Correct identification of insect order important for pest control

By Sandra Frost

About 1 million insect species have been described by scientists.

More than 90,000 of them are in North America, and between 10,000 and 15,000 are in Wyoming.

Less than 1 percent of all insect species are serious pests that affect humans, their animals, crops, structures, or fiber.

Scientists distinguish among living organisms based on kingdom, phyla, class, order, family, genus, and species. The insect class is in the animal kingdom, Arthropoda phylum. The class of insects is divided into orders based upon broad characteristics such as mouth parts or life cycle. A successful pest control strategy is based upon correct identification at the order level because pest control strategies commonly target an insect that eats in a particular way or a particular, vulnerable stage of growth.

An insect may have either a simple or complete metamorphosis life cycle. A simple life cycle is

Order Hymenoptera

Order Diptera

egg, nymph, and adult. Nymphs are miniature adults that keep on growing to full size. Grasshoppers are examples of simple metamorphosis. Complete metamorphosis includes four stages: egg, larvae, pupae, and adult. Butterflies (Lepidoptera) are an example of complete metamorphosis.

A short description of orders that include the most common crop and garden insects will help with identification. Life cycle, mouth parts, and wings are useful characteristics for identification.

Coleoptera (beetles, weevils) – These insects undergo complete metamorphosis. Larvae are worm-like. Adults have chewing mouthparts and two pairs of wings. The outer pair of wings is hardened. Pest species include blister beetles, Mexican bean beetle, wireworms, flea beetles, and western corn rootworm.

Dermaptera (earwigs) – These insects undergo simple metamorphosis. Mouthparts are the chewing type. They have short, hardened outer wings and folded, membranous inner wings.

Diptera (flies, mosquitoes, gnats, midges) – Species in this order undergo complete metamorphosis. Larvae may have chewing mouthparts or mouth hooks. Species with mouth hooks are called maggots. Adults have one pair of wings. They have either sponging or piercing mouthparts. Members of this order may be pests (such as mosquitoes or sugar beet root maggot) or beneficial insects (such as parasitic flies that control pests).

Hemiptera (stinkbugs, plant bugs, squash bugs, boxelder bugs) – Metamorphosis is simple in this order. Adults have piercing-sucking mouthparts and two pairs of wings. Adults and nymphs are both damaging in pest species (lygus bug in seed alfalfa). Some species (such as damsel bugs), however, are predators of harmful insect pests (such asaphids).

Homoptera (scale, mealybugs, whiteflies, aphids, leafhoppers) – These insects undergo simple metamorphosis. There can be winged and unwinged adults within the same species. Adults have sucking mouthparts. Many members of this order are carriers of plant pathogens. Homoptera that damage crops include leafhoppers, spotted alfalfa aphid, and Russian wheat aphid.

Hymenoptera (bees, ants, wasps, sawflies, horntails) – These insects undergo complete metamorphosis. Adults have two pairs of membranous wings and generally have chewing mouthparts. Many Hymenoptera are beneficial insects that help control pest species. Two species necessary to crop production are the honey bee and the leaf-cutter bee.

Lepidoptera (butterflies, moths) – Members of this order undergo complete metamorphosis. Larvae are worm-like caterpillars with chewing mouthparts that feed voraciously. Adults have two pairs of membranous wings covered with small scales. The mouthpart is a coiled sucking tube. Adults feed on nectar. Crop pests in the larvae stage include the alfalfa looper, corn earworm, army cutworm, and true armyworm.

Orthoptera (grasshoppers, crickets) – These insects undergo simple metamorphosis. Nymphs resemble small adults and molt four to five times as they grow into adults. Adults have two pairs of wings. Mouthparts are the cutting and chewing type. Grasshopper populations can reach high numbers and damage crops over a wide region.

Order Hymenoptera

Identification of an insect at the order level allows producers to plan integrated pest management strategies based on life cycle and mouthparts. Take an insect sample to a University of Wyoming Cooperative Extension Service educator in your county for complete identification.

Additional resources:

http://ces.uwyo.edu/Entomology.asp

The Wyoming School IPM site www.uwyo.edu/wyschool_ipm/

Reduced Agent and Area Treatments www.uwyo.edu/grasshoppersupport/Html_pages/ghwywfrm.htm

Sandra Frost is a University of Wyoming Cooperative Extension Service educator based in Powell specializing in crop systems. She can be contacted at (307) 754-8836 or sfrost1@uwyo.edu.

Originally published in the Barnyards & Backyards April 2010 newspaper insert. Found at http://insuringsuccess.org