



Oregon State University



## Landscape weed control

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## Weed control reality

- Weed seeds are present in soil
- You cannot eliminate all weed seed
  - Even fumigation with MeBr is only temporary relief
- Sanitation and management practices should discourage weeds from *establishing*

## Redroot pigweed

- Plants produce up to 100,000 seed
  - 13,860 with no fertilizer
  - Over 34,600 when fertilized
- Seed can be wind dispersed
  - Small size
- Seed survive for more than 30 years
  - Soil surface or buried




## Weeds

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

Liebman et al.




## Landscape weed control

- Sanitation
- Cultural practices
- Mulches
- Herbicide use






## Sanitation

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- Clean mulch
- Weed-free plant material
- Remove existing weeds
  - Prevent the next generation of seed

## Clean mulch

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- Bark is generally weed-free
- Storage conditions might introduce weeds
- Examine the source of your bark supply to make sure they use sound sanitation



## Weed-free plant material

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- Container or field-grown nursery plants can be infested with weeds
- When possible, visit your plant supplier
  - Visit your supplier's supplier
- Demand weed-free nursery stock





## Eliminate existing weeds

- Most 'weeds' reproduce prolifically
- Do not allow weeds to mature in the landscape
  - Do not allow perennials to spread vegetatively

## Cultural practices

- Watering
- Fertilizing
- Mulching
- Plant density

## Irrigation

- Weed seeds require available moisture for germination
- Seeds imbibe water, triggering germination
- Leave landscape surface dry, reduce weed establishment

## Irrigation

- Subsurface irrigation is most effective
  - Water moves throughout soil via capillary action
- Sub-mulch irrigation is partially effective
  - Water movement depends on mulch physical properties

## Irrigation

- Overhead irrigation is least ideal
  - But also most common
- Fewer irrigation events
  - Longer drying cycles reduce germination
  - Make it more difficult for seedlings to establish



## Nutrition

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- Seed of many landscape weeds are small.
- Seeds must germinate close to the surface.
- Seed require available nitrogen (N), phosphorus (P), and potassium (K).

## Nutrition

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- Most bark mulches are very low in available nitrogen (N).
  - Composts are often high in available N.
- Seed germinate poorly in bark without available nutrients.
  - Seed germinate readily in compost.



## Landscape nutrition

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- Keep the mulch surface free of N
  - Incorporate fertilizers into the planting hole when installing plants
  - Inject or drill fertilizers into soil
  - Do NOT broadcast fertilizers on the surface
- Use a mulch with no available N
- Seeds will germinate and grow poorly in absence of N

## Mulches

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- Mulches can prevent weed growth
  - Sometimes!!!!
- Mulches prevent weed growth by the following mechanisms
  - Reduced nutrition (especially nitrogen)
  - Reduced moisture
  - Reduced light

## Mulches

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- Characteristics of a good mulch
  - Resistant to decomposition
  - Large particle size
  - Does not retain moisture
    - If it retains soil moisture, that is generally a good thing, if it retains moisture itself, that is not a good thing.
  - Attractive



## Weed fabrics

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- Problem
  - Weeds generally will start growing in mulch.
  - Weeds cannot grow up through fabrics.
  - Weeds **can** germinate on top and root down through!





## Plant density

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- Dense and vigorous plantings will exclude weed growth.
- Groundcovers
- Turf



## Ground covers

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- Support vigorous growth
- Use the right plant in the right place
- At planting, use tighter planting density

## Summary

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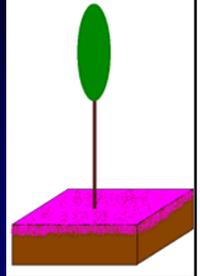
- Minimize the potential for new weed germination
  - Sanitation!
- Use management practices that make seedling establishment inhospitable.
- Alone or with herbicides, these practices will improve weed control.

## Herbicides in landscapes

- Preemergence herbicides
  - Apply to weed free soil
  - Apply prior to weed emergence
  - Apply uniformly and do not disrupt
- Postemergence herbicides
  - Select the correct type
  - Apply thorough coverage

## Preemergence herbicides

- Most seed germinate in the top 1 inch of soil.
- Herbicide placement should occur where seeds will germinate and begin growing.
- Application of herbicide followed by incorporation with water is necessary for proper placement.



## Preemergence herbicides

- **Will not** kill weeds present at time of application
- Even small weeds have roots large enough to escape effect of pre herbicides.



## Preemergence herbicides

- **Do not** prevent seed from germinating
- **Do not** kill dormant seeds!!!!
- Typical herbicidal activity
  - Hypocotyl and epicotyl emerge from seed
  - Grows through chemical barrier
  - Herbicide is absorbed and weed is killed or stunted.



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## Weed species controlled (pre-em)

- Broadleaf-active herbicides
  - Goal
  - Princep
  - Gallery
- These herbicides provide poor control of grasses, especially at lower rates.



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## Weed species controlled (pre-em)

- Grass-active herbicides
  - Surflan, Pendulum, Treflan, Factor
  - Ronstar
  - Pennant
- These products provide effective control of grasses and some “small-seeded” broadleaves



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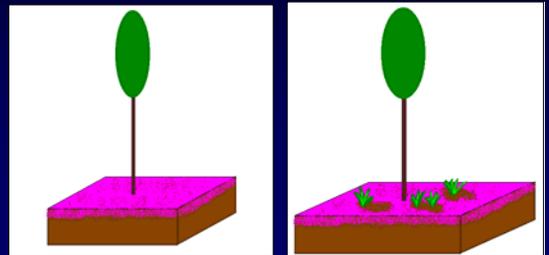
## Weed species controlled (pre-em)

- Broad-spectrum control
- Tank mix a grass-active herbicide with a broadleaf-active herbicide
  - Gallery + Pendulum
  - Goal + Factor
  - Princep + Surflan

## Maintain the chemical barrier

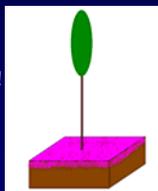
- Incorporate the herbicide
- Reduce unnecessary traffic
- Reduce excessive irrigation

## Reduce traffic



## Incorporate the herbicide

- Most abused aspect of weed control
- Incorporate immediately after application
  - Herbicides degrade on soil surface
- Incorporate with irrigation if possible
- Do NOT incorporate with drip irrigation!!!



## Preemergence herbicides

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- If applying to bark
  - Apply to moist bark
- Pre-herbicides applied to dry bark reduces efficacy
  - Dry bark adsorbs the herbicide tightly
  - May not be released with subsequent irrigation
  - Herbicide is rendered ineffective

## Postemergence herbicides

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- Select the right type of herbicide
  - Contact
  - Translocated
- Apply thorough coverage
- Ensure adequate uptake and movement

## Contact herbicides

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- Burns only foliage that is contacted.
- Good for control of annual weeds.
- Will not control roots of perennial weeds.

## Postemergence herbicides

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- Contact
  - Finale (poorly translocated)
  - Gramoxone
  - Scythe (pelargonic acid, soft pesticide)
  - Diquat
  - Acetic acid

## Contact herbicides

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- Require thorough coverage for complete control
- Best when used on small, recently germinated weeds.
- Not effective against established perennials.



## Translocated herbicides

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- Absorbed by foliage and other green tissue
- Moved throughout plant along with photosynthates
- Moved to growing points

## Postemergence herbicides

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- Translocated
  - Moved throughout the plant to control roots and shoots
    - Roundup – all vegetation
    - Vantage – grasses only
    - Fusilade – grasses only
    - Envoy – grasses only
    - Manage - Nutsedge

## Translocated herbicides

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- Require living, functioning plants.
- Environmental conditions that favor plant growth also improve effectiveness
  - High light
  - adequate soil moisture
  - moderate temperatures

## Translocated herbicides

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- Coverage is extremely important for controlling perennial weeds
  - *Convolvulus arvensis*
  - Roots grow to a depth of 30 feet.



## Translocated herbicides

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- Ideal for killing perennial weeds
- Best when used for spot spraying
- Will injure ornamental crops if contact is made



## Which type?

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- 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

## Website

- [http://oregonstate.edu/dept/nursery\\_weds/](http://oregonstate.edu/dept/nursery_weds/)