

# Pest Management in Vegetable Gardens

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# Pest Management Involves:

- Providing proper cultural practices
- Scouting/Identifying/Monitoring
- Choosing a method of control
- Protecting beneficial insects and the environment



# Cultural Practices

- Choose plants resistant to disease
  - Tomatoes – VFN
  - Use plants recommended for Florida
- Sanitation
  - Remove infected plants
  - Remove plant debris and mulch
  - Soil solarization
  - Control weeds

# Cultural Practices

## ➤ Exclusion

- Floating row covers
- Micro-irrigation
- Rotate crops

## ➤ Follow recommended planting dates

## ➤ Plant some flowers



# 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 or brown spots 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 also see evidence of beneficial insects?



# 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



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# 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
- Neem oil or Organocide
- Insecticidal Soaps



# 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
  - Especially damaging on fruit
- Squash, beans, tomatoes, eggplant, peppers

## Control:

Insecticidal soap – nymphs

Neem oil or Organocide

Spinosad

Mechanical removal

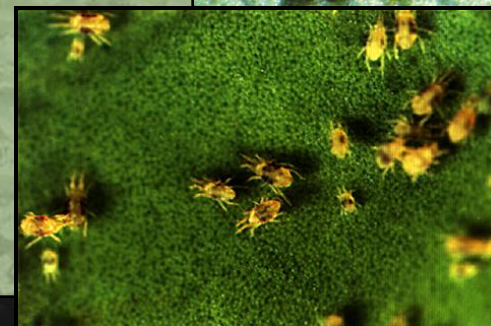
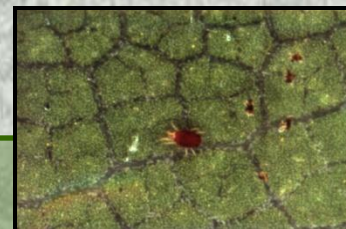


# Spider Mites

- Relatives of spiders – eight legs
- Found on lower leaf surfaces and fruits
- Webs sometimes present
- Feeding causes stippling on leaf surface
- Prevalent during hot, dry weather

## Control:

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



# Chewers

## Larvae

- Live below soil level
  - Cutworms, wireworms, grubs, lesser cornstalk borers
- Leaf and stem chewers
  - Armyworms, cabbage loopers, tomato hornworms, bean leafrollers, leafminers



# Chewers

## Beetles and Weevils

- Banded cucumber beetle
- Colorado potato beetle
- Mexican bean beetle
- Flea beetles
- Pepper weevils



# Control of Chewers

## Controlled best if very young

- Bt (*Bacillus thuringiensis*) for caterpillars
- Spinosad
- Neen oil
- Beneficial insects
- Mechanical removal

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



# Root Knot Nematodes

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

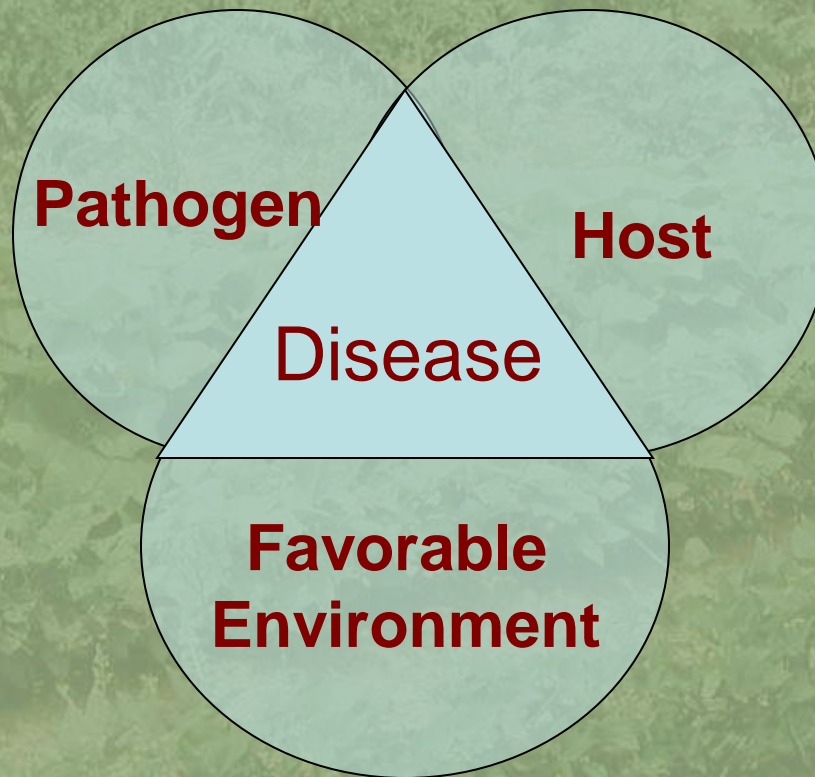


## Management

- 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:



# Plant Diseases

Large



Small

- Fungi
- Bacteria
- Phytoplasmas
- Viruses



85% of all plant diseases are caused by fungi



Bacterial decay = bad



**odor**

# Diseases of Vegetables



Damping off Fungus



Early Blight



Late Blight



Powdery mildew



Rust



Tomato Yellow  
Leaf Curl Virus



Blossom End Rot

# 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.

# Beneficial Organisms:

Most **insects** found in **gardens** are not **pests**. Many are beneficial, preying on **pests** or performing other useful tasks.

# 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
- Pests easier to control if caught early
- Sanitation helps with pest & disease control
- Organic treatments can be effective
- Protecting beneficial insects is important or we inherit their job

# QUESTIONS?

