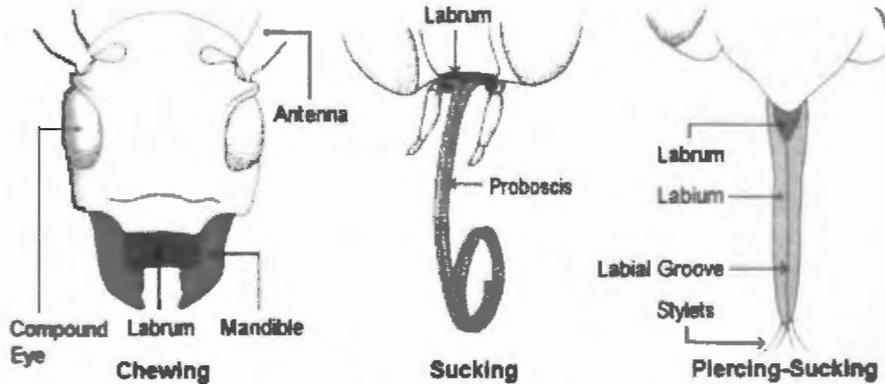


Insect Plant Damage

Insects that may damage our plants leave tell-tale signs that they have been on our plants. It is up to us to figure out what type of insect may have caused the damage, so that we know the proper way to discourage or eliminate that pest. So we need to become insect detectives.

Insects feed on plants in different ways according to their **mouthparts** at each **stage of life**. With some insects **only the adult insect feeds on certain plants**. In other insects the **immature form may only eat certain plants**. In other insects the **adults have mouth parts different from those of the immature forms**. There is a lot to learn!



(1) Insects with chewing mouthparts eat parts of a plant. They may eat all the leaves (**defoliate**). They may eat only

portions of the leaf tissues between the veins (**skeletonize**). They may eat **only the edge** of leaves. Some may eat tiny holes in the leaves (**shot-hole**). Others may feed on **particular layers inside of leaves (leaf miners)** or bore into stems and roots (**borers**). Some insects with **chewing mouth parts** include caterpillars, grasshoppers, some beetles and their larvae. Look for **frass** (bug poop) from chewing insects, especially caterpillars.

(2) Insects with piercing and sucking mouthparts pierce the surface of the plant and suck out the sap from **within**. Because the green **chlorophyll** is also sucked from plants the parts **discolor**. Many plants react to the saliva and damage of sucking pests with curled leaves or twisted young stems.

Many insect pests stay on the plant at all times and so are easy to see. Others run or fly when disturbed; you may need to sneak up to the plant to avoid scaring the pests. Carefully approach the plant low to the ground and try to observe its upper and lower leaf surfaces without casting a shadow. Many other insect pests come out at night; you should look for them with a flashlight.

(3) Insects that feed with a long proboscis (a coiled straw) suck nectar from the centers of flowers.

Name an insect that feeds with a long proboscis. _____

Plant damage can also be the result of feeding by pests other than insects. **Can you think of a few non-insect pests that can damage our plants?** _____

Cabbages in the garden have big holes in their leaves. **What do you suspect is eating the cabbage?**

What type of a mouth does the larval form of a butterfly or moth have? _____

If you see frass on the ground, what insect do you suspect? _____

What type of a feeding mechanism does a mosquito have? _____

If we see pale yellow patches on leaves, what kind of insect was feeding there? _____

Insects in the Garden

We see many kinds of insects in our gardens. People sometimes think that all insects are bad, but we know that many are necessary in order to grow vegetables and fruits. Many insects are **interdependent** with plants. Insects are neither good nor bad. All insects occupy a niche in our environment. We refer to some insects that harm our food crops as **pest insects**. As a good gardener you must learn the beneficial insects from the harmful ones before killing any of them. We can learn to identify them by looking in books or the Internet.

Bugs and insects are often words that we use interchangeably. **Bugs** are actually a class of insects that includes aphids, stink bugs, and cicadas. Spiders and spider mites are **arachnids**, not true insects.

Insects we may encounter in the garden include:

(1) **Ladybeetles** are usually red with black spots. There are many varieties of ladybeetles. They are predatory insects that feed on small, soft-bodied insects. Their immature forms also eat small insects.



(2) **Caterpillars** may be smooth or fuzzy. They are the immature form of butterflies and moths. Caterpillars eat plant parts. Some eat only one specific type of plant.



(3) **Bumblebees** are usually yellow and black in color. Bumblebees appear to be 'furry' compared to other bees. They are bigger than a honey bee and live in small nests rather than a hive. Bumblebees are good pollinators.



(4) **Beetle larvae** are also known as **grubs**. They are the immature stage of beetles. The larvae live in the soil and are usually white in color. Most beetle larvae eat dead plant material, but some eat the roots of plants.



(5) An **aphid** may be green or yellow or black. Aphids are small insects the size of a pin head. They suck plant juices from plant parts.



(6) A **praying mantis** is shaped like a stick and is green. They hide on plants. When other insects come by it grabs them with its front legs and eats them. Some people say it looks as though it is praying.



(7) **Stink bugs** are large, oval or shield-shaped insects. They get their common name from the odor of the chemical that they produce in glands on their abdomen. This odor might be a defense against predators. Many species of stinkbugs suck juices from plants. Some stinkbugs eat other insects.



(8) **Hover Flies** are small flies that **mimic** wasps. Their larvae, which look like tiny slugs, eat small insects like aphids and whiteflies. The adults are sometimes called flower flies because they eat nectar and pollen. They are about 3/4" in size.



To eliminate a pest from the garden to keep plants safe, always use the **least** toxic (poisonous) method to remove them. Sometimes removing the insect by hand is the best solution. It is not always necessary to remove a pest. Nature has a way of balancing insect populations. This is called natural control. Wait a day or two to allow that to happen.

Integrated Pest Management (IPM)

What is a pest? It is any organism that is a nuisance, harms or damages us or our food crops, homes, or animals.

Can you think of some pests that affect you? _____

Can a plant be a pest? _____

Can you name a plant pest? _____

How is it a pest? _____

There are a number of ways to get rid of pests. We can use chemical compounds that kill pests. These are called **pesticides**. If a pesticide kills an insect, it would be called an **insecticide**.

If a chemical kills plants, what would it be called? (Hint: Plants are often called "herbs".)

Many pesticides are harmful to living things other than the "pest" that we want to kill. Many of these chemicals can hurt us as well. Therefore we use only "**organic**" methods to grow our plants.

There is another way to get rid of pests that might not harm us or our environment. It is called **Integrated Pest Management**, or **IPM**. How can we control pests in ways that do not hurt us or the environment?

We need to understand that pests also have pests. With the IPM method of pest control we take advantage of the **pests** that harm the pests that we would like to kill. If we want to get rid of the cabbage worms that are eating our **cabbage** we could use a product called BT. BT is a bacterium that infects caterpillars and makes them sick and die. **Is BT safe to use in our butterfly gardens?** _____ **Why?** _____



Lady beetles eat many small insects. We can use them to eat aphids and other small insects that eat our plants.



Spiders and wasps also eat many pest insects. Wasps and spiders could also hurt us.

Should we kill all spiders and wasps? _____ **Why?** _____

Mosquitoes are a big nuisance and can carry diseases like West Nile. Female mosquitoes need blood of a mammal to lay their eggs. When they bite us, we itch. They lay their eggs in water where their larvae can live **until** they become adult mosquitoes. Another Bacterium related to BT can infect mosquito larvae and kill them. We can **buy** these in a dry form called Dunks.

What IPM methods could we use to reduce the number of mosquitoes around our homes and gardens?

Is poison ivy a pest to us? The seeds of poison ivy feed 23 different kinds of birds.

Should we kill all poison ivy? _____ **Why?** _____

Healthy plants, just like healthy people are usually able to fight off diseases.

Name at least 3 things plants need to stay healthy.



Using IPM methods of pest control will keep our environment and people healthier!