herbicides
Translocated herbicides
Translocated herbicides
Translocated herbicides
Translocated herbicides
Weed biology

• Every weed has an Achilles' heel

• Understand their biology, growth habits, and method of reproduction

• Use a combination of weed management tools to exploit their weakness
Yellow nutsedge

- Yellow nutsedge (*Cyperus esculentus*)
- Family Cyperaceae
What works?

• Preemergence herbicides
  – Pennant (metolachlor)

• Emergence
  – April 9, 2004
  – Maybe later?
Preemergence control

• Apply Pennant just before emergence for best results……
  – Not 3 months before!!!!
  – Not 2 weeks after!!!!

• Herbicides degrade
  – Too early, poor results
  – To late, no results!!!
Typical herbicide degradation

Hypothetical situation where herbicide half-life is 60 days
Typical herbicide degradation

Herbicide concentration vs. Days after herbicide application
Typical herbicide degradation

Herbicide concentration vs. Days after herbicide application.
Preemergence herbicides

• Long-term crops (3+ years)
  – Complete control with Pennant???
    • Tubers must germinate in 2 years, or rot

• Short-term crops (2 years or less)
  – Pennant is only a Band-Aid
  – Tubers are suppressed
  – Tubers can still be viable after plants are dug and shipped.
Postemergence herbicides

- Roundup
- Manage
- Roundup + Manage

- Make applications 2 to 4 weeks after emergence in spring

- Repeat after re-emergence, before it grows to 6” tall.
Wild garlic – *Allium vineale*

- Clumps of foliage form in late summer.
- Grows throughout winter and spring.
- Creates thousands of bulbs.
- Bulbs shipped with nursery stock is a serious problem.
Wild garlic

• Emerges mid-September
• Grows vegetatively all winter
• Develops new underground bulbs in late March
• Forms flowers, aerial bulblets in May-June
Wild garlic - control

- After emergence, before new bulb formation

- Cultivation, or 2,4-D
  - Be careful with 2,4-D around nursery stock
  - Image (imazaquin) also labeled for landscapes (not nursery crops).

- Kill existing plants, don’t allow next generation to be developed.
Wild garlic

- Some bulbs can persist in soil for 5 years
- Persistent control is necessary for at least 3 years, maybe as long as 5
- If you skip a year, you start from scratch!!!
Canada thistle

- *Cirsium arvense*
- Spreads by seed and spreading root system
- Deep tap root and extensive roots make control difficult
• A seedling can spread 20 feet radius in a single season.

• Seed persist in soil for 20 years.

• A seedling can reproduce vegetatively in just 6 weeks.
Canada thistle

• Control with Lontrel (clopyralid)

• Apply at the rosette stage
  – In spring, apply at rosette before plants bolt
  – In fall, apply after plants flower and produce additional small rosettes

• Will likely require at least 2 applications
• Stinger – ag label for clopyralid
• 2/3 pint/acre in fall
• 1/3 pint/acre in spring
• Rosette stage
Field bindweed

- *Convolvulus arvensis*
- Seeds persist in soil for 60 years
- Roots grow to a depth of 30 feet.
Perennial
Grows in summer
Vine habit
Field bindweed

• Repeated tillage every 3 weeks will provide control after 2 years.
  – Applying contact herbicides should have similar result.
Field bindweed

- 2,4-D or Roundup

- Apply just before plants begin to flower.

- Repeated applications will be necessary.
Horsetail

- *Equisetum arvense*
- Produces tubers 6 feet deep
- Reproduces by spores
- Spreading root system
Horsetail control

• Preemergence
  – Casoron
  – 3 consecutive years at 4, 3, and 2 lb ai/acre

• Postemergence control
  – MCPA
  – 20-30% reduction in plant roots with each application
  – Do not skip an application!!!
Perennial weed control

• Prevention is the best method of control

• To remove infestation, develop a plan of repeated cultivation or herbicide application.

• Be diligent
  - If you give an inch, they take a mile
Website

- http://oregonstate.edu/dept/nursery-weeds/