



# First Detector Training: Beneficials

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Marion Murray, USU Extension IPM Program



# Types of Natural Enemies

**Predators:** eat many prey in a lifetime, feeding both as young and as adults.

**Parasitoids:** specialized insects that develop as a young in one host, eventually killing it.

**Pathogens:** nematodes, viruses, bacteria, fungi, protozoans.





# PREDATORS

Beetles - Coleoptera

True bugs - Hemiptera

Flies – Diptera

Others



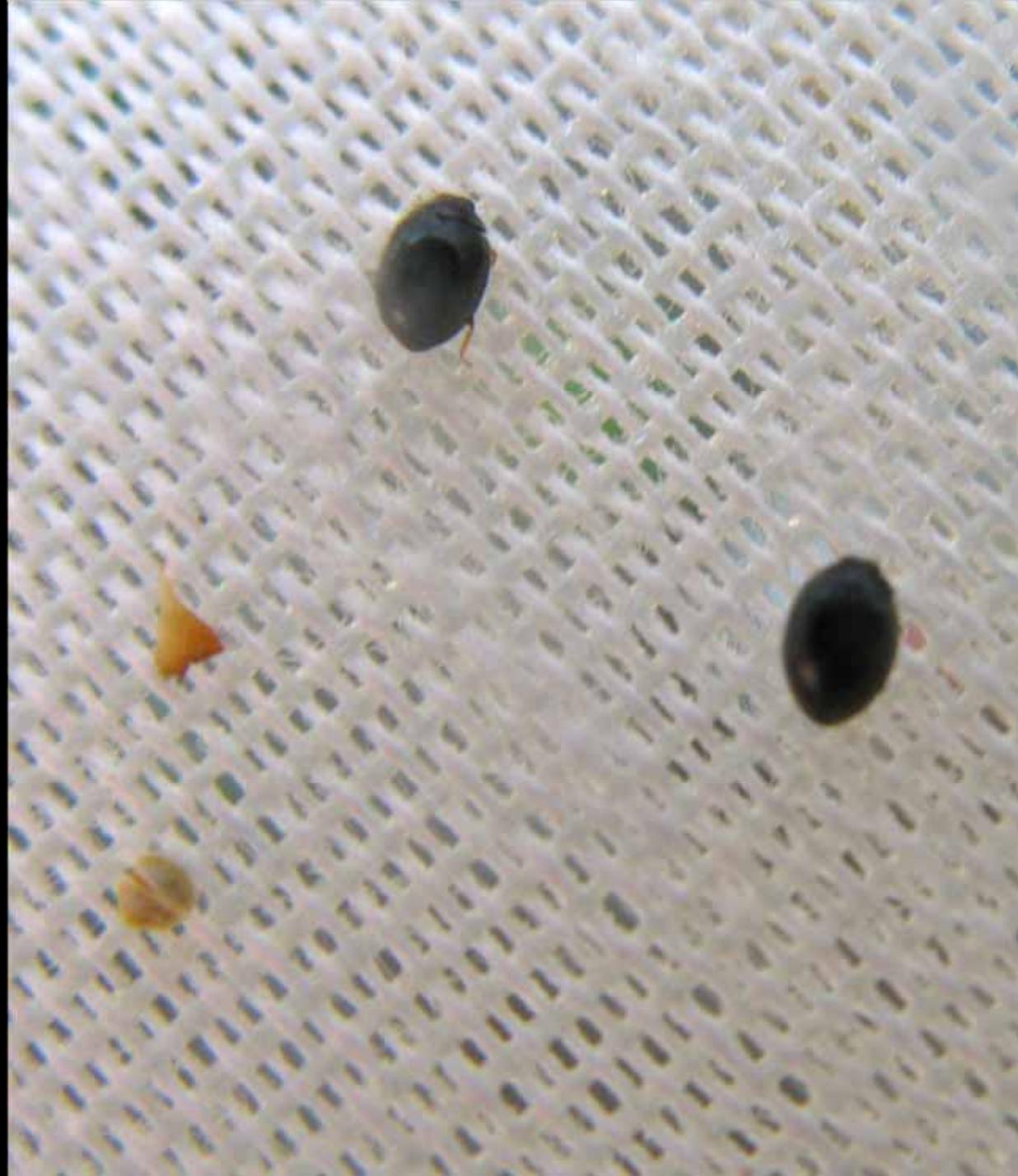
**Convergent lady beetle**

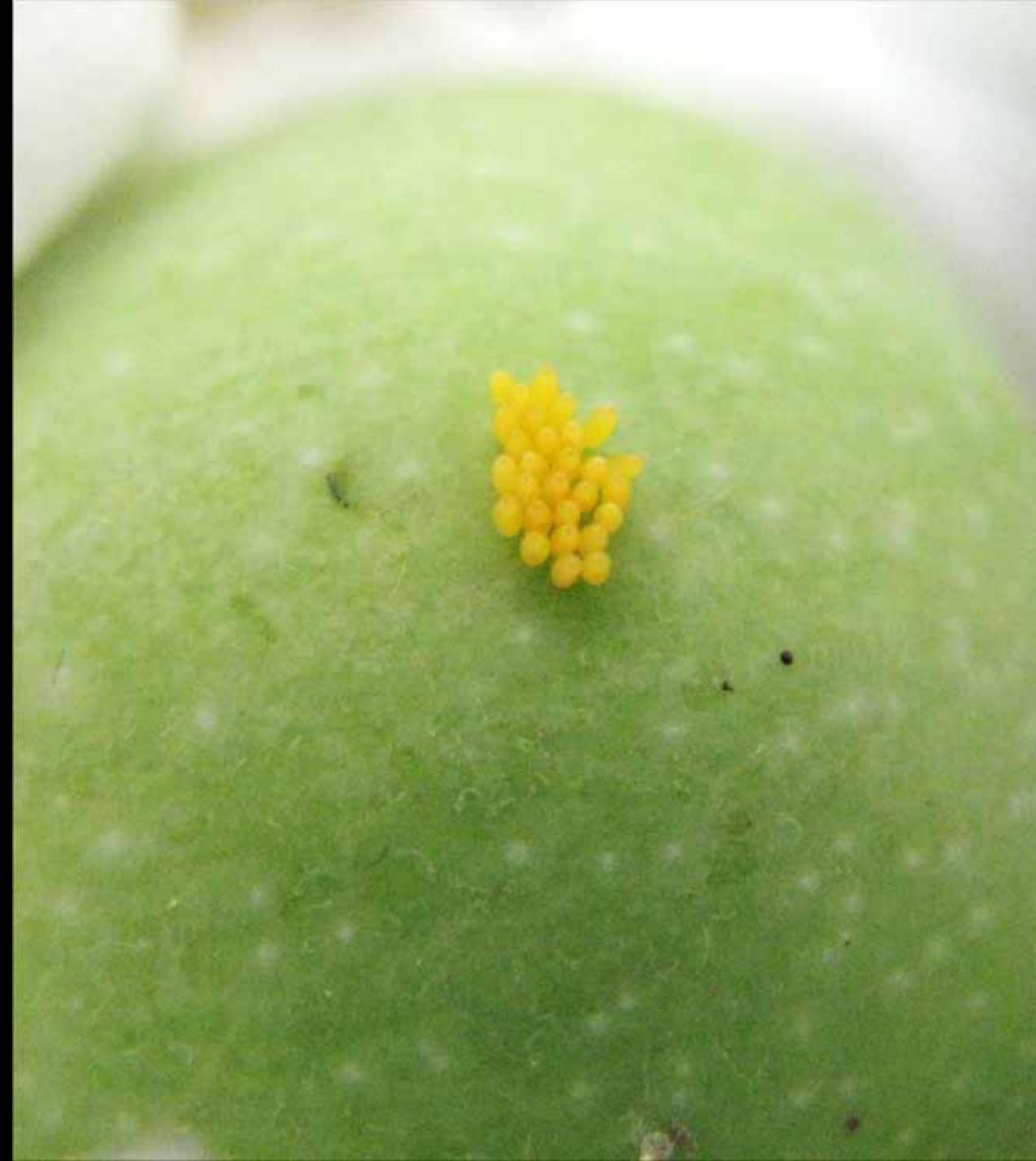


# Multi-colored Asian lady beetle



*Stethorus* sp. (Mite Destroyer)







# Lacewings

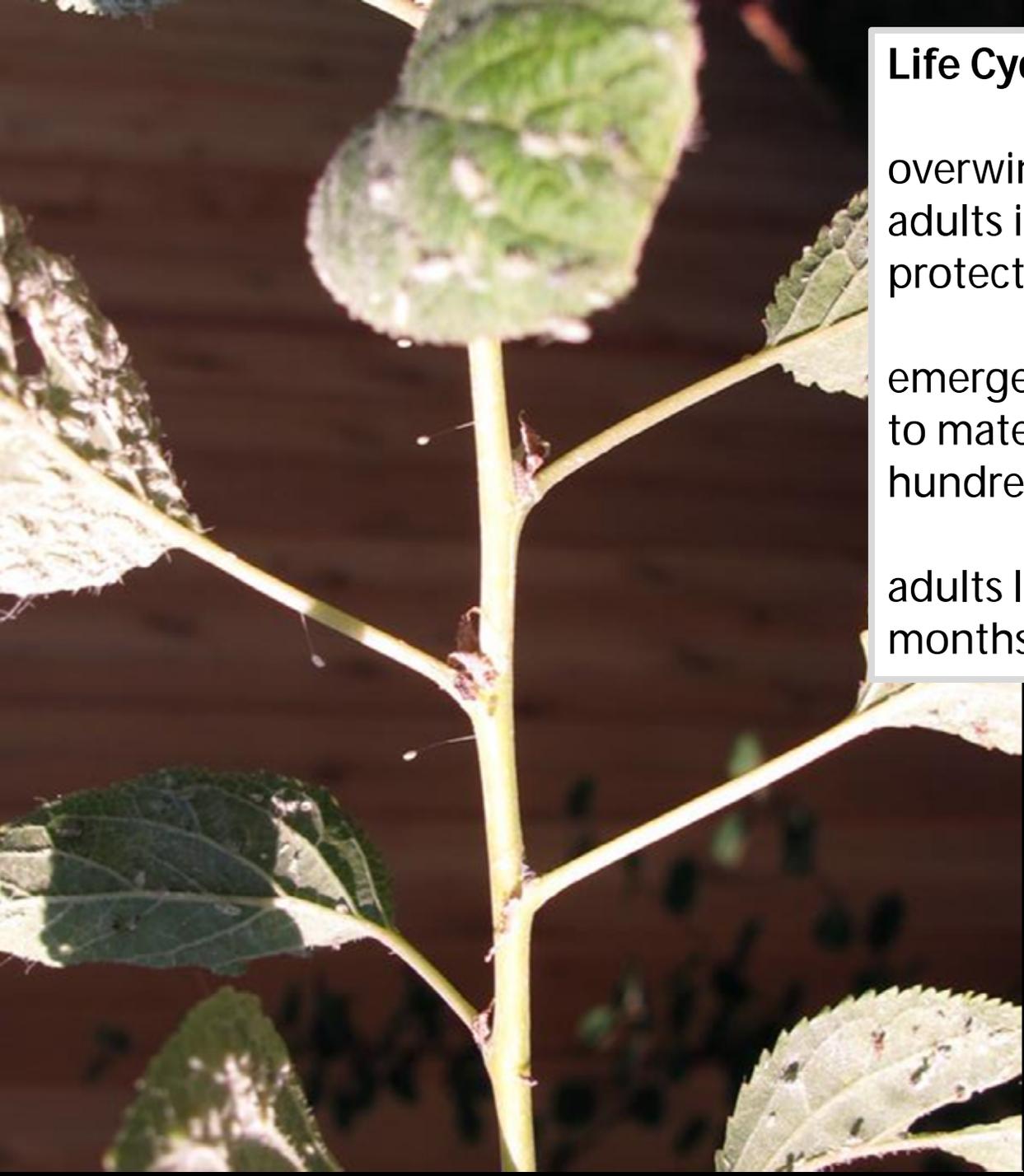
## ID tips:

green or brown  
lacy wings  
long, thin body  
larvae resemble  
alligator

## Where found:

adults nocturnal  
adults at flowers, lights  
larvae among prey



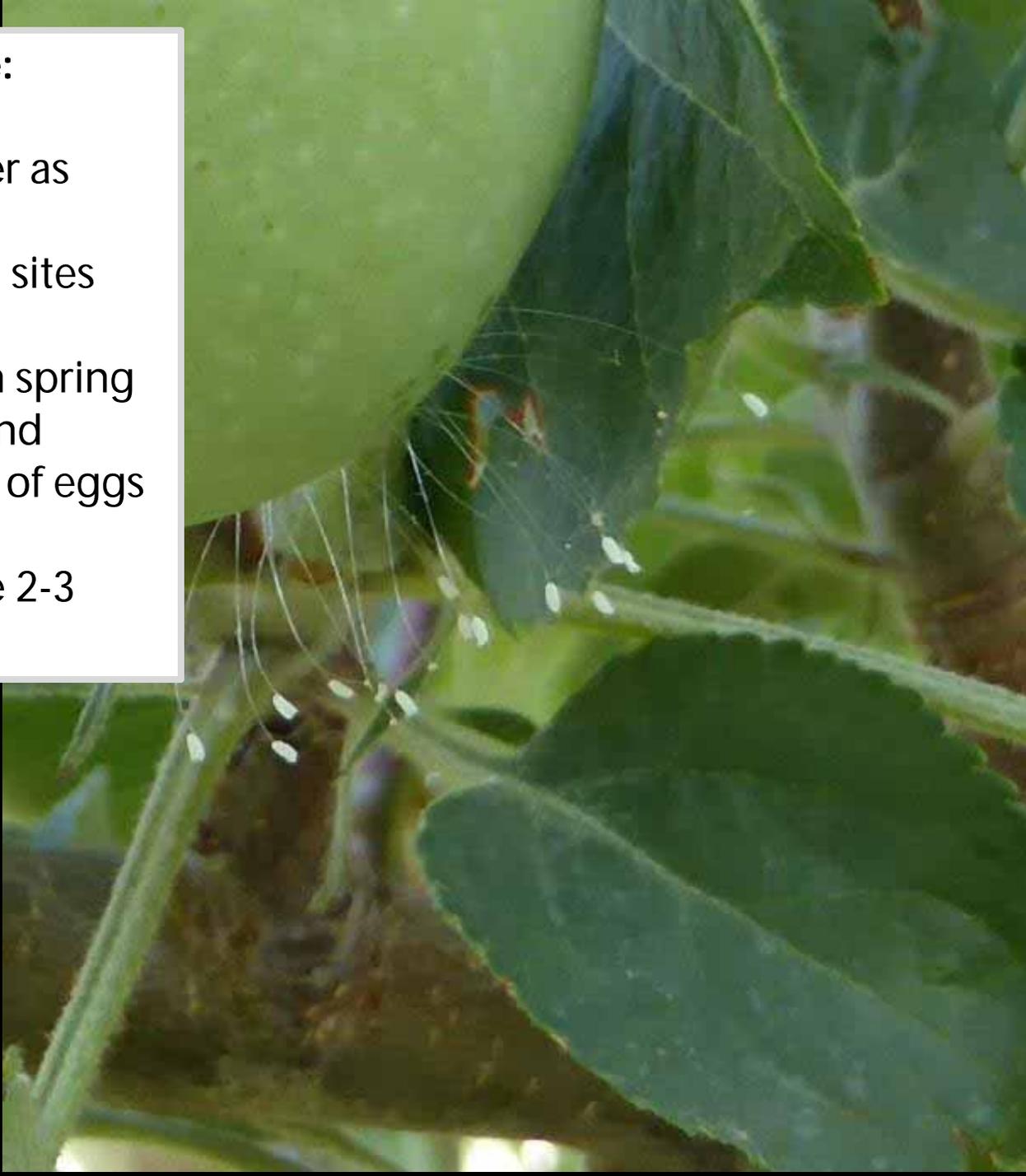


### Life Cycle:

overwinter as  
adults in  
protected sites

emerge in spring  
to mate and  
hundreds of eggs

adults live 2-3  
months





# Syrphid Fly Hover Fly

## ID tips:

adult resembles bee  
hovering flight  
maggots pointed head  
various colors

## Where found:

adults at flowers  
maggots among aphids









# Rove Beetles

## **ID tips:**

slender to 0.5" long  
reddish-brown to  
black  
short wing covers  
points hind end up

## **Where found:**

soil-dwelling  
active at night  
fast-running



# Soldier Beetles

## **ID tips:**

long and thin  
long antennae  
red or orange markings  
soft wing coverings

## **Where found:**

leaves and flowers





# Ground Beetles

## ID tips:

larger beetles  
metallic  
dark, ridged wing covers  
thread-like antennae

## Where found:

adults - dwelling  
nocturnal  
hidden under objects



# Predatory Stink Bug

**ID tips:**

shield-shaped

brown or gray

0.5" long

pointed "shoulders"

**Where found:**

on plants

waiting at flowers



Spined soldier bug – pointed shoulders



**Pest stink bug-  
Round shoulders**

# Minute Pirate Bug

**ID tips:**

very small

black and white

adults move fast

nymphs yellow to orange

**Where found:**

flowers

undersides of leaves







# Big-eyed Bugs

## ID tips:

large eyes  
small in size; stout  
1/8 inch in size

## Where found:

on plants in fields



# Damsel Bugs

## ID tips:

slender  
cream to brown  
narrow head  
prominent eyes  
long antennae  
large front legs

## Where found:

heat of summer  
low, dense vegetation  
flowers



# Assassin Bugs

## ID tips:

slender  
cream to brown  
narrow head  
prominent eyes  
long antennae  
large front legs

## Where found:

hiding in wait for prey  
in protected areas  
soil or tree



# Ambush Bug

**ID tips:**

stout  
yellow  
enlarged front legs

**Where found:**

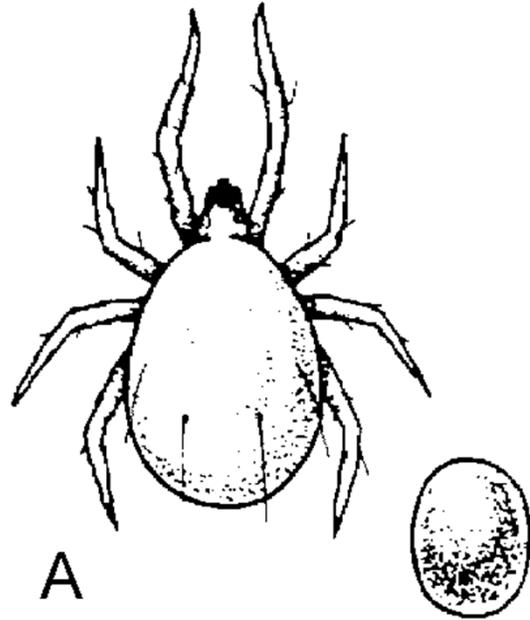
hiding in wait for prey  
at flowers



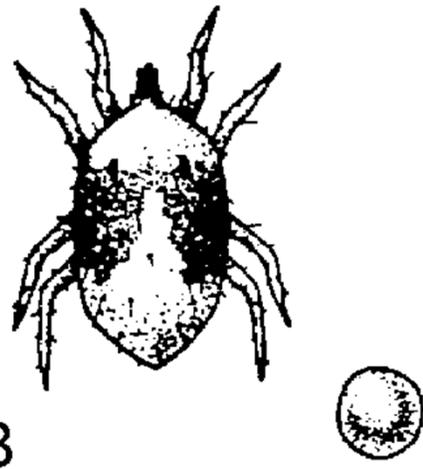
# Predatory Mites

**ID tips:**  
pear-shaped  
body

**Where found:**  
travelling quickly  
within pest mite  
colony



A



B

*Galendromus occidentalis* Western predatory mite



# Spiders



# Praying Mantis





# PARASITOIDS

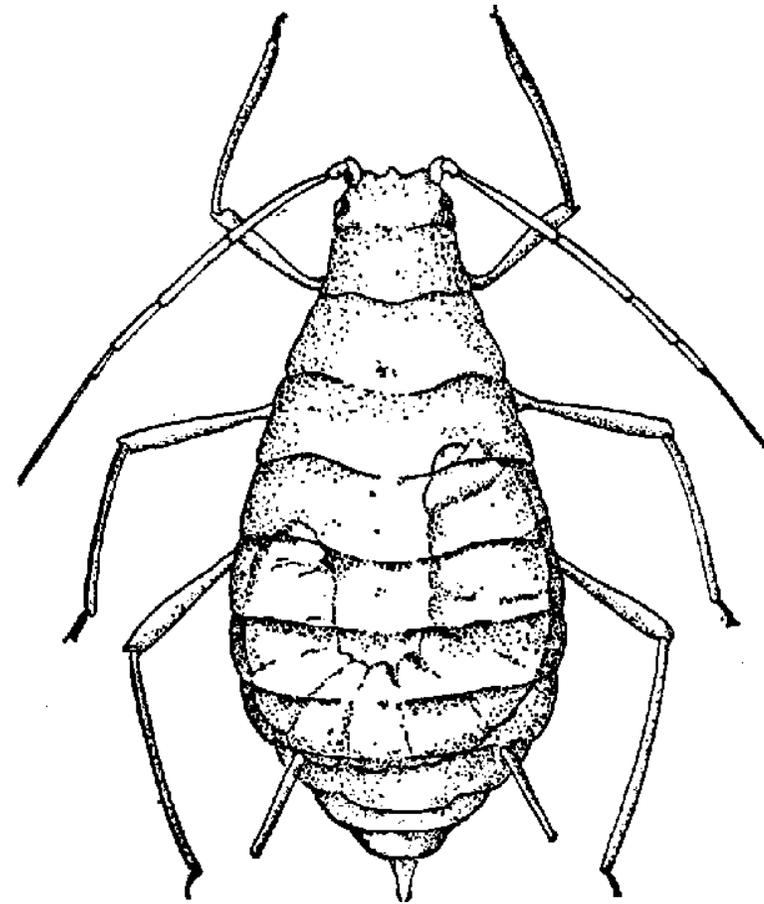
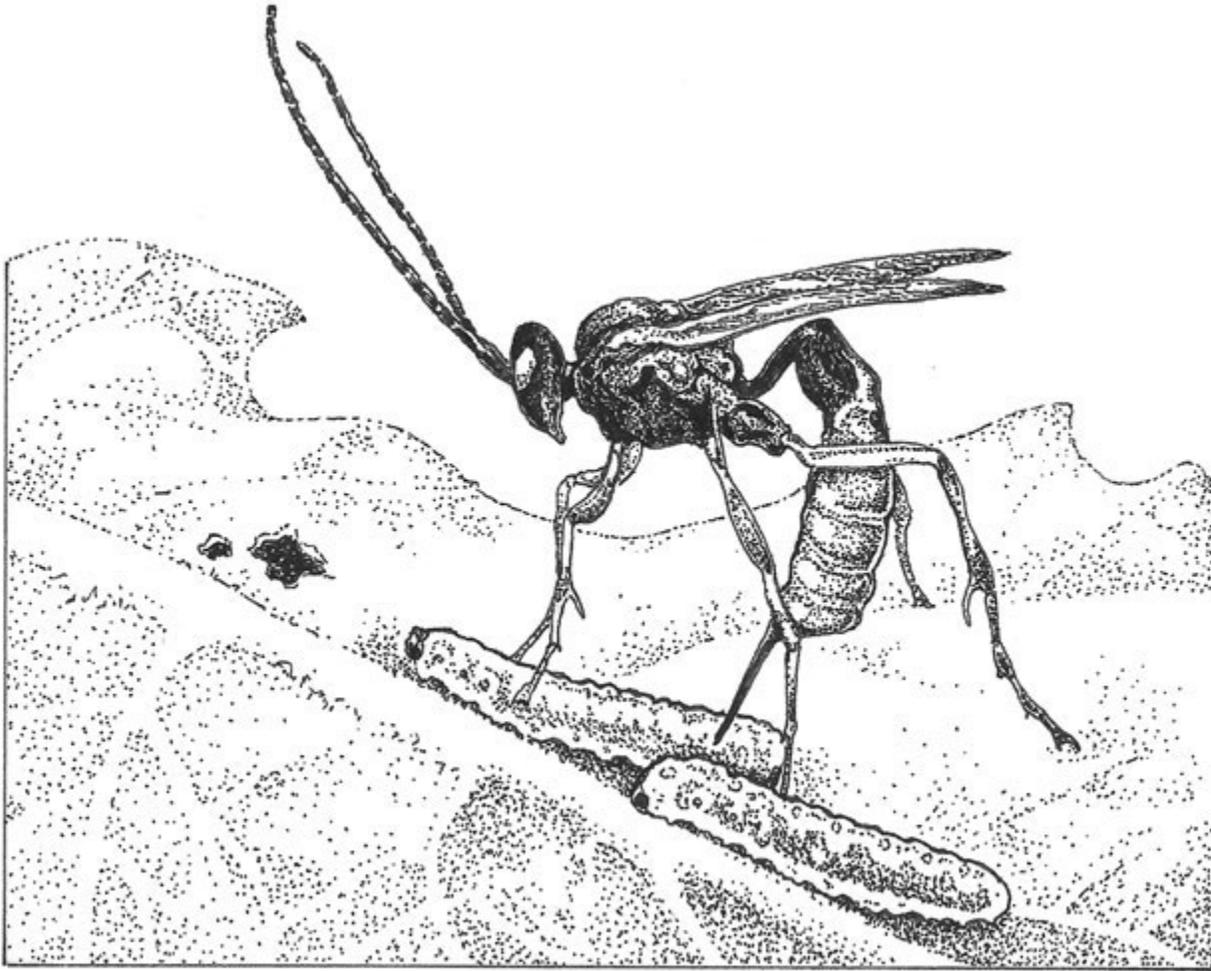
Wasps

Flies

# Ectoparasitoid - develop outside the host body



# Endoparasitoid - develop inside of their prey



# Parasitoid Wasps

## ID tips:

various colors

large

long ovipositor

pinched joint between  
thorax and abdomen

## Where found:

adults at flowers

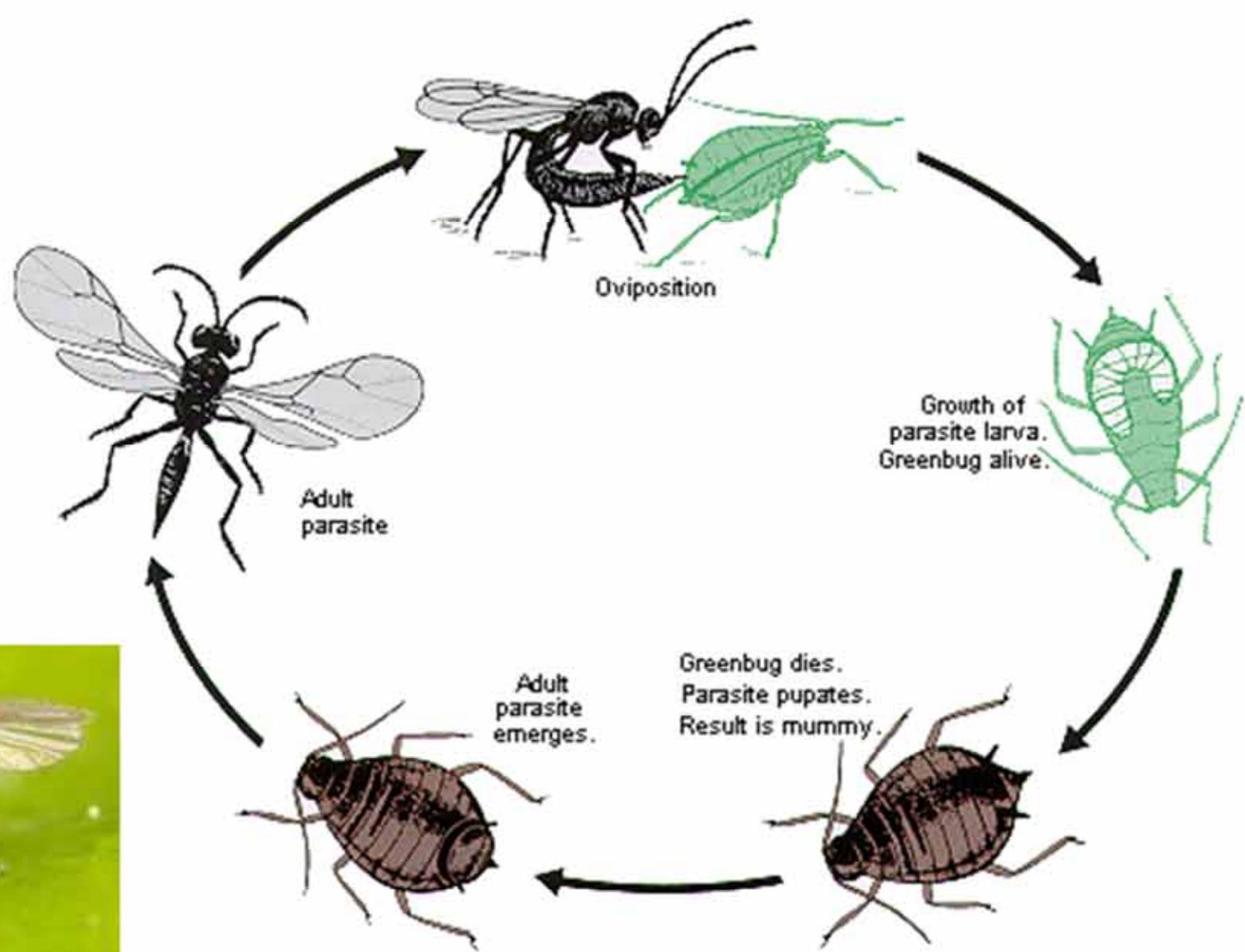
larvae are internal or  
external parasites



# Ichneumonids



# Parasitoid Wasps Targeting Aphids (Braconids)





# Small Parasitoid Wasps



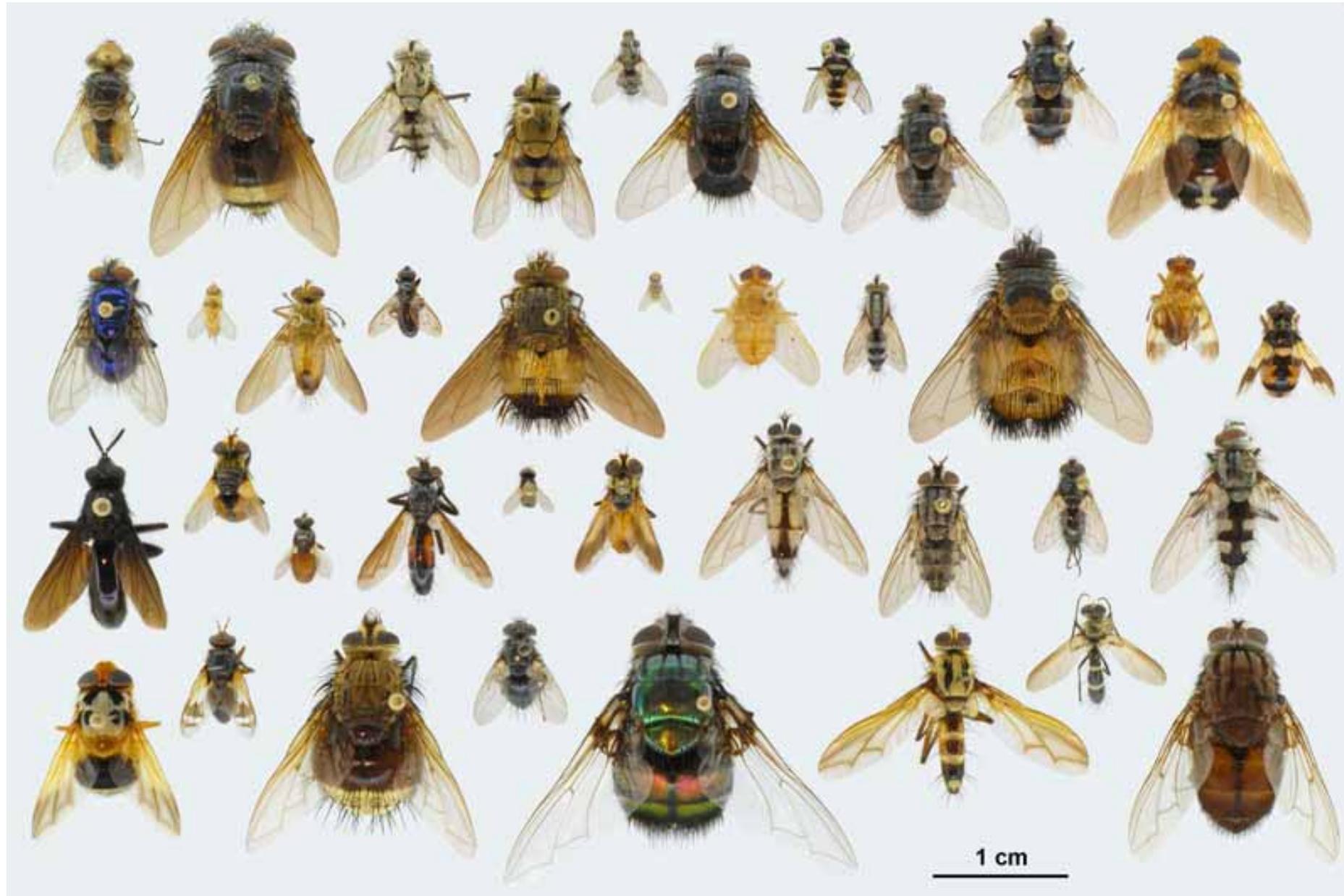
# Tachinid Flies

## ID tips:

long bristles on tail end  
yellow or reddish  
eggs white and oblong  
on host

## Where found:

adults at flowers  
eggs on outside of prey



*Trichopoda pennipes*







## **CONSERVING BENEFICIALS**



# Conservation Biological Control

Provide nectar and pollen

- insectary strips
- border plantings

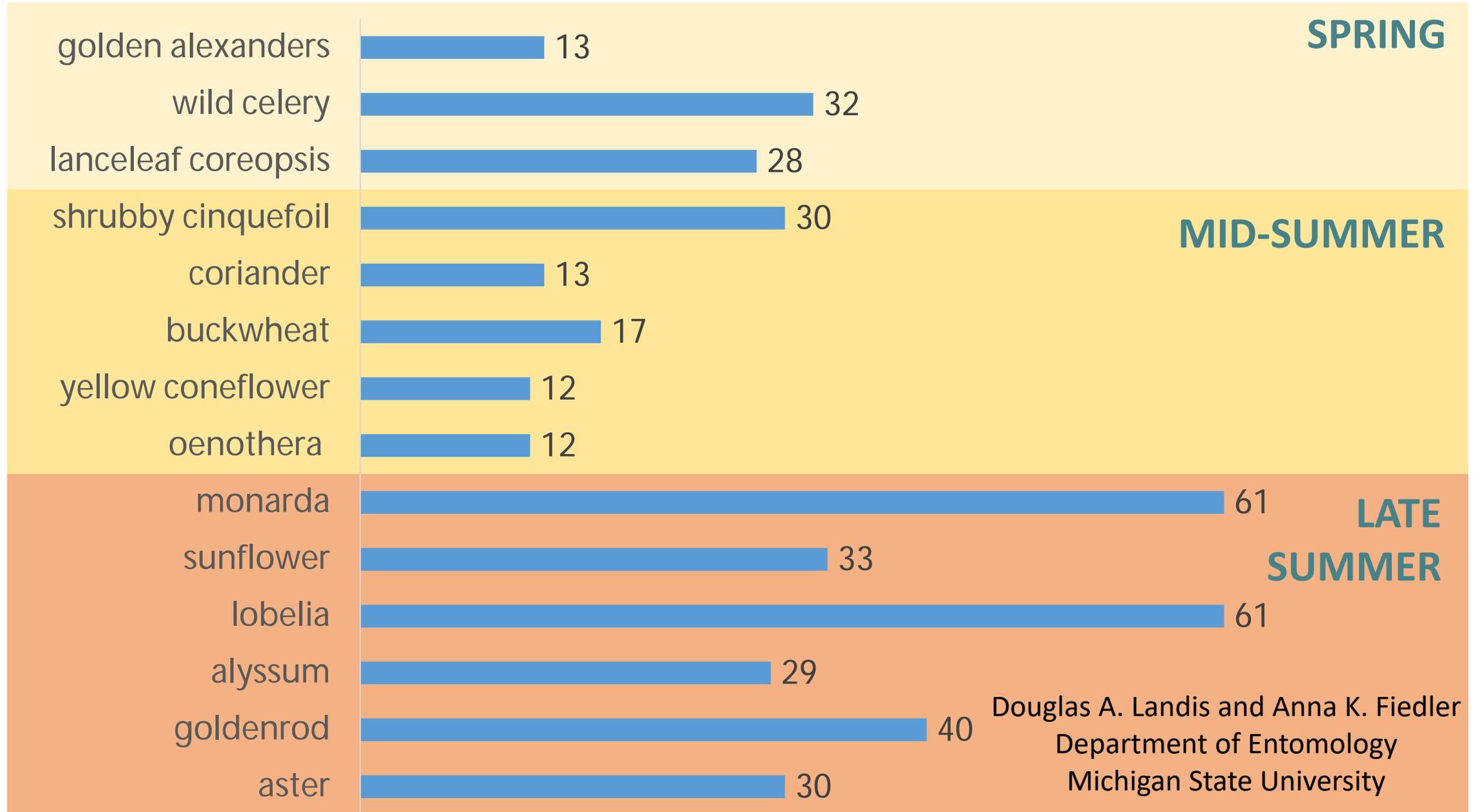
Provide shelter and overwintering sites

- grass banks
- hedgerows
- no-till crop debris
- organic mulches
- cover crops

Protect habitat from pesticides



# Average number of beneficials per day during peak bloom



Douglas A. Landis and Anna K. Fiedler  
Department of Entomology  
Michigan State University









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# RESOURCES

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## Utah Pests Menu

[Utah Pests Home](#)

[Fact Sheets](#)

[Guides and Publications](#)

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[Utah Pest News](#)

[IPM Pest Advisories](#)

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## Fact Sheets - Beneficial Insects

### [Brown Marmorated Stink Bug - Samurai Wasp Parasitoid Identification](#)



Brown marmorated stink bug (BMSB) is an invasive insect that first invaded Utah in 2012. It has since

### [Parasitoids of Brown Marmorated Stink Bug](#)

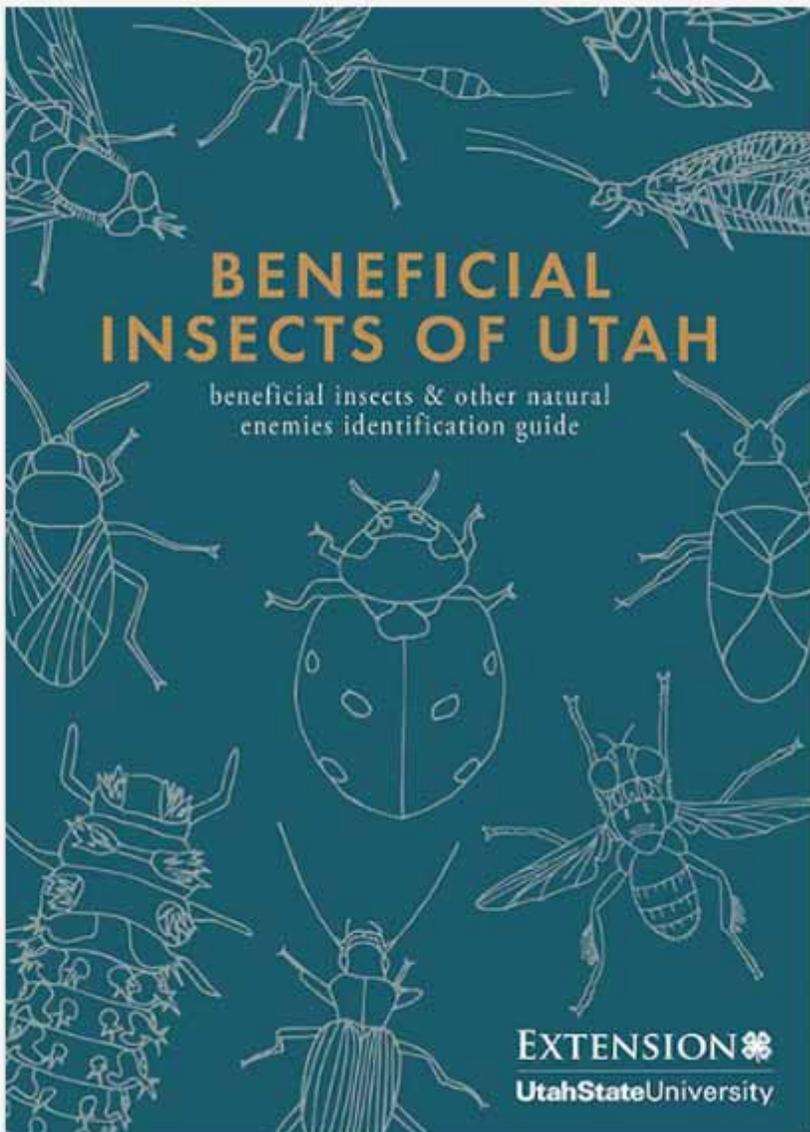


The brown marmorated stink bug (BMSB) is an invasive pest that damages fruit, vegetable, and nut crops in the U.S. Parasitoid wasps that sting and kill BMSB eggs are the most promising biological

### [Aphid Natural Enemies and Biological Control](#)



Aphids are prey to many predatory insects, spiders, and parasitoids. Healthy predatory populations keep aphid populations low, which can reduce or eliminate the need for chemical controls.



## Beneficial Insects of Utah

\$6.00

☆☆☆☆☆ (No reviews yet) [Write a Review](#)

Weight:

10.30 Ounces

Quantity:

▼ 1 ▲

Add to Cart

Add to Wish List ▼



Description

## Attracting Beneficial Insects with Native Flowering Plants

Anna Fiedler, Julianna Tuell, Rufus Isaacs, and Doug Landis  
Department of Entomology, Michigan State University

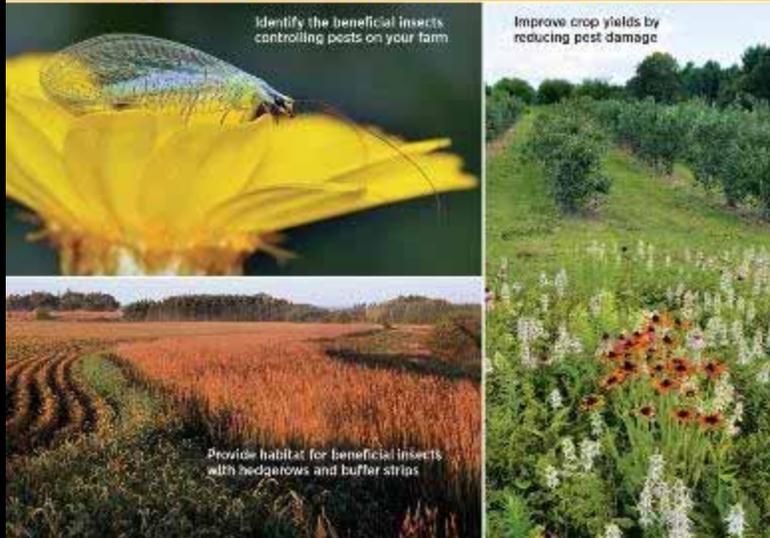


MICHIGAN STATE  
UNIVERSITY  
EXTENSION

THE XERCES SOCIETY GUIDE

# Farming with Native BENEFICIAL INSECTS

Ecological Pest Control Solutions



Identify the beneficial insects  
controlling pests on your farm

Improve crop yields by  
reducing pest damage

Provide habitat for beneficial insects  
with hedgerows and buffer strips

## HEDGEROWS FOR CALIFORNIA AGRICULTURE

### A RESOURCE GUIDE



BY SAM EARNSHAW



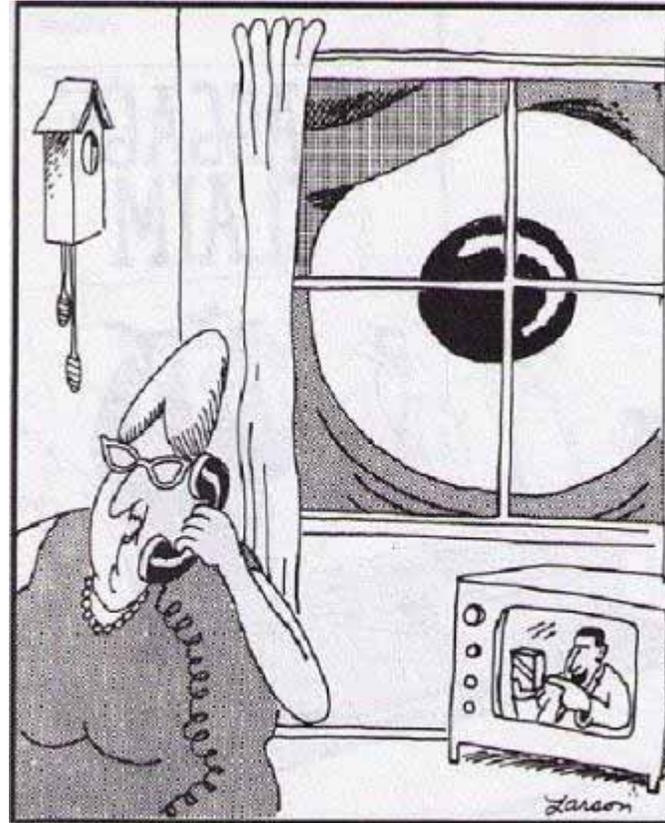
COMMUNITY ALLIANCE WITH FAMILY FARMERS

P.O. Box 373, Davis, CA 95616  
(530) 756-8518 [www.caff.org](http://www.caff.org) [caff@caff.org](mailto:caff@caff.org)

A project funded by Western Region Sustainable Agriculture Research and Education



"Aphids! Aphids, Henry! ... Aphids are loose in the garden!"



"Hello, Emily. This is Gladys Murphy up the street. Fine, thanks . . . Say, could you go to your window and describe what's in my front yard?"



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