

Pests You CAN Conquer

Managing Friends and Foes
of the Insect World

Pick your battles

- Not all pests must be eliminated
- Not all “bugs” do damage
- Not all damage done has long term detriment

Approaching the problem

- You have options
 - Do nothing
 - Go 'nuclear'
 - Everything in between - IPM

IPM

- Integrated **P**est **M**anagement
 - A practice of taking the least toxic approach to solving pest problems
 - Uses more than one approach; often in combination
 - Natural
 - Biological
 - Cultural
 - Chemical

Natural controls

- The suppression of pest populations by naturally occurring biological and environmental agents
 - Natural enemies
 - Weather
 - Climate changes
 - Food resources

Biological controls

- Management of pest populations using other living organisms such as pathogens, predators, parasites and parasitoids
 - Preserve existing population
 - Reduce pesticide use
 - Maintain alternate host insects
 - Introduce supplementary population of natural enemies

Examples of Predator/Parasite species

- Trichogramma wasp (parasite)
 - attack eggs of 200 pest species
 - timing of release is critical
- Green lacewings (predator)
 - prey on aphids and spider mites
 - require nearby food supply
- Praying Mantis (predator)
 - predator of grasshoppers, bees, crickets, wasps, and flies
- Lady Beetles (predator)
 - aphids are preferred diet
 - require ample supply of live aphids at the release point

Other Beneficial Predators

- Beneficial insects
 - Assassin Bug
 - Big-Eyed Bug
 - Ground Beetle
 - Honey Bee
 - Minute Pirate Bug
 - Predatory Wasp
 - Spiders
- Beneficial micro-organisms
 - Predatory nematodes

Cultural controls

- Site selection
- Crop rotation
- Isolation
- Interplanting or companion planting
- Plant or cultivar selection
- Optimum plant health

Chemical controls

- Using chemicals to eradicate pests
- Use **lowest** toxicity possible
- Read and follow directions, including **safety equipment** and **disposal**
- Chemical must be approved for use against the specific pest AND the plant group
 - Many are **NOT** approved for use on crop plants
- Obey laws protecting honey bees

Protecting honey bees

- Don't apply pesticides while bees are active during the day
- Treat plants early in the morning or late in the afternoon
- Avoid using products highly toxic to bees

Understanding 'organic'

- Not all 'organic' remedies are safe
- Many 'organic' remedies are chemical controls
- 'Cide' means kill
 - Dishsoap can kill many insects, so it can be called a pesticide
- Watch out for untested home remedies
 - Many are effective; some are not
 - Some are illegal and unsafe

'Organic' controls

- Spinosad
 - Causes rapid excitation of the nervous system
 - Recently approved for use vegetables
- Pyrethrum
 - Causes rapid paralysis
 - Approved for use on most fruits, vegetables, and ornamentals
- Nicotine
 - Controls piercing-sucking insects
 - Most effective in warm weather

'Organic' controls

- Sabadilla
 - A contact and stomach poison
 - Wear a mask to reduce irritation
 - Safe for food crops before harvest
- Rotenone
 - Controls aphids, caterpillars
 - Toxic to fish, insects and mammals
 - Wear a mask during application

‘Organic controls’

- Insecticidal soaps and oils
 - Destroys insect cuticle
- Pepper, onion, garlic sprays
 - Little scientific data available
- Diatomaceous earth
 - Must be reapplied after each rain or watering
 - Marginally effective
 - Has some lung irritant danger
- Sulfur
- Microbial insecticides

Microbial insecticides

- *Nosema locustae* - a spore used to control grasshoppers
- *Bacillus thuringiensis* (BT)- controls larvae of moths and butterflies
- *Bacillus popilliae* - controls grubs of Japanese beetles
- Bacillus is a naturally occurring soil bacterium
- Bacillus is bred for specific insects, make sure you use the right one for the target pest

Six Steps to IPM

- Identify the pest
- Size up the problem
- Prevent infestation
- Make a plan
- Use pesticides only when necessary
- Evaluate the effectiveness of your plan
- Consider hiring a pro in some cases

Types of injury

- By chewing insects
 - External plant parts are eaten
 - Holes or skeletonized leaves
- By piercing-sucking insects
 - Epidermis is pierced and sap is sucked from plant cells
 - Tissue necrosis
 - Leaf curl
- By internal feeders
 - Insects feed within plant tissue

Types of injury

- By subterranean insects
 - Attack roots below the soil
- By laying eggs
 - Often kills critical plant tissue
- By using plants for nest material
 - Tunnels or holes are evidence
 - Folded leaves with webbing
- Disease transmission

Diagnosing Common Insect Problems

- Observe symptoms
 - Chewed leaves/stems
 - Stunted/distorted plant parts
 - Tunnels in stems/roots/trunks
 - Wilting/yellowing/silvering/stippling pattern on leave
- Observe primary plant part affected
 - Leaves
 - Flowers or fruits
 - Stems or roots
 - Whole plant
- Note any occurrence of multiple symptoms on plant

Clues to look for

- Look for the pest itself
- Match mouthparts to damage patterns
- Look for signs of insect presence
 - Honeydew
 - Fecal droppings (frass)
 - Cast skins
 - Empty egg cases
 - Dead insects

An ounce of prevention

- Plant resistant varieties
- Choose adapted plants
- Crop rotation
 - Works with insects having short migration ranges
- Plant or harvest early
 - Consider a fall vegetable garden
- Remove debris at season end
 - Destroy by burning or burying (don't put in compost pile) if infested

An ounce of prevention

- Remove weeds
 - Provide homes for insects
 - Compete with healthy crops
 - Healthy crops resist insects
- Cultivation
 - Exposes pests to adverse conditions & predators
 - Can expose beneficials as well

An ounce of prevention

- Companion planting
 - Orderly mixing of crops to control insect populations
- Fertilization
 - Proper plant nutrition produces healthier plants that are more capable of resisting pests

Some common garden pests

- Aphids
- Mealy bugs
- Scale
- Leaf-footed bugs
- Thrips
- Leaf miners
- Leaf rollers
- Grubs
- Squash Vine Borers
- White Fly
- Red Imported Fire Ants

Fire Ants

- Texas Two-step program
 - May and October for Harris County
 - Economical, uses very little product
 - Can be effective even when applied at less than recommended rate
- “Organic” control:
 - 1 oz liquid dish soap
 - 1 oz orange oil (up to 2 oz)
 - 1 oz horticultural molasses
 - 1-gal water

Recommended resources

- <http://hortipm.tamu.edu/>
- <http://insects.tamu.edu/>
- <http://vegipm.tamu.edu/>

Got questions?

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