Illinois Extension









# Illinois 4-H

# It's a Bug-Eat-Bug World:

## A Guide to Insects in Urban Gardens

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# WELCOME



This guide can help children of all ages (classroom students, teachers, parents, & volunteers) learn to identify the most common insects they're most likely to encounter in urban gardens in Illinois, based on annual surveys performed by student researchers in the 'Bug2School' program.

Our guide will help you distinguish pests from the predatory insects that eat them and protect our crops. You'll also learn about their unique diets, behaviors, their most-preferred host plants.

With this powerful knowledge, you can look in your back yards anytime and observe predator-prey interactions with your own eyes!



## CREATE AN INSECT GUIDE FOR YOUR OWN URBAN GARDEN!

Every garden is different, and contains a unique group of insects that are most abundant. Once you familiarize yourself with the insects in this guide, observe your garden space and identify your own most common "usual suspects".

Then, select the top 5 easiest-to-observe pests and beneficial insects to create your own guide by adapting our pages! They are free to use and adapt for educational purposes.

Share with volunteers and students to fascinate them with the insect ecology happening right in their own backyards!

# ACKNOWLEDGEMENTS

Content for this guide was gathered by students in UIUC's 'Bug2School' program, along with students in the University of Georgia's Outreach and Service-Learning in Entomology class. Bug2School is supported by USDA NIFA grant # 2022-68018-41926.



Many outstanding insect photographers graciously allowed us to use their work. They are attributed in the photo credits section (page 37). If you'd like to find more amazing insect images, here are some websites of outstanding photographers featured in this guide.

Alex Wild:
https://www.alexanderwild.com/

Colin Hutton:
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Jena Johnson:
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Tom Shahan:
https://www.canadiannaturephotographer.com/ThomassShahan.html

Insect Images: (Bugwood):
https://www.insectimages.org/

Bug Guide:
https://bugguide.net/

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# PREDATORY BEETLES

Beetles have thick and hardened wings, called “elytra” and chewing mouthparts called “mandibles”



# HARLEQUIN LADY BEETLE

*Harmonia axyridis*



## What do they eat?

Lady beetles eat smaller insects like aphids, eggs, and tiny larvae. Sometimes they will eat nectar or flower pollen too! Harlequin lady beetles often outcompete native lady beetles for food, and sometimes even eat them!



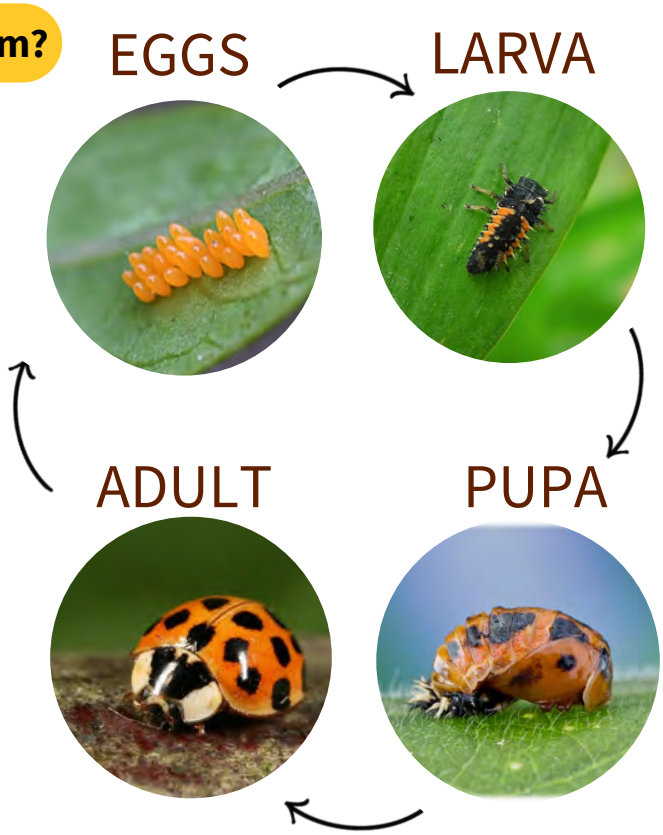
## What do they look like?

Harlequin lady beetles can vary in color and in numbers of spots (0-21), and usually have white spots behind their heads.

## Where can you find them?




Harlequin lady beetles are native to Asia, but one of the most common lady beetles in the United States. You might find them trying to come in your house in the fall as it gets colder!



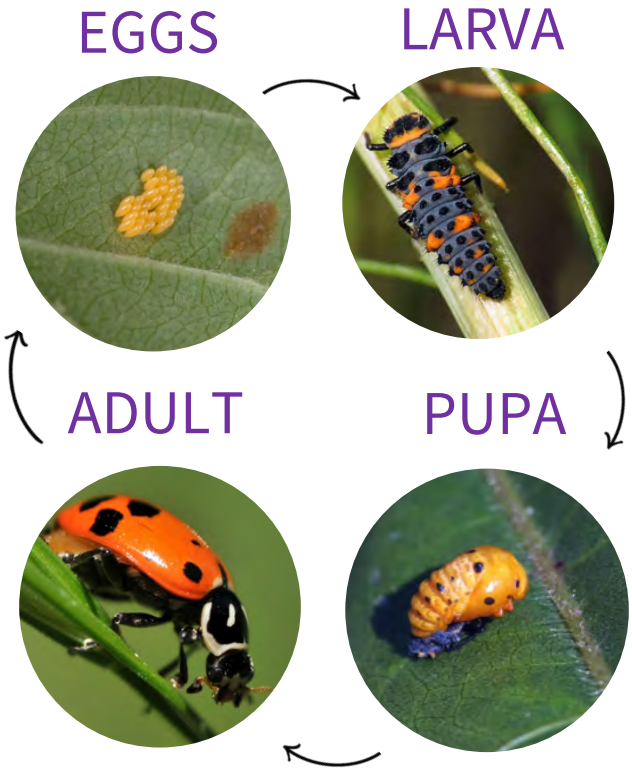
# CONVERGVENT LADY BEETLE

***Hippodamia convergens***

## What do they look like?

Convergent lady beetles are 5-7 mm long, with **two white angular lines** above their heads. They often have twelve spots, but spots and coloration can vary.






**Fun fact**:

In the Western US, Convergent lady beetles hibernate in giant clusters to keep warm up high in the mountains!

## What do they eat?

Like other lady beetles, they eat aphids another soft-bodied insects, and occasionally feed on nectar and pollen from flowers.

## Where can you find them?

Convergent lady beetles are native to North America and widespread, although they are outcompeted in some areas by exotic lady beetles like the Harlequin and 7-spotted lady beetle. Look for them on any garden plant, and particularly around colonies of aphids!





*Coccinella septempunctata*

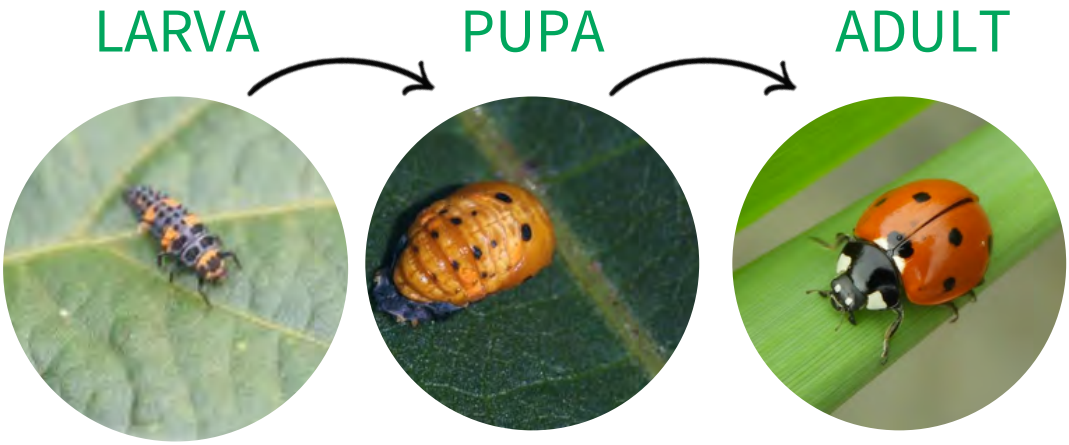
# 7-SPOTTED LADY BEETLE

## What do they look like?

7-Spotted lady beetles are 7-8 mm long. They are identified by having **precisely** seven spots on their back and white spots on either side of the head that look like eyes!

## What do they eat?

Lady beetles prey on smaller insects like aphids and scale insects. They can be 'cannibalistic' as well, and sometimes prey on other lady beetles! Sometimes they will eat nectar or flower pollen too!






## Where can you find them?

Seven spotted lady beetles are native to **Europe,** but are established throughout the United States. You can find them on a variety of crops & flowering plants. Look for them if you find a big colony of aphids, their favorite food!

# DUSKY LADY BEETLE

*Nephus spp., Scymnus spp.*

## What do they look like?

These adorable lady beetles are round in shape, but **SO MUCH TINIER** than lady beetles you're used to seeing (about 2mm or the size of the tip of a crayon). They vary in color– many are black with red spots on their wings and/or head. Their body is covered with short tiny hairs. Larvae have fluffy white spikes and look like tiny sheep!





EGGS LARVA ADULT



## Where can you find them?

Dusky Lady Beetles are common in backyards, vegetable gardens, commercial farms, fruit orchards, and vineyards. If you are looking for them, try looking underneath leaves of plants where aphids may be.



## What do they eat?

These tiny beneficial insects are predaceous and prefer aphids!

- Aphids
- Mealybugs
- Scales
- Insect Eggs
- Pollen/Nectar

# PREDATORY "BUGS"

**TRUE** bugs have piercing/sucking mouth parts (called "stylets") that they use to stab other insects, liquefy their insides, and slurp them out like a straw!

Stylet



# MINUTE PIRATE BUG



*Orius insidiousus*



A minute pirate stabs whitefly nymphs!

## What do they look like?

Minute pirate bugs are TINY– only 3 mm LONG. They have black triangular heads, and white wing spots near the end, making them look a bit "checkered." Nymphs are even tinier, and orange/yellow, with red eyes.



NYMPH → ADULT





## What do they eat?

Minute pirate bugs are omnivores, meaning they eat both plants and insect pests! They feed on aphids, whiteflies, mites and eggs. They also love nectar and pollen, and suck juices from plants that are especially rich in nitrogen (like beans and clover), but usually eat insects whenever they are available.

## Where can you find them?

Minute pirate bugs are **the most** common predatory insect you can find in a garden! They love to hang out on or inside flowers, and they are especially common on or near beans, clover, cilantro, and sweet alyssum, and calendula.





# DAMSEL BUG

*Nabis spp.*

## What do they look like?

Measuring in at just 4-13 mm (just about the size of a battery), these bugs are certainly not damsels in distress! Damsel bugs have piercing/sucking mouthparts that they use to impale prey! Usually brown or gray, damsel bugs are slender bodied with long legs and antennae.






EGG NYMPH ADULT



## What do they eat?

Damsel bugs eat a wide variety of herbivores such as aphids, caterpillars, eggs, and beetles. When feeding, they will hold onto their prey with their “raptorial forearms” like preying mantids!

They use sword like mouthparts to stab prey, liquefy their insides, and slurp them out like a straw! They occasionally feed on plant sap too.

## Where can you find them?

Damsel bugs can be found throughout North America, and thrive on a variety of crops and garden plants. They are more common on or near “legumes” like beans, clover and alfalfa.

# OTHER PREDATORY INSECTS

Spiders, flies, lacewings, and parasitoid wasps eat other insects too!



# ANTS

***Family Formicidae***



## What do they look like?

Ants have a distinct head, thorax and abdomen, but they vary in size and color. Most of the ants we see in gardens in the Midwest are either Pavement ants, native odorous house ants (which look similar). They range from 2-5 mm (about the size of a pencil eraser!).

## What do they eat?

**Ants drink aphid pee!** Aphids make a sugary liquid called “honeydew” from the plant juices they eat. You can often find ants patrolling plants and guarding their “flocks” of aphids from other predators.

Ants are fierce predators as well, and eat eggs and small larvae from garden plants, as well as seeds, nectar & pollen. In urban areas, ants are adapted to exploit food waste from humans like cheese, crumbs, and sandwiches! Guard your sandwiches.

## Midwest Ants

### Pavement Ant



### Ordorous House Ant



**Fun fact**:
Ants live together in huge colonies and collaborate on finding food. They leave little “scent trails” to guide their sisters to excellent food sources. That’s why you often see ants marching in lines.

## Where can you find them?

Ants are some of the most common insects we see in raised beds, and you can find them marching around on the leaves and stems of almost any plant. You might find more of them on plants with aphid colonies!

# Lacewings

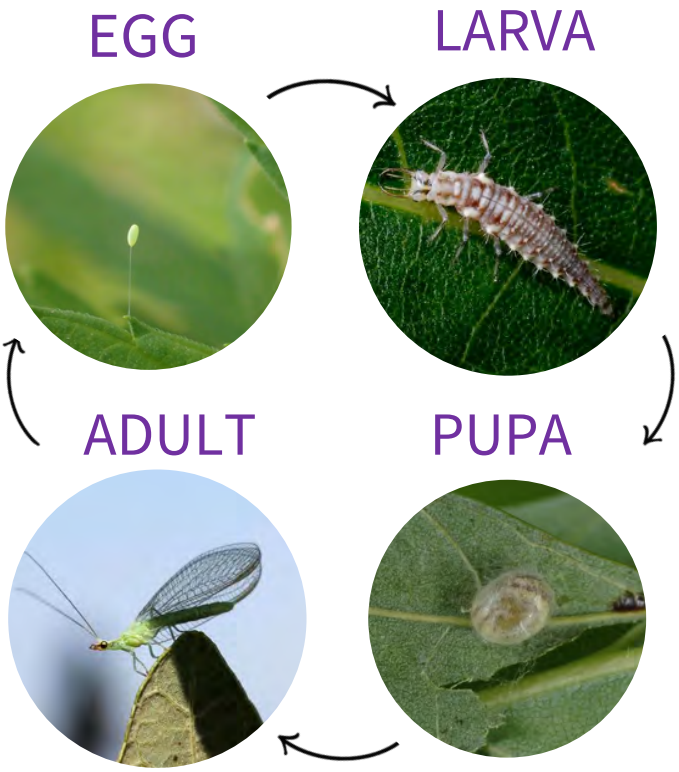
***Order: Neuroptera***





## What do they look like?

Lacewings look like beautiful green aliens as adults. They about half the size of a quarter and have green lacey wings, huge shining eyes, and long antennae. As tiny larvae, the have soft bodies and, hook-like jaws that are longer than their heads! They lay their eggs on top of tall stalks to protect their babies from predators, and their pupae look like shining little pearls.




## What do they eat?

Lacewing larvae are fierce predators of aphids and other soft-bodied insects, as well as insect eggs. They impale their prey with their sharp jaws and hold them above their heads, letting their body juices drop into their mouths! Adults rely on nectar for energy, and love basil and other flowering plants!






## Where can you find them?

Look for lacewing eggs and larvae when you see a big colony of aphids! Adults are attracted to light, and are often found fluttering awkwardly at night near street lights or porch lights.



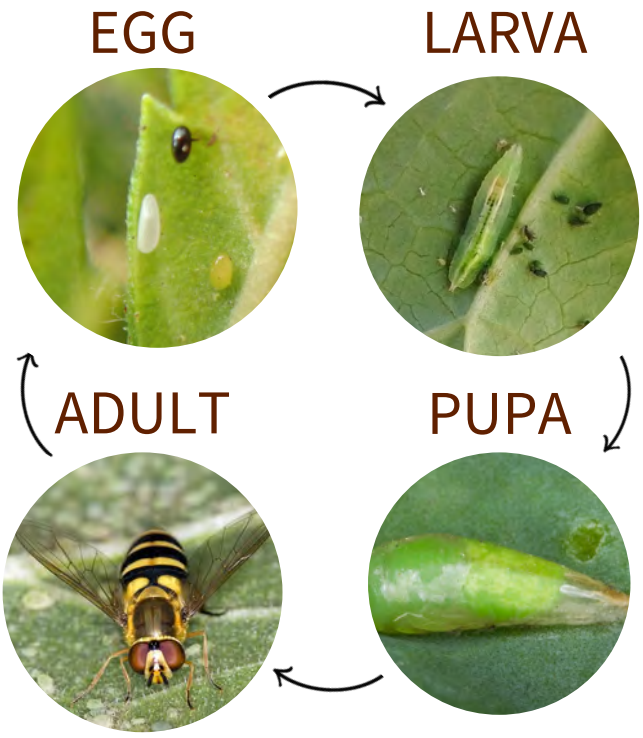
# Hoverflies

*Family Syrphidae*



## What do they look like?

Hoverfly adults dress up like **BEES**! But they only have two wings. As larvae, they vary in color from green to brown, and can be easily confused for caterpillars! But they don't have real legs like caterpillars. Their eggs look like a tiny grain of rice!




## What do they eat?

Adult hoverflies eat nectar and pollen, and are important pollinators! Larvae are voracious predators of aphids, and somehow eat them without real mouthparts. Or real legs! They're like aphid vacuums.



Sweet Alyssum



*Phacelia*

## Where can you find them?

Look for hoverfly larvae near colonies of aphids! Look for adults among blooming flowers. Flowers that are known to attract them include sweet alyssum, buckwheat, and phacelia.

# LONG-LEGGED FLY

*Family Dolichopodidae*



## What do they look like?

Long-legged flies are fabulous. They are neon metallic green, blue, red, copper, or gold! They also have long long and slender legs, that make them seem like they are up on stilts! They have two clear wings that may be marked with dark spots or bands near the wing tips. These flies are TINY and only around 4-9 mm long! That's a little less than the size of a pea!

**Fun fact:**
Male long-legged flies perform crazy mating dances including squats, waving, butt wiggles, and airborne gymnastics!

## ADULT



Killed bug!

## What do they eat?

These tiny flies are predators that love to snack on smaller arthropods like flies, aphids, or mites. That is why they are great for pest control!

## LARVA



## Where can you find them?

Larvae are difficult to find because they develop in moist soil. However, adults are easy to see on foliage in gardens and are active during morning and late afternoon. They are incredibly quick fliers though, and difficult to catch!

# JUMPING SPIDER

*Family Salticidae*





## What do they look like?

Jumping spiders are easily the most adorable of all the predators-- They have the saddest faces and silliest hairstyles! You can identify them by their unique eye arrangement. They are generally less than 1 cm, come in a variety of colors, and most have hair on their legs and bodies.

## What do they eat?

Jumping spiders sit and pursue prey, and then jump on them when they're least suspecting! (Of course, they would not be inclined to jump on humans– we're much too large!)





## Where can you find them?

Jumping spiders can be found in garden foliage, hunting during the day. Some of them create little silk nests to hide in and protect their eggs!



# PARASITOID WASPS OF APHIDS

## What do they look like?

Aphid parasitoid wasps are identified by their slender black and brown body with pinched “wasp waist.” They are **TINY**! Only 3 mm long! They are way smaller than a dime and much too tiny to sting you!

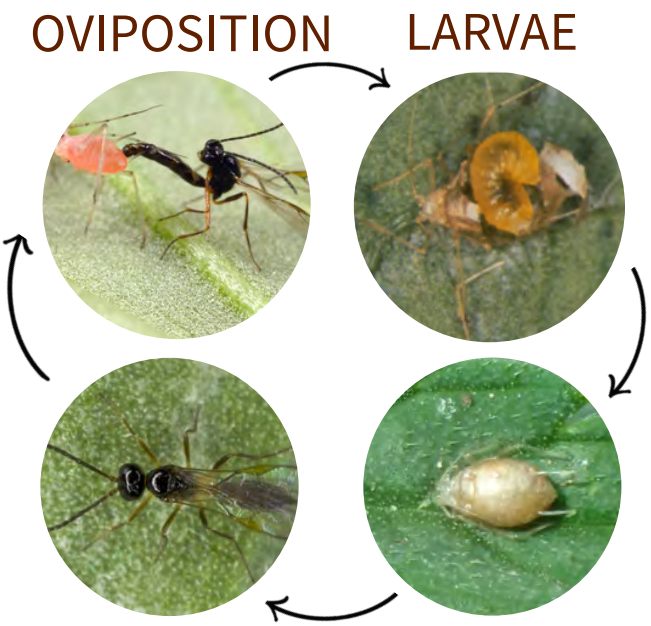





“Oviposition” happens when an insect lays its eggs. Parasitoids “oviposit” inside other insects and then pupate inside the dead bodies of their victims

## What do they eat?

Aphid parasitoid wasps specialize on aphids (little bugs that suck the juices out of garden plants!) As adults, parasitoids rely on nectar blooming from plants like dill, parsley, mustards, and white clover.






## Where can you find them?

Aphid parasitoid wasps are active during the day and can be found on a variety garden plants. The easiest way to find them is to search among aphid colonies for crispy brown “mummies” (aphids killed by parasitoids).

# PARASITOID WASPS OF CATERPILLARS



## What do they look like?

Like aphid parasitoids, these wasps are black and TINY (about 3 mm). Their cocoons looks like fuzzy little white or yellow tic-tacs!





**Fun fact**: Some parasitoids spin cocoons in a cluster beneath the dead body of the caterpillar and use it as a shield!



**Fun fact**: Some parasitoids spin their cocoons right on the caterpillar's back.



## What do they eat?

Parasitoid adults sting caterpillars, and then lay their eggs inside. When larvae hatch, they feed inside their caterpillar hosts until it dies. When they emerge as adults they drink nectar for energy.



## Where can you find them?

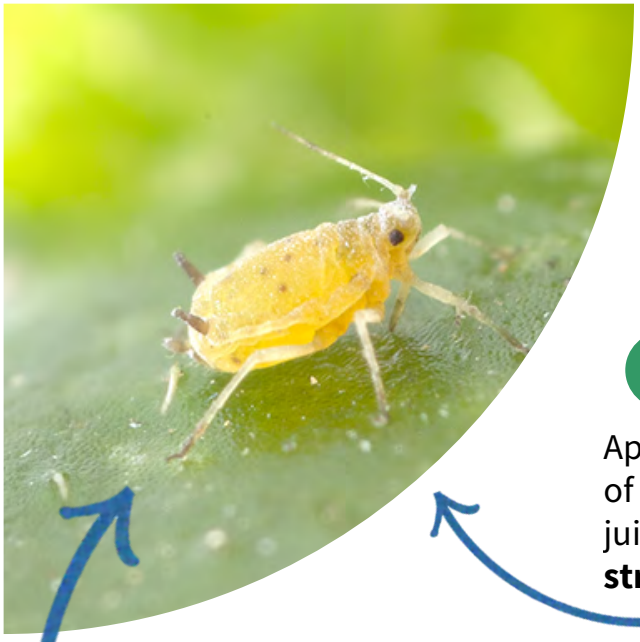
Parasitoid wasps attack almost every type of caterpillar, and if you look closely late in the summer, you might be able to find them pupating on or under sluggish-looking caterpillars.

# "GENERALIST" HERBIVORES

These insects feed exclusively on plants, and can be found on many kinds of garden plants







# APHIDS

*Family Aphididae*

## What do they eat?

Aphids feed on a wide variety of plants! They suck sugary juices from plants with **tiny straw-like mouthparts**.



## What do they look like?

Aphids are quite tiny! (between 1-2 mm). These squishy little bugs have piercing/sucking mouthparts, long antennae, and **two cute little "horns" on their butts called "cornicles**." They come in quite a variety of colors-- from ashy white, to green, pink, yellow, and even black!

**Fun fact:**
Aphids rarely lay eggs. Instead, they give live-birth to their babies, just like your mom did with you! Unlike your mom, aphids generally make all-female clones of themselves, and each new daughter is born with another aphid baby already inside her!



**Fun fact:**
Most aphids never grow wings, but when colonies get large, a few sprout wings so they can fly off to invade a new plant!

## Where can you find them?

Aphids one of the most common insects you can find in gardens. Look for aphids on the undersides of plant leaves. Sometimes when colonies get large, you can see their shiny & sticky poop, called "honeydew" on the leaves below.

# WHITEFLIES



*Family Aleyrodidae*

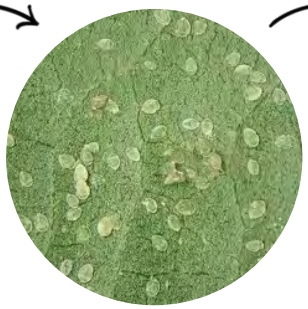


## What do they look like?

Whiteflies are tiny, (1.5-3mm). Most have white or yellowish heads, and cute white wings that they hold in a heart shape on their backs! Eggs are laid in an adorable “fairy ring”, and nymphs look like tiny pancakes!

EGGS → NYMPHS → ADULT







## What do they eat?

Whiteflies pierce plants and suck out their juices. They can become quite a situation on large farms, but are not often problems in gardens.

## Where can you find them?

Whiteflies eat a variety of plants. Look under leaves for tiny white hearts. <3 They are also quite common on houseplants and in greenhouses.

**Fun fact:**
Sometimes whiteflies can infect plants with viruses!

# FLEAHOPPER

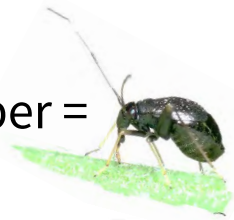
***Halictus spp.***



## What do they look like?

Fleahoppers are tiny little bugs (just 2 mm long!) that look like flea beetles. Which sort of look like fleas. Fleas, fleabeetles and fleahoppers all have large jumping hind legs, like bunnies! But fleahoppers are bugs, not beetles. Got it? Unlike fleas and fleabeetles, fleahoppers have long antennae are green as nymphs.

Fleahopper =



Fleabeetle =



Flea =



NYMPH



ADULT FEMALE



Female fleahoppers generally have stubby little wings and can't fly, while males have longer wings and can fly! Unfair.

ADULT MALE



## What do they eat?

Fleahoppers use piercing/sucking mouth parts to drink the juices of many garden plants.

## Where can you find them?

Fleahoppers are common on the leaves of most garden plants and are active during the day. If you poke them, they might leap away, but won't get very far-- they're only moderately good jumpers.

# FLEA BEETLE

***Alticini spp.***



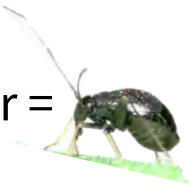
## What do they look like?

Flea beetles are very small, and only measure to be about 1/16$^{th}$ of an inch! They come in various colors including black, brown, bronze and gray (some even have stripes). They have huge back legs that are used for jumping.



## What do they eat?

As adults , flea beetles feed on leaves and stems of your garden plants. They are chewing herbivores that leave irregular holes in the plant.

Fleahopper = 

Fleabeetle = 

Flea = 

## Where can you find them?

Flea beetles can be found on garden plants throughout the summer and in leaf debris during the winter. When startled you can see them jump with their large legs



# LEAF/PLANTHOPPERS

*Family Cicadellidae, Flatidae, Cercopidae*

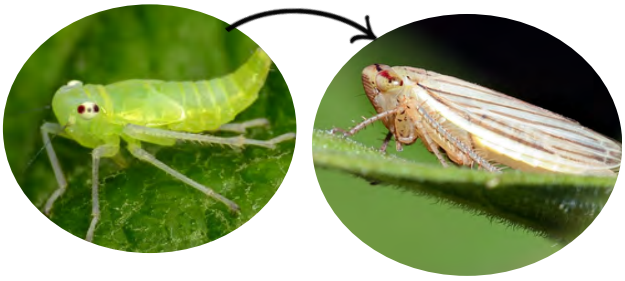
## What do they look like?

Leafhoppers & planthoppers can vary in size, from 30-125 cm. They also vary in color– some have vibrant stripes, while others range from green, brown, yellow or white. Leafhoppers have flat rounded heads, and hold their wings over their body like a tent. Some immature "nymphs" are tiny and green, while others are fluffy like tiny cotton balls!





NYMPH ADULT



## What do they eat?

Leafhoppers suck juices from a variety of plants.

## Where can you find them?

Leafhoppers are commonly found on most garden plants, but their eggs are difficult to find because they cut tiny slits in plants and lay their eggs inside!

**Fun fact:** This planthopper is disguised as a leaf!





# SPOTTED CUCUMBER BEETLE

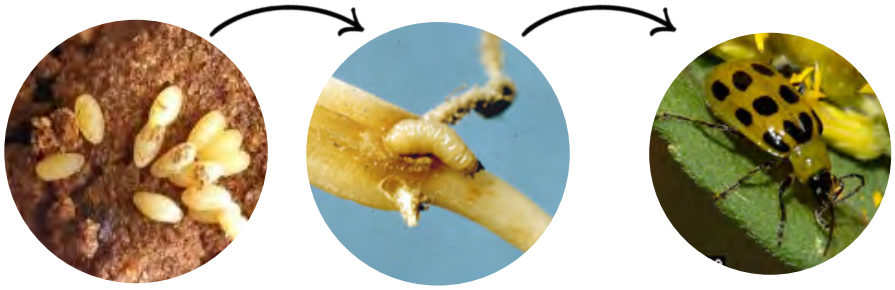
*Diabrotica undecimpunctata*

## What do they look like?

Very small yellow beetles with 12 black spots. They are only 1 /4 inch long. You can fit 4 of them on a single paperclip!



EGGS LARVAE ADULTS



## What do they eat?

Spotted cucumber beetles commonly eat squash and cucumber plants, but they can also feed on a wide range of other plants too. We call them “generalists” for that reason. In fact, they’re also known as the “Southern Corn Rootworm,” because the larvae live belowground and feed on plant roots! (and they happen to be one of the world’s worst pests of corn as well!)

## Where can you find them?

They can be found all over North America. They are common to see on garden foliage, but larvae and eggs are rarely found, as they develop belowground.

# SPECIALIST * PESTS

(*bugs that specialize on certain plant families)







# Squash bug

*Anasa tristis*



## What do they look like?

Squash bugs are 1.5 cm long (about the size of a dime). They are grey/black with orange and brown stripes along their backs. Immature "nymphs" are ashy grey, and eggs are golden brown and laid in clusters on the undersides of squash leaves.

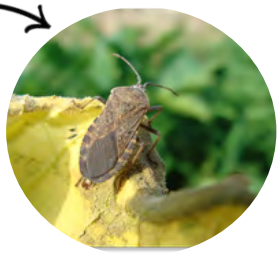
EGGS



NYMPH



ADULTS



Freshly hatched babies!



## Where can you find them?

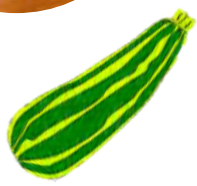
Squash bugs are the most common pests of summer squash and pumpkins. Look on the undersides of leaves!

## What do they eat?

Squash bugs use needle-like mouthparts to pierce squash leaves, stems, and fruits and suck plant juices out like a straw!







# STRIPED CUCUMBER BEETLE

*Acalymma vittatum*



## What do they look like?

Very small yellow beetles with 3 black longitudinal stripes! They are only 7mm long – smaller than a pea!



LARVAE → ADULT





## What do they eat?

As their name suggests, Striped Cucumber Beetles specialize on eating leaves and flowers of plants in the cucumber family, like squash and melons.

**Fun fact:**
Striped cucumber beetles use the scent of squash and cucumber flowers to gather and find mates!



## Where can you find them?

Striped cucumber beetles can be found from Mexico to Canada. Eggs are laid at the soil surface, and larvae feed on the roots and stems of “cucurbit” plants (cucumbers, melons, squash, and pumpkins!)

# SQUASH VINE BORER

***Melittia cucurbitae***



## What do they eat?

Larvae chew their way in and eat the inner tissue of the stems on summer squash and pumpkins.





## What do they look like?

Squash Vine Borers are fairly large -- about 16 mm long. They have fabulous costumes, with pretty green/black iridescent wings, and their abdomen is covered in orange or reddish hairs with a line of black dots down their back. Their legs are covered in black and red hairs, so it sort of looks like they're wearing pants!




## Where can you find them?

Squash vine borers are common in the eastern half of the United States. If you see a squash plant looking a bit sad and droopy, check the base of the stem and look for a hole with clumps of yellow poo that the caterpillars leave behind! You can slice open the stem to find the larva and get your revenge.





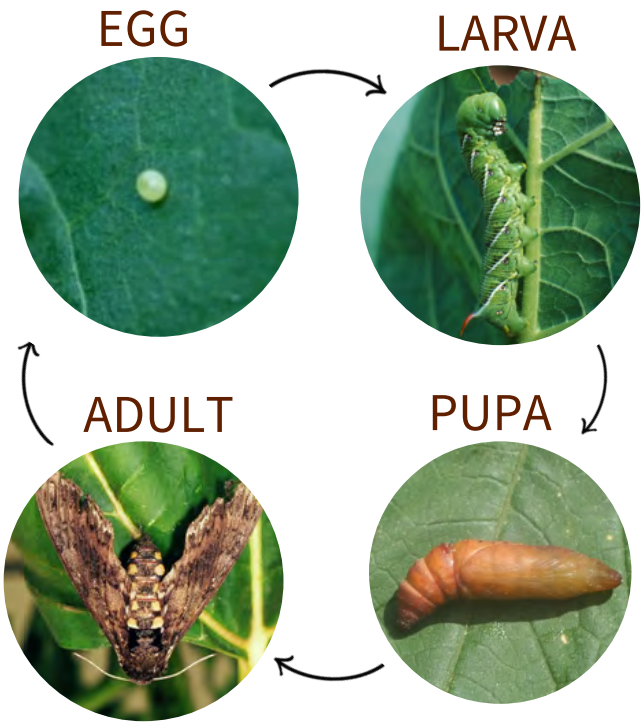
# TOBACCO HORNWORM

***Family Sphingidae***



## What do they look like?

Tobacco Hornworms reach about 4 inches in length at maturity; they are cylindrical shaped. They have 5 pairs of ‘prolegs’. This hornworm is green with seven white strips on its back with an iconic orange red tail spine.




## What do they eat?

Tobacco Hornworms feed on the leaves, stems, flowers an d fruits of plants form the Solanaceae family (tobacco, tomatoes, potatoes and eggplant. These caterpillars have chewing mouthes and will leave big holes in the plants or eat them away!

## Where can you find them?

These caterpillars can be found on any Solanaceae plant in the garden. They can be found easily by locating their clusters of poop of leaves below them!



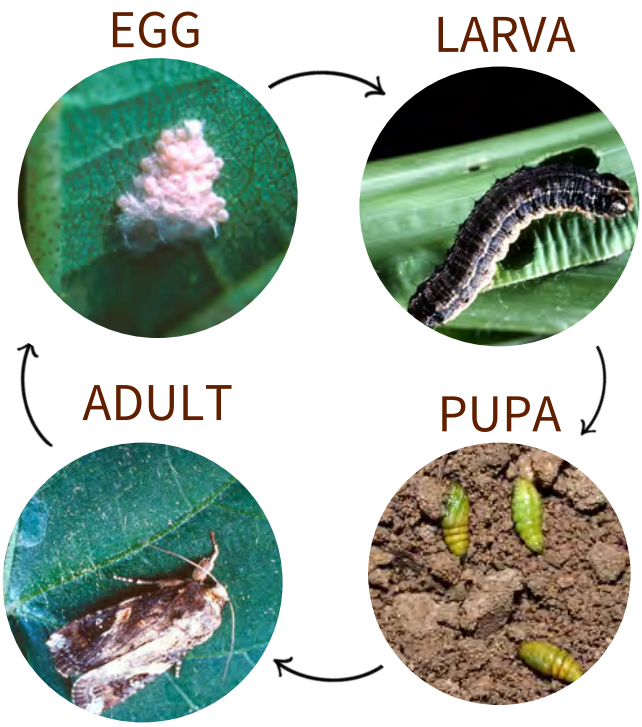
# ARMYWORMS, CUTWORMS, & FRUITWORMS



***Family Noctuidae***

## What do they look like?

These caterpillars are typically about 1 inch to 1 ½ inch long and come in a variety of colors such as brown, green and black. They have a y shape on the top of their heads with 3 pairs of claw like true legs and 5 pairs of prolegs.




## What do they eat?

These caterpillars can eat many different garden plants, and sometimes even burrow into fruits. Some 'cutworms' chop tiny plant seedlings down at the base and drag them underground



## Where can you find them?

It's best to find caterpillars while they're still small before they do too much damage by searching for holes nibbled in leaves, or little pieces of 'frass' (caterpillar poop) that they leave behind.

# SPECIALIST PREDATORS*



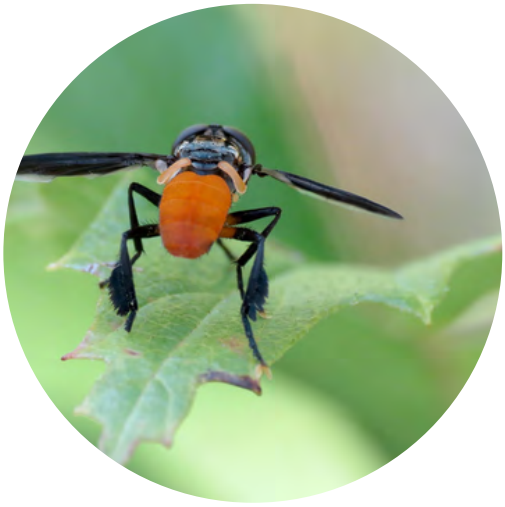


*Insects that attack only a few specific pests

# SQUASH BUG PARASITOID FLY

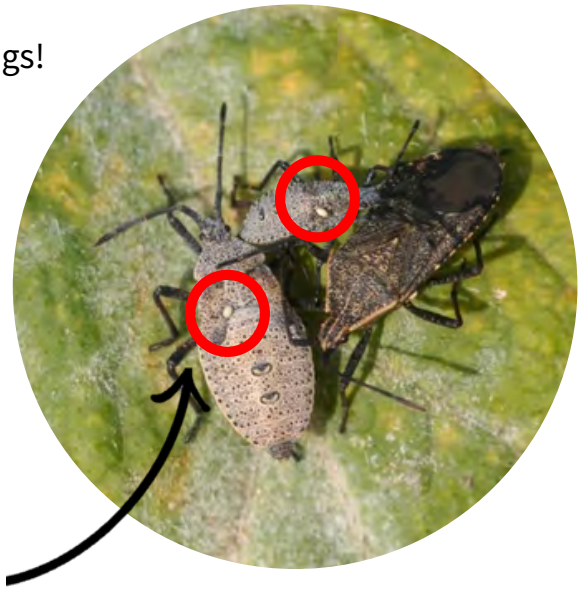
*Trichopoda pennipes*





## Where can you find them?

Look for them buzzing around squash plantings!



**Parasitoid fly eggs!**

## What do they look like?

Squash bug parasitoid flies are just the most cute. They are about the same size as a housefly, but have two magnificent black velvety wings, and bright orange butt! They also have fancy "brushes" on their hind legs.

## What do they eat?

These flies are "parasitoids" meaning they feed on a single animal during their immature "maggot" stages– squash bugs and stink bugs! They lay little white oval eggs on squash bugs, then the larvae hatch and slowly eat the bug from the inside out!

# SQUASH BUG PARASITOID WASP

## What do they look like?



These wasps are tiny! (about the size of the tip of a ballpoint pen-- 1.5 mm), but they're still very important! They have black bodies, elbowed antennae, and cute little hunched backs.



## What do they eat?

Adults "sting" squash bug eggs and lay eggs. (These wasps are FAR too tiny to sting a human!). The tiny wasp larvae eat the baby squash bugs before they ever hatch from their eggs. Adults feed on nectar and pollen from blooming plants.



## Where can you find them?

Squash bug parasitoids are common in the Eastern US, and can often be found snooping around squash bug egg clutches.

*Try cutting squash bug egg clutches from squash leaves after July, and store them in a clear container. Wait and see how many tiny wasps emerge after a week or two!





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