Basic Insect ID

Wayne J. Ohnesorg & James A. Kalisch
University of Nebraska-Lincoln Extension

Identifying insects takes great attention to detail. While trying to identifying insect you will need to look at different parts of the insect's anatomy. Figure 1 shows the basic parts of an adult insect or one that has gradual metamorphosis. Figure 2 shows the basic parts of a larva of an insect with complete metamorphosis. Sometimes you will need to look at features on the head such as the eyes, antenna, or mouthparts. Different types of insect antennae are shown in Figure 3.

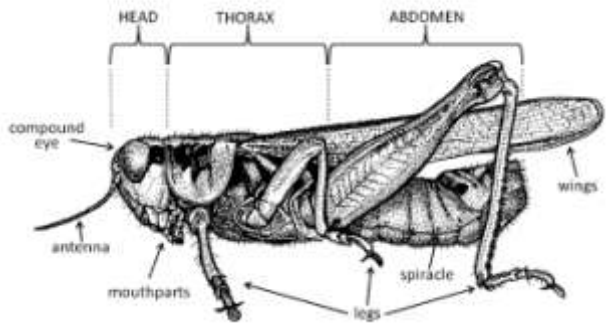

Figure 1. Body regions and parts of an adult grasshopper.

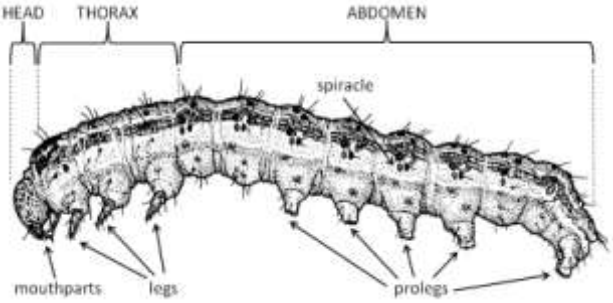

Figure 2. Body regions and parts of a corn earworm.

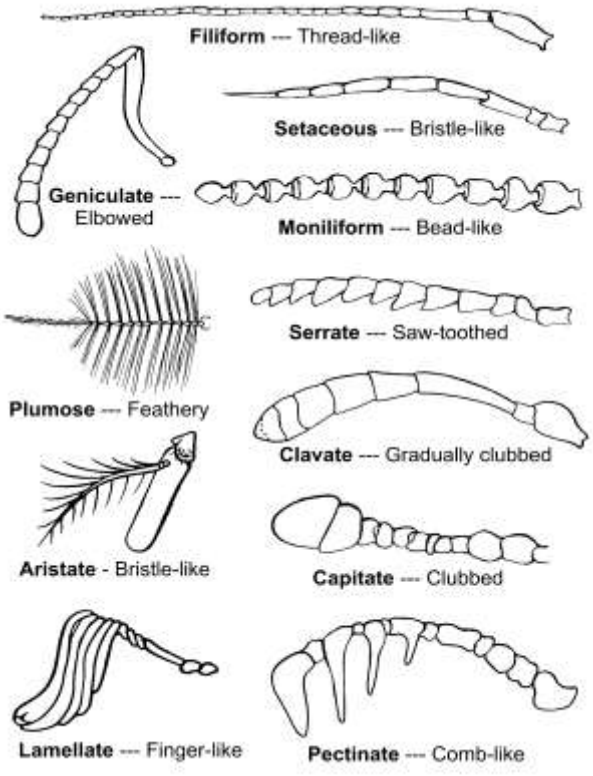

Figure 3. Types of insect antennae.

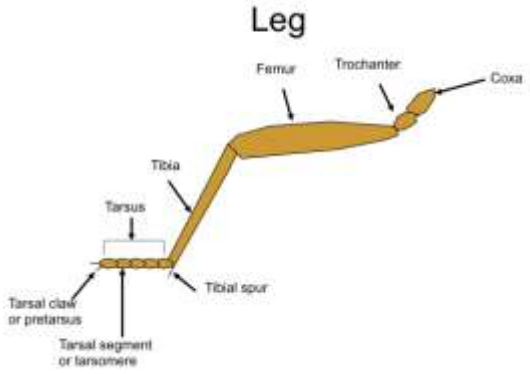

Figure 4. The basic parts of an insect leg.

At other times you will have to look closely at the thorax, and in particular, the legs or wings. A diagram of a basic insect leg's parts can be found in Figure 4. Different types of insect legs can be found in Figure 5. Often, examination of the abdomen will also be important in identification of insects, particularly caterpillars. Specifically, you will be asked to count the number of prolegs present (Figure 2).

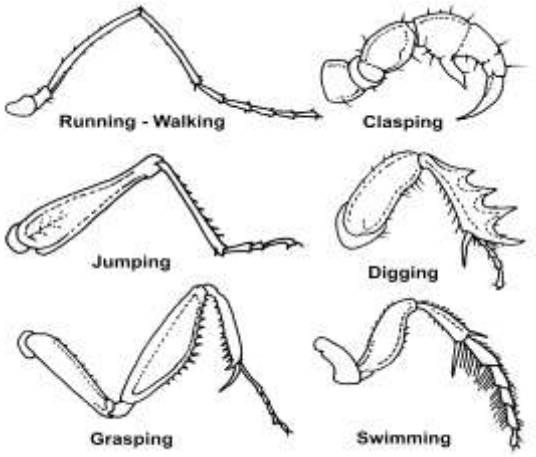

Figure 5. Types of insect legs.

Mouthparts of insects are also very important. There are two basic types of mouthparts, those for sucking and those chewing. Each type of mouthpart causes different types of damage in crops. Both mouthparts are illustrated in Figure 6.

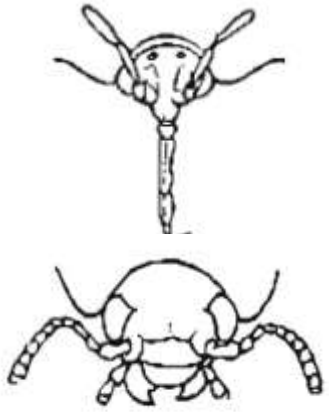

Figure 6. Top, sucking mouthparts of true bug; bottom, chewing mouthparts of a beetle.

Life cycles of insects are very important when it comes to their management in crops. When dealing with crop related insects, there are two types of metamorphosis that are typically found. The other two types are found in groups of insects that are not detrimental to crops in Nebraska.

Gradual Metamorphosis (*Paurometabolous Development*)

In gradual metamorphosis, the immature stages (nymphs) and adults closely resemble each other, except for size (Figure 7). Wings pads develop and grow longer as the nymphs reach full maturity (fifth-instar). With insects that have gradual metamorphosis, both nymphs and adults live in the same habitat and feed on the same kinds of foods or plants. Examples include the orders Blattodea (Cockroaches), Isoptera (Termites), Mantodea (Mantids), Dermaptera (Earwigs), Orthoptera (Grasshoppers and Crickets), and Hemiptera (True Bugs, Aphids, Leafhoppers, etc.).

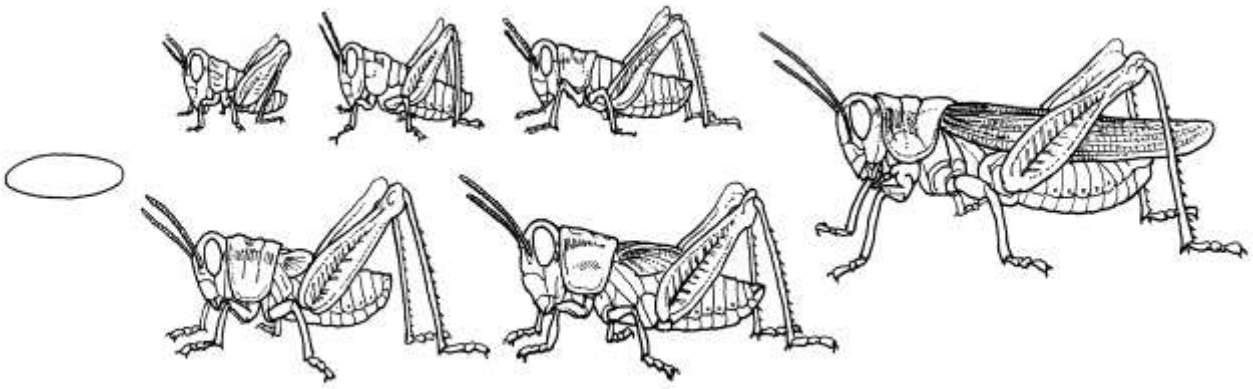

Figure 7. Lifecycle of a grasshopper, demonstrating gradual metamorphosis.

Complete Metamorphosis (*Holometabolous Development*)

Insects with complete metamorphosis pass through four stages of development --- egg, larva, pupa, and adult. The immature stage is called a “larva”, and it is quite different in form than the adult. Larvae in this group are usually soft-bodied and have such names as “caterpillars”, “worms”, “grubs” or “maggots”. Adults are usually winged and quite mobile. The resting stage between the mature larva (last instar) and the adult is called the “pupa” (Figure 8). Within the pupa, which may be protected by a cocoon, capsule or soil, the larval body undergoes a radical transformation to the adult stage. Sometime later, the new adult emerges and rests until its wings fully expand and its body hardens. Examples of insect orders that have complete metamorphosis are Coleoptera (Beetles), Diptera (Flies), Hymenoptera (Bees and Wasps), Lepidoptera (Butterflies and Moths) and Neuroptera (Lacewings and Antlions).

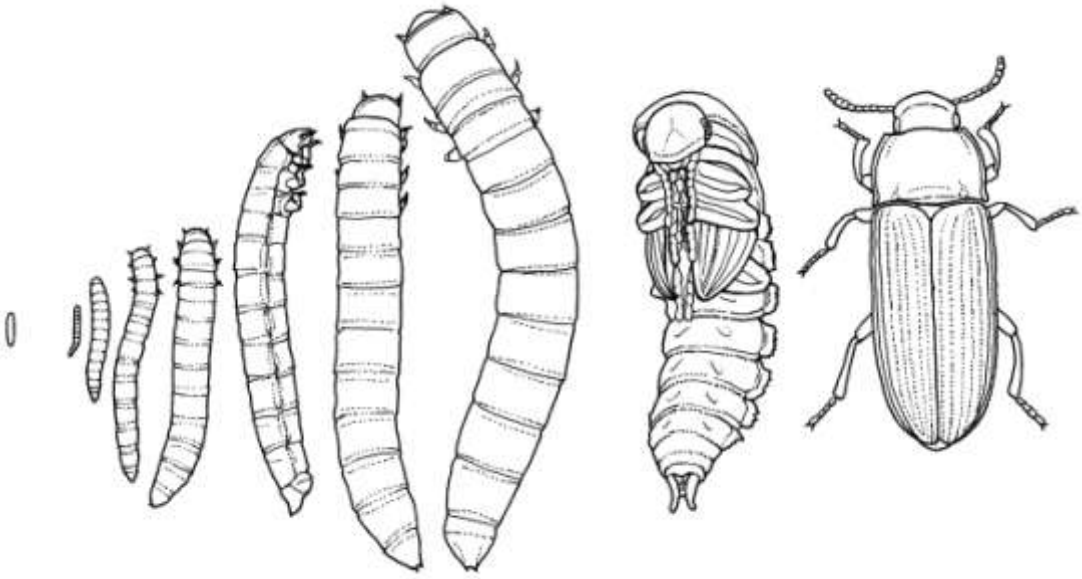

Figure 8. Lifecycle of a beetle, demonstrating complete metamorphosis.

Corn Insect Pest Identification Resources

Corn Insects I. Robert Wright, Terry DeVries, & Jim Kalisch. University of Nebraska-Lincoln Extension Circular EC1572. http://www.ianrpubs.unl.edu/epublic/live/ec1572/build/ec1572.pdf

Corn Insects II. Robert Wright, Terry DeVries, & Jim Kalisch. University of Nebraska-Lincoln Extension Circular EC1573. http://www.ianrpubs.unl.edu/epublic/live/ec1573/build/ec1573.pdf

Corn Insects – Quick Reference Guide. Robert Wright. University of Nebraska-Lincoln Extension Circular EC1562. http://www.ianrpubs.unl.edu/epublic/live/ec1562/build/ec1562.pdf