

Managing Pests in Your Vegetable Garden (IPM)

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Integrated Pest Management Involves:

- Providing proper cultural practices
- Choosing plants resistant to pests
- Scouting/Identifying/Monitoring
- Asking the right questions
- Choosing a method of control
- Protecting beneficials and the environment

Scouting

➤ Observe vegetable plants regularly

- Look carefully – tops and undersides of leaves and at soil line
- You might need a hand lens
- Do you see insects, signs of insects or disease?



Scouting

➤ Look for damage:

- Distorted new growth
- Yellow stippling on leaves
- Webs around leaves
- Notched or chewed leaves
- Black sooty mold
- Rotting roots



Identifying

- Is damage due to insect pest, disease or cultural practices?
- If you see insects, are they harmful, helpful, or harmless?
- If the insects are harmful, do you see evidence of beneficial insects also?



Gregg S. Nuossly
University of Florida

Monitoring

- Check to see if insect population is getting larger or problem getting worse
- Check for beneficial insect activity
- Have a pest tolerance level
 - When level of infestation reached – act
 - Only treat affected areas or plants
 - Monitor results
 - Re-treat as needed



Insects with Piercing, Sucking Mouthparts

- Aphids
- Whiteflies
- True bugs
- Spider mites



Aphids

- Found on new plant growth and/or flowers
- Damage: leaf curling or puckering, deformed flowers
- Sooty mold & ants

Heavy population control:

- Sharp spray from hose
- Beneficial insects
- Insecticidal Soaps
- Neem oil or Organocide



Whiteflies

- Found on undersides of leaves
 - Adults look like white gnats
 - Larvae stationary on leaves
- Leaves pale or spotted
- Heavy sooty mold
- Vector for many diseases

Control:

- Beneficial Insects
- Yellow sticky cards
- Neem oil or Organocide
- Insecticidal soap



This is a
good bug

True Bugs

Leaf-footed bug, Squash bug, Stink Bug

- Hide under leaves near base
- Suck juices from leaves & fruit
- Squash, beans, tomatoes, eggplant

Control:

Insecticidal soap – nymphs

Neem oil or Organocide

Pyrethrum

Spinosad



Spider Mites

- Relatives of spiders – eight legs
- Found on lower leaf surfaces and fruits
- Webs sometimes present
- Feeding causes stippling on leaf surface

Control:

- Sharp spray from hose
- Beneficial insects
- Neem oil or Organocide
- Insecticidal soap
- Chemical miticides



Insects that Chew

- Caterpillars
- Weevils
- Beetles
- Leaf miners
- Snails & Slugs



Control of Chewers

Controlled best if very young

- Bt (*Bacillus thuringiensis*) for caterpillars
- Spinosad
- Beneficial insects
- Mechanical removal
- Chemical pesticides
 - Carbaryl (Sevin)

Remember – butterfly larvae are caterpillars. If you want butterflies, be careful where you use pesticides, including Bt.



Snails and Slugs

- Rasping mouth parts
- Irregular shaped holes in leaves, flowers, fruit and stems
- Wet weather or over watered gardens

Control:

- Upside down grapefruit hulls
- Boards
- Beer in tins sunk in ground
- Iron Phosphate based control granules
- Chemical control baits



Root Knot Nematodes

- Decline and thinning
- Roots may be brown, stunted and galled

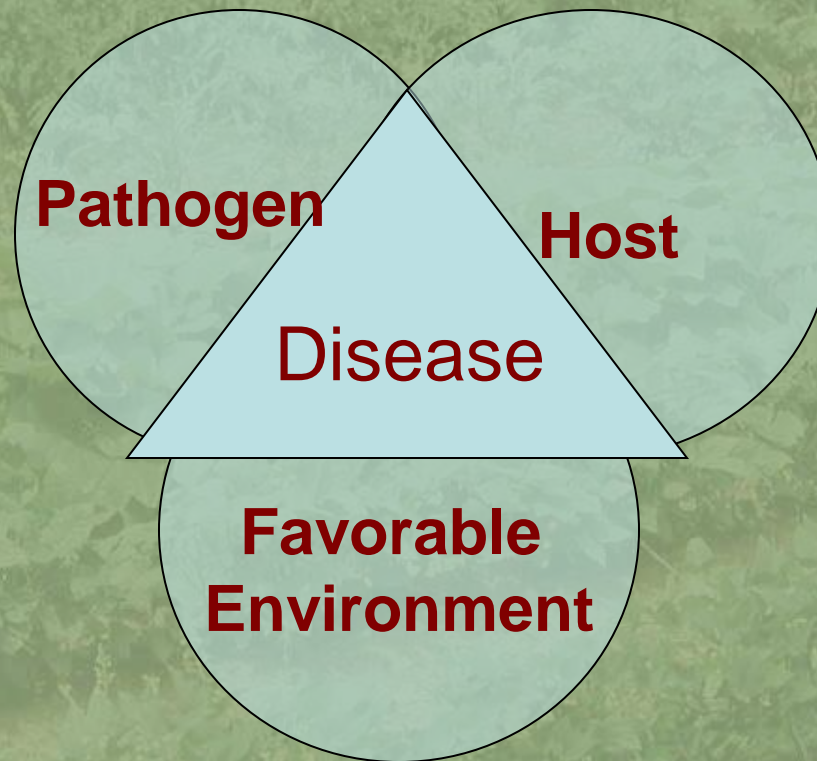


Management

- Provide adequate water and fertilizer
- Crop rotation
- Heavy applications of organic matter
- Resistance?
- Red plastic mulch
- Soil solarization in summer
- Grow marigolds in summer

Diseases

Requirements for disease to occur:



Disease Causing Pests

Large



Small

- Fungi
- Bacteria
- Phytoplasmas
- Viruses



85% of all plant diseases are caused by fungi

Bacterial decay = bad



odor

Fungi

Spread:

- Air movement, water splash and insects
- Infected seed and plants
- Contaminated soil and tools
- Man

Bacteria

Spread:

- Splashing water
- Insects
- Contaminated tools
- Man



Diseases of Vegetables



Damping off Fungus



Early Blight



Late Blight



Powdery mildew



Rust



Blossom End Rot



Tomato Yellow
Leaf Curl Virus

Points to Remember:

- **Fungi cause more diseases than bacteria.**
- **Bacterial diseases are more difficult to control.**
- **Most fungal and bacterial diseases are promoted by high humidity.**
- **Viral diseases cannot be cured.**

Weeds – plants with a people problem

Common garden weeds:

- Grass like weeds:
 - Common bermudagrass
 - Sedges – nutsedge
 - Crabgrass



Weeds

Common garden weeds:

- Broadleaved weeds:
 - Asiatic Hawkskbeard
 - Chamberbitter
 - Carolina geranium
 - Yellow woodsorrel
 - Bittercress



Weeds

Control strategies

- Mulch
- Weed barriers – layers of newspapers
- Hand pulling
- Solarization in summer



Beneficial Organisms:

Predators

- Kill and eat harmful pests



Parasites

- Live in or on pests eventually causing death



Beneficial diseases

- Viruses, fungi and bacteria that naturally infect and kill insects.



Learn to Recognize the Good Guys:



More Good Guys



Summary

- Many insects inhabit gardens
- Scouting helps catch pests early
- Proper conditions must exist for disease development
- Fungal and Bacterial diseases are favored by high humidity
- Weeds can be a problem
- Protecting beneficial insects is important or we inherit their job

Credits

- Thomas J. Weissling – *Good Bug / Bad Bug* UF/IFAS
- Vivienne Harris – Pasco County Extension Director – *Only the Young Die Good*
- *Helpful, Harmful, or Harmless* ID card Deck – Sydney Park Brown and Eileen Buss UF/IFAS
- *Vegetable Gardening* – Jim Stevens & Sydney Park-Brown
- Lyle Buss – Pictures – UF/IFAS

QUESTIONS?

