Pesticide Safety and IPM

Jeff Schalau
Associate Agent, Agriculture & Natural Resources
University of Arizonia Cooperative Extension Yavapai County
David Redhage
Kerr Center for Sustainable Agriculture
Sue Gray
Tulsa County OSU Extension

IPM Definition

- Integrated pest management (IPM) is an ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. Pesticides are used only after monitoring indicates they are needed according to established guidelines, and treatments are made with the goal of removing only the target organism. Pest control materials are selected and applied in a manner that minimizes risks to human health, benefical and non-target organisms, and the environment.

Principles of IPM

1. Identify Pest Species
2. Determine Damage Threshold
3. Employ Prevention Measures
4. Employ Control Options
5. Monitor for Effectiveness

Why use Pesticides?

- When non-chemical management methods fail to control an economically significant pest
- When situations warrant pesticide use, control methods also should include non-chemical strategies
- Pest eradication is impossible, but many times pest management is feasible

What are Pesticides?

- “cide” equals kill
- Some pesticide examples:
  - Cockroach sprays and baits
  - Insect repellents for personal use
  - Insect pheromones (attract or confuse)
  - Rat and other rodent poisons.
  - Flea and tick sprays, powders, and pet collars.
  - Kitchen, laundry, and bath disinfectants and sanitizers.
  - Products that kill mold and mildew.
  - Some lawn and garden products, such as weed killers.
  - Some swimming pool chemicals.

What We Hope to Learn Today

- Pesticides and Labeling
- Equipment
- Using Pesticides Safely
- Symptoms of Poisoning
- Storage of Pesticides
- Herbicide Use
- Insecticide use

All pesticides have risks!!

- Organic ≠ Safe
- Natural ≠ Safe
- Synthetic ≠ Highly toxic

Pesticides: Home vs. Professional

- General Use Pesticides

  -These pesticides are not likely to harm the environment when used according to label directions. Anyone can buy and use a general use pesticide.

- Restricted Use Pesticides

  -Classified by the EPA because they can cause harm to human health or the environment even when applied according to the label

  -Training and testing are required to purchase and apply restricted use pesticides (i.e. Certified Applicators).

Pesticide Labeling
The Label is the Law

- Brand, chemical and common names
- Formulation, ingredients and contents
- First aid information
- EPA Registration Number
- Manufacturer information
- Directions for use
- Hazards to non-target organisms and environment
- Storage and disposal information

Pesticide Labeling

- Brand Name-plainly displayed and used to identify specific product
- Common Name-helps make active ingredients with complicated chemical names easier to identify
- Chemical Name-scientific name of pesticide

Pesticide Labeling Example

- Brand name- Roundup
- Common Name- Glyphosate
- Chemical Name-
  N-(phosphononmethyl)glycine

Signal Words

Signal Word	Toxicity	Human Lethal Dosage	Symbol
CAUTION	Low	Ounce to a pint	None
WARNING	Moderate	Teaspoon to one ounce	None
DANGER	High	A few drops to a teaspoon	Skull and crossbones; POISON

Pesticide Labeling Signal Word Examples

- Danger- Nicotine Sulfate, Temik, Paraquat
- Warning- Poast, rotenone, pyrethrum
- Caution-Neem Oil, Insecticidal Soaps, Malathion

❖ Signal word can be different for the same chemical depending on formulation

Material Safety Data Sheet

- How to clean up spills
- First aid measures
- Fire fighting measures
- Handling and storage
- Personal protection
- Other toxicological information (LD50)

Application Equipment

- Proportioner (hose-end sprayer)
  – Not recommended for most situations

  Compressed Air Sprayer

  -Best choice for small jobs

  Hand Duster

  -Old fashioned, not accurate but works for some materials

Personal Protective Equipment
Basic Equipment

- Long sleeve shirt and long pants (always)
- Impervious Boots (always)
- Eye/face protection (as per label)
- Respirator (as per label)
- Gloves (as per label)
- Hat (as per label)
- Disposable protective clothing such as Tyvek (as per label)
- Apron (as per label, often recommended when mixing)

Personal Protective Equipment Cleaning Clothes

- Change clothing every day and change immediately if they become contaminated
- Store removed clothing in a plastic bag until it can be washed
- Wash clothes with maximum amount of detergent
- Wash separately from other clothes
- After washing clothes, run washer empty to clean
- Hang clothes outside to dry

Pesticide Poisoning

- Dermal Response

  -Most common – wash with soap and water before touching any other part of your body

- Oral Exposure

  -Usually takes place when one neglects to wash hands before eating and smoking

- Respiratory Exposure

  -Vapors and fine particles are easily absorbed by lungs and into bloodstream

Pesticide Poisoning

- Eye Exposure

  -Eyes very rapidly absorb chemicals

Symptoms of Pesticide Poisoning

- Mild Exposure

  - Fatigue, blurred vision, headache, nausea/vomiting, excessive sweating/salivation, dizziness, stomach cramps/diarrhea

- Moderate Exposture

  -Weakness, chest discomfort, inability to walk, constricted eye pupils, more severe forms of mild symptoms

Symptoms of Pesticide Poisoning

- Severe Symptoms
  - Unconsciousness, secretions from mouth and nose, coma, muscle twitches, difficulty in breathing

  Refer to Pesticide Label and MSDS for specifics

Insecticides

- Stomach poisons
- Contact insecticides
- Systemic insecticides
- Growth regulators
- Dessicants

Other Insect Management Tools

- Crop Rotation
- Sanitation
- Plant Nutrition
- Proper Irrigation
- Resistant Varieties
- Intercropping
- Encourage Natural Enemies

About Herbicides
Non-Selective vs. Selective:

- Non-selective Herbicides
  - -Kill all types of weeds (as per label)
- Selective Herbicides
  - Kills only a certain type of weed (as per label)

Some Specifics About Herbicides Contact vs. Translocated

- Contact Herbicides
  - Causes burning effect on leaves with little effect on roots
- Translocated Herbicides
  - Absorbed and translocated throughout plant
  - Used on perennials and woody plants

Some Specifics About Herbicides Soil Applied

- Pre-emergence
  - Kills germinating seeds
- Post-emergence
  - Long residual effect- for use in industrial areas
  - Not recommended for home use

About Fungicides

- Diseases are often difficult to control
- Cultural practices are usually key- sanitation, irrigation, etc.
- Fungicides are often only effective prior to infection- creating a barrier to infection

Conditions which affect spraying

- Wind speed
- Air temperature
- Rainfall

Additional methods for weed control

- Corn gluten meal
- Thermal Kill
- Mechanical Control
- Soil Solarization

Surfactants, Additives, Adjuvants

- Reduces surface tension between surfaces, keeps materials in suspension, improves coverage
  - Spreader
    - Improves contact and weatherability
  - Sticker
    - Improves adherence, usually oily
  - Wetting Agent
    - Reduces surface tension

Storage and Disposal

- Proper storage is important

  -store in original container with label

  -storage area should be secure from children
- Disposal

  -Label indicates proper disposal methods

  -Some Oklahoma cities have collection days for hazardous materials.

  -Oklahoma Department of Ag. sponsors Unwanted Pesticide Disposal Program for farm chemicals.

Major Points Revisited

- Not all organisms that damage plants need to be controlled
- Identify thresholds to determine when to begin pesticide application
- Identification of the pest organism is crucial to effective control
- When applying a pesticide, always read the label before buying, before mixing, before application, after application (for cleanup)
- Buy pesticides in appropriate sized containers to avoid having to store them for long periods
- When in doubt, contact you local Cooperative Extension Office.