THE BUGS OF YOUR BACKYARD

A GUIDE BY THE MATHIS LAB @ CLARK UNIVERSITY

Background

What makes an insect?

- All insects have 6 legs and 3 main body sections (head, thorax, and abdomen). Most insects go through some form of metamorphosis – where they hatch from an egg as a flightless juvenile, and then eventually grow wings and can fly when they reach adulthood.

- While things like spiders, millipedes, centipedes, and mites are not insects, they are all arthropods – animals with a hard exoskeleton and jointed legs, and are commonly included when learning about bugs because they interact with insects and share the same habitats.

Background

What are those bugs up to?

Here are the important roles that bugs play in our environment:

- Pollinators – Insects that drink nectar or eat pollen from flowers. They allow plants to complete their reproduction by transferring pollen.
- Predators – Insects that eat other insects. These bugs are very important in keeping pests away from our plants.
- Herbivores – Bugs that eat plants. These insects are the base of food chains in almost every land ecosystem. Many other animals eat nothing but these kinds of bugs.
- Decomposers – Many insects only eat dead things and are important in recycling nutrients back into the earth for plants and other organisms to eat.
- Parasites – Although you probably won't see any on plants today, parasitic insects are those that feed on other organisms without killing them. Parasites that cause problems for people include mosquitoes, lice, and ticks.

What animal groups are in this book?

- Class Insecta: the insects
  - Order Hymenoptera: Bees, ants, and wasps
  - Order Coleoptera: Beetles
  - Order Diptera: Flies
  - Order Lepidoptera: Butterflies/moths/caterpillars
  - Order Hemiptera: True bugs
  - Order Orthoptera: Grasshoppers/crickets
- Class Arachnida: Spiders/mites
- Class Isopoda: Pill bug/roly poly
- Subphylum Myriapoda: Millipedes/centipedes
- Phylum Annelida: Earthworms

** The images included in this pamphlet are all live organisms captured by Clark University students, and only represent a small fraction of the diversity of species of New England that belong to each group listed here**

Ants, Bees, and Wasps (Order: Hymenoptera)

Ants, bees, and wasps all share a common ancestor. These insects can be solitary but often form colonies that start with a queen whose offspring take care of different chores like foraging, cleaning, and taking care of young.

Bees are very important pollinators, and many plants we farm need bees to transfer pollen and complete their life cycle to produce fruit. Ants and wasps are common predators that eat pest insects that damage our crops.

Formicine ant (*Formica spp.*): © Joe Nelsen

Winter ant (*Prenolepis spp.*): © Joe Nelsen

Ruby ants (*Myrmica rubra*): © Joe Nelsen

Western honeybee (*Apis mellifera*): © Joe Nelsen

Small carpenter bee (*Ceratina spp.*): © Joe Nelsen

Large carpenter bee (*Xylocopa spp.*): © Daley O'Keefe

Spider-hunting wasp (Fam: Pompilidae): © Daley O'Keefe

Bumblebee (*Bombus spp.*): © Joe Nelsen

Beetles
(Order: Coleoptera)

Beetles are the most diverse group of land animals. They come in many shapes, colors, and sizes. The main trait that separates beetles from any other bug are their hard wing coverings called “elytra” which act as a protective armor from predators.

Beetle larvae look very different from their adults, they are wingless, have jointed legs, and often have completely different diets/habitats to avoid resource competition between their different life stages.

Flower beetle (Fam. Scarabaeidae): © Daley O’Keefe

Tiger beetle (Fam. Cicindelidae): © Daley O’Keefe

Fireflies (Fam. Lampyridae): © Joe Nelsen

Net winged beetle (Fam. Lycidae): © Joe Nelsen

Leaf beetle (Fam. Chrysomelidae): © Joe Nelsen

Squash beetle larvae (Fam. Coccinelidae): © Joe Nelsen

Scarab grub (Fam. Scarabaeidae): © Joe Nelsen

Click beetle larvae (Fam. Elateridae): © Joe Nelsen

Flies
(Order: Diptera)

Flies are another very diverse group. Adults are distinguished by having only two wings, where most other bug groups have four. The larvae of flies have no legs or wings and are usually detritovores – organisms that break down dead organic matter. Some fly species prey on other insects, some drink nectar and eat plants, and others can be parasites.

Mosquito larvae are aquatic, and you can help reduce their numbers by emptying anything in your yard that collects rainwater.

Long-legged fly (Fam: Dolichopodidae): © Joe Nelsen

Robber fliy (Fam: Asilidae): © Noah Hunt

Blowfly (Fam: Calliphoridae): © Joe Nelsen

Various species of mosquito larvae (left) and adults (right) (Fam: Culicidae): © Joe Nelsen

Horsefly (Fam: Tabanidae): © Daley O'Keefe

Butterflies and Moths (Order: Lepidoptera)

Butterflies and moths are important pollinators and are characterized by their large delicate wings and long tongue called a “proboscis” used to drink nectar.

Caterpillars and inchworms are the larval stage of butterflies and moths and all species eat plants. They spin a cocoon and eventually emerge as an adult.

Viceroy butterfly (Fam: Nymphalidae): © Maya Egan

Skipper butterfly (Fam: Hesperiidae): © Joe Nelsen

Monarch caterpillar (Fam: Nymphalidae): © Joe Nelsen

Grass moth (Family: Crambidae): © Noah Hunt

Ctenucha moth (Family: Erebidae): © Daley O’Keefe

Rosy maple moth (Fam: Saturniidae): © Daley O’Keefe

Geometer moths (Fam: Geometridae): © Daley O’Keefe

Cecropia moth caterpillar (Fam: Saturniidae): © Joe Nelsen

Tussock moth caterpillar (Fam: Erebidae): © Daley O’Keefe

True bugs
(Order: Hemiptera)

The word “bug” is a very general word used to describe any tiny thing with many legs, but there is also a specific group of insect called “True Bugs”.

True bugs are characterized by their piercing mouthparts used to suck the juices from plants. True bugs are very numerous, and some are important crop pests but also serve as an important food source for other animals higher on the food chain. Some true bugs are predaceous, and important in controlling pests.

Leafhopper (Fam: Cicadellidae): © Joe Nelsen

Squash bug (Fam: Coreidae): © Joe Nelsen

Shield bug (Fam: Pentatomidae): © Noah Hunt

Ambush bug (Fam: Reduviidae): © Daley O’Keefe

Plant bug (Fam: Miridae): © Joe Nelsen

Grasshoppers and Crickets (Order: Orthoptera)

Grasshoppers, crickets, and katydids are closely related to each other. They are easily identified by their long hind legs used to jump away from danger, and the “chirping” noise they make by rubbing their legs against their body to find mates.

These bugs are mostly herbivores, but some crickets are omnivorous.

Grasshopper (Fam: Tetrigidae): © Daley O’Keefe

Grasshopper (Fam: Acrididae): © Reese Viquez

Grasshopper (Fam: Acrididae): © Joe Nelsen

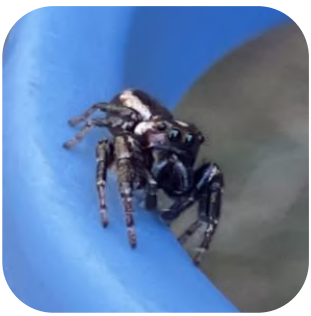
Spiders and Mites (Class: Arachnida)

Arachnids are not insects, but share close *ecological* similarities to insects. Spiders have venomous fangs used to stun and digest their prey. Some spin webs used to catch bugs flying by, and others are more active hunters.

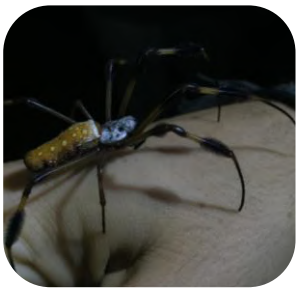
Mites are another group of arachnid but are much smaller. Ticks are a type of mite that feeds on the blood of mammals and birds. Ticks can be easily avoided by staying out of tall grassy areas while outdoors. Harvestmen are another common arachnid you will find outdoors.

Flower spider (Fam. Thomisidae) © Joe Nelsen

Orb weaver (Fam. Nephilidae): © Maya Egan



Jumping spider (Fam. Salticidae) © Maya Egan



Orb weaver (Fam. Nephilidae): © Joe Nelsen

Crab spider (Fam. Thomisidae) © Maya Egan

Pill bugs/poly-polys (Class: Isopoda)

Isopods are an arthropod found almost everywhere on earth, even the ocean! The isopods we encounter in New England are small detritovores that like cool, damp areas in the soil, under rocks, and fallen logs.

A common name for isopods is “roly-poly”, since they will roll up into a ball for protection.

Isopod © Daley O’Keefe

Isopods © Joe Nelsen

Millepedes and centipedes (Subphylum: Myriapoda)

Millipedes and centipedes are closely related and found in similar habitats, but have very different diets. Both groups are distinguished by having many legs.

Millipedes are slow moving detritovores and have two legs per each body segment.

Centipedes are fast moving and predatory, they use their venomous fangs to capture and eat their insect prey. This group has only one pair of legs per segment.

Millipede © Daley O'Keefe

Centipede © Joe Nelsen

Non-arthropod invertebrates

Here are some other invertebrates that are not arthropods but are included here because you will often find them on plants.

Snails and slugs: Many are aquatic and eat algae, but some are fully terrestrial eat land plants.

Earthworms: They are important in breaking down dead plant material, and their tunnels help aerate the soil – making it easier for plants to get water and nutrients to their roots.

Snail © Joe Nelsen

Slug © Maya Egan

Earthworm © Joe Nelsen

Credits

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