4-H Study Materials for Entomology Contests

January 2003

V. Insect and Arachnid Orders

Class Hexapoda (Insecta)

Insect Characteristics

Most adult insects have:

1. A body divided into three parts (head, thorax and abdomen)

2. Three pairs of legs

3. Usually one pair of antennae and a pair of compound eyes (a few exceptions to these characteristics are found)

4. Usually two pairs of wings (absent in insects such as lice, fleas, ants; flies have one pair of wings)

Insect Orders

The Class Insecta is generally divided into about 30 orders. Many of these orders are of minor importance and are studied only because of scientific interest. Considered here are some of the most important orders likely to be encountered. Many taxonomists (scientists who name organisms) disagree on the number of orders and their names. Thus, this scheme will often vary.

Insect orders are groups of insects that are similar in body structure, type of wing**s**, type of mouthparts, etc., and to some extent, in habits. With approximately 1,000,000 different insect names (species), it is impossible to become familiar with more than a small percentage of them. A fundamental step in insect identification is recognition of order. One should be able to assign nearly all insects to order, with a little study. This placing allows a person to conclude many things about the species from known information about the order.

Each insect order shares a set of characteristic biological and anatomical features. Therefore proper interpretation of mouthparts, leg types, etc., aids in recognition of orders. A good entomologist can recognize common insect orders quickly.

In more advanced entomology, the ability to assign an insect to a family, genus and species becomes necessary. As the insect is assigned to a more precise group, it corresponds more closely to other individuals in that group. Thus, classification helps us become familiar with and organize our knowledge concerning insects. Classification also allows one to use the proper scientific name to correctly look up information about a species (or other group) in a library.

Common Insect Orders

Collembola

Common name: springtails

Metamorphosis: ametabolous

Mouthparts: chewing

Key Characteristics: Collembola are tiny, wingless, with spring-like apparatus on abdomen. They jump by means of a tail-like appendage that folds under the body. The body is elongate or globular, usually microscopic, but sometimes larger than 1/8 inch. They are usually white, but some are yellowish brown or gray.

Biology: Springtails are common in moist locations and in leaf mold. Some species are important pests in greenhouses and mushroom cellars. Springtails are abundant on the soil surface, but are easily overlooked.

Name derivation: Collembola = Latin for “glue” (coll); “wedge” or “bolt” (embola)

Thysanura

Common names: silverfish, firebrats and bristletails

Metamorphosis: ametabolous

Mouthparts: chewing

Key Characteristics: Thysanura are wingless with long antennae and three thread-like filaments at the tip of the abdomen.

Biology: They are usually found in moist locations around houses or under stones and boards outdoors. They run rapidly and hide in cracks and crevices. They are secretive and usually are most active at night. Silverfish can be a nuisance in houses. Occasionally they damage book bindings, curtains, wallpaper etc.

Name derivation: Thysanura = Latin for "fringe-tail"

Ephemeroptera

Common name: mayflies

Metamorphosis: hemimetabolous

Mouthparts: chewing, adults do not feed

Key Characteristics: Ephemeroptera are delicate insects with two pairs (rarely just one pair) of triangular shaped wings with many veins; the front pair is large and the hind pair is small. They have long front legs and two or three long, tail-like appendages. The adults have reduced mouthparts and do not feed.

Biology: Aquatic nymphs live in water and have chewing mouthparts. They do not look like adult mayflies. Adults are common around water, especially in spring, when they often emerge in large numbers. They are an important fish food. Fish eat both the nymphs and adults. Adult mayflies live only for one or two days. They do not feed during their adult life; their purpose is to mate and lay eggs for future generations of mayflies. Mayflies molt once after they have developed wings. Mayflies are the only insect group that molts after the wings are fully developed.

Name derivation: Ephemeroptera = Latin for a “day” or “short-lived” (ephemero); “wings” (ptera)

Odonata

Common names: dragonflies and damselflies

Metamorphosis: hemimetabolous

Mouthparts: chewing

Key Characteristics: Odonata are large insects with two pairs of membranous, many-veined wings; the hind pair is as large as or larger than the front pair. They have large conspicuous eyes and bristle-like antennae.

Biology: Young live in water and are not like the adults. Adults are common around ponds, lakes and streams. Both adults and aquatic nymphs feed on insects. They are beneficial, because they feed to some extent on mosquitoes and other small flies. Dragonflies and damselflies can hover like a helicopter or fly and dart around rapidly. They have been called "mosquito hawks" and "snake doctors."

Name derivation: Odonata = Greek word meaning “tooth”

Plecoptera

Common name: stoneflies

Metamorphosis: hemimetabolous

Mouthparts: chewing, many of the adults do not feed

Key Characteristics: Plecoptera are large, soft-bodied insects that are from 1/2 inch to 2 inches long. They have four wings that fold flat over the back; the hind wings fold like a fan and are much larger than the front wings. Antennae are long, and there are two long, tail-like appendages at the tip of the abdomen.

Biology: Aquatic nymphs live under stones in rapidly running streams. Adults are found on stones or plants near streams and are attracted to lights. These soft-bodied insects are difficult to find. They are sometimes abundant in early spring near a stream.

Name derivation: Plecoptera = Latin for “folded” (pleco); “wings” (ptera)

Orthoptera

Common names: grasshoppers, crickets, katydids

Metamorphosis: paurometabolous

Mouthparts: chewing

Key Characteristics: Orthoptera have long antennae and various leg modifications. They generally have two pairs of wings with many veins. The front pair is usually slender and the hind pair is broad and fan-like. Wings are reduced to small pads in some grasshoppers and crickets.

Biology: Nymphs resemble adults. Adults in several groups in this order never develop wings. These include such odd insects as the cave crickets. The order Orthoptera is a large one. Some members of this group are quite destructive to crops (grasshoppers).

Name derivation: Orthoptera = Latin for “straight” (ortho); “wings” (ptera)

Blattaria

Common name: cockroaches

Metamorphosis: paurometabolous

Mouthparts: chewing

Key Characteristics: Blattaria are cursorial (adapted for running) and move rapidly. They have flattened bodies and a head concealed from above by the pronotum. They have two pairs of wings, but in some species the wings are greatly reduced.

Biology: Cockroaches are somewhat general feeders, but prefer materials high in fats and starches. They deposit their eggs in a capsule called an ootheca. Several species invade homes where they can contaminate food. They have an unpleasant odor and can be very annoying.

Name derivation: Blattaria = Greek word meaning “shuns light”

Mantodea

Common name: mantids or preying mantids

Metamorphosis: paurometabolous

Mouthparts: chewing

Key Characteristics: Mantodea are large, elongate and slow-moving insects. Their front legs are greatly modified for grasping prey.

Biology: They are predaceous on a large variety of insects and other arthropods. They usually wait motionless for their prey to venture within striking distance. Mantids are well known as biological control agents. However, they do not distinguish between useful and destructive species, but feed on any insects that come near.

Name derivation: Mantodea = Greek word meaning “soothsayer”

Phasmida

Common names: walkingsticks, leaf insects

Metamorphosis: paurometabolous

Mouthparts: chewing

Key Characteristics: Phasmida have elongate bodies.

Biology: Walkingsticks are slow moving and are generally found on trees or shrubs. Walkingsticks are able to regenerate lost legs. These insects have chewing mouthparts and feed on foliage. Our species are wingless as adults. However, some tropical forms are winged and are called leaf insects.

Name derivation: Phasmida = Latin word meaning “phantom”

Dermaptera

Common name: earwigs

Metamorphosis: paurometabolous

Mouthparts: chewing

Key Characteristics: Dermaptera are medium-sized insects usually with four wings. The front pair is short, leaving the abdomen exposed. The hind wings are folded under these. A pair of non-poisonous pinchers is found at the end of the abdomen.

Biology: Usually they are found hiding under leaves, boards or in cracks outdoors during the day. Earwigs can be destructive in greenhouses. They release a bad-smelling substance when disturbed.

Name derivation: Dermaptera = Latin for “skin” (derma); “wings” (ptera)

Isoptera

Common name: termites

Metamorphosis: paurometabolous

Mouthparts: chewing

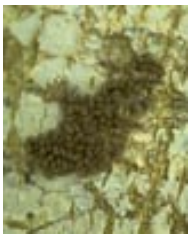
Key Characteristics: Isoptera have bead-like antennae, wings absent or present, and membranous wings similar in size, shape, and pattern when present. They are small, soft-bodied, yellowish or whitish insects that live in colonies in wood. Colonies consist of three castes: workers, soldiers and swarmers. Workers and soldiers are wingless and never leave the colony. Swarmers, or the reproductive forms, have dark bodies and four long, many-veined wings.

Biology: Swarmers leave the colonies on sunny days to mate and search for new homes. Termites have chewing mouthparts and feed on wood. Termites are important to man. They do millions of dollars in damage to houses each year.

Termites digest wood with the help of enzymes in their intestines.

Name derivation: Isoptera = Latin for "equal" (iso); "wings" (ptera)

Psocoptera



Common names: psocids, booklice, and barklice

Metamorphosis: paurometabolous

Mouthparts: chewing

Key Characteristics: Psocoptera are tiny insects that have either four wings or none at all.

Biology: Booklice are found around old books, papers and in damp, dark rooms. Those with wings are called psocids (pronounced so-sids). Most live out of doors and are found resting in soil litter, around vegetation or on stones, logs and fences. They are rather uncommon but may be locally abundant. Some booklice feed on stored grains while others are library pests. They are microscopic to 1/4 inch in size.

Name derivation: Psocoptera = Latin for rubbed "small" (psoco); "wings" (ptera) (This refers to the gnawing habits of these insects.)

Phthiraptera

Common name: lice

Metamorphosis: gradual

Mouthparts: chewing or sucking

Key Characteristics: Phthiraptera are wingless parasites that live on most birds and mammals. They are small, flat, wingless, parasitic insects with short legs and short antennae. They are about 1/6 to 3/16 inch long when mature. Phthiraptera are divided into two suborders: Mallophaga or chewing lice and Anoplura or sucking lice.

Biology: Chewing lice feed on bits of hair, feathers or skin of the host. Lice deposit their eggs on the hair or feathers of the host. They are important pests of domestic birds and animals, but they do not live on humans.

Sucking lice feed mainly on blood. These insects are found commonly on domestic animals, but not on birds. They feed by sucking blood and are important pests of domestic animals and humans. Eggs are laid on individual hairs and the eggs are called "nits". The human body louse has been responsible for millions of human deaths through the centuries. They spread the organism causing epidemic typhus from one person to another.

Name derivation: Phthiraptera = "lice" (phthir); "without" (a); "wings" (ptera)

Mallophaga = Latin for “wool” (mallo); “eat” (phaga)

Anoplura = Latin for “unarmed” (anopl); “tail” (ura)

Hemiptera

Common name: bugs or “true bugs”

Metamorphosis: paurometabolous

Mouthparts: piercing-sucking

Key Characteristics: Hemiptera have a beak arising from front of the head, long antennae, and two pairs of wings (in most adults). Hemiptera usually have four wings held flat over the body. The front pair are thickened and leathery at the base with membranous tips or ends and called hemelytra.

Biology: They are found on plants and animals, or in water. Some bugs cause considerable plant damage by their feeding. Some are beneficial because they prey on other insects.

Name derivation: Hemiptera = Latin for “half” (hemi); “wings” (ptera)

Thysanoptera

Common name: thrips

Metamorphosis: paurometabolous

Mouthparts: piercing-sucking (sometimes referred to as rasping-sucking)

Key Characteristics: Thysanoptera are wingless or winged with 4 narrow, strap-like fringed wings. They are tiny insects about 1/8-inch long. Legs and antennae are short.

Biology: Surfaces are rasped by the mouthparts and the juices sucked up. Immature stages resemble the adults. Some of the insects feed on plants; others prey on small insects. Those that feed on plants are frequently injurious in greenhouses or on vegetable crops. They will also bite humans but only cause momentary discomfort.

Name derivation: Thysanoptera = Latin for "fringe” (thysano); “wing"(ptera)

Homoptera

Common names: leafhoppers, scale insects, aphids, planthoppers, cicadas, whiteflies, mealybugs

Metamorphosis: paurometabolous

Mouthparts: piercing-sucking

Key Characteristics: Homoptera have a beak arising from the rear of the head and wings membranous when present. They may or may not have wings. All have sucking mouthparts. When present, there are four wings which are held roof-like over the body and are usually membranous. Cicadas and leafhoppers all have wings. Aphids may or may not have wings and are small, typically with a pair of projections (cornicles) arising from the fifth or sixth abdominal segment. Scale insects are wingless; live on branches, roots and leaves; and move around little, if any, after beginning to feed. The body is covered with a hard or waxy covering. Mealybugs are usually wingless, whitish or gray in color, covered with a waxy substance, and move slowly. Mouthparts arise from the hind part of the head. Leafhoppers, aphids, etc. have many shapes and sizes. Some species in the order Homoptera give birth to living young.

Biology: All Homoptera feed on plants.

Name derivation: Homoptera = Latin for “uniform” (homo); “wings” (ptera).

Neuroptera

Common names: lacewings, antlions, and dobsonflies

Metamorphosis: holometabolous

Mouthparts: chewing

Key Characteristics: Neuroptera have membranous wings with numerous veins, and long antennae. They are rather fragile insects with two pairs of many-veined wings of about the same size. Antennae are long. Chewing mouthparts occur in adults, but some larval mouthparts are modified for grasping and sucking.

Biology: Immature stages are predaceous. Lacewings and their immature forms, known as aphid lions, are the most common insects in this order, and both feed on aphids. Adult green lacewings can be found throughout the year. They are considered beneficial, because they feed on other insects. Immature ant lions are called "doodlebugs", and they form pits in dry, dusty soil.

Name derivation: Neuroptera = Latin for “nerve” or net referring to the many wing veins (neuro); “wings” (ptera)

Coleoptera

Common names: beetles, weevils

Metamorphosis: holometabolous

Mouthparts: chewing

Key Characteristics: Coleoptera have the front pair of wings (elytra) hard and shield-like, meeting in a straight line down the middle of the back. They usually have two pairs of wings. The hind wings are membranous and are folded under the front wings when at rest.

Biology: Immature stages are grub-like or worm-like and the insects pass through a pupal stage before becoming adults. Food habits are varied. Some feed on living plants; some are predaceous; some are scavengers; and some bore in wood. This order includes some of the best-known and most important insect pests. Most of the members are terrestrial, but some are aquatic. Coleoptera is the largest order, including about 1/4 of all known insects or about 280,000 different species. Perhaps the most famous members of this group are lady beetles and the cotton boll weevil.

Name derivation: Coleoptera = Latin for “sheath” (coleo); “wings” (ptera)

Mecoptera

Common name: scorpionflies

Metamorphosis: holometabolous

Mouthparts: chewing

Key Characteristics: Mecoptera are small to medium-sized insects with four long, narrow wings and long antennae. They have chewing mouthparts located at the end of a broad, flat snout which is two or three times as long as the head is wide.

Biology: Scorpionflies are harmless and are so named because some of the males have the end of the abdomen enlarged which makes it look like the stinger of a scorpion. Scorpionflies are usually found only during a two- or three-week period in the summer. These insects are found resting on plants that grow along the banks of streams and in damp woods. The larvae are like caterpillars and live in damp soil. Adults usually feed on dead insects. Some species capture live insects. The adults sometimes are attracted to lights. Scorpionflies are seldom common.

Name derivation: Mecoptera = Latin for “long” (meco); “wings” (ptera)

Trichoptera

Common name: caddisflies

Metamorphosis: holometabolous

Mouthparts: chewing, adults do not feed

Key Characteristics: Trichoptera have long antennae, four hairy wings (folded tent-like over their body) and resemble small, dull-colored moths. They are soft-bodied insects as adults and larvae. Larvae resemble caterpillars with few hairs.

Biology: Adults are common around streams. Adults do not feed and have reduced, non-functional mouthparts. Larvae live in water and most build cases to enclose their bodies. Larvae are scavengers, herbivores or predators with chewing mouthparts.

Name derivation: Trichoptera = Latin for “hairy” (tricho); “wings” (ptera)

Lepidoptera

Common names: butterflies, skippers, and moths

Metamorphosis: holometablous

Mouthparts: siphoning as adults, chewing as larvae

Key Characteristics: Lepidoptera usually have four well developed wings covered with overlapping scales. Mouthparts of the adults are formed for sucking. Immature stages (larvae) are worm-like. Some are known as caterpillars, cutworms or hornworms; and their mouthparts are formed for chewing.

Biology: This is one of the best-known orders of insects and contains some of our most important pests, such as the codling moth, armyworm, clothes moth and cabbageworm. Most of the caterpillars feed on leaves of plants, while others bore in plant stems and still others are leafminers.

Name derivation: Lepidoptera = Latin for “scale” (lepido); “wings” (ptera)

Diptera

Common names: flies, midges, gnats, mosquitoes

Metamorphosis: homometabolous

Mouthparts: piercing-sucking, cutting-sucking, cutting-lapping, and sponging

Key Characteristics: Diptera are usually winged, but have only one pair of wings with few veins. Hind wings are represented by a pair of slender, knobbed structures called halteres that are reduced in size and sensory in function. Mouthparts are formed for sucking or piercing and sucking. Fly larvae are known usually as maggots; they are entirely unlike the adults. Flies occur in many shapes and sizes.

Biology: Diptera is a very important group. The order includes forms that are parasitic, predaceous and others that live on either living or dead plant or animal material. Other members of the order cause much damage to crops. Many harmful flies, such as mosquitoes, spread diseases (such as yellow fever and malaria) and are responsible for millions of human deaths. Because many of the species carry diseases, this is one of the most important orders from the standpoint of human health.

Name derivation: Diptera = Latin for “two” (di); “wings” (ptera)

Siphonaptera

Common name: fleas

Metamorphosis: holometabolous

Mouthparts: piercing-sucking

Key Characteristics: Siphonaptera are small, wingless, flattened from side to side, and have jumping hind legs. Spines on the body point to the rear of the insect which allows them to move through the hair of an animal easily. The immature or larval stage is worm-like, quite different from the adults. Larvae are found in the nests of various animals.

Biology: Fleas are well known as pests of domestic animals and humans. One species transmits the bacterium that causes plague. Plague has killed more than 125,000,000 people during the past 3,000 years. These insects suck blood only as adults. They usually feed on animals but will attack humans.

Name derivation: Siphonaptera = Latin for “tube” (siphon); “wingless” (aptera)

Hymenoptera

Common names: ants, bees, wasps, sawflies, horntails

Metamorphosis: holometabolous

Mouthparts: chewing, chewing-lapping

Key Characteristics: Hymenoptera have membranous wings with few veins and the front pair larger than the hind pair. Some individuals are wingless. Mouthparts are formed for chewing or for both chewing and sucking. The body is usually constricted greatly between the abdomen and thorax. Immature stages are maggot-like or caterpillar-like and are entirely different from the adults.

Biology: Habits of these insects are varied: some are predaceous, some are parasitic, some cause plant galls, and some feed on plant foliage. Others, such as bumble bees and honey bees eat plant pollen and nectar. This order includes some of our most harmful, as well as some of our most beneficial insects. The abdomen in the females is usually furnished with a stinger. These insects have a painful sting and should be avoided if possible.

Name derivation: Hymenoptera = Latin for “membrane” (hymeno); “wings” (ptera)

Class Arachnida

Common names: ticks, mites, spiders, scorpions, windscorpions and various others

Arachnid characteristics include:

1. A body divided into two parts (cephalothorax and abdomen)

2. Four pairs of legs

3. No antennae

4. No wings

Common Arachnid Orders

Acari

Common names: ticks, mites, chiggers

Metamorphosis: There are usually four stages; egg, larva, nymph and adult. (The terms larva and nymph are not used the same here as for insects.) No metamorphosis is present because adults resemble young and no wings are present.

Mouthparts: piercing-sucking mouthparts

Key Characteristics: Ticks and mites are wingless, lack antennae and usually have flat or round bodies. Adults have

eight legs, although some immature stages have only six legs. Many are microscopic.

Biology: Ticks only feed on blood of animals. Ticks are responsible for spreading disease organisms such as the organism that causes Rocky Mountain spotted fever in man and cattle fever in cattle.

Name derivation: Acari

Araneae

Common name: spiders

Metamorphosis: The stages are eggs, young (often called spiderlings) and adults.

Mouthparts: Mouthparts are a pair of chelicerae, each with a piercing tooth. Chelicerae are used to manipulate captured prey but all food intake is liquid.

Key Characteristics: Spiders are wingless and lack antennae. Most have six or eight eyes and bodies variable in size and shape. Young and adults have eight legs and a pair of palpi by the mouth. Size ranges from 1/8 inch to more than four inches.

Biology: Palpi are used much like antennae in insects and in males are used during mating. Most spin webs of various sorts to capture prey or as a refuge. All spiders are beneficial predators. A few such as the widow spiders and recluse spiders are poisonous and should be avoided. There are about 900 species of spiders in Texas and only a few are mentioned here.

Name derivation: Araneae

Scorpionida

Common name: scorpions

Metamorphosis: simple - egg, young and adults

Mouthparts: chewing

Key Characteristics: Scorpions are wingless, have no antennae and have bodies that are broad near the front and taper to a tail. The tail has a sting at the tip and is often held over the body. All scorpions can sting, but only a few are deadly poisonous. Front appendages are enlarged into pincers. They are often found under loose bark of logs or under trash piles. Size ranges from one inch to three inches.

Biology: Scorpions are easily recognized by the pincers on the first set of appendages (pedipalps), the long tail with a stinger at the end and the flattened appearance of the body. They have four pairs of walking legs. Scorpions have two eyes on the top of the head region and usually two to five along the side of the head. Nevertheless, they do not see well and rely more on the sense of feel for most of their activities. Between the last pair of legs is a comb-like structure of pectines used to identify substrate structures and for chemoreception of pheromones. There are about 18 species of scorpions in Texas. any of these are uncommon or are known only locally. *Centruroides vittatus* is the only species reported from the eastern half of the state. The number of species increases in the western parts of the state with most species (14) reported in the Big Bend region.

Name derivation: Scorpionida

Solifugae

Common name: sunspiders, but also called windspiders, sunscorpions, windscorpions

Metamorphosis: simple - egg, young and adults

Mouthparts: The mouthparts (chelicerae) of windscorpions are formed into large jaws that work vertically and project forward from the mouth. The shape of the head with its enormous jaws is quite distinctive.

Key Characteristics: Windscorpions are 3/8 to 2 inches long. Most are yellowish to brown, and have four pairs of legs. The pedipalps are thin and used like feelers. The first pair of legs are more slender than the others and act as sense organs. The males often have a more slender body, which is often longer than in the females. With their longer legs, males look bigger.

Biology:

Name derivation: Solifugae

Uropygi

Common name: whipscorpion or "vinegaroon"

Metamorphosis: simple - egg, young and adults

Mouthparts: Whipscorpions have heavy mouthparts (pedipalps) that are formed into pincers

Key Characteristics: The first pair of legs is long and thin and is used like antennae to feel their way around. The next three pairs of legs are used for walking. The abdomen is attached widely to the head-thorax region (cephalothorax). The tail is long and thin suggesting a whip which is where the common name, "whipscorpion", originates.

Biology: The only species that occurs in Texas is *Mastigoproctus giganteus* (Lucas) which is a vinegaroon in the family Thelyphoridae. Our Texas species is nearly black. Bodies of adults are 1 to 3 inches long. It is found primarily in west Texas especially in the Trans-Pecos region but has been reported as far north as the Panhandle and in south Texas.

Name derivation: Uropygi

Opiliones

Common name: harvestmen

Metamorphosis: simple - egg, young and adults

Mouthparts: weak chewing mouthparts

Key Characteristics: Harvestmen have a globular body. They can be separated from spiders which have two distinct body segments because harvestmen have the entire body as one unit. The abdomen is distinctly segmented and the two eyes are mounted on a large dorsal tubercle on the top surface of the body (carapace). While most species have extremely long spindly legs, there are species with shorter legs.

Biology: Worldwide, there are 37 families of harvestmen. Eighteen species are reported from Texas. Members of only one family, Phalangiidae, are properly referred to as "daddy longlegs."

Name derivation: Opiliones

Class Chilopoda

Common name: centipedes

Metamorphosis: simple - egg, young and adults

Mouthparts: piercing and chewing mouthparts

Key Characteristics: Centipedes can easily be distinguished from millipedes by counting the number of pairs of legs arising from most body segments. Centipedes have one pair of legs per body segment, with the first pair of legs being modified into fangs. Centipedes are generally flattened and have a pair of well-developed antennae on the head.

Biology: Centipedes are generally predators which feed on insects and other arthropods. They pierce the prey to kill or disable it. They are active mostly at night and they can move quickly. One large species in Texas in the genus *Scolopendra* is large enough to be a hazard to humans.

Name derivation: Chilopoda

Class Diplopoda

Common name: millipedes

Metamorphosis: simple - egg, young and adults

Mouthparts: chewing

Key Characteristics: Millipedes have two or more pairs of legs per body segment. The body is generally rounded but some species have extensions on each segment.

Biology: Millipedes are usually scavengers on dead arthropods and organic matter. They are active mostly at night and usually are slow-moving. Millipedes can be a nuisance when they enter homes.

Name derivation: Diplopoda

Class Malacostraca

Order Isopoda

Common name: sowbugs and pillbugs

Metamorphosis: simple - egg, young and adults

Mouthparts: chewing

Key Characteristics: Adults grow to about 3/8 inch long, have a number of rounded body segments and seven pairs of legs. Sowbugs possess a pair of tail-like structures on the back end of the body. Pillbugs do not have these structures and are capable of rolling into a tight ball when disturbed, a behavior that resulted in their common name, "roly-polyes."

Biology: Sowbugs and pillbugs are generally scavengers. They prefer moist habitats with organic matter. They hide during the day under rocks, boards, or other structures.

Name derivation: Isopoda

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