Integrated Pest Management

Sustainable Small Farming and Ranching

Skagit County
Washington State University Extension

Skagit Valley College
Where Learning Comes to Life

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PRODUCER PROFILE

Reading Discussion:

1. **What are some of the tools and methods Coleman introduces readers in this chapter?**

2. **What impacts does spacing have on mechanical weed management?**

3. **How does flame weeding work? What factors impact the effectiveness of flame weeding?**

4. **What is IPM and its basic strategies? Why practice IPM?**

5. **What are common pests that farmers face in the Pacific Northwest?**

6. **What are common weeds that farmers face in the Pacific Northwest?**

What is IPM?

- Integrated Pest Management is a sustainable approach to controlling insect pest populations that combines PAMS
  - Prevention
  - Avoidance
  - Monitoring
  - Suppression

- Combination of strategies that minimizes **economic**, **health**, and **environmental** risks.

Prevention

Practices that keep pests from infesting a production site (i.e. field, orchard, or greenhouse)

- Using pest free seed or transplants
- Row covers
- Field sanitation
- Eliminating alternative hosts

Organic Preventative Practices

Avoidance

Pest impact can be minimized through various cultural practices

- Crop rotation
- Crop choices
  - Resistance traits
  - Fast maturing varieties
  - Cropping systems
  - Trap crops
- Adjusting planting schedule
  - Early planting, late planting, not planting

Monitoring

- The key component to any IPM program
- Proper identification of pest – know your enemy
  - Monitoring program
    - Traps
    - Weather monitoring
    - Soil testing, when appropriate
    - Growing Degree Days
  - Record keeping
    - Pest incidence and distribution in each field

Suppression

To avoid economic loss, population suppression technique may be necessary

- Cultural practices
  - No-till or strip till
  - Cover crops or mulches
  - Companion planting
- Physical suppression
  - Baited or pheromone traps
  - Exclusion devices
- Biological Control
  - Mating disruption
    - Pheromone
    - Sterile release
  - Conservation
  - Augmentation
- Chemical/biopesticide control
  - Considered a last resort
  - Evaluate Cost to benefit ratio

Planning an on Farm IPM Program

- Ecosystem management
  - Know crop growth cycles
  - Know the pests
  - Preserve beneficials
- Cultural control
- Know your resources
- Monitoring program
- Record keeping

- An **economic threshold**- the insect's population level or extent of crop damage at which the value of the crop destroyed exceeds the cost of controlling the pest.

Biological Controls: Plants to Attract and Feed Beneficial Insects

- **Umbelliferae family**
  - carrot, yarrow, Queen Anne's lace, dill, anise, fennel, coriander, parsley
- **Compositae family**
  - zinnia, marigold, aster, daisies, mums, black-eyed susan, coneflower, Coreopsis
- **Mint family and Perennial herbs**
  - mints, thyme, sage, oregano, bee balm, basil
- **Other plants**
  - salvias, wallflowers, nasturtiums, poppies, etc.

goldenrod

dill

wild carrot

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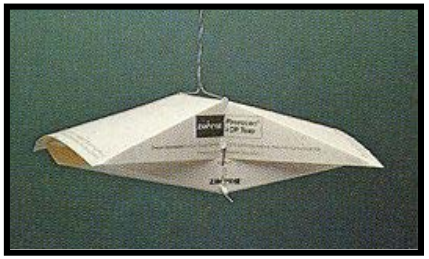
Monitoring of pest populations

Random Samples: a measure of the total population

- Scouting fields
  - Hand lens
  - Random samples
- Trapping
  - Pheromone traps
  - Light traps
  - Pit fall traps
  - Sticky traps
  - Sweep Net
  - Vacuuming
  - Beat sheets



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Mechanical/Physical controls

- Row covers
- Hand picking
- Sticky boards
- Plant collars

Insecticides

- Chemical pesticides
  - Biochemicals
  - Synthetic pesticides with properties of natural substance
- Biopesticides (Organic alternatives)
  - Bacteria
  - Fungi
  - Viruses

Problems with pesticides: The pesticide treadmill

- Resistance
- Resurgence
- Secondary pests
- Residues

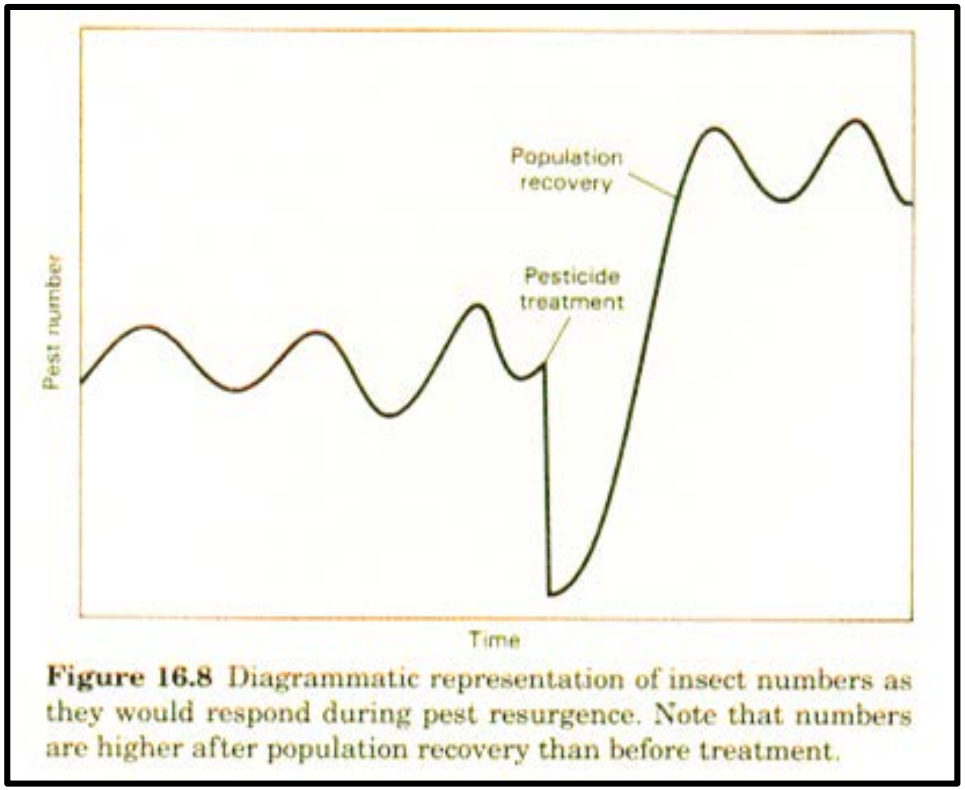
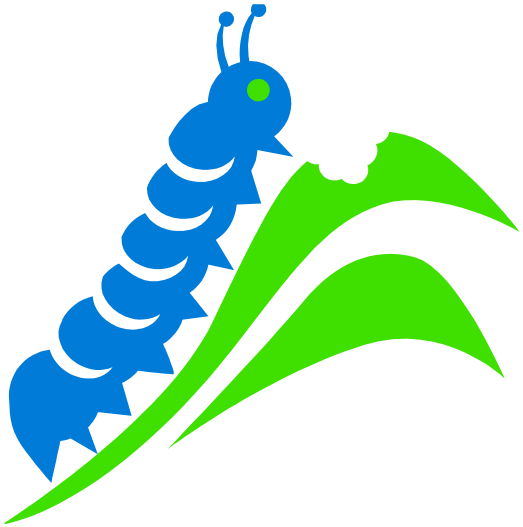


Figure 16.8 Diagrammatic representation of insect numbers as they would respond during pest resurgence. Note that numbers are higher after population recovery than before treatment.



Sustainable Weed Management Strategies

Sustainable Small Farming and Ranching

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Know your Weeds

- Benefits of Weeds:
  - Holding water
  - Creating organic matter
  - Providing cover
  - Habitat for beneficial insects

- Common Weed Sources
  - Re-seeding
  - Uncooked Mulches and Manure
    - Use appropriately maintained compost instead
  - Uncooked compost

"Weeds are plant we have not yet found a use for."
"Weeds are any plant growing in a space intended for another."

Cultivating

- Planting techniques will help the crop out compete the weeds
- Small weeds easier than big weeds to remove
- Expensive to control in row

- Cultivate on both sides of row and in row
  - Shallow tillage
  - Brings smallest amount weeds to the top

- Timing is key (irrigation)

Cover Crops

Use cover crop for weed suppression

Transplants

Give 4+ week jump on weeds

Plant at the right planting density can give you weed free plots

Cover cropping with winter peas for organic dry land wheat production.

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Irrigation

- **Drip irrigation** is more water efficient

- By directing water to the crop it minimizes weed germination and reduces need to cultivate

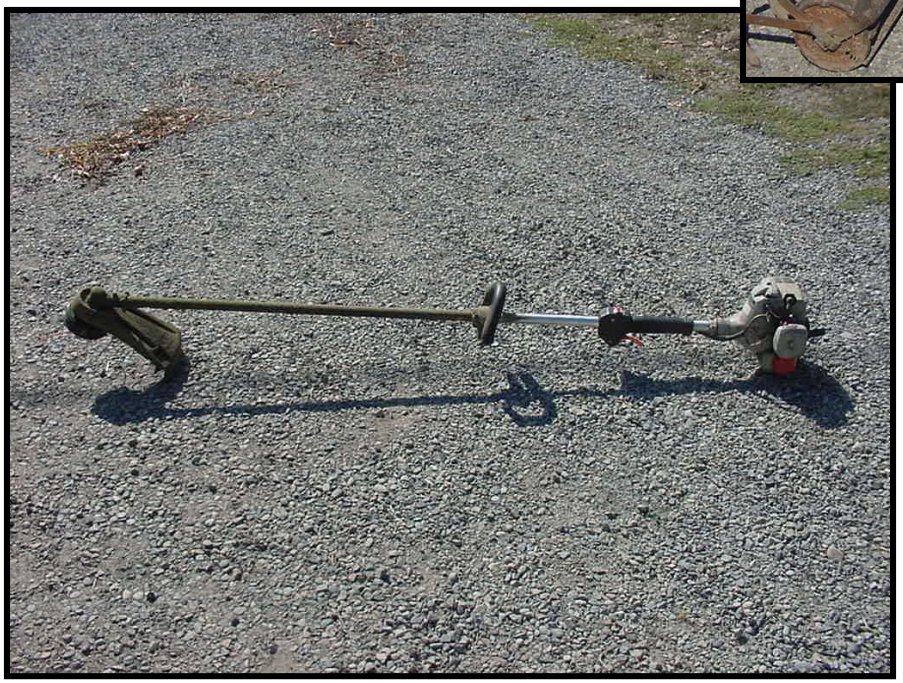
Equipment

A large part of controlling weeds is recruitment of the appropriate technology

Hand Tools

Photos provided by D. Muehleisen

Hand Tools



Photos provided by D. Muehleisen

Flame Weeder

Bush hog (rotary mower)

- Cutting cover crop
- Mowing weeds before setting seeds

Lely Tine Weeder

- Specially suitable for weeds with underground rhizomes
- Bring rhizomes to surface and causes them to desiccate
- Timing is critical

Summary

- Know your weed problems
- Don't introduce new weeds
- Eliminate spread of existing weeds
- Compete with them – cover crops, the main crop (spacing, timing, etc.)
- Use a variety of tools depending on situation (cultivators, flamers, hand tools)

Group Activity:
Whole Farm Plan Peer Review

- Highlight the areas in your own plan that you think need further development or detail
- Exchange plans with a partner
- Take 5 minutes to read through the plan
- Come up with 3 strengths of the plan and 3 suggestions for improvement
- Take 5 minutes to discuss each plan as a pair

Reading and Assignment

- Reading for Next Week
  - New Organic Grower - Chapter 5
  - *Using Enterprise Budgets to Make Decisions about Your Farm*. R. Carkner, A Pacific Northwest Extensions Publication, Washington State University, 2000 (http://cru.cahe.wsu.edu/CEPublications/pnw0535/pnw0535.pdf)

- **Assignment**
  - Whole Farm Plan Section- Crop Production Plan:
  - Pest Management, Weed Management