

CMG GardenNotes #311

Taxonomy of Arthropods (Insects and Insect Relatives)

- Outline:
- Introduction, page 1
 - Insects and mankind, page 1
 - Insect orders, page 2
 - Insect identification, page 2
 - Taxonomy of *Arthropods* (insects and insect relatives), page 2
 - Insect relatives, page 3
 - Class: *Arachnida* - spiders, mites, ticks, scorpions, and daddy-long-legs, page 3
 - Class: *Crustacea* - sowbugs, pillbugs, shrimp, lobsters, crayfish, page 3
 - Class *Diploida* – millipedes, page 3
 - Class *Symphyla* – garden centipedes, page 4
-

Introduction

Insects and Mankind

Insects are the most abundant and diverse form of life found on earth. Over three-quarters-of a million species are known to exist, more than the number of all kinds of animals and plants put together. Insects are a vital part of the world's ecosystem.

Insects are a major link in the world food chain. Insects like bees, wasps, flies, bugs, and beetles pollinate crops. Insects destroy various weeds in the same manner that they can injure crops. Insects improve the physical conditions of the soil, and promote its fertility by decomposing plant residues and aerating the soil. Insects help control insect pests as predators and parasites. Only a few of the thousands of species are pests of mankind or his crops.

Most books list insect pests according to host plants, or by orders (beetles, bugs, flies, etc.) and families (aphids, scales, leaf beetles, etc.). When gardeners can identify insects to order, they will be able to identify the majority of pests by the process of elimination. Most routine garden pests are readily identifiable to order, some to families. However, there are always a few insects, with atypical appearances, that do not fit standard descriptions.

Insect Orders

“Order” is one of the levels of taxonomy. Most common names for insects describe the insect *orders*. For example, “beetle” is the common name for members of the *Coleoptera* order, and “butterflies” and “moths” for the *Lepidoptera* order. A few common names refer

to families (or superfamilies). For examples aphids, leafhoppers, and psyllids refer to families in the *Homoptera* order.

Insect Identification

Identifying an insect is easy when:

- The insect is large enough to see.
- The insect is associated with plant damage.
- The insect has typical characteristics for the order and family.

Insect identification is more difficult when:

- The insect is too small to see characteristics.
- The insect is not associated with plant damage.
- The insect has atypical characteristics for the order or family.
- The insect has moved on, leaving only damage symptoms.

Taxonomy of *Arthropoda* (Insects and Insect Relatives)

The phylum *Arthropoda* includes insects, plus spiders, mites, tick, sowbugs, centipedes, millipedes, and more. They are characterized by chitinous exoskeletons, segmented bodies, and jointed appendages.

Class

- *Arachnida* — Spiders, mites, ticks, scorpions, and daddy-long-legs
- *Chipoda* — Centipedes
- *Crustaceae* — Lobsters, crabs, shrimp, sowbugs, and pillbugs
- *Diplopoda* — Millipedes
- *Symphyla* — Garden centipedes
- *Hexapoda* (or *Insecta*) — Insects
- etc.

Orders of Hexapoda

- *Coleoptera* — Beetles
- *Diptera* — Flies
- *Lepidoptera* — Butterflies and moths
- *Hemiptera* — True bugs
- *Homoptera* — Aphids, cicadas, leafhoppers, scales
- *Hymenoptera* — Ants, bees, hornets, sawflies, wasps
- etc.

Family

Some insects, such as beetles are easy to identify to family, while others, like flies, are more difficult.

Genus and species

Actual identification of an insect to genus and species requires a very high level of expertise.

Insect Relatives

Class: *Arachnida*

Spiders, Mites, Ticks, Scorpions, Daddy-Long-Legs

Arachnids (spiders, mites, and ticks) have four pair of legs and two body regions, the *cephalothorax* (a fusion of head and thorax) and the abdomen. [Figure 1]

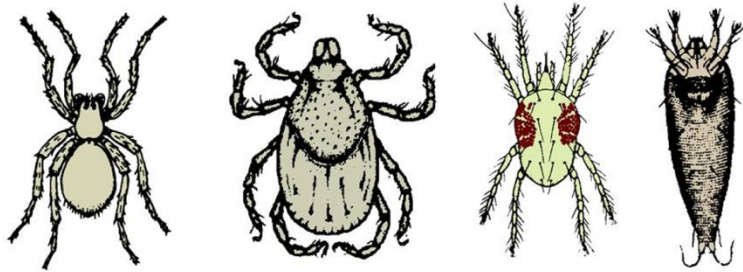


Figure 1. Arachnids (left to right): spider, dog tick, two-spotted mite, eriophyid mite

Class: *Crustacea*

Sowbugs, Pillbugs, Shrimp, Lobster, and Crayfish

Pillbugs and sowbugs are land crustaceans that usually have 5-7 pair of legs. They have two pair antennae and two body regions. The pillbug will roll into a ball, the sowbug cannot. [Figure 2]

Pillbugs and sowbugs are organic matter feeders, occasionally feeding on tender roots. Pillbugs and sowbugs can become a pest when numbers become very high or when they invade a home.

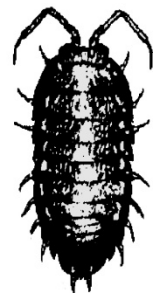


Figure 2. Sowbug

Class: *Diplopoda*

Millipedes

Millipedes have two pair of legs per body segment (except the first three). The body is usually cylindrical, 1 to 1 1/2 inches long, with short antennae. They may have 15 to 150 body segments, with 30 being common. [Figure 3]

Millipedes are usually found in damp and dark places, such as under leaves, under stones or boards, in rotting wood and in soils high in organic materials. If touched or picked up when crawling, they will curl up. They frequently invade homes, especially after a heavy rainstorm. They are not known to bite people. However, some species will give off an ill-smelling fluid. Most are scavengers and feed on decaying plant materials and overripe fruit. A few species attack living plants.



Figure 3. Millipede

Class: *Symphyla* Garden Centipedes

Centipedes have flattened bodies with typically 40-50 body segments and one pair of legs per body segment. [Figure 4]

They are predatory, feeding on small spiders, carpet beetles, sowbugs, millipedes, and other small insects.

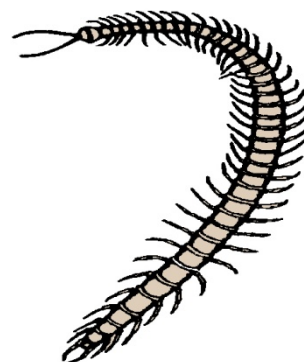


Figure 4. Centipede

Additional Information – CMG GardenNotes on Identify Insects

- #310 Identifying Insects: Reference and Study Questions
- #311 Taxonomy of Arthropods (Insects and Insect Relatives)
- #312 Insect Anatomy and Growth
- #313 Insect Orders
- #314 Key #1—Key to Insects Associated with Gardening
- #315 Key #2—Key to Insect Orders
- #316 Worksheet: Identifying Insects
- #317 Homework: Identifying Insects

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Line drawings from USDA.

- o Colorado Master Gardener *GardenNotes* are available online at www.cmg.colostate.edu.
- o Colorado Master Gardener training is made possible, in part, by a grant from the *Colorado Garden Show, Inc.*
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Revised October 2014