



Weed control in field production

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Nursery weed management

- Field production
 - Seeds in soil
 - Each crop planted back is same soil
 - Weed control should be preventative
 - Several postemergence options
- Container production
 - Bark is weed-free
 - Each new crop planted in fresh bark
 - Weed control must be preventative
 - No postemergence herbicides.

Weeds

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

Liebman et al.

Redroot pigweed

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



Field bindweed

- *Convolvulus arvensis*
- Seeds persist in soil for 60 years
- Roots grow to a depth of 30 feet.



Field weed control

- Start clean.....stay clean

Field weed control

1. Field preparation
2. Prevent weed establishment
 - Most important step
 - Sanitation
 - Cultural practices
 - Preemergence herbicides
3. Control (kill) escape weeds

Field preparation

1. Spray with broad-spectrum post herbicide
 - Wait 2 weeks
2. Till weeds under
 - Wait 3 weeks
 - Apply soil amendments?
3. Till field again, final prep
4. Plant nursery crops



Perennial weeds

- Tillage can be used to eradicate perennial weeds
- Probably will take at least 2 years
 - Tilling every 3 weeks



Field preparation

- Goal is to reduce weed populations
 - Complete eradication is impossible
- Excessive tillage is damaging to soil structure
- Limit the number of tillage passes (plow, disk, roto-till, etc.) to a minimum.

Weed prevention

- Sanitation
 - Clean tillage equipment
 - Control non-crop area weeds
 - Physical barriers
- Cultural practices
 - Tillage
 - Fertilization
 - Irrigation
- Preemergence herbicides

Sanitation

- Clean tillage equipment
 - Prevent spread of perennial weeds

Sanitation

- Control weeds in non-crop areas



Sanitation

- Physical barriers
 - Prevent wind-blown seed
 - Thistles, groundsel, fireweeds
- Seed dispersed during growing season
 - Use fast growing deciduous plants (poplar)





Cultural practices

- Fertilization
 - Band apply fertilizers
 - Do not broadcast apply Nitrogen
- Weeds grow poorly in absence of nitrogen



Cultural practices

- Irrigation
 - Switch to drip irrigation if possible
- Drip irrigation
 - Faster growing crops
 - More uniform crops
 - Less labor
 - Less water
 - Less money
 - FEWER WEEDS!



Cultural practices – Tilling

- Tilling
 - Low/no chemical input
 - Prevents soil from crusting
 - Looks good
 - No weed resistance
- Repeated tilling
 - Damages soil structure
 - Degrades soil aggregates
 - Accelerates organic matter degradation
 - Leaves soil prone to erosion



Tillage

- If perennial weeds are present
 - Flag area
 - Do NOT till
 - Eradicate with post herbicides
 - Wait 30 days for regrowth
 - Spray again
 - Excavate if necessary



Clean cultivation

- 100% vegetation control
- Herbicides within rows
- Till between rows



Clean cultivation

- Disadvantages
 - Reduces soil organic matter
 - Destroys soil structure
 - Degrades soil aggregates
 - Soil compaction
 - Allows for erosion

Living mulch

- Cover crop growing between rows of nursery stock



Living mulches

- Disadvantages
 - They can compete with nursery crops
 - Cover crops can attract unwanted pests
 - Seeds can become weed problem
 - They require maintenance
 - Many don't look very good.

Living mulch

- Advantages
 - Reduced soil erosion and runoff
 - Increases soil organic matter
 - Increase soil aggregates
 - Reduces soil compaction
 - Suppresses weeds
 - Improves percolation
 - Reduces temperature fluctuations in soil



Living mulches

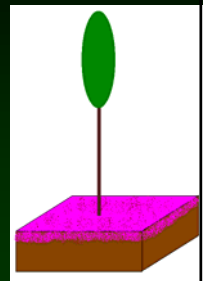
- Characteristics of a good living mulch
 - Small or low growing
 - Requires minimal maintenance (mowing)
 - Minimal competitor for nutrients and water
 - Forms dense cover for weed suppression
 - Not attractive to pests or wildlife
 - Clover attracts deer
 - Turf attracts Japanese beetles in some areas

Preemergence herbicides

- Herbicide selection
- Application timing
- Maintain the chemical barrier

Plant uptake

- 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
 - Exception is spray-applied Goal and SureGuard
- 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

Herbicide timing

- First application
 - February-March
 - Irrigate newly plant crops to settle soil
 - Apply preemergence herbicide to soil
 - Incorporate the herbicide with $\frac{1}{2}$ inch of irrigation

Herbicide timing

- Second application
 - Early summer (May)
 - Reinforce herbicides applied earlier
 - Control emerging summer annuals
 - Be careful of herbicides on tender foliage

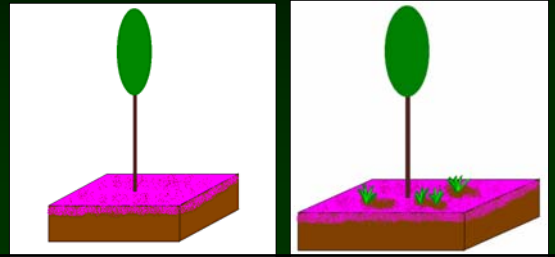
Herbicide timing

- Third application
 - Late summer (September)
 - Winter annual weed control
 - Can provide weed control through next spring

Maintain the chemical barrier

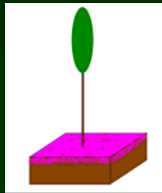
- Incorporate the herbicide
- Reduce unnecessary traffic
- Reduce excessive irrigation

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!!!



Field weed control

- Controlling escape weeds



Controlling escape weeds

- Herbicides
 - Glyphosate and paraquat most commonly used
 - Spot spray only
 - Broadcast applications are dangerous around valuable nursery crops.

Controlling escape weeds

- Cultivation
 - Used extensively for weed control between tree rows.
 - Negative consequences on soil structure and health.

Controlling escape weeds

- Hoeing
 - Safe
 - Labor intensive
 - Inefficient
 - Very expensive!

Summary

- Field preparation
- Weed prevention
- Weed eradication

Website

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