Landscape Weed Management

- Site Preparation
- Sanitation & Exclusion
- Preemergence Weed Control

Preemergence weed control options

- **Mulches** prevent germination and establishment by excluding light
- **Preemergence Herbicides** prevent seedling establishment

Mulches: #1 defense against annual weeds

- Bare ground
- Mulched

Mulches

- Control many annual weeds from seed
- Do not control perennial weeds from roots, tubers, or rhizomes
- Must be replenished yearly

Mulches

- Types: organic, inorganic, geotextile
- Function: exclude light to prevent seed germination and seedling establishment
- Also, holds moisture and improves aesthetics

Kinds of mulches
What makes a good Mulch?

- Coarse texture to dry out
- Aesthetically pleasing
- Will not wash
- Relatively weed free
- Not phytotoxic

Phytotoxic mulch?

- Anaerobic mulches can burn tender plants. Make sure mulches are properly composted and stored
- Pine straw can stunt pansy growth

How much mulch is enough?

<table>
<thead>
<tr>
<th>Mulch Depth (inches)</th>
<th>% Weed Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>90</td>
</tr>
<tr>
<td>6</td>
<td>80</td>
</tr>
<tr>
<td>10</td>
<td>70</td>
</tr>
</tbody>
</table>

Source: Greenley and Rakow, 1991

Mulches -- How Much?

- Organic mulches: ~ 3-4 in
- Inorganic mulches: ~ 3 in
- With a geotextile: ~ 2 in
Mulches -- How Much?
In annual color beds:

- Organic mulches: ~ 1 in. Just enough to cover the surface. Bedding plants should provide the cover.
- Inorganic mulches: Do not use
- With a geotextile: Do not use

How Much Mulch Do You Need?

- Bark mulch: 1 cu yd covers ~ 100 sq ft to a depth of 3 inches
- Pine Straw: 1 bale covers about 35 sq ft.

When to mulch?

- Typically done in late winter
  - Before summer annuals germinate
  - Cover up winter weeds
  - Before ornamental plants leaf-out

Mulches do not control creeping perennial weeds

- Vegetatively propagated perennial weeds can emerge through mulches
  - Bermudagrass
  - Nutgrass
  - Mugwort

Geotextile fabrics

- Woven or spun-bonded plastic fabrics
- Allow water and air to penetrate
- Often sold at “weed mats” or “weed fabrics”

Geotextile fabrics -- Advantages

- Long term annual weed control
- Soil stabilization
- Holds moisture
- Possible add-on service $$
Geotextile fabrics -- Disadvantages
- Cost – materials and installation
- Site preparation: eliminate perennial weeds
- Must cover with mulch
- Perennial weeds can penetrate

Geotextile fabrics do not control perennial weeds
- Vegetatively propagated perennial weeds can emerge through geotextile fabrics
  - Bermudagrass
  - Mugwort

Many perennial weeds can grow through geotextile fabric mulches

Weeds germinating on top can grow through the mulch
- Roots penetrate the fabric more easily than shoots

Biggest problem with geotextiles is proper installation
- Not installed correctly: Edges come up, mulch washes off. Unsightly and ineffective.

Steps in proper installation
- Dig trench around perimeter of bed
Step 2: place geotextile over bed
- Install geotextile over plants.
- Don’t try to plant through the bed
- Dirt on top of the fabric leads to weeds.

Step 3: Anchor edges in SOIL (not mulch)
- Bury edges in soil. [remember, roots will grow through the fabric]
- Mulch-only will allow edges to come up

Step 4: Cover with enough mulch to prevent light degradation

Types of Geotextile fabrics
- Lots of different types:
  - Spun bonded
  - Woven
  - Needle punched
- Are there differences? Yes, between consumer and professional grade products.

Study Questions -- mulches
- How do mulches control weeds?
- What kinds of weeds are controlled by mulches? And, what kinds are not?
- How deep should the mulch layer be for:
  - organic mulches, inorganic mulches, woody beds vs flower beds?
- Advantages and disadvantages of using a geotextile fabric?
- Describe the procedures for proper installation of a geotextile fabric.

Some Weeds Like Growing in Mulches
- Herbicides are sometimes needed
Landscape Herbicide Uses

- Preemergence (PRE) – controlling annual weeds before they emerge.
- Postemergence (POST) – control weeds after they have emerged.

PRE Herbicides in Landscapes

- Many choices – over 20 products registered
- Most are also used in turf
- Dinitroanlines are the most common
- Gallery (isoxaben) for broadleaf weed control
- Combinations for broad spectrum control
- Granules are preferred for plant safety and convenience

Dinitroanline Herbicides

- Several similar herbicides
  - Surflan (oryzalin)
  - Pendulum (pendimethalin)
  - Barricade (prodiamine)
  - Treflan / Preen (trifluralin)
- PRE grass control, some broadleaf weeds – spurge, chickweed, henbit and oxalis
- GR formulations are safer

Comparison of Dinitroanline Herbicides on Winter Annual Weeds

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Annual Grass</th>
<th>Bitter-cress</th>
<th>Chickweed</th>
<th>Henbit</th>
<th>Horseweed</th>
<th>Sow-thistle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surflan</td>
<td>G</td>
<td>G</td>
<td>G</td>
<td>F</td>
<td>F</td>
<td>G</td>
</tr>
<tr>
<td>Barricade</td>
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<td>F</td>
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<td>F</td>
<td>F</td>
<td>G</td>
</tr>
<tr>
<td>Pendulum</td>
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<td>F</td>
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<tr>
<td>Treflan</td>
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<td>F-G</td>
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<td>F</td>
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<tr>
<td>XL</td>
<td>G</td>
<td>F</td>
<td>F</td>
<td>P-F</td>
<td>G</td>
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</tr>
</tbody>
</table>
Gallery (isoxaben)
- Preemergence broadleaf weed control
- Spray formulation generally tank mixed with Surflan or other PRE grass herbicide
- Safe on most woody ornamentals
- Injures most herbaceous ornamentals

Snapshot TG
- A combination of Gallery + Treflan
- Preemergence control of annual grasses and broadleaves
- Broad spectrum preemergence weed control
- Good plant safety – does not burn foliage like some broad spectrum herbicides
- Weak on bittercress & phyllanthus
- Safe on ‘blue-collar’ perennials but injures most bedding plants

Preemergence Herbicides for Other Uses..
- PRE nutsedge control
  - Pennant Magnum
  - Freehand and Tower
- PRE broadleaf weed control
  - Gallery – more commonly Snapshot TG
- Very broad-spectrum herbicides for use around woody plants and in hardscapes
  - Broadstar, Sureguard

Yellow nutsedge control
- Preemergence control with Pennant Magnum, Tower or Freehand
- Selective POST control with Basagran TO or Sedgehammer
- POST control with Roundup or Finale

Pennant Magnum EC (metolachlor)
- PRE yellow nutsedge and annual grass control
- Only available as an EC
- Apply Pennant EC before bud-break (to avoid foliar injury)
- ~2 to 3 months residual. Re-apply as directed spray

Tower EC (dimethenamid-p)
- PRE yellow nutsedge, annual grass and certain broadleaf weeds
- EC formulation
- Apply before bud-break (to avoid foliar injury)
- ~2 to 3 months residual. Re-apply as directed spray

New in 2008
**Freehand 1.75G (dimethenamid-p + pendimethalin)**
- Preemergence control of annual grasses and small seeded broadleaf weeds
- Suppression of yellow nutsedge
- Safe on most woody ornamentals
- Herbaceous plants ??? Still testing.

**Pennant Magnum vs. Freehand**
- EC Form.
- Yellow nutsedge suppr.
- Ann. Grasses
- Few broadleaf weeds controlled
- Well known plant safety
- GR Form.
- Yellow nutsedge suppr.
- Ann. Grasses
- Better on broadleaf weeds
- We are still learning about plant safety

**EC herbicide injury to tender spring growth**
- Tower injury 1 WAT
- Pennant Magnum injury 1 WAT

**Choosing the right product**
- Safety to the ornamentals in the bed – this is complicated by diversity of plants
- Efficacy on the weeds
- Formulation
- Cost

**Woody Ornamentals**
- Many choices
- Tolerant of broad spectrum herbicides such as Snapshot, Surflan, Regal OO, Gallery, etc.
- Can also sometimes use Casoron (diclobenil)
Herbaceous Plants

- Tolerance to herbicides varies among species
- Few herbicides labeled
- Check labels and Extension recommendations
- Hort Info Leaflet #644

http://www.ces.ncsu.edu/depts/hort/hil/

Herbaceous Perennial Beds

- Even fewer options
- Site Prep and sanitation are critical

PRE herbicides for summer bedding plants

<table>
<thead>
<tr>
<th>Plant</th>
<th>Pennant</th>
<th>Barri-cade</th>
<th>Pendu-lum G</th>
<th>Surf-lan</th>
<th>Tref-lan</th>
<th>XL</th>
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</thead>
<tbody>
<tr>
<td>Ageratum</td>
<td>R</td>
<td>R</td>
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<tr>
<td>Begonia</td>
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<td>Melampod</td>
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<td>Salvia</td>
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<tr>
<td>Vinca</td>
<td>R</td>
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</table>

Source: HIL 644 -- Weed management in annual color beds

What does that mean?

- A species is listed on the label – it is “Registered or Labeled”
- The company warranties the herbicide safety on this ornamental species
- If it’s not listed on the label – it may or may not be safe. No guarantees.

Efficacy – Generally….

- Grasses are easy to control with several options
- Variable control of broadleaf weeds
- Sedge – fewer options

Comparison of Preemergence Herbicides on Winter Annual Weeds

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<tbody>
<tr>
<td>Surflan</td>
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<td>G</td>
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<tr>
<td>Barricade</td>
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<tr>
<td>Pendulum</td>
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<td>Treflan</td>
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<tr>
<td>Pennant Magnum</td>
<td>G</td>
<td>P</td>
<td>F</td>
<td>P</td>
<td>P</td>
<td>F</td>
</tr>
</tbody>
</table>
Application timing is everything to effective control

- Preemergence means before weeds germinate.
- Applications must be made about 2 weeks before germination
- Timing depends on the weed’s life cycle

A typical Landscape Calendar -- PRE

- Winter –
  - Mulch
  - PRE for summer annual weeds
- L. Spring / E. Summer
  - 2nd PRE for late germinating summer annuals and nutsedge
- L. Summer / E. Fall
  - PRE for winter annual weeds

Where to get more information?

- Cooperative Extension Bulletins
- Clemson University Pest Management Guide
- Cornell Recommends for pest management in herbaceous ornamentals
- HIL 644 and other fact sheets
- Trade journals and your peers

How to use the print resources

- One table for efficacy
- Tables for herbicide safety safety
- Cross reference between tables

Example:

What preemergence herbicide would you use to control bittercress in pansy beds?

Step 1: what herbicides are safe on pansies?

<table>
<thead>
<tr>
<th>Species</th>
<th>Barri-cade</th>
<th>Gallery</th>
<th>Pendulum</th>
<th>Pennant</th>
<th>Surlan</th>
<th>Treflan</th>
<th>XL</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>Marigold</td>
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<td>I</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pansy</td>
<td>I</td>
<td>R</td>
<td>I</td>
<td>R</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

R= registered, I = injury has been observed
Step 2: which of these herbicides controls bittercress best?

Table 1. Preemergence herbicide efficacy on annual weeds

<table>
<thead>
<tr>
<th>Species</th>
<th>Barricade</th>
<th>Gallery</th>
<th>Pendulum</th>
<th>Pennant</th>
<th>Surflan</th>
<th>Treflan</th>
<th>XL</th>
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</thead>
<tbody>
<tr>
<td>Bittercress</td>
<td>F</td>
<td>G</td>
<td>F</td>
<td>P</td>
<td>G</td>
<td>P</td>
<td>F</td>
</tr>
<tr>
<td>Chickweed</td>
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<td>G</td>
<td>F</td>
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<td>G</td>
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<tr>
<td>Crabgrass</td>
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<tr>
<td>Henbit</td>
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</tr>
</tbody>
</table>

Example:

- What preemergence herbicide would you use to control bittercress in pansy beds?
- XL is the best alternative
  - Fair control
  - Registered (or labeled for the plant)

Study Questions

- How do preemergence herbicides control weeds?
- When should a preemergence herbicide be applied? And, how does this relate to a weed’s life cycle? Specific examples.
- Why are dinitroaniline herbicides the most commonly used herbicides in landscape plantings?
- Give 4 examples of dinitroaniline herbicides labeled for use in landscape beds.

Study Questions

- Given the species of weeds and ornamental plants – be sure you know how to use the tables to develop a herbicide recommendation.
- Which would be safer on herbaceous ornamentals? And Why? Surflan vs XL; Penulum 2G vs Treflan 5G; Barricade vs. Regakade; Gallery vs. SnapshotTG?
- What PRE herbicides would suppress yellow nutsedge?
- Of the herbicides discussed in this lecture, Gallery is more likely to injure herbaceous ornamentals. Why? Two reasons…….