



HAYES FARM TRAVELLING GARDEN TOOL KIT

INSECTS!

GRADES 3 - 5



Insects and other garden creatures

Today we will learn

- What kinds of insects we might find on the farm

Here are some of the creatures that you could meet:

pill bugs, lady bugs, potato bugs, squash bugs, cucumber beetles, cabbage moths, bees, hornets, wasps and slugs and snails.

- How we can control insects without using chemicals
- The difference between native, non-native and invasive species
- Where insects go in the winter
- What the different insects look like? We will learn a few facts about each one.
- What jobs these insects do on the farm?

What are insects?

- Small animals with 6 legs and 1-2 sets of wings
- Their bodies are divided into three parts
 1. the head
 2. the thorax (where legs and wings are)
 3. the abdomen
- These are called “True Insects”
- Some of the animals we call insects are actually from other animal families.

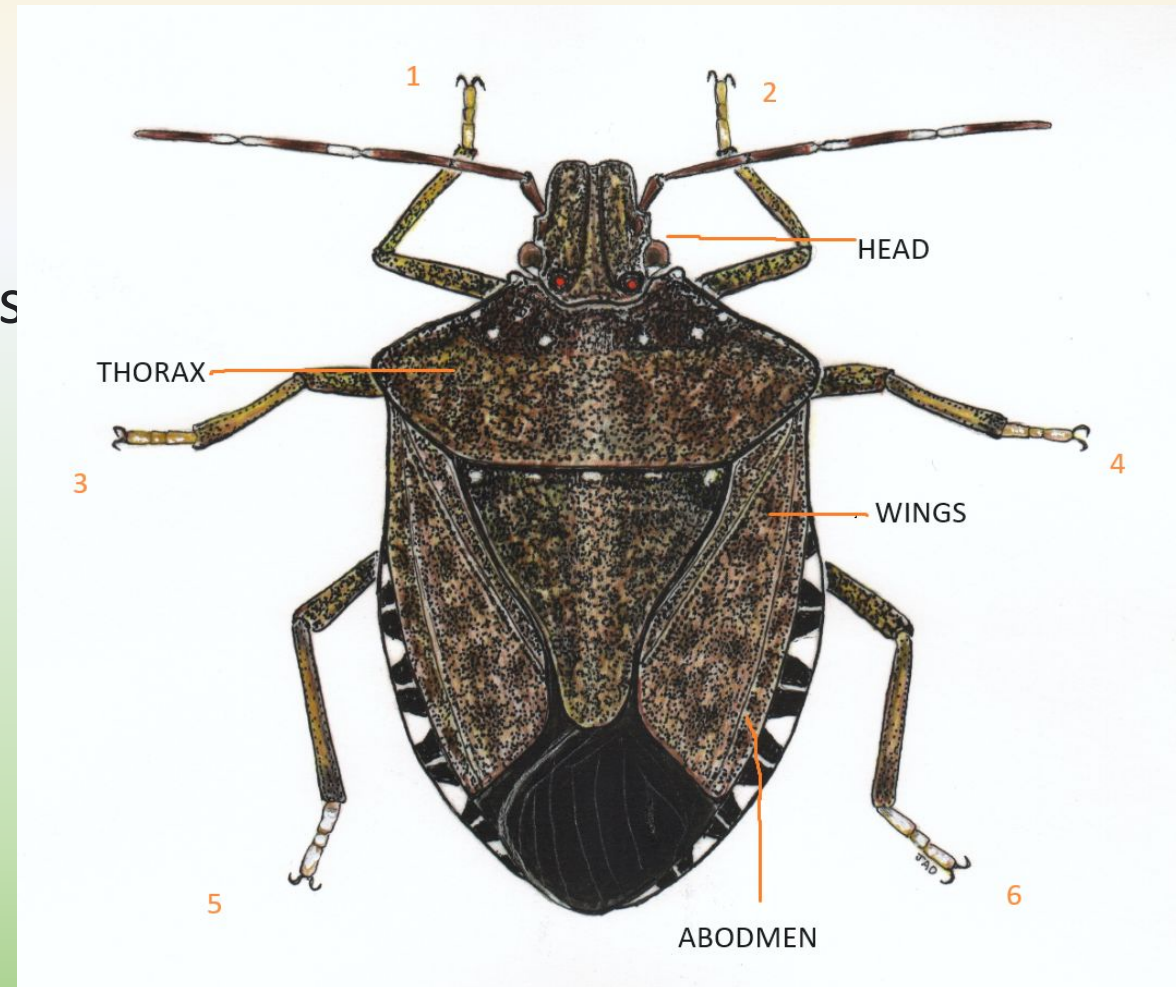


Illustration: Univ. of Maryland Dept. of Entomology, Artist J.A.D

Let's name some insects...



*Is there a common household creature
that has more than 6 legs and no wings?*

Common insects

Common insects are -
beetles, mosquitoes, ants, flies, grasshoppers...

Of course spiders have 8 legs and no wings!

Spiders are *Arthropods*, they have a hard layer on the outside of their bodies. Some of the animals that we think are insects are actually different types of animals. We will learn more about this soon.



Photo: Cross Orb-Weaver
from spiderid.com

Role of insects on the farm

Insects do of course sometimes eat the food that we want to eat.

We generally call those insects “pests,” although they often do have their own role in the ecosystem.

For pests, we want to find ways to “control” the damage they cause without spraying chemicals onto the plants that we eat or onto the soil.

This is a very important practice at Hayes Farm.

Sometimes that means squishing individual bugs and their eggs.

We don’t like to kill bugs, but sometimes we need to.

There are some other things we can do...

Natural pest control



Photo: Companion planting,
Robert Pavlin, GardenMyths.com

When soil is healthy, plants are healthy!

If plants are sick, they release a chemical signal and insects can read that signal. A sick plant will get chomped on much quicker than a healthy plant.

So we try to keep our soil healthy with compost and covered up with mulch to protect it from the wind and sun.

At Hayes Farm we often practice *companion planting*. Sometimes we add plants with a very strong scent like lemon balm or mint to distract insects. Sometimes we add plants with great nectar flowers so that insects might go to them instead of the plants WE want to eat. These last two examples are called “trap plants.”

We sometimes use “row cover” to keep insects out altogether.



Photo: Floating row cover,
Univ. of Maryland, Extension

? *Where to insects go in the winter?*

Getting through the winter

We know that mammals like bears hibernate.

Insects do something called *diapause*.

They don't grow or move at all when it is cold out.

They get into micro-habitats like under rocks, pieces of wood, inside trees, into the walls of buildings, etc.

Their goal is to find a place where the temperatures stay more steady.

When it is warm enough in spring, they become active again.

Over winter Cocoon Case – found in spring



The top of the case is made from individual pieces of grass.



The bottom of the case is a hole dug into a piece of rotting wood. Notice the wood grain.

Photos: Amy Floyd

? *Does anyone know what a native species is?*

Native, Non-native and Invasive species

- *Native species* means that plants and animals have been here for a very long time.
- *Non-native species* means that people brought them here from somewhere else. Sometimes people mean to bring them, but sometimes they come by accident (like catching a ride on a boat).
- Sometimes non-native species can make problems because there are no other animals in the food web to eat them and their population grows too fast. When this happens we call them *invasive species*.
 - They can eat the food that is usually eaten by the native species, and damage their new ecosystem, because it is not adapted to them.

Invasive Species



Photo: Can. Food Inspection Agency

Ex. Emerald Ash Borer

This insect came from Asia and is damaging and killing many ash trees that are native to our area.

Ash trees are very special to indigenous people for cultural uses like basket making.

To not move the borer around, you can avoid moving wood around. If you go camping, don't take your own campfire wood, just buy it where you are going.

Pill Bugs (Wood Louse)

Pill bugs have 6 pairs of legs and no wings

? *Is a pill bug an insect?*

- Actually, they are a type of *crustacean* that lives on the land. Animals like lobsters and crabs are also crustaceans.
- They are covered in a shell that looks like armour and their legs have joints.
- Like creatures that live in the ocean, they breathe through gills.



Photo: Amy Floyd

They are also called Roly-Poly bugs because they can roll into a tight ball to protect themselves!

- Females carry eggs for 2-3 months in a pouch, and after hatching continue to feed and protect these babies
- They can live to be up to 1.5 years old.
- Pill bugs are a native species. We don't remove pill bugs because they are helpful.

Their job on the farm is to clean up!

They *compost* waste plants and other creatures like dead bugs and worms. They can even remove unwanted metals that cause soil pollution.

? ***Who knows what composting means?***



Photo: Pill bug rolled up. Carnegie Museum of Natural History

Composting

Composting is when living materials that have died get turned back into soil.

Did you ever wonder where all of those leaves, mowed grass, and tree branches go?

Insects, along with bacteria and fungi are super hard workers!

Together they create the Soil Food Web which helps to compost everything in the world.

Just imagine if every living thing that ever existed on earth just stayed here, like even dinosaurs!



Photos: Amy Floyd

Lady Bugs

Lady Bugs have 6 legs and 1 pair of wings

? *Is a Lady Bug an insect?*

- Lady Bugs have different numbers and patterns of spots, they can be different colors too
- The one we most think of is the 7 or 9 spotted lady bug, bright red with a black head with white patches.
- We more often see Asian Lady Beetles which were brought here to eat aphids in greenhouses. These non-native beetles unfortunately eat the same foods as Lady Bugs.
- They can live for 2-3 years and you can tell which ones are older because their spots start to fade.



Photo: Vulcan Termite and Pest Control (U.S)



Photo: 7-spotted lady beetle,
Denis A. Doucet, Gov. of Canada

Lady Bugs

- Young Lady Bugs look like tiny alligators
- The young Lady Bugs, called larvae eat even more aphids than adults! They can eat almost 200 aphids a week.
- They live for 2-3 years and can eat up to 5000 insects in their life.
- Lady Bugs spend the winter under logs, rocks and sometimes in houses.
- We don't remove these insects, we leave them alone.

Their job on the farm is help the farmer!

They eat aphids and other bugs (include Potato Beetle eggs) that eat garden plants.



Photo: Carol Muncer

The Colorado Potato Beetle “Potato Bugs”

Potato Beetles have 6 legs and 1 pair of wings

? *Are they insects?*

- These Beetles can really give farmers problems because they are not *native* to Canada.
- They can be seen on any plants that in a plant family called *Nightshades* - eggplant, tomato, ground cherries, Evening Nightshade (wild), tobacco and pepper plants, as well as potatoes.
- Potato Beetles don't eat the potato, but they suck the sweet juices from under the leaves and stems
- Females lay clusters of 20 – 45 bright yellow-orange eggs on the bottom of the leaf. Adult beetles will spend the winter buried in the soil



Photo: US Dept of Ag. Extension Services

The Colorado Potato Beetle

Their job on the farm is mostly to be a pest!

Native insects all have jobs in their ecosystem, but non-native species like the potato beetle may not.

We like to get rid of potato beetles by:

1. Removing any leaf or part of leaf that have egg clusters.
2. Picking off any beetles you see, squish them or put them in a bucket of soapy water along with eggs.
3. Putting straw or mulch around the plants to confuse any adults that hatch in the spring.



Gerald Holmes, Strawberry Center, Cal Poly San Luis Obispo, Bugwood.org

Photo: Gerald Holmes

Food Web

Predators of the Potato Beetle



Photo: Nighthawk by Ronnie d'Entremont.
All About Birds.com

- Predatory species of stink bugs
- Lady Beetles eat the eggs
- The ground beetle specialises in eating Potato Beetles!
 - They spend the winter near potato fields
 - The young beetles are ready to feed at the same time Potato Beetle eggs are laid
 - The female can lay about 1300 eggs
 - They are not seen much because they come out at night
- Birds – Rose-Breasted Grosbeak, Nighthawks and some other birds eat the larvae and adults

Cabbage Moths

The cabbage moth has six legs and two sets of wings.

? Are they insects?

- Cabbage moths don't only eat cabbage, they also love kale, broccoli, cauliflower, Brussels sprouts and bok choy, these vegetables are called *cruciferous vegetables*. They aren't picky and will even eat plants like lettuce, potatoes and beets!
- The caterpillars have a fluffy, velvety appearance. They move forward like an inch worm.
- They spend their winters in a cocoon. The moth emerges in the spring and lays yellow eggs on the top and bottom of leaves at night.

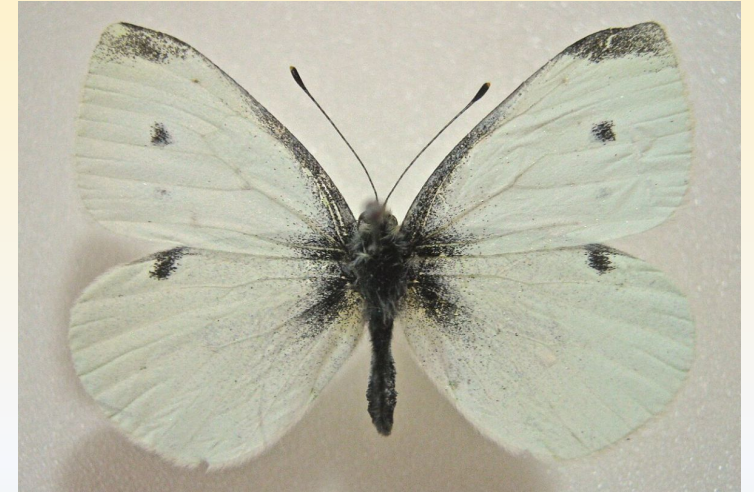


Photo: Wikipedia



Photo: Missouri Botanical Garden

If you see holes in the leaves and pile of poop, then it is probably the cabbage moth caterpillar at work.

Their job on the farm is to be a pest. Unfortunately, we need to squish these bugs and their eggs. Lady bugs and some other bugs will eat their eggs though.

To manage cabbage moths:

- Hand remove caterpillars.
- Plant cabbage early in the season in order to harvest before the worm populations get too high
- Use floating row covers to exclude cabbageworm butterflies from laying eggs on crops.
- Some kinds of cabbage are tougher and can handle the worms better
- Remove weeds because they can live there during the winter.



Photo: Ken Allison, Utah State Univ.,
Horticulture Extension

Squash Bugs and Cucumber Beetles

?

They have 6 legs and 1 set of wings

Are they insects?

Cucumber Beetle adults are yellow with black stripes

Squash Bug adults are dark grey, with light spots. They have a flat back with an x across it. The bottom of the X is all dark grey. They are a type of insect called Leaf-Footed Insects.

Both of these kinds of insects are native to North America.

These bugs have sap sucking mouths, to take the sugary food from the plant.

They attack fruits in the *Curcubit* family which are pumpkins, squash, cucumbers, zucchini and melons.

Sometimes Squash Bugs eat the fruit too (the pumpkin or squash).

Both kinds of bugs can carry plant viruses bacteria with them that affects the plant (withering) see in photo on next slide.

They spend the winter under soil, stones or woodpiles



Photo: Striped Cucumber Beetle, Ric Bessen, Univ. of Kentucky



Photo: Adult Squash Beetle, Utah State Univ. Extension

Squash Bugs and Cucumber Beetles



Photo: Striped Cucumber Beetle, USDA Extension Services, Utah



Photo: Feather-legged fly, Univ. of Wisconsin Horticulture Extension

Their job on the farm is mostly to be a pest, but they do feed some flies and wasps, like the feather-legged fly above which is a parasite to the moth.

Tips:

- Keep wood piles away from the garden area
- In small gardens, put a board on the ground near the plants. The bugs go under the board at night. You can go out early in the morning to catch them.
- Cover the plants when seeding or transplanting and keep the plant covered until it flowers (so that it can get pollinated to make fruit).
- Remove leaves with eggs, or infested with insects, destroy/ drown.
- Don't compost the leaves.

Pollinators – Bees, Wasps, Hornets

? Bees, wasps and hornets have 6 legs and 2 sets of wings
Are they insects?



Solitary wild bee photo:
Xerces Society/ Rich Hatfield

- Many people are afraid of bees, wasps and hornets because of their sting.
- They usually don't sting unless you accidentally (or on purpose) squish them or bother them at their nest/ hive.
- If bees sting animals with fur or thick skin their stinger can get stuck and they die. This is why bees usually don't sting unless they are afraid.
- Male bees collect most of the food and they have no stinger.
- We do need to be careful though, because some people are allergic to stings.

Bees have wide bodies, thick legs and look furry. Bees look furry because they are covered hairs that pollen sticks to.

With the exception of honeybees and bumblebees, most bees are solitary and live in underground nests.

Honey bees are not native to North America. Native bees don't make honey, they use all of the food they collect to help them get through the cold winter.

Native bees can be many colours, blue, green, black...



Lifecycle Photo: Carol Muncer



Photo: Yellow Jacket, Poulin's Pest Control, Can.



Photo: Mud dauber, Hawx Pest Control, (U.S)

- **Wasps** and **hornets** have skinny bodies with narrow waists. Their bodies are mostly hairless.
- They can sting multiple times.
- **Yellowjackets** are a type of social wasp that will nest above or below ground. They are social because they live in colonies.
- These wasps attach papery nests made from chewed fibers to tree limbs or the eaves.
- Though there are many solitary wasps such as **digger wasps** and **mud daubers**.
- Solitary wasps nest in the ground or in natural cavities (like cracks in wood or stone).

Their job on the farm is to be a pollinator, which means they help plants to make seeds. This is a really important job!

For rainy days on the farm – Slugs and Snails

Snails and slugs have one big foot and no wings

Are snails and slugs insects?

- They are mostly a head, belly and a big foot that moves them along. They are called a gastropod (gastro=stomach), (pod=foot)!
- Their big foot makes a mucous that helps them slide along and find their way back home!
- Slugs have no shell, but snails do.
- They have two pairs of tentacles on their heads. The longer pair is the eyes. The short pair is used for smelling and feeling its way around.



Photo: Pinhead Spot Snail
by James Bailey from iNaturalist

They live on the ground or water. They are active at night and on cloudy days.

They can eat leaves and damage plants, especially when they are young.

Their job on the farm is to be a cleaner!

They remove dead plant matter and they are food for some animals like birds, raccoons, mice, squirrels, toads, turtles, etc.



Photo: Milky slug by Bruce Marlin, Wikimedia

Activity

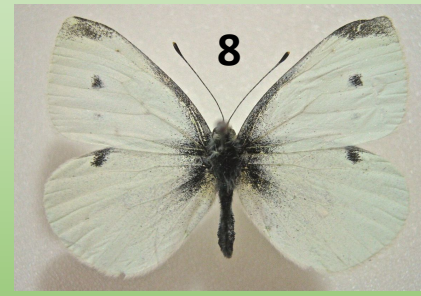
1. Let's have a look at some models that show the lifecycle of a few insects.
2. We can also play The NAME GAME on the next slide.



Let's match the insect with its name.

You can write your answers on the board to keep track...

- A. Wild bee
- B. Snail
- C. Yellow Jacket
- D. Cabbage moth
- E. Potato Beetle
- F. Lady Beetle
- G. Cucumber Beetle
- H. Pill Bug
- I. Squash Beetle



Answers – Let's see how many you can correctly remember

- A. Wild bee - #4
- B. Snail - #2
- C. Yellow Jacket - #3
- D. Cabbage moth - #8
- E. Potato Beetle - #6
- F. Lady Beetle - #9
- G. Cucumber Beetle - #7
- H. Pill Bug - #1
- I. Squash Beetle - #5

Arthropods are creatures like spiders and scorpions that have a hard layer on the outside of their bodies.

Companion planting means putting plants together so that they can be mutually beneficial.

Composting is when living materials that have died get turned back into soil.

Crustaceans are aquatic and land animals that have an exoskeleton and legs that have joints.

Cruciferous refers to a family of vegetables that includes broccoli, cabbage, squash, cauliflower and other greens that have a lot of sulfur in them (strong smell).

Curcubits are in the squash family and include; pumpkins, squash, cucumbers, zucchini and melons.

Diapause is a hibernation-like state that insects go into to survive during the winter.

Gastropod is the classification for slugs and snails, being mainly a stomach and one large foot.

Native species means that plants and animals have been here for a very long time.

Non-native species means that people brought them here from somewhere else

Invasive Species are non-native species that can damage their new ecosystem.

Nightshades are plants in the potato family and include; eggplant, tomato, ground cherries, Evening Nightshade (wild), tobacco and pepper plants, as well as potatoes.

True Insects have six legs and either one or two sets of wings

We can't wait to see you on the farm!



Hayes Farm