The University of Georgia

College of Agricultural & Environmental Sciences

www.ugaextension.com

The University of Georgia Master Gardener

College of Agricultural & Environmental Sciences and Cooperative Extension Service

IPM: Basics of Integrated Pest Management

Paul Guillebeau, Professor
Dept of Entomology

Learning Objectives

- **Pests & concept of IPM**
- **Scouting for pest problems**
- **Georgia Pest Control Handbook**
- **Pesticide formulations**
- **Pesticide label & Signal words**
- **Pesticide failure**
- **Safely storing pesticides**
- **Natural controls, their benefits and limitations**

Components of IPM

- Pest Identification
- Monitoring
- Control Guidelines
- Methods of Prevention and Control

A Pest…

- **Competes** with humans, domestic animals, or desirable plants **for food or water**
- **Injures** humans, animals, desirable plants, structures, or possessions

A Pest…

- **Spreads disease** to humans, domestic animals wildlife, or desirable plants
- **Annoys** humans or domestic animals

Types of Pests

- Insects
- Insect-like organisms
- Microbial organisms
- Weeds,
- Mollusks
- Vertebrates

Categories of pests

- Continuous pests
- Sporadic, migratory, or cyclical pests
- Potential pests

Things to know about pests

- Physical features
- Damage caused
- Development & biology
- Continuous, sporadic, or potential pests
- Control goal

Do you need to control the pest?

Causing or expected to harm?

-more than acceptable level?

Aphids on Chrysanthemum

Pest Control Goals

1. **Prevention** — keeping a pest from becoming a problem
2. **Suppression** — reducing pest numbers or damage to an acceptable level
3. **Eradication** — destroying an entire pest population

Regular Observation

Scouting - Pest Monitoring

- What kinds of pests?
- How many?
- When is the right time to control?
- Have controls reduced numbers of pests?

Monitoring a Landscape

- Know your plants
- Frequent inspection
- Observe general appearance
- Slowly scan plant

Monitoring a Landscape

- Identify what you find
- Decide what's acceptable
- Select management method
- Evaluate
- Keep record

Tools for pest monitoring

- Notebook
- Sticky traps
- Hand lens 10x or better
- White paper on clipboard
- Tweezers
- Sample jar
- Reference books

Steps in Pest Monitoring

- Identify the pest.
- Identify the current stage in life cycle.
- Note the location
- Determine the number of insects, weeds or disease infected plants

Steps in Pest Monitoring

- Inventory the environment surrounding the pest
- Identify Key Hosts
- Identify existing damage from the pest.
- Keep accurate records of findings and controls

Solving pest problems

- Identify the pest or pests and determine whether control is warranted for each
- Determine pest control goal
- Know what control tactics are available
- Evaluate the benefits and risks

Solving pest problems

- Choose most effective and least harmful strategy
- Use each tactic in the strategy correctly
- Observe local, state, and federal regulations
- Keep a record

Natural controls

- **Climate**
- **Natural enemies**
- **Geographic barriers**
- **Food & water**
- **Shelter**

Applied Controls:

1. **Host resistance**
2. **Cultural control**
3. **Mechanical control**
4. **Sanitation**
5. **Chemical control**
6. **Biological control**

1. Host Resistance

- Host prevents pest from completing life cycle
- Host is more vigorous or tolerant
- Host is more difficult to attack

2. Cultural Control

Prevent or suppress an infestation by:

- Altering the environment
- Altering the condition of the host plant
- Altering the behavior of the pest

Cultural practices

- Crop rotation
- Cultivating soil
- Varying time of planting or harvesting
- Planting trap crops
- Adjusting row width
- Pruning, thinning, & fertilizing plants

3. Mechanical (physical) control

- Traps, screens, barriers, fences, nets
- Lights, heat, refrigeration

4. Sanitation

- **Remove crop residues**
- **Use mulches**
- **Clean seeds & transplants**
- **Decontaminate equipment**

5. Chemical control

Pesticides are **chemicals** used to destroy pests, control their activity, or prevent them from causing damage.

6. Biological control

- **Parasites**
- **Predators**
- **Pathogens**

Green lacewing

Eddie McGriff, The University of Georgia, www.insectimages.org

Pest Control Failures

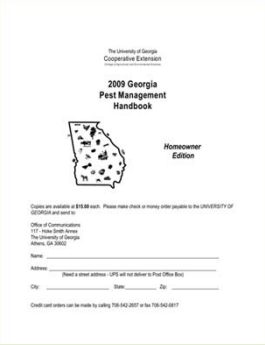
Pest Resistance

Pesticide rarely kills 100% of the target pests

- Most susceptible killed
- Survivors avoid or adapt- may pass along traits to offspring
- Over time, resistance may increase

Other Reasons for Failure

- Incorrect dose
- Incorrect application
- Pest not correctly identified
- Wrong time
- Infestation may have developed later


The University of Georgia
Cooperative Extension

2009 Georgia Pest Management Handbook

Homeowner Edition

Copies are available at $15.00 each. Please make check or money order payable to the UNIVERSITY OF GEORGIA and send to:

Office of Communications
117 - Hoke Smith Annex
The University of Georgia
Athens, GA 30602

Name: _____

Address: _____
(Need a street address - UPS will not deliver to Post Office Box)

City: _____ State: _____ Zip: _____

Credit card orders can be made by calling 706-542-2657 or fax 706-542-0817

Georgia Pest Management Handbook

INTRODUCTION TO PESTICIDES

Grouping Pesticides Based on the Source

- Inorganic
- Organic-natural
- Organic- synthetic
- Microbial

Grouping Pesticides Based on Activity

- Protectants
- Contact poisons
- Stomach poisons
- Systemic
- Translocated
- Selective
- Nonselective
- Fumigants

Grouping Pesticides Based on Timing

- Preplant
- Preemergence
- Postemergence

When and Where to Apply Pesticides

- Follow label directions
- Don't exceed label rate
- Use at correct stage
- Treat only intended target
- Treat correct area
- Don't treat in adverse weather

Factors that Affect Pesticide Activity

- Problem correctly identified?
- Appropriate pesticide used?
- Applied properly?
- Right place?
- Right time?
- Conditions right?

Ingredients

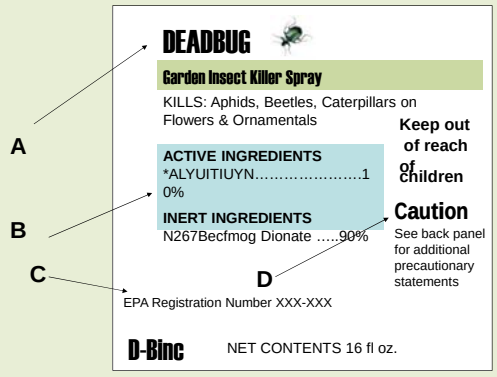
- Active ingredients
- Inert ingredients

Liquid Formulations

- EC Emulsifiable concentrate
  - Mixes well
  - Less safe
- RTU Ready to Use
  - No mixing or measuring
  - More expensive

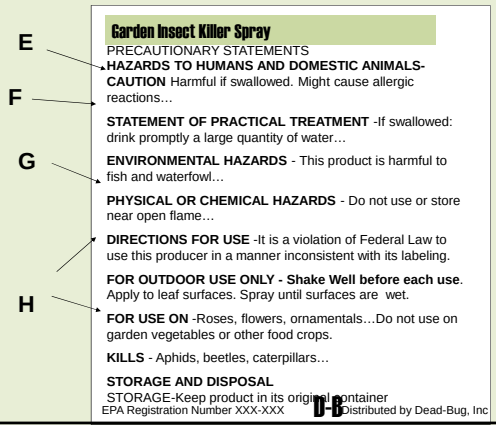
Dry Formulations

D	Dusts
G	Granular
WP	Wettable Powder
B	Baits



(D) Signal words

- DANGER-POISON (can kill)
- DANGER (eye & skin damage)
- WARNING (may cause severe injury)
- CAUTION (low toxicity. Exposure is much less likely to cause injury)



(H) Pesticide Directions for Use

- Where it may be used
- How much may be used
- How often it may be applied
- Other restrictions
- Pests that it will control
- Storage and disposal

Application Equipment

Sprayers

Dusters

Granular Applicators

Pesticide Toxicity

- Acute toxicity - single or short term
- Chronic toxicity - repeated or long term

Pesticides are most dangerous as concentrates. Be especially careful when measuring and mixing pesticides.

USING PESTICIDES SAFELY

Routes of Exposure

- **Skin**
- **Swallowing**
- **Inhaling**
- **Eye injury**

NEVER store any pesticide in a food or drink container

First Aid for Pesticide Exposure

- **Skin** - Rinse the exposed area with clean water.
- **Swallowed** - Consult the pesticide label and call Poison Control **1-800-222-1222** immediately.
- **Inhaled** - Move the victim to fresh air.
- **In eyes** - Rinse with clean water for at least 15 minutes

Protecting the Body from Pesticides

- Wear Protective Clothing
  - **Gloves**
  - **Boots**
  - **Other –**prescribed by label
- Shower
- Launder clothing separately

Pesticide Spills

- Dry Spills
  - **Scoop up**
- Liquid Spills
  - **DO NOT HOSE DOWN**
  - **Absorbent material (kitty litter)-dispose**
  - **Remove contaminated soil-dispose**

Pesticide Disposal

- Buy only needed amount
- Mix only what you need
- Share excess
- Fill leak proof container with kitty litter and dispose
  - **Rinse empty bottles**
  - **Discard clean bottles in household trash**
- Collection days

Beneficial Insects

Parasites, Parasitoids and Predators

Parasites & Parasitoids

Parasite - organism that lives in or on the body of the host during some part of the parasite's life cycle.

Parasitoid - a special kind of parasite that may consume all or part of the host's tissues, eventually resulting in the host's death.

Predator

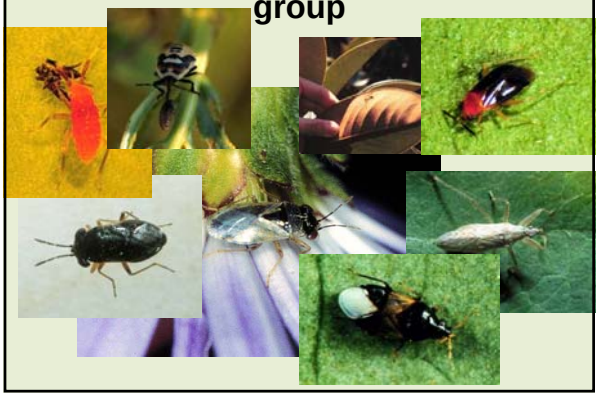
- Insect, mite or spider that attacks and feeds on its prey
- Usually larger than prey
- kills and consumes several prey during its lifetime

Key Beneficial Insects

- Lady beetles
- Ground beetles
- Tiger beetles
- Rove beetles
- Syrphid flies
- Long-legged flies
- Robber flies
- Spined soldier bugs
- Predaceous damsel bugs
- Minute pirate bugs
- Predaceous plant bugs
- Assassin bugs
- Big-eyed bugs
- Green lacewings
- Brown lacewings
- Parasitic wasps
- Parasitic flies

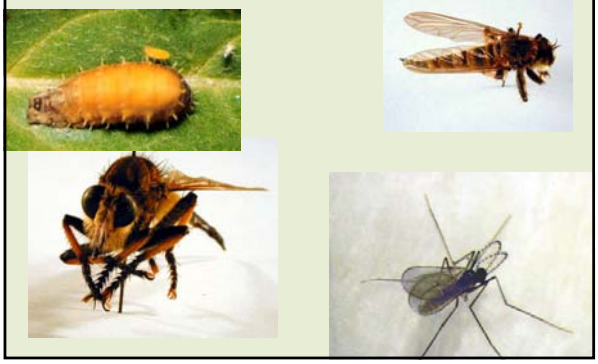
Predatory beetles

Predators in the "True Bug" group



Earwigs

Predatory flies



Spiders and mites

Thrips

Lacewings

Praying mantids

Parasitic wasps and flies

Increase Natural Enemy Populations

- Judicious selection and use of pesticides
- Design landscapes to feature a variety of plant material

Managing Naturally Occurring Parasites and Predators

- Choose selective rather than broad-spectrum insecticides
  - **May be slower, but long term control is better achieved by using methods that conserve natural enemies**
- Monitor for beneficial arthropods as you would for pest insects
  - **If ratio of pests to natural enemies is low, then spraying can be delayed**

Questions