



MASTER GARDENER
COLORADO STATE UNIVERSITY
EXTENSION

CMG GardenNotes #314

Key 1 – Key to Insects Associated with Gardening

Notes:

- This key covers insect orders commonly associated with gardening and landscape maintenance. Key 2 includes additional orders.
 - This simplified key covers insects showing common characteristics for the order. Species with atypical appearances will not work with this simplified key.
-

1a. Wings present. — go to 2

1b. Wings absent. — go to 8

(1a) 2a. One pair of membranous wings. The insect may look like a fly or bee. (Look carefully for a second pair of wings hidden beneath the front pair.) — *Diptera* (flies)
[details page 313-4]



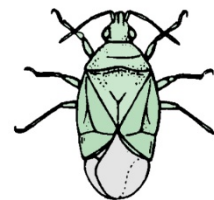
2b. Two pair of wings present. — go to 3

(2b) 3a. Front and hind wings not similar in texture. Front wings parchment-like, shell-like or leathery or thickened. Hind wings more delicate or membranous. — go to 4

3b. Front and hind wings similar in texture. Either membranous, transparent or covered with powdery-like scales. — go to 6

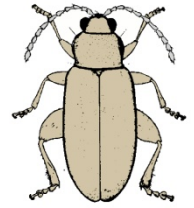
(3a) 4a. Chewing mouthparts. — go to 5

4b. Piercing-sucking mouthparts. Beak-like mouthparts usually easily visible and appear to arise from front of head, ahead of eyes. Front wings thickened at base but membranous and overlapping at tips, so that the wings form a triangle pattern on the back. —
Hemiptera, suborder *Heteroptera* (true bugs)



(4a)

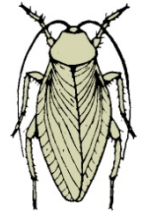
- 5a. Leathery front wings, without veins, lay over body in a shell-like fashion, making a straight line between wings. Hind wings membranous. No cerci (tail-like appendages). — ***Coleoptera* (beetles)**



- 5b. Front wings more or less parchment like with a network of veins. Hind wings membranous and folded fan-like when at rest. Hind leg enlarged for jumping. — ***Orthoptera* (grasshoppers, crickets, katydids)**



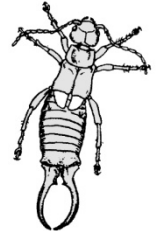
- 5c. Front wings more or less parchment like with a network of veins. Flattened bodies, thread-like antennae — ***Blattaria* (cockroach)**



- 5d. Front leg enlarged for capturing prey. — ***Mantodea* (mantids)**



- 5e. Front wings short and leathery. Hind wings membranous. Elongated flattened body with distinct forceps-like pinchers (cerci). — ***Dermaptera* (earwigs)**



(3b)

- 6a. Wings membranous. — go to 7

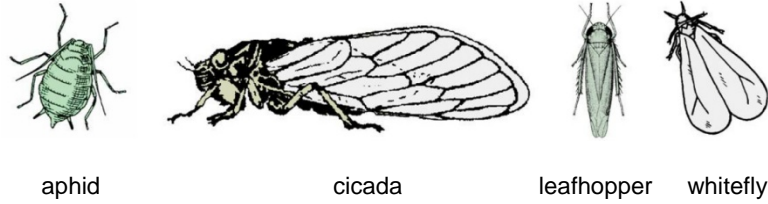
- 6b. Wings usually covered with powdery-like scales. Mouthparts coiled sucking tube beneath the head. — ***Lepidoptera* (butterflies, moths)**



- 6c. Wings very narrow and fringed with hair. Tiny insect (less than 1/8 inch). Foot ending in balloon-like swelling. — ***Thysanoptera* (thrips)**



- (6a) 7a. Piercing-sucking mouthparts. Jointed beak-like mouthparts not very visible and appear to arise from under the head or between the front legs. Wings generally held roof-like over body when at rest. — *Hemiptera, suborder, Auchenorrhyncha* or *Sternorrhyncha* (aphids, cicadas, leafhoppers, psyllids, treehoppers, and whiteflies)



- 7b. Front wing usually larger than hind wing. Wings may be connected. Chewing or chewing sucking mouthparts. Bee, wasp, or ant like with narrow waist. — *Hymenoptera* (bees, wasps, ants)



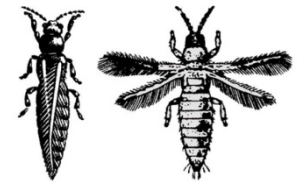
- 7c. Large membranous wings, usually with many veins and cross veins; similar in size and texture; held roof-like over body when at rest. Antennae longer, not extremely short or bristle-like. Tarsus (foot) with five segments. No cerci (tail-like appendage). — *Neuroptera* (lacewing)



- (1b) 8a. Piercing-sucking, jointed beak-like mouthparts. — go to 9

- 8b. Chewing mouthparts. — go to 10

- 8c. Rasping-sucking mouthparts. Tiny (less than 1/8 inch), slender insects. Balloon-like swelling on end of foot. Often noticed by scarring and deformation of leaves and flowers where it feeds. — *Thysanoptera* (thrips)



- (8a) 9a. Bug-like with jointed beak. Mouthparts usually easily visible and appear to arise from front of head, in front of eyes. — *Hemiptera, suborder Heteroptera* (true bugs)

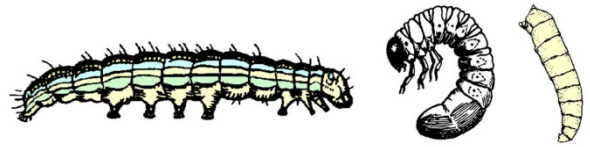


- 9b. Bug-like with jointed beak. Mouthparts not highly visible and appear to arise from under the head or between the front pair of legs. — *Hemiptera, suborder, Auchenorrhyncha* or *Sternorrhyncha* (aphids, cicadas, leafhoppers, mealybugs, psyllids, scale)

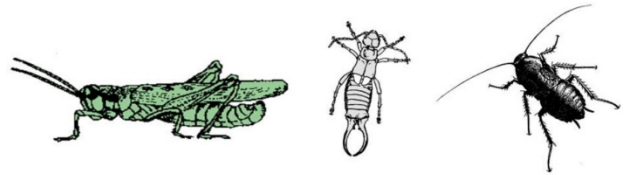


(8b)

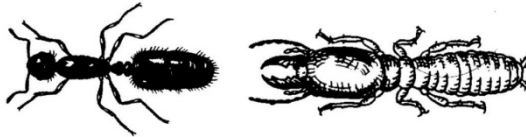
10a. Larva-like (i.e., caterpillar-like, grub-like, maggot-like). — go to 11



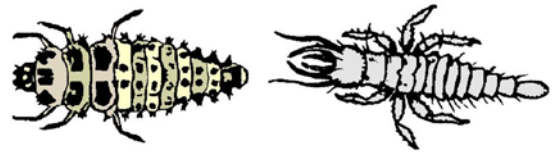
10b. Bug-like with tail-like features (cerci, filaments). — go to 14



10c. Ant-like. — go to 15

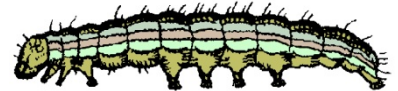


10d. Dragon-like with lots of appendages and decorations. — go to 16



(10a)

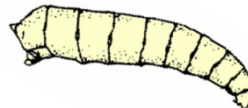
11a. Caterpillar-like: soft bodied, three pair of legs on thorax, fleshy leg-like *prolegs* on abdomen. — go to 12



11b. Grub-like: head capsule, three pair of legs on thorax, and no legs on abdomen.
— typical of *Coleoptera* (beetle grubs) [details page 313-2]

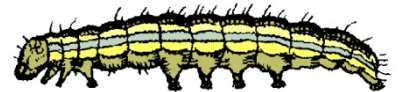


11c. Maggot-like, headless, legless. — go to 13



(11a)

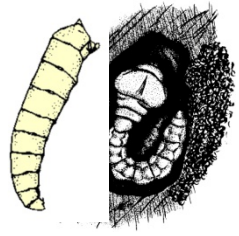
12a. Up to five pair of prolegs on abdomen. — *Lepidoptera* (butterfly and moth caterpillars)



12b. Six or more pair of rolegs on abdomen. — *Hymenoptera* (sawfly larva)



(11c) 13a. Maggot-like: no legs, no head capsule, mouth-hooks. — typical of *Diptera* (fly maggots)

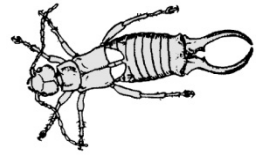


13b. Legless, no head capsule, head area may be enlarged. Insect internal wood or bark borer. — some *Coleoptera* (borer larva)

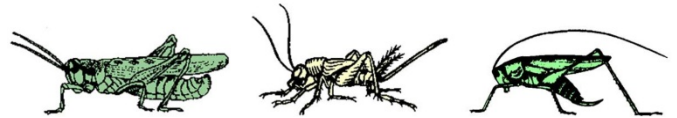
13c. Slug like; foliage feeding. — *Hymenoptera* (typical of some sawfly larva)

13d. Maggot-like; larva found in nests. — *Hymenoptera* (larva of bees, wasps and ants found in nest)

(10b) 14a. Elongated flattened body with distinct forceps-like pinchers (cerci), and short leathery front wings. — *Dermaptera* (earwigs)



14b. Hind legs designed for jumping. Antennae tread-like. — *Orthoptera* (grasshoppers, crickets, katydids)



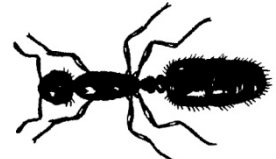
14c. Flattened body, thread-like antennae, thick semi-transparent wings with major venation. Household pest. — *Blattaria* (cockroaches)



14d. Front legs designed for grasping and holding prey. Body elongated. Long, thread-like antennae. — *Mantodea* (mantids)



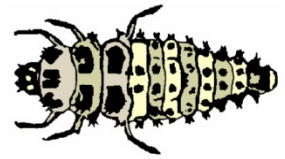
(10c) 15a. Three distinct body segments. Narrow waist. Elbowed antennae. — *Hymenoptera* (ants)



15b. Looks like a fat ant without a narrow waist. Creamy white. Straight beaded antennae. — *Isoptera* (worker termites)



(10d) 16a. Generally dark colored with bright markings and spines. —
***Coleoptera* (beetle grubs)**



16b. Forward-projecting, curved pointed jaws designed to grasp prey,
which they crush and suck the insides of prey. — ***Neuroptera***
(antlion)



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

Author: David Whiting, Consumer Horticulture Specialist (retired), Colorado State University Extension.
Line drawings from USDA. Photographs by David Whiting. Revised by Mary Small, Colorado State University Extension.

- 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.*
- o Colorado State University, U.S. Department of Agriculture and Colorado counties cooperating.
- o Extension programs are available to all without discrimination.
- o No endorsement of products mentioned is intended nor is criticism implied of products not mentioned.
- o Copyright 2005-2018. Colorado State University Extension. All Rights Reserved. *CMG GardenNotes* may be reproduced, without change or additions, for nonprofit educational use.

Revised July 2017