

Good Bugs, Bad bugs: The Insects that Impact the Food We Eat

By Heather Connelly

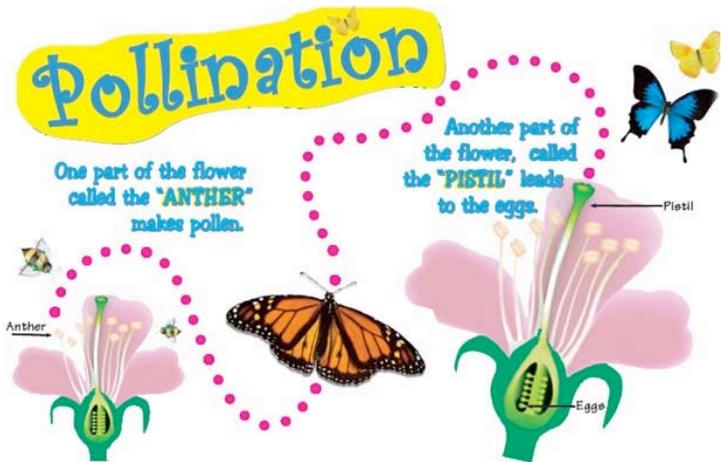


Insects are the largest and most diverse group of organisms on the planet. Insects have evolved to be very effective herbivores, predators and parasites and live on almost every terrestrial habitat on earth, including Antarctica. While most humans might think these tiny creatures have little affect on us ask any farmer and they will tell you a different story. What insects lack in size they make up for in numbers. It has been estimated that at any time there are 10 quintillion (10,000,000,000,000,000,000) insect living on earth. That's a lot of hungry mouths that are often competing with humans for resources like food. But not all insects have negative impacts. Some are beneficial, like pollinators and natural enemies.

Pollination

Pollination is the process by which angiosperm (flowering) plants are fertilized allowing them to produce seeds and often fruits. Fertilization occurs when pollen is

transferred from the anther (male organs) to the pistil (female organs) of another flower. This transfer can occur either by wind or vectored pollination. Wind pollinated flowers rely on the air current to pick up pollen and carry it to neighboring flowers. However, this



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isn't always efficient as there is no control over where the pollen goes. A more efficient system is vectored pollination. A vector is an organism that carries pollen from one flower to another. Many insects are pollen vectors like, bees, butterflies, moths and even beetles and flies. Pollination by native insects is estimated to produce around \$3.1 billion in crops annually.

Pests

Thanks to the hard work of the insect pollinators, crop plants are fertilized and are able to produce our food. Unfortunately, we are not the only ones who want to eat our food. There are thousands of hungry pests that want to eat our crop plants. Some of these pests are aphids, beetles, caterpillars and grubs and they are happy to make a snack out of many parts of the plant.

Some pests are indirect, meaning they damage the leaves and stems rather than



the fruit of the plant, while others known as direct pest cause damage to the marketable parts like the fruits. Insects destroy 16% of all the crops produced in the whole world over one year. They are able to cause so much damage

because of the conditions under which we grow our crops. Large monocultures are easy target for pests to find and provide almost unlimited food resources. Further these environments are unfriendly to predatory insects that might naturally control pest population. Breeding for certain traits may also reduce natural plant defenses and spraying pesticides kills not only pests, but pollinators and predatory insects too.



Predators and Parasitoids

Predatory insects are those that eat insects and other arthropods. They can be good friends to farmers who don't want to spray their crops with pesticides. Many predatory insects live in our own backyards like ladybeetles, praying mantises and lacewings. These insects eat pest both as young and adults. A single ladybeetle can eat up to her weight in aphids everyday.



Another group of insects, called parasitoids, kill pests differently. They lay their eggs on pests and after hatching the larvae burrow into the host and consume its tissues from the inside out, killing the host. Parasitoids are generally very small and include many species of tiny wasps and flies. On a large host, a female parasitoid may lay up to a hundred eggs. Predators and parasitoids can effectively control pests if they have access to resources that are rare in conventional

agricultural systems. These insects require shelter and alternative food like pollen and nectar or prey when pests are scarce. These resources can be provided by planting native flowering plants, and of course by avoiding pesticides that may harm the predators.

Resources

A great article about many predators and parasitoids and how to attract them to your garden

<http://greenopolis.com/goblog/joe-laur/good-bugs-bad-bugs-and-plants-they-love-and-hate> -

[Good Bug, Bad Bug: Who's who and what they do by Jessica Walliser Published by St. Lynn's Press, 2008.](#) – This book describes many beneficial and pest insects and how to control them organically.

[Good Bugs & Bad Bugs \(PDF\)](#)- PDF booklet that describes many beneficial and harmful insects and includes classroom activities.

[Good vs Bad Bugs Education Module](#)- PDF module that introduces some good and bad bug species and includes an identification activity

In-class activity:

Wind vs. insect pollination

This activity demonstrated the relative efficiency of wind vs. insect pollination. Class is divided between wind pollinators and insect pollinators. Each group (4-6 students) is given two cardboard flowers. One flower has pollen (flower) that the student must transfer to the other flower which has double stick tape to collect the pollen. Wind pollinators transfer pollen from one flower to another by blowing to pollen while insect pollinators use an “insect” (cotton ball or similar object). The students will transfer pollen for a designated amount of time and at the end they will compare the flowers and determine which collected the most pollen (the insect pollinators win 99.8% of the time).