

Integrated Pest Management

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Part 1: Integrated Pest Management (IPM) Concepts

Part 2: Making an IPM Plan

The background of the slide features a close-up, slightly blurred image of green leaves, likely from a plant, with some yellowish spots visible on the foliage. The leaves are layered, with some in the foreground and others in the background, creating a sense of depth.

Objectives:

1. Understand the concepts of IPM.
2. Be able to incorporate IPM strategies in your own practices.
3. Be able to recommend a variety of IPM strategies.

Definition

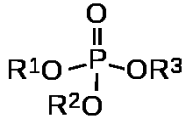
Integrated Pest Management aims to reduce crop losses from pests that are effective, economically viable and ecologically compatible (Pedigo 2008).

Integrated Pest Management (IPM) is a strategy to prevent and suppress pests with minimum impact on human health, the environment and non-target organisms (Steve Dreistadt, University of California)

IPM History



Sulfur, natural enemies, soaps and oils



DDT, organophosphates, chlorinated hydrocarbons



Green Revolution



Silent Spring by Rachel Carson 1962; Stern 1959 ICC



1970s-1980s: Increase IPM research



1990s: Genetically modified organisms and emphasize softer more targeted pesticides




Current: targeted pesticides, invasive species, answering ecological based questions

IPM Concepts

Integrated Pest Management

1. Identify the area you want to manage pests
2. Identify pest damage, key pests and monitor
3. Prevent pest damage from occurring
4. Determine the amount of plant injury you are willing to incur
5. Determine the best management tactics: cultural control, mechanical controls, biological control and chemical control.



Identify the area you
want to manage



Identify the pest?

Saur Farm, Hood River, OR

What is a Pest?



A species that interferes with human activities, property, or health or is displeasing.

Plant Injury

Chewing Insects



Piercing-sucking Insects



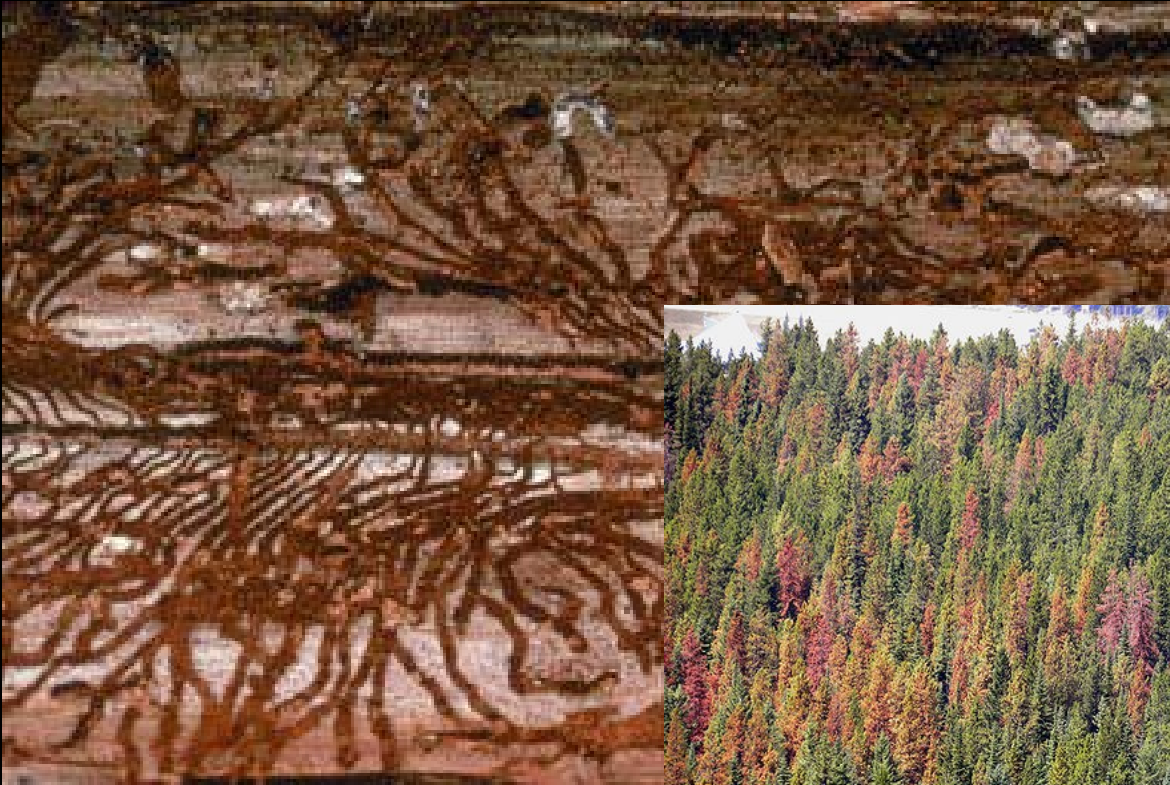
Pathogens



Abiotic Factors



Types of Plant Injury



Types of Plant Injury



Types of Plant Injury



Types of Plant Injury



Types of Plant Injury



Types of Plant Injury



How much plant injury are you
willing to incur?

Plant Injury



Plant Injury



A photograph of a farm field. In the foreground, there are rows of leafy green plants, possibly kale or chard, growing in dark brown soil. A black irrigation pipe runs along the left side of the plants. In the background, a person is standing on a path, and there are tall evergreen trees and a mountain range under a cloudy sky. A large green rectangular box with a white border is overlaid on the image, containing the word "Monitor" in white serif font.

Monitor

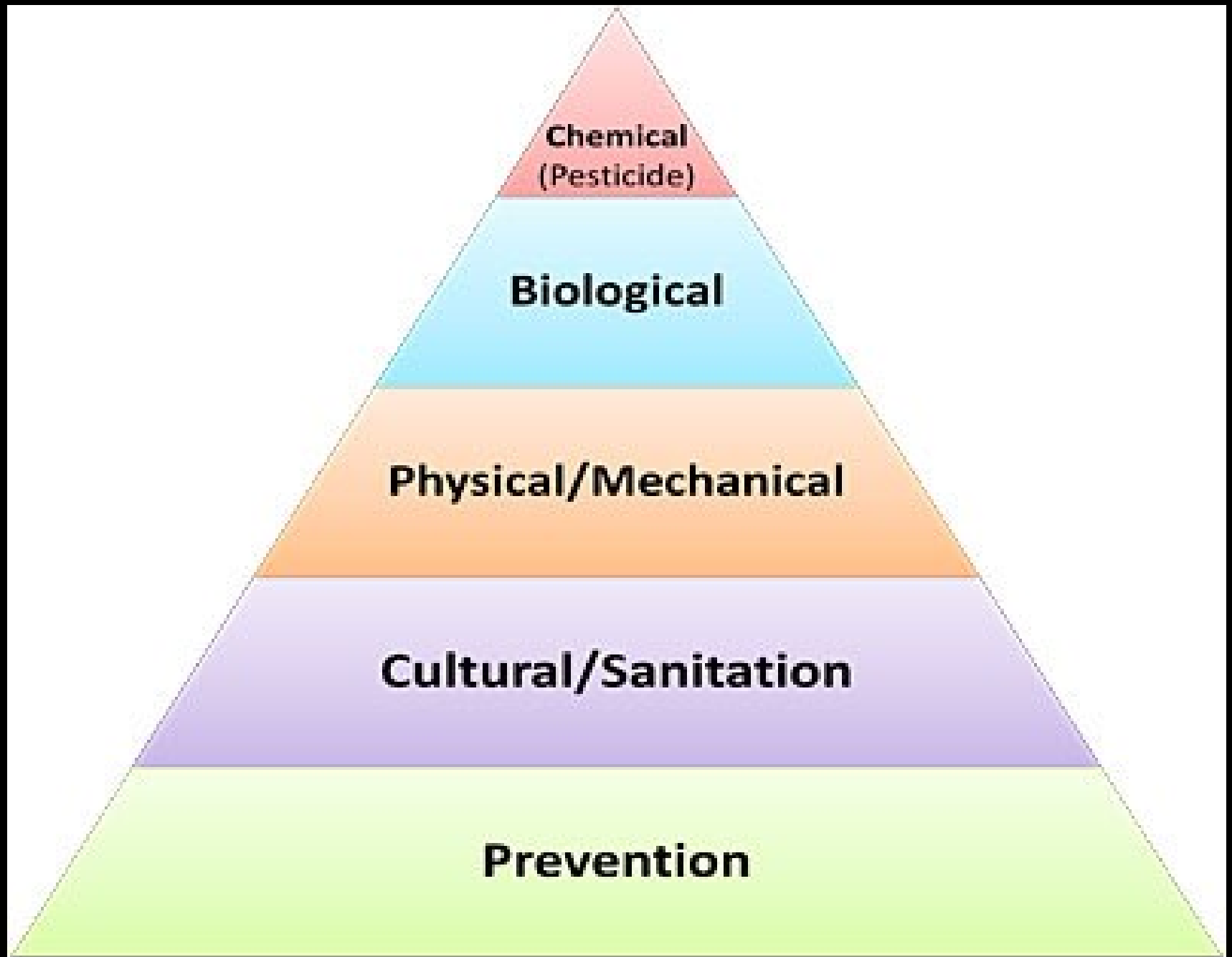
Wildwood Farm, Hood River, OR

Sampling and Monitoring Methods



Best Management Strategies

Prevention
Cultural Control
Mechanical Control
Biological Control
Chemical Control



Prevention

Prevention as establishing a first line of defense:

- Impede the introduction of pests
- Eliminate pest reservoirs
- Keep pests from spreading if they do occur somewhere on the farm.

Prevention and cultural management often overlap

Prevention

- Soil health
- Crop rotation and minimize tillage
- Healthy plants and clean seed
- Clean and sanitize tools and implements
- Use good quality soil amendments
- Field sanitation
- Farmscaping and landscaping

Farmscaping and Landscaping



Cultural Controls

Change the environment to
make it inhospitable to
thrive.

Cultural Controls

- Crop rotation
- Intercropping
- Sanitation
- Reduce pest habitat in and around crop
- Trap crop: divert pest population away from crop
- Tillage
- Adjust crop planting space or time
- Vacuuming
- Choosing resistant/tolerant cultivars or varieties
- Cover cropping
- Nutrient management
- Succession planting
- Improve soil health
- Increase crop diversity
- Timing and amount of irrigation
- Soil solarization
- Mow or prune

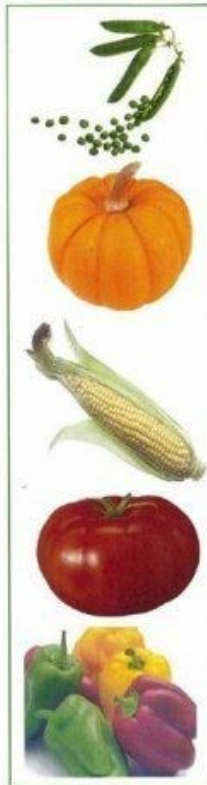
Crop Rotation

3 Year Crop Rotation

Root
& Bulb



Fruit
& Seed



Leaf
& Stem



Intercropping and Undersowing



Sanitation



Reduce Pest Habitat



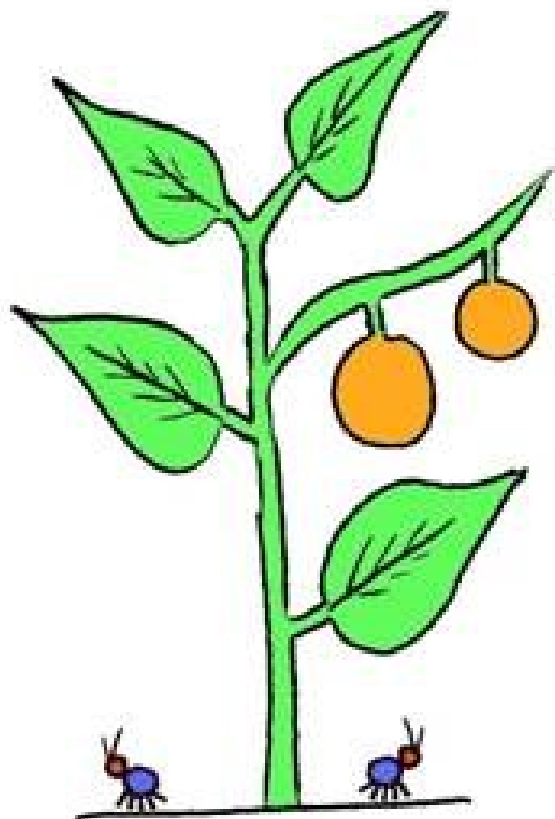
Tillage



Adjust Crop Space and Timing



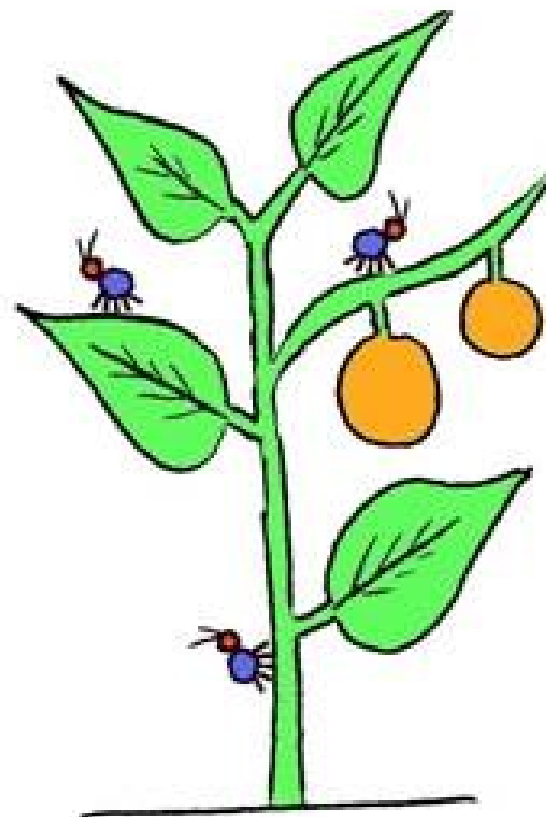
Choose Resistant Varieties



Resistant



Susceptible

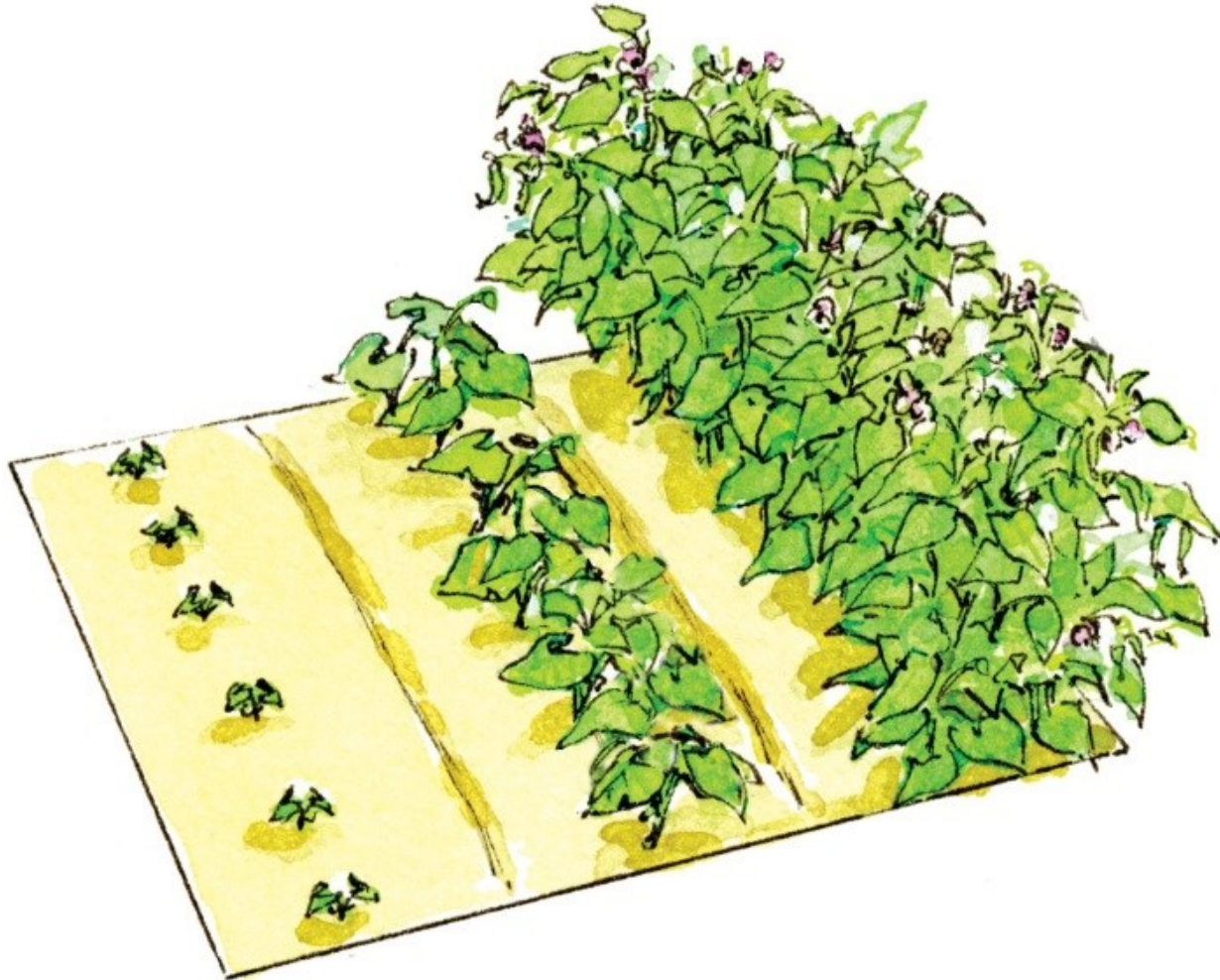


Tolerant

Cover Cropping



Successional Planting



Nutrient and Soil Management



Crop Diversity



Irrigation



Stale Seed Bed



Mow or Prune



parentables.howstuffworks.com

Mechanical Controls

Using barriers, traps, or physically removing pests to prevent or reduce infestations.

What mechanical controls do you know and use?

Barriers



<http://www.petscreenmesh.com/>

Barriers



Removal



Traps





Biological Control: Using Natural Enemies

Biological Control: Using Natural Enemies

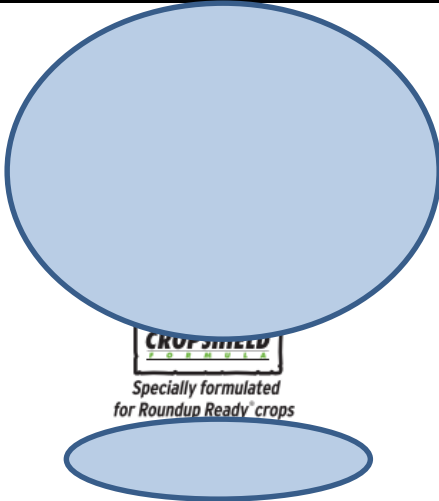
- Identify beneficial organisms (insects, native plants)
- Increase natural beneficial habitat and undisturbed areas – conservation
- Farmscaping
- Provide a diverse habitat
- Introduce beneficial insects: lady beetles, predatory mites, parasitic wasps, nematodes – augmentation
- Classical biological control or importation

Chemical Controls

Typically used as the last resort in
Integrated Pest Management
Strategies

Pesticide Information

- Mode of Action
- Chemical Name
- Trade Name



CROP SHIELD
Specially formulated
for Roundup Ready® crops

Complete Directions for Use

EPA Reg. No. 524-549

AVOID CONTACT OF THIS HERBICIDE WITH FOLIAGE, GREEN STEMS, EXPOSED NON-WOODY ROOTS OR FRUIT OF CROPS (EXCEPT AS SPECIFIED FOR INDIVIDUAL ROUNDUP READY® CROPS), DESIRABLE PLANTS AND TREES, AS SEVERE INJURY OR DESTRUCTION COULD RESULT.

Herbicide for Roundup Ready Crops

Selective broad-spectrum weed control in Roundup Ready crops

Non-selective, broad-spectrum weed control for many agricultural systems and farmsteads

Not all products listed on this label are registered for use in California. Check the registration status of each product in California before using.

Read the entire label before using this product.

Use only according to label instructions.

Read the "LIMIT OF WARRANTY AND LIABILITY" statement at the end of the label before buying or using. If terms are not acceptable, return at once unopened.

THIS IS AN END-USE PRODUCT. MONSANTO COMPANY DOES NOT INTEND AND HAS NOT REGISTERED IT FOR REFORMULATION. SEE INDIVIDUAL CONTAINER LABEL FOR REPACKAGING LIMITATIONS.

1.0 IMPORTANT INFORMATION

acid, base, or other hazardous material.

This product is provided under license to Monsanto Company, 800 North 3rd Street, St. Louis, MO 63101. Other Patents Pending. No license granted under any non-U.S. patent(s).

2.0 IMPORTANT PHONE NUMBERS

1. FOR PRODUCT INFORMATION OR ASSISTANCE IN USING THIS PRODUCT,
CALL TOLL-FREE, 1-800-332-3111

2. IN CASE OF AN EMERGENCY INVOLVING THIS HERBICIDE PRODUCT, OR FOR MEDICAL ASSISTANCE, CALL COLLECT, DAY OR NIGHT,
(314)-694-4000

3.0 PRECAUTIONARY STATEMENTS

3.1 Hazards to Humans and Domestic Animals

Keep out of reach of children

CAUTION!

CAUSES MODERATE EYE IRRITATION

Avoid contact with eyes, skin, or clothing

FIRST AID: Call a poison control center or doctor for treatment advice.	
IF IN EYES	<ul style="list-style-type: none">• Hold eye open and rinse slowly and gently with water for 15 to 20 minutes.• Remove contact lenses, if present, after the first 5 minutes then continue rinsing eye.
IF ON SKIN	<ul style="list-style-type: none">• Take off contaminated clothing.• Rinse skin immediately with plenty of water for 15 to 20 minutes.

• Have the product container or label with you when calling a poison control center or doctor, or going for treatment.

• You can also call (314) 694-4000, collect, day or night, for emergency medical treatment information.

• This product is identified as Roundup PowerMAX Herbicide, EPA Registration No. 524-549.

DOMESTIC ANIMALS: This product is considered to be relatively nontoxic to dogs and other domestic animals; however, ingestion of this product or large amounts of freshly sprayed vegetation may result in temporary gastrointestinal irritation (vomiting, diarrhea, colic, etc.). If such symptoms are observed, provide the animal with plenty of fluids to prevent dehydration. Call a veterinarian if symptoms persist for more than 24 hours.

Personal Protective Equipment (PPE)

Some of the materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for Category A on an EPA chemical resistance category selection chart.

Applicators and other handlers must wear: long-sleeved shirt and long pants, socks, shoes, and chemical-resistant gloves made of any waterproof material such as polyethylene or polyvinyl chloride.

Follow manufacturer's instructions for cleaning/maintaining PPE (Personal Protective Equipment). If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them.

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides (40 CFR 170.240 (d) (4-6)), the handler PPE requirements may be reduced or modified as specified in the WPS.

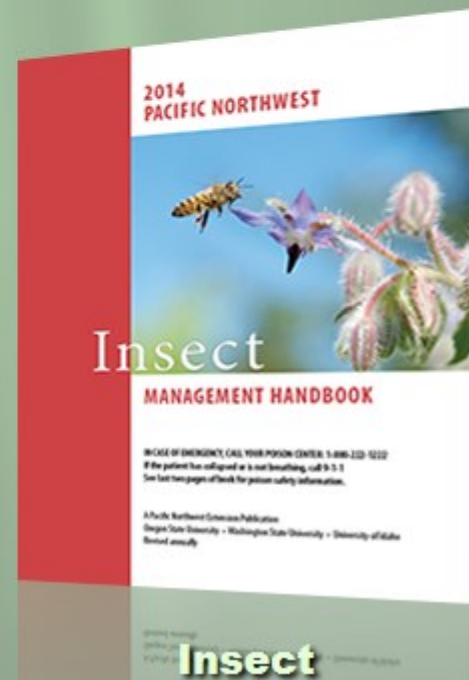
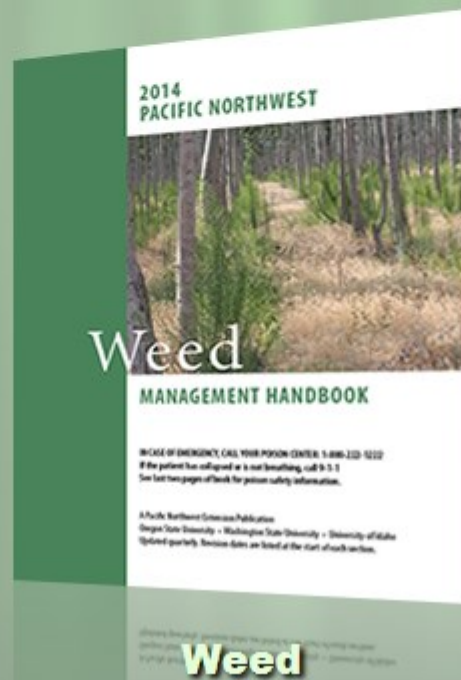
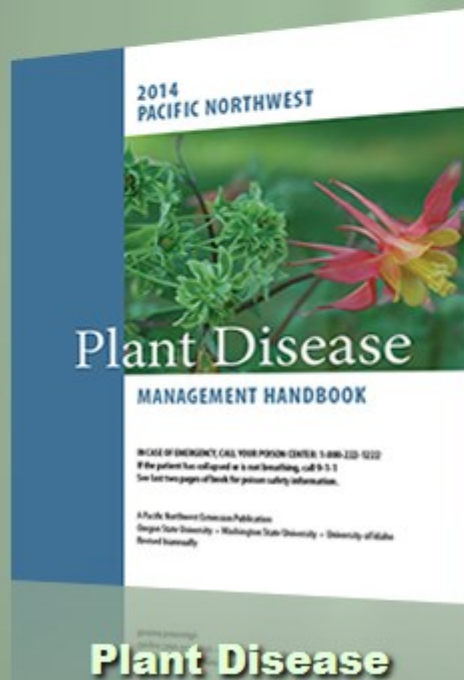
IMPORTANT: When reduced PPE is worn because a closed system is being used, handlers must be provided all PPE specified above for "applicators and other handlers" and have such PPE immediately available for use in an emergency, such as a spill or equipment breakdown.

Types of Herbicides

- Contact and systemic herbicide
- Pre-emergent and post-emergent
- Selective and non-selective

Always check the
labels for correct
use of pesticides

PACIFIC NORTHWEST PEST MANAGEMENT HANDBOOKS



Enter Search Terms



UNIVERSITY OF CALIFORNIA AGRICULTURE & NATURAL RESOURCES

UC IPM Online

Statewide Integrated Pest Management Program



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*Solve your pest
problems with
UC's best science*

What's New

- [New Herbicide Symptoms photo repository](#)
- [Online course: Providing IPM Services in Schools and Child Care Settings](#)
- [New videos: Agricultural pests in stone fruits](#)
- [Pest Notes: Perennial Pepperweed, Biological Control and Natural Enemies, Rattlesnakes and Lizards revised](#)
- [Quick Tips: Catarinas \(Lady Beetles\) added](#)
- [Green Bulletin: December 2014](#)

Home, Garden, Turf & Landscape Pests



Agricultural Pests



[Common Cultural Problems](#)

[Common Diseases](#)

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WSU Extension Presents

Hortsense



Home gardener fact sheets for managing plant problems with IPM or Integrated Pest Management.

Cultural controls and Washington-registered pesticides are included.

[Hortsense Home](#)

[Pestsense Home](#)

[UPEST](#)

[Acknowledgements](#)

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Questions