

A Kid's Guide To
Backyard
Bugs



WHAT'S BUGGING YOUR GARDEN?



Hidden in your garden is a secret world inhabited by fascinating creatures—bugs. There are more bugs on this planet than all other animals combined, about 200 million of them for every person! While a few of these creatures are troublemakers that “bug” gardeners by munching on plants, most of them actually help to keep your garden healthy.

■ What are “bugs”? The creepy crawly critters you find in your garden are really many different kinds of animals. Scientists divide them up into separate groups. The largest group is made up of insects like butterflies, bees and beetles. Other groups of animals include: spiders (arachnids), millipedes (diplopods), worms (annelids), sowbugs (crustaceans) and snails (mollusks).

■ In this guide you’ll learn how to recognize helpful bugs and how to spot garden troublemakers. You’ll discover what you can do to attract creatures that will help keep your garden healthy and beautiful.

A BUG'S LIFE

Many insects go through amazing changes during their life cycle. Scientists call this series of changes *metamorphosis*.



Eggs



Larva



Pupa



Adult

■ Some insects, like ladybugs and butterflies, go through four different stages. They start out as eggs that hatch into soft worm-like or caterpillar-like forms called *larvae*. The job of a larva is to eat and grow, and many of the best pest controllers in your garden are the hungry larvae of insects like lacewings and ladybugs.

■ A larva sheds its outer skin, called an exoskeleton, many times as it grows. When it's fully grown, the larva forms a protective covering around itself and becomes a *pupa*. Inside this covering, the pupa completely transforms until eventually it breaks out as a fully formed adult.

■ Some insects, such as dragonflies and grasshoppers, go through only three stages. The young, called *nymphs*, hatch from eggs and look like smaller versions of their parents. Nymphs don't become pupae. They just eat, grow and shed their skin as they gradually become adults.

PESTS OR PALS

You may not realize it, but bugs are an important part of your life. In fact, people couldn't live without them! Bugs pollinate our food crops and flowers, mix and fertilize soil, eat our garbage, provide food for wildlife and give us honey, wax and silk. There are millions of different kinds of bugs, and very few of them are pests that harm people or plants.

Bugs have four important jobs in your garden:

Predators, such as ladybugs and spiders, are part of the pest patrol. These garden defenders are skilled hunters that feast on plant-eating insects.



Parasitoids, such as some tiny wasps, lay their eggs inside of garden pests. When the eggs hatch, the wasp larvae eat the insides of their victims.



Pollinators, like bees and butterflies, move pollen from flower to flower as they feed on nectar, helping plants make seeds and reproduce.

The Clean-Up Crew including earthworms, millipedes and fruit flies, eat and break down dead plants and animals. This process, called *decomposition*, transforms waste into nutrient-rich soil for healthy plant growth. Without these talented recyclers we would soon be buried in garbage!

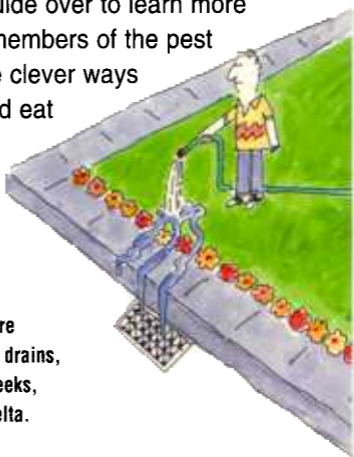


THE PEST PATROL

People sometimes use chemicals, called *pesticides*, to kill unwanted bugs in the garden. However, some of these chemicals can also harm people, pets and the helpful bugs that pollinate plants and eat pests.

Pesticides can also pollute Bay Area waters and can poison the animals that call the water home. When pesticides are washed into storm drains by rain and over-watering of lawns and gardens, they wind up in creeks, the Bay and the Delta. Pesticides that are poured or rinsed down household drains cannot be removed by sewage treatment plants, so they also end up in the Bay. Instead of using pesticides, we can often control garden troublemakers safely by calling out the pest patrol — the hardworking bugs that eat the pests. These natural pest control experts protect our plants without harming people, wildlife or the environment.

■ Turn this guide over to learn more about some members of the pest patrol and the clever ways they catch and eat garden pests.



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BUG THUGS

Here are four pests that annoy gardeners by eating plants. If you see one of these troublemakers in your garden, look for the helpful bugs of the pest patrol — they won't be far away!

Aphids ■ These tiny, pear shaped insects come in many different colors. They suck the juices out of plants and secrete a sweet liquid, called *honeydew*, that ants love to eat.

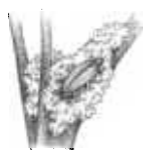


Aphids are the favorite meal of ladybugs, lacewings and hoverflies.

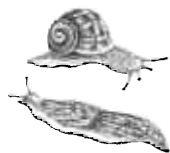
Scale Insects ■ Tiny barnacle-like bumps on the stems of plants might actually be the protective shell of this insect pest. Lacewings, hoverflies and ladybugs find them delicious.



Spittlebugs ■ If you find a wad of bubbles that looks like spit on a plant, you've found the hiding place of a spittlebug larvae. Lacewings, wasps and assassin bugs make them into a feast.



Snails & Slugs ■ A shiny slime trail through the garden is your clue that snails and slugs have been eating holes in your plants. Beetles, birds and toads help keep these pests under control.



GOING BUGGY: FUN GARDEN PROJECTS



You can keep your garden healthy by creating a safe home for the bugs and other animals that eat garden troublemakers and pollinate plants. Just provide them with food and water, and avoid using pesticides in your wildlife habitat!

Planting for the Pest Patrol

Many of the helpful bugs that eat pests also feed on pollen and nectar. You can attract these hard workers to your garden by planting alyssum, calendula, cosmos, yarrow, asters and sunflowers.

Grow a Butterfly Banquet

Invite a butterfly to lunch! Choose a sunny, wind-sheltered spot and include a shallow dish of water and a flat rock for sunbathing. Plants that provide food for butterflies and their caterpillars (larvae) include buddleia, fennel, zinnia, lantana, hollyhocks and milkweed.

GOING BUGGY: FUN GARDEN PROJECTS

Be a Hummingbird Helper

Hummingbirds devour pests like aphids and pollinate flowers as they sip sweet nectar. To attract hummingbirds, plant red or orange tubular-shaped flowers that produce lots of nectar—such as fuchsia, scarlet sage, penstemon, bee balm and cardinal flower.

Get a Bug's Eye View

It's easy to make a bug house to catch and study the critters you find in the garden. You will need: two clean, empty tuna cans, a 7" by 12" piece of plastic window screen, adhesive tape and wire. Cover the cut edges of the screen with tape. Hold one of the short edges and roll the screen into a tube. Stand the tube up in one of the cans, and let it unroll just until it fits snugly in the can. Fasten the long edges of the tube together with wire. Set the other can on top for a lid. Use this guide to identify the bugs you catch with this bug viewer, then return them safely to the garden.



Dragonflies

These dragons of the air are swift predators that gorge themselves on flying pests like mosquitoes, flies and moths. Dragonflies are flying acrobats they can hover, dodge, dive even fly sideways and backwards at 35 miles per hour! As they fly, dragonflies form a basket with their spike-covered legs to scoop up their prey in midair. Dragonflies have huge appetites and can eat 300 mosquitoes in a day, giving them the nickname “mosquito hawk.”



■ Creature Features

Dragonflies have enormous, bulging eyes. They can see in almost all directions at once and can spot insect prey from 60 feet away. They have four clear wings and brightly colored bodies that help attract mates.

■ Habitats and Hang-outs

On sunny days, dragonflies hunt for prey as they fly over gardens, fields and ponds. Young dragonflies, called nymphs, live in ponds and streams and breathe with gills.

FUN FACT

F *Scientists have discovered fossils of huge dragonflies that lived over 300 million years ago and were the size of small hawks.*

Green Lacewings



There's a lion loose in your garden — an “aphid lion.” It's the green lacewing larva, a deadly bug hunter that uses tusk-like jaws to catch and eat pests. One larva can eat 60 aphids in an hour! As adults, green lacewings feed on flower nectar and help to pollinate plants.

■ Creature Features

Adult lacewings are pale green with golden eyes. The veins in their delicate, clear wings look like lacework. The tiny larvae look like spiny caterpillars with long curved jaws.

■ Habitats and Hang-outs

At dusk and dawn, adult lacewings visit garden flowers searching for nectar and pollen. They are sometimes attracted to house or porch lights. Larvae crawl along branches and leaves in search of prey.

FUN FACT

Some lacewing larvae are masters of disguise. To hide from predators, they cover themselves with bits of leaves and the remains of aphids they've already eaten.

Ground Beetles

Hiding under wood and rocks in your garden are fierce predators called ground beetles. At night these hungry hunters use their powerful jaws to munch on garden pests like snails and slugs. Ground beetles may live for two years and can eat over 500 pests in their lifetime!

■ Creature Features

Most ground beetles are dark brown or black which helps them blend in with soil and bark. They have long legs and are swift runners, but you'll seldom see them fly. Ground beetles have hard front wings that protect them like armor, and some ground beetles can release smelly liquids from their rear ends to repel their enemies.

■ Habitats and Hang-outs

During the day, ground beetles rest under rocks, logs, soil and dead leaves. At night they patrol the garden and even climb trees searching for tasty bugs.



F UN FACT

There are so many beetles on earth that if you lined up all the animals in the world, every fifth one would be a beetle!

Hoverflies

If you see a bee or wasp in your garden, look closer — it might be a hoverfly, a great friend to gardeners.

Hoverflies feed on pollen and nectar and pollinate many garden plants. The larvae are greedy predators that grab and suck the juices out of garden pests like aphids.



■ Creature Features

With their yellow and black stripes, hoverflies look like slender bees. Predators, such as birds, avoid them; but hoverflies are actually harmless and can't sting. Like tiny garden helicopters, hoverflies seem to hang almost motionless over flowers before darting quickly away. The larvae look like fat, legless caterpillars.

■ Habitats and Hang-outs

You'll find hoverflies near nectar-rich flowers like marigolds and sunflowers. Look for the larvae on leaves near colonies of aphids.

F UN FACT

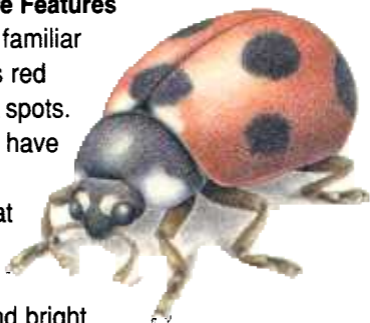
One tiny hoverfly larva can eat 400 aphids in two weeks!

Ladybugs

Many people believe ladybugs bring good luck, especially in the garden where they eat fantastic numbers of pests. Both adults and larvae gorge themselves on plant-eating bugs, especially aphids. In fact, one ladybug can eat 5,000 aphids in its lifetime!

■ Creature Features

The most familiar ladybug is red with black spots. Ladybugs have hard wing covers that protect them like a shell, and bright



colors to warn enemies that they taste bad. The larvae look like tiny orange and black alligators.

■ Habitats and Hang-outs

In spring and summer, you'll find ladybugs on your garden plants. In fall, some ladybugs fly to the Sierra Nevada Mountains where they spend the winter hibernating, with as many as 500 gallons of ladybugs piled up together in one spot.

F UN FACT

In the 1880's, California's orange trees were almost destroyed by a pest called the cottony cushion scale. Scientists brought in Australian ladybugs called vedalia beetles to eat the scales, and these tiny heroes saved the trees!

Spiders

Without these skillful hunters we'd soon be overrun with insect **pests**



In fact, if you piled up all the pests that spiders eat in a year, they would weigh more than 50 million people! Some spiders spin webs to catch their prey, while others hunt on the ground or make clever traps and tunnels. Spiders use sharp, curved fangs to paralyze and suck the insides out of their insect prey.

■ Creature Features

Spiders are *arachnids*, with eight legs, two body parts, and many eyes. Though they look ferocious, they are shy creatures that munch on pests, not people. Spiders will bite only if they feel threatened. Most spiders have fangs that cannot pierce human skin.

■ Habitats and Hang-outs

Hunting spiders often hide in flowers or crawl along the ground looking for prey. Look for the homes of web-weaving spiders early in the morning when their webs sparkle with dew.

FUN FACT

Spider silk looks fragile, but it is stronger than steel thread of the same thickness and can hold 4,000 times the weight of a spider!

Digging Deeper

Here are more resources about bugs:

FOR BOOK WORMS

Bug Bites, Insects Hunting Insects...and More
Diane Swanson, Whitecap Books, 1997.

Compost Critters

Bianca Lavies, Dutton Children's Books, 1993.

Insect Wars

Sara Van Dyck, Franklin Watts, 1997.

Insects in the Garden

D. M. Souza, Carolrhoda Books, 1991.

Slugs, Bugs and Salamanders:

Discovering Animals In Your Garden

Sally Kneidel, Fulcrum Publishing, 1997.

BUGS IN THE WEB

City Bugs: Insects of the S.F. Bay Region

<http://www.cnr.berkeley.edu/explore>

The Minibeast World of Insects and Spiders

<http://members.aol.com/YESedu/welcome.html>

Katerpillars and Mystery Bugs

<http://www.uky.edu/Agriculture/Entomology/ythfacts/entyouth.htm>

BUG STOPS: PLACES TO VISIT

San Francisco Zoo's Insect Zoo

1 Zoo Road, San Francisco, CA 94132
(415) 753-7080

The Insect Room

California Academy of Sciences, Golden Gate Park
San Francisco, CA 94118
(415) 750-7145

FOR MORE INFORMATION

City and County of San Francisco

Public Utilities Commission

Water Pollution Prevention Program

(415) 695-7375



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