

# Tips for Attracting & Retaining Beneficial Insects in the Garden

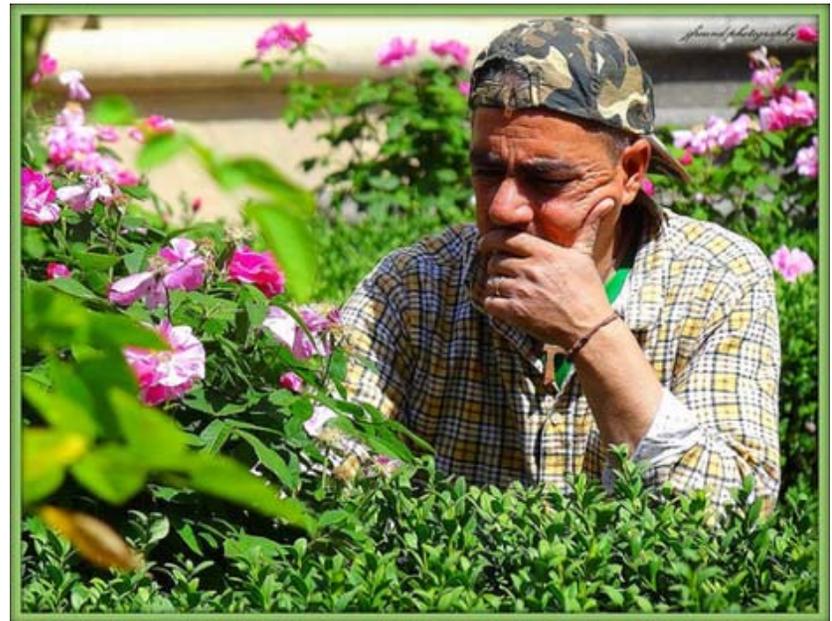
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# Who are the good bugs?



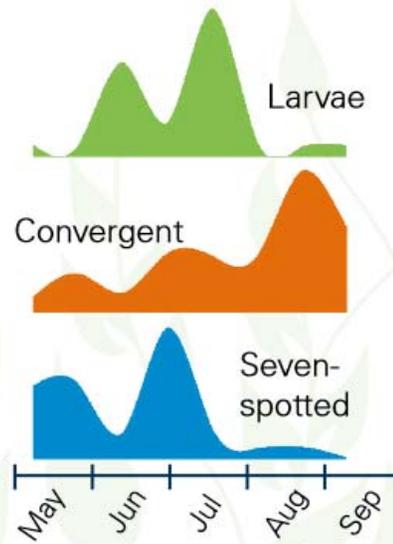
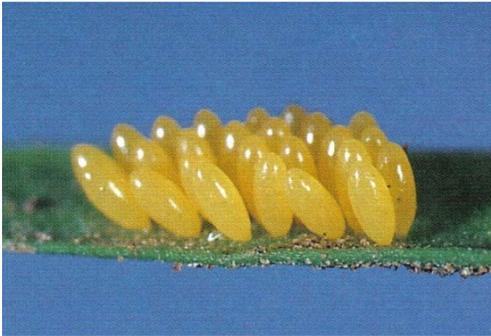
# Praying Mantis



- “Sit and wait”
- Need their space



# Lady Bug/Beetle



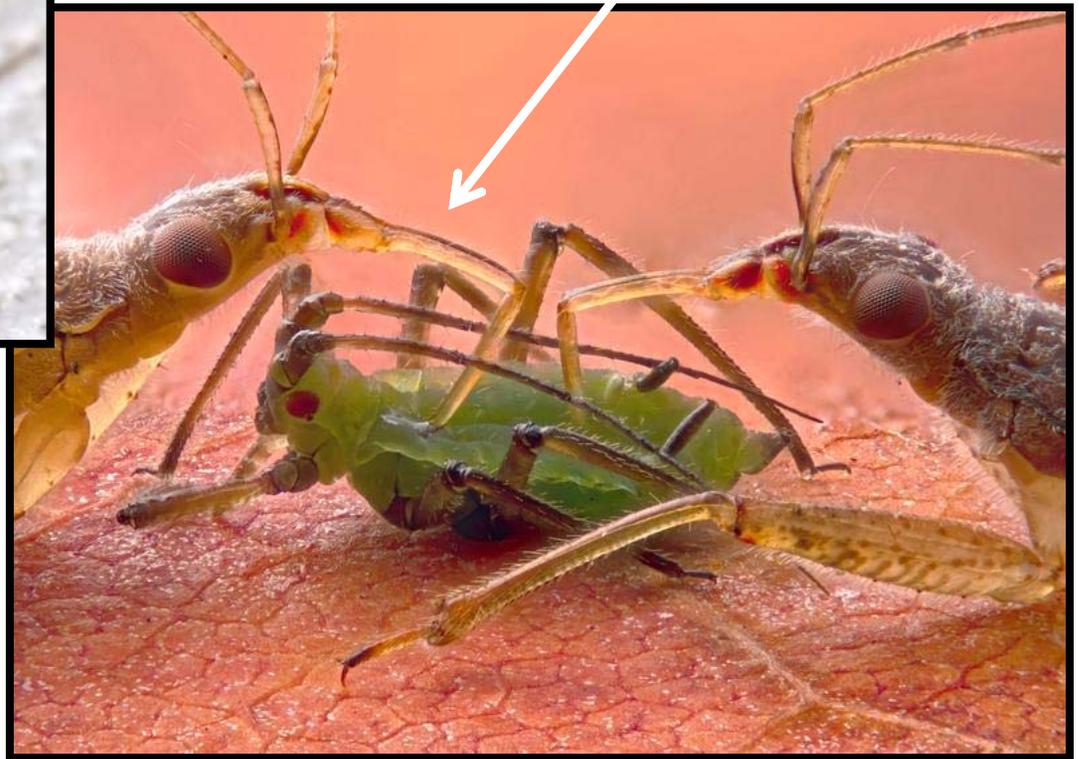
- Highly mobile adults
- Larvae are great predators
- Active foragers

# The True Predatory Bugs



Wings held across back  
"X"

Straw-like mouth  
"Stylet"



# Damsel Bug



- Intermediate “sit & wait” and active forager
- Overlapping generations



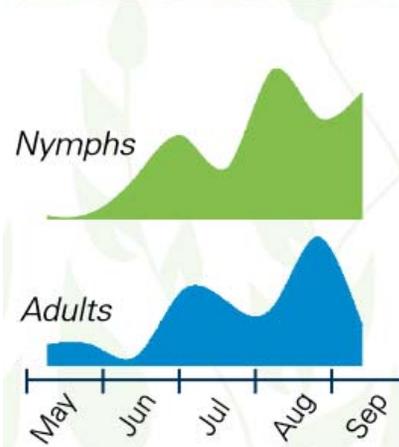
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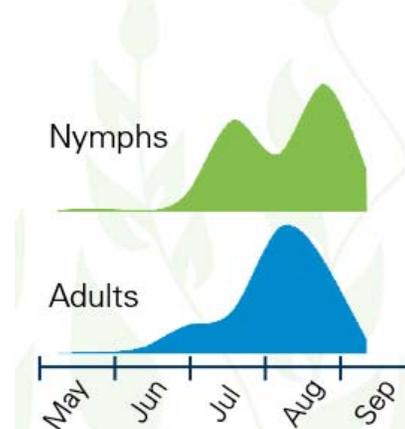


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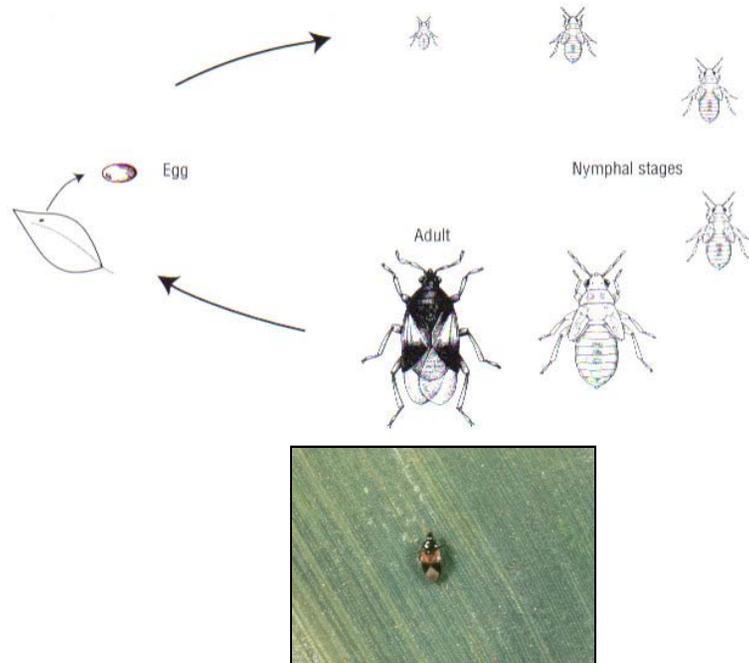
# Big-Eyed Bug



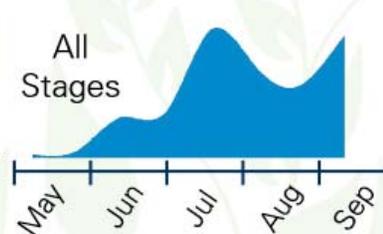
- Active and fast moving predator
- Overlapping generations



# Minute Pirate Bugs



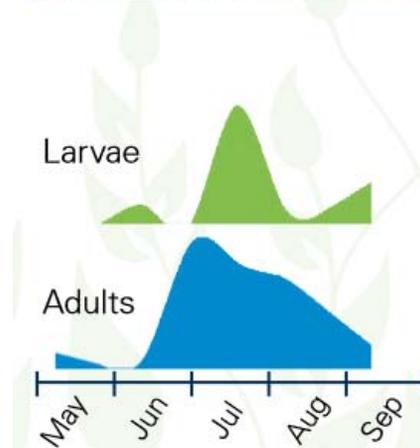
- Active predator
- Overlapping generations
- Feed on small prey



# Green Lacewing



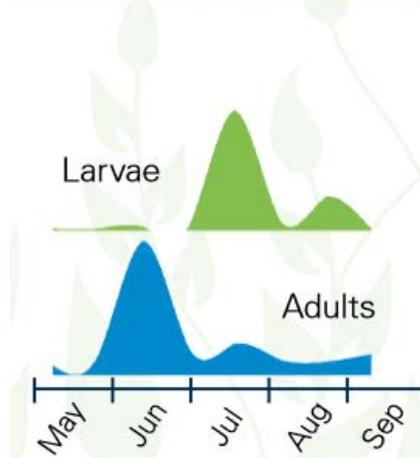
- Active predator
- Larvae are great predators



# Hover Flies



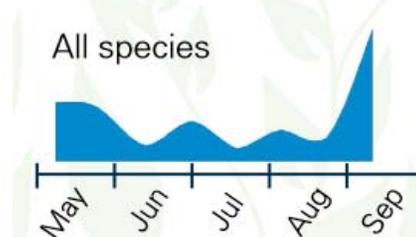
- Active larval predator
- Adults assist in pollination



# Predatory Ground Beetles



- Less in the canopy, more at the soil surface
- Active foragers both as adults and larvae
- Tend to be nocturnal



# Spiders

Trapping



Hunting



Active foraging



Sit and wait

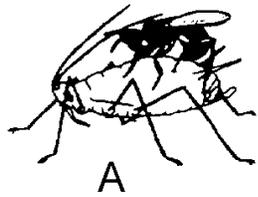


# Generalist predators

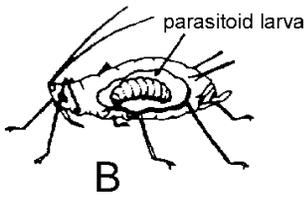


Have a broad diet and do not discriminate...

# Parasitoid wasps

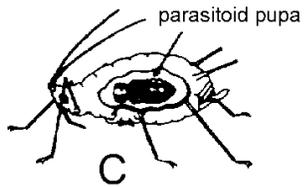


A



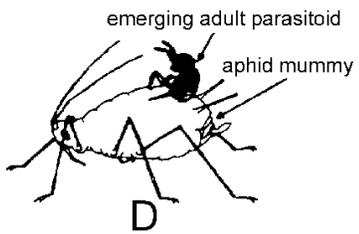
parasitoid larva

B



parasitoid pupa

C



emerging adult parasitoid

aphid mummy

D



# Disrupting the Balance



# Landscape Diversity

- Provide continuous blooms
- Larger, closer and more interconnected patches to create predator corridors



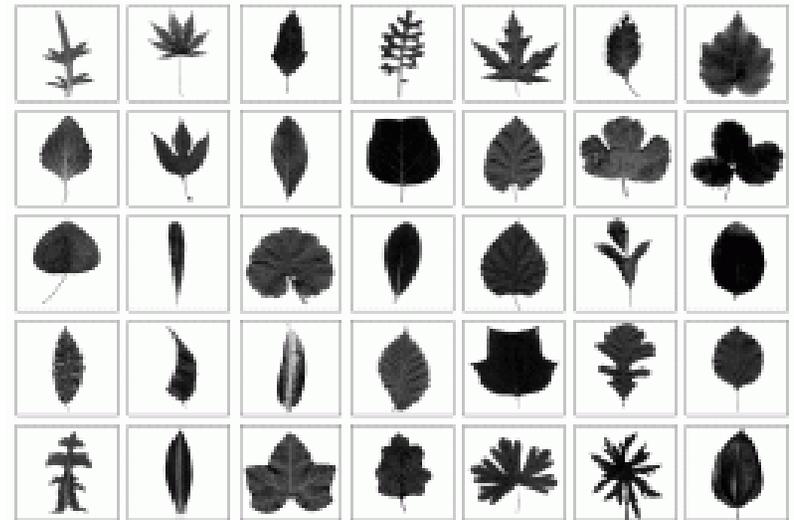
# Diverse Plant Architecture

- Diverse flower types
- Different bloom times
- Florets with small corolla better for beneficials



# Diverse Plant Architecture

- Short vs Tall plants
- Perennial vs Annual plants
- Varied leaf shapes

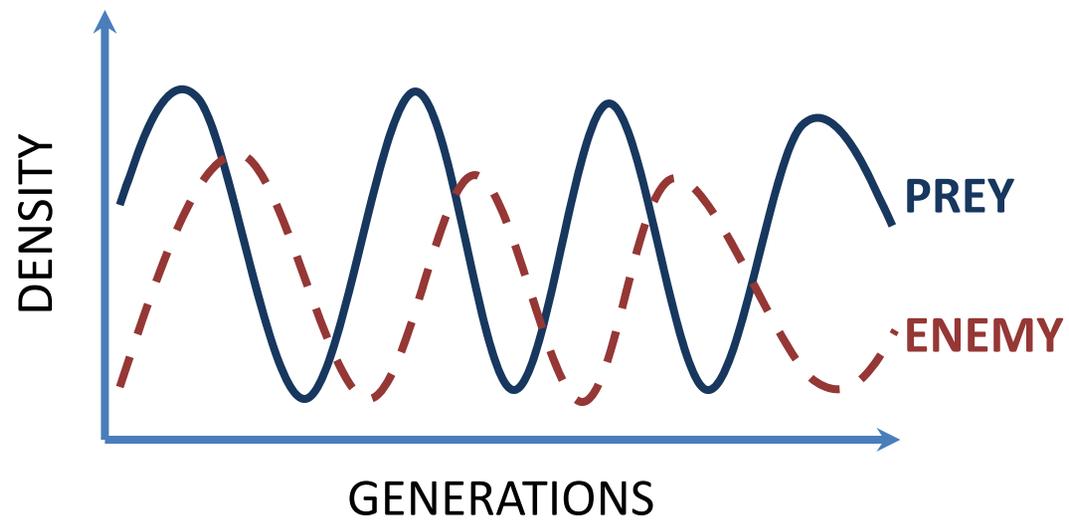


# Diverse Plant Architecture

- Be aware of nectar-less varieties and introduce more varieties with nectar resources



# Predators Lag Behind Pests



# Banker Plants

- Supply alternative prey resources
- Home base habitat



# Insectary Planting

- Supply alternative prey resources
- Home base habitat



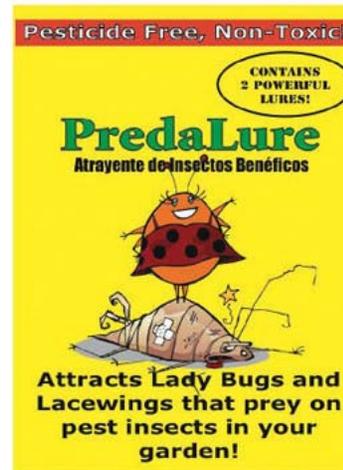
# Beetle Banks

- Perennials and grasses
- Refuge area



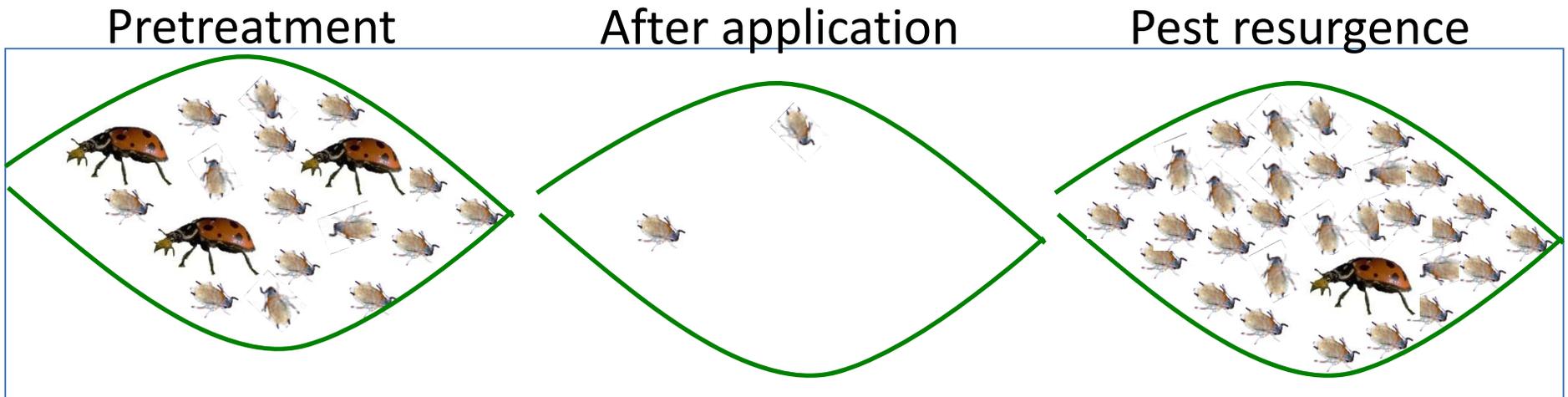
# Predator Attraction

- PredaLure
  - Methyl salicylate
- Aphid alarm pheromones



# Beyond Attraction: Avoid Broad-Spectrum Insecticides

- Choose alternative practices
- Choose “soft” or “selective” insecticides



# Beyond Attraction: Supplementing with Beneficial Release

- Got to think ahead
- Identify your pest habitat (veg, fruit, etc.)
- Identify your pest and life stage



# Beneficial Release

- Select a type of beneficial
- Select a specific beneficial



# Parasitoid wasps-Whitefly

Encarsia spp.



- Adult = 60-100 eggs
- Lifecycle=2-4 weeks
- Adults live 30 days but active for 10 days
- Target 3-4<sup>th</sup> stage larva



Not parasitized



Parasitized



# Egg Parasitoids

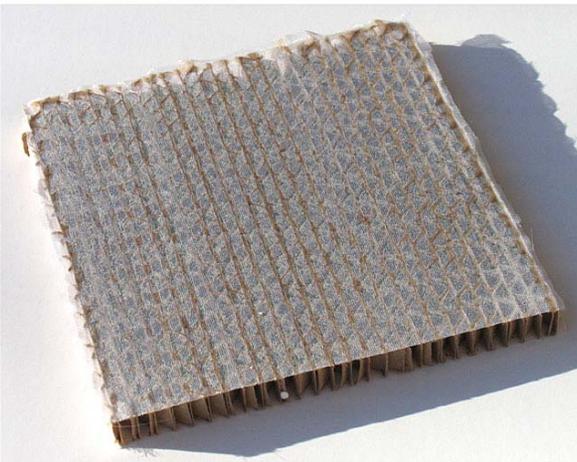
*Trichogramma* spp.



- One adult up to 300 eggs
- Adult survival up to 14 days
- Species vary in searching behavior
- Mainly lepidopteran egg parasitoids
- Release during moth flight and in combination with trapping

# Beneficial Release

- Field vs Greenhouse
- Pair predator behavior and life stage with success



# Quality Assurance

- Reputable Sources
- Shipping and Handling
- Cool storage
- Check for survivorship



# Dispenser Type



# Beneficial Release Considerations

- Avoid prolong cold storage
- Consider early morning or evening release
- Avoid high winds, rain, extreme hot & cold weather
- Follow the rate of application



# Recognize the oddities know the good bugs



# Visit utahpests.usu.edu

The screenshot shows the Utah State University Utah Pests website. At the top, it says "Utah State University COOPERATIVE EXTENSION" and "UTAH PESTS". There are navigation links for "UTAH PESTS Home", "Utah Plant Pest Diagnostic Lab", "Integrated Pest Management", "Bees", "CAPS", and "Plant Diseases". A search bar is present with "Google™ Search". On the left, there is a sidebar with links: Home, Fact Sheets, Frequently Asked Questions, Image Galleries, Slideshows, Video Fact Sheets, Utah Pests News, Quarterly Newsletter, and Contact Us. The main content area features a large image of a squash bug on a yellow flower. Below this are four colored boxes: "Utah Plant Pest Diagnostic Lab" (green) with a microscope icon and text "Just \$7 gets your pest problem diagnosed or insect identified."; "Integrated Pest Management" (blue) with an apple icon and text "Your source for fruit, vegetable, and landscape pest problems."; "Bees" (orange) with a bee icon and text "Honey bees aren't the only bees that pollinate plants in Utah."; and "Cooperative Agriculture Pest Survey" (purple) with an envelope icon and text "CAPS protects Utah agriculture through statewide monitoring of invasive pests." At the bottom, it says "Utah State University is an affirmative action/equal opportunity institution. © 2011 Utah State University Utah Pests".

The header for the "UTAH PESTS fact sheet" from Utah State University Extension. It includes the text "Published by Utah State University Extension and Utah Plant Pest Diagnostic Laboratory" and "ENT-120-08 August 2008".

## Squash Bug (*Anasa tristis*)

Diane G. Alston, Entomologist • James V. Barnhill, Weber County Agriculture Agent

### What You Should Know

- In Utah, the squash bug is primarily a pest of squash and pumpkin.
- Plant injury includes leaf necrosis, scamed fruits, and rapid plant wilt.
- Squash bugs are prone to develop resistance to insecticides and adults are difficult to kill.
- Best management is achieved by suppressing squash bugs when eggs or nymphs are first detected.
- Preventive cultural and mechanical controls should be the first line of defense.
- One egg cluster per plant is the treatment threshold.



Fig. 1. Mating pair of adult squash bugs.<sup>1</sup>



Fig. 2. Immature squash bugs, or nymphs.<sup>1</sup>

Squash bug (*Anasa tristis*) is a "true bug" with piercing-sucking mouthparts (Order Hemiptera) in the leaf-footed bug family (Coreidae). It is common throughout the U.S. and found from Canada to Central America. Adults (Fig. 1) emit a foul odor when disturbed and may be called "stink bugs"; however, true stink bugs are in a different true bug family. The insect spends the winter in the adult stage. In the late spring to early summer, adults seek out young cucurbit plants on which to lay eggs. Adults and immatures (called nymphs) (Fig. 2) feed on leaves, fruits, and vines. Typical feeding symptoms include yellow to brown spots on leaves, and if feeding is heavy, entire leaves will turn black and dry out. Feeding on fruits can cause scars and desiccated, sunken areas. Entire plants may wilt when squash bug-feeding severs xylem vessels in vines. Injection of a toxin during feeding has been proposed as a cause for rapid plant wilt, but no salivary toxins have been confirmed in squash bugs.

### HOST PLANTS

All cucurbits are hosts, but pumpkin and squash are most attractive; cucumber, melons and gourds are less attractive. Pumpkins, 'Hubbard' and yellow (straightneck

Early to mid season papaya effective squash bug management to develop resistant are difficult to kill. Sustain cultural and mechanical removal, resistant cultivar healthy plants, and hand

### Paper Wasp Traps

