Common Beetles (Order Coleoptera) in the Wichita Mountains and Surrounding Areas

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Introduction

The beetles belong in the Kingdom Animalia, Phylum Arthropoda, Class Hexapoda (Insecta), Order Coleoptera. Of the 158 families of Coleopteran known to occur in the U.S., 17 are mentioned in this guide. Note that the family name for plants and animals, including insects, always ends in "ae." The Coleoptera is the largest insect order, with about 350,000 species described worldwide. Of the estimated 92,000 species of insects recorded in the United States and Canada, approximately 24,000 are beetles. This guide makes reference to only a few of the more common and conspicuous beetles found in the area. The numbers of genera and species given for each family are based on Arnett (1993).

The scientific name of an organism, whether plant or animal, consists of the genus and species, written in *italics*. The genus is writen in full the first time that it is mentioned in a paper (e.g. *Hippodamia convergens*). Thereafter, the genus name is abbreviated to its initial (e.g. *H. convergens*). If another genus with the same initial is being discussed in the same section, both genera are spelled out to avoid confusion. Often, the genus name is written, followed by sp. (for one species) or spp. (for more than one species). For example, *Hippodamia* sp. indicates that a beetle belongs to the genus *Hippodamia*, but the writer is not sure about the species. *Hippodamia* spp. means that the writer is referring to two or more species in this genus.

Considering the large size of the Coleoptera, few beetles have common names recognized by the Entomological Society of America. Those which do are often agricultural, forest, or stored grain pests, such as the Colorado potato beetle, cotton boll weevil, confused flour beetle, and Japanese beetle, all of which have been extensively studied by entomologists. Relying on only common names at the species level may lead to confusion, since more than one common name may exist for the same species, or the same name may be used for more than one species. Using the scientific name, which is the same in any language or region, eliminates this problem. Furthermore, only scientific names are used in the scientific literature. Common names are not capitalized.

Figure 1. A rainbow scarab

Body form and structure (morphology)

The body of a beetle consists of three well-defined regions, the head, thorax, and abdomen. Head appendages consist of a pair of antennae, two compound eyes, three simple eyes (the ocelli), and the mouthparts. The mouthparts consist of a pair of opposable mandibles, a pair

of maxillae, an upper labrum, and a lower labium. The mandibles in beetles are designed for biting. In general, the head points straight forward in predaceous beetles and downward in plant feeding species. The antenna shape, length, number of segments, and presence and form of a terminal club are features used to identify beetle families.

The thorax in insects consists of three segments, the prothorax (anterior segment, next to the head), mesothorax (middle segment), and metathorax (posterior segment, contiguous to the first abdominal segment). The dorsal sclerite (hardened plate) of the prothorax is known as the pronotum. The mesonotum and metanotum are the dorsal sclerites of the mesothorax and metathorax, respectively.

A pair of legs arise from each thoracic segment, each consisting of six articulated segments. Starting with the one attached to the thorax, these segments are the coxa, trochanter, femur, tibia, tarsus, and pretarsus or claws. Depending on the family, the tarsus may have 3, 4, or 5 segments. The number of tarsal segments is another feature used to identify families. For instance, a tarsal formula of 5-5-4 indicates that the anterior and middle pair of legs have five tarsal segments each, while the posterior pair has only four.

A pair of wings arise from the mesothorax and a second pair from the metathorax. In most beetles the anterior wings are hardened, forming a case that covers and protects the posterior membranous wings and the abdomen. These hard wings are known as the elytra. Each wing is an elytron. Most beetles can fly using their membranous wings.

Beetles undergo a full metamorphosis, passing through egg, larval, and pupal stages before becoming adults. The developing larva molts five to eight times before it is ready to pupate. Each larval stage between molts is known as an instar. For instance, a newly hatched larva is a first instar larva. Depending on the species and weather conditions, the larval stage may take from a few weeks (most species) to as long as 2-3 years (some of the larger scarabs) to complete. The pupal stage takes from weeks to months before the adult emerges.

The larval morphology can be highly variable, especially at the family level. However, all have a well-developed head with functional mandibles, most have well developed thoracic legs, and none has abdominal false legs. For instance, ground beetle and rove beetle larvae are elongate, rather cylindrical, and highly mobile. The larvae of lady beetles are active, their body narrows posteriorly, and their legs are rather long and protrude sideways. Scarab beetle larvae are c-shaped and have well-developed legs. The larvae of weevils or snout beetles are also c-shaped, but legless. Those of wood-boring beetles are mostly legless, rather flat and broad anteriorly, and elongate and cylindrical posteriorly. Darkling beetle and click beetle larvae are elongate and cylindrical, with short, but well-developed legs, and often with hardened skin.

Beetles are found in all biotic communities, including deserts, grasslands, savannas, chaparral, and forests, as well as in croplands, backyards, gardens, and disturbed areas. Some families are aquatic and found in lakes, ponds, and other fresh water bodies. Some species are agricultural pests and others infest stored grain and other products.

Food habits - The food of coleopterans is highly diverse. Plant feeding species may feed on leaves, stems, fruit, flowers, seeds, or roots. The larvae of several families, including Buprestidae and Cerambycidae, develop in living and dead

wood, attacking most forest trees. Predaceous species feed on smaller insects and spiders. Their prey is often specific at the family level. For instance, larvae and adults of most lady beetles (Coccinellidae) prey on aphids. Other lady beetles feed exclusively on plant-eating mites. The large ground beetles (Carabidae) prey on caterpillars and other insect larvae.

The adults and larvae of several species of aquatic beetles prey on the larvae of other aquatic insects. The larvae of some scarab beetles feed on animal dung that females bury for their offspring. The larvae and adults in the family Silphidae feed on carrion and on carrion feeding insects, including fly eggs and larvae. Some species in the families Dermestidae, Staphylinidae, and Scarabaeidae also feed on carrion or on carrion feeding insect larvae. Along with blow flies (Calliphoridae) and flesh flies (Sarcophagidae), beetles found in carrion play a role in forensic investigations.

Some species can be major agricultural pests, damaging field, vegetable, and fruit crops; stored grain and other stored products, forest trees, and lumber. Some dermestid beetles can destroy animal and plant museum specimens, including insect collections. On the other hand, several lady beetles (Coccinellidae) and ground beetles (Carabidae) have been used as biological control agents. Integrated pest management programs targeting aphids, scale insects, moth larvae, and various other crop pests depend largely on the protection and augmentation of predaceous and parasitic insects.

This guide describes some of the more common and conspicuous beetles found in the Wichita Mountains and surrounding areas. All photos in this guide were taken by the author using a Canon PowerShot SX110 IS camera.

Family Cicindelidae (tiger beetles)

Tiger beetles have large, bulging eyes, and long, thin legs. The head is wider than the pronotum, and the hind margin of the pronotum is narrower than the base of the elytra. Both adults and larvae are predaceous. Their large, sharp mandibles are designed to grasp prey. In the adult each mandible is also outfitted with a row of sharp teeth. Tiger beetles are usually found in areas with sparse vegetation and sandy soil.

Tiger beetles are active diurnal hunters, and can often be seen running on the ground in search of small insects and spiders. If approached, they quickly run or fly away a short distance, keeping a safe distance from the observer. They are seldom still, and capturing or photographing them is a challenge. Some species are metallic blue or green, often with light spots. Most tiger beetles are about ½ inch long, but the two species in the genus *Megacephala* are about ¾ inch long, and the Great Plains giant tiger beetle, *Amblycheila cylindriformis,* reaches 1.5 inches.

The larva lives in a vertical burrow that it digs in sandy or sandy loam soil. It keeps its flat head flush with the ground, blocking the opening. When a small insect or spider approaches, it leaps at it, often backward, and quickly seizes it with its sickle-shaped mandibles. A dorsal hump on the fifth abdominal segment anchors the body to the burrow wall, making it difficult to be pulled out by a predator or a strong prey.

Of 100 or so tiger beetle species found in the U.S. and Canada, about 80 are in the genus *Cicindela*. The six-spotted tiger beetle, *C. sexguttata*, is one of the most common in our area. It is shiny metallic green, with three or four small white spots on each elytron (Fig. 2).

Figure 1. Six-spotted tiger beetle

Cicindela punctulata is dull, dark grey, some times with a bronzy tinge. There are four cream colored spots on each elytron and a row of minute bluish dots along the inner margin (Fig. 3). It is fairly common in areas free of vegetation.

Figure 3. *Cicindela punctulata*

Cicindela scutellaris has large protruding eyes, metallic green pronotum, and mostly metallic coppery elytra. This species is unusually hairy, with white hairs along the legs and sides of the pronotum, that, under magnification give it a bearded appearance (Fig. 4).

The Virginia tiger beetle, *Megacephala* (= *Tetracha*) *virginica* is unusually large (¾ inch long) for a tiger beetle. Its color varies from metallic blue-green to almost black, with tan legs and antennae (Fig. 5). It is nocturnal, rather secretive, and seldom flies. Although not uncommon, it is not often seen.

Figure 4. *Cicindela scutellaris*

Figure 5. Virginia tiger beetle

Family Carabidae (ground beetles)

Most ground beetles are shiny black, often with several longitudinal striations or ridges along the elytra. A few species are colorful. Body length varies from a fraction of an inch to 1½ inches. The head is often narrower than the pronotum, the mandibles are strong and sharp, and the antennae are filiform (thread-like). Most adult and immature carabids, are predaceous. The larva is elongate, with well developed thoracic legs, and head provided with sharp mandibles that point forward. With 150 genera and about 1,700 species in the U.S., carabids are among

the most common beetles that are often seen running rapidly on the ground in search of prey. Most species are nocturnal, and in the daytime may be found under logs, in leaf litter, and under plants that hug the ground. The larvae live in soil, leaf litter, decomposing wood, and accumulated organic matter, where they prey on soft-bodied insects.

Among the more common larger species in the area are *Calosoma scrutator*, *Carabus* sp., *Pasimachus elongatus*, *Harpalus caliginosus*, and *Scarites* sp. These beetles are especially noticeable because of their large size (3/4 - 1 ¼ inches long). All prey on insect larvae and pupae, especially those of Lepidoptera.

Of the 40 or so species of *Calosoma* in the U.S., the caterpillar hunter, *C. scrutator* (Fig. 6), is one of the largest and most colorful. It is about 1¼ inches long and may live up to three years. The body is black, the legs are dark blue, the center of the pronotum is dark blue with a golden border, and the elytra are bright metallic green. The relatively small head is armed with strong and sharp mandibles.

Figure 6. Caterpillar hunter, *Calosoma scrutator*

Most other species of *Calosoma*, including at least one other found in this area (Fig. 7), are black and about one inch long. In late spring, these diurnal beetles can be seen on the ground actively searching for cutworms and other caterpillars. If handled, *Calosoma* beetles secrete a foul-smelling liquid from the tip of the abdomen. The smell persists for a while and acts as a deterrent against potential predators.

Figure 7. *Calosoma* sp.

The caterpillar hunter larva (Fig 8) preys on a variety of soft-bodied insect larvae. It is most commonly found under leaves, bits of bark, and similar plant debris, but occasionally may be seen crawling rapidly on bare ground.

Figure 8. *Calosoma scrutator* larva

The nearly 100 species of beetles in the genus *Harpalus* in the United States and Canada are mostly shiny black, with well defined striations on the elytra. The species shown in Fig. 9 is likely *H. caliginosus*, and one of the largest in

the genus. This beetle is about one inch long and fairly common in our area.

Figure 9. Ground beetle, *Harpalus* sp.

Carabus sp. (Fig. 10) superficially resembles a black *Calosoma*, but the pronotum is broader relative to the head, and its lateral margins extend farther out and upward. In both *Calosoma* and *Carabus* the head is only half as wide as the base of the pronotum. *Carabus* sp. is about one inch long.

Figure 10. Ground beetle, *Carabus* sp.

Scarites sp. is a black, rather flat beetle, with long mandibles and a well-defined narrow "waist" that separates the thorax from the abdomen (Fig. 11). It is ¾ -1 inch long, and is commonly found on moist soil under rocks, bricks, and logs in urban and rural areas. When uncovered, it freezes for several seconds, keeping the thorax slightly raised, before escaping in search of cover.

Figure 11. Ground beetle, *Scarites* sp.

Pasimachus sp. (Fig. 12) is black, has a broad head, very large mandibles, and a pronotum that is almost as large as the abdomen. This large ground beetle is 1-1¼ inches long.

Figure 12. Ground beetle, *Pasimachus* sp.

Family Staphylinidae (rove beetles)

With over 300 genera and 3,000 species, the Staphylinidae is the largest beetle family in the U.S. Rove beetles are unique in that their short elytra only cover part of the abdomen, leaving the last five or six abdominal segments exposed. Most are black and all have a long, slender body that ranges from a fraction of an inch to slightly over one inch in length. The thin antennae end

in a club. When disturbed, they tend to run with the tip of the abdomen raised. Rove beetles are good fliers.

The larva has a long, thin body, with rather long thoracic legs and sharp mandibles. Adults and larvae are commonly found in humid habitats, such as carrion, manure, rotting wood, and other decomposing plant material. Depending on the species, adults and larvae can be mainly predators, scavengers, carrion feeders, or omnivores. *Platydracus maculosus* (Fig. 13) is about ¾" long and one of the largest rove beetles in the area. It is often found on carrion, feeding on fly larvae.

Figure 13. Rove beetle, *Platydracus maculosus*

Family Silphidae (carrion beetles)

This small family consists of some 40 species in the U.S. and Canada. Most carrion beetles are grey or dull black and have a flat and oval shape. A few also have orange markings. Most are 0.5 - 1 inch long, with distinctly clubbed antennae. Carrion beetles in the genus *Nicrophorus* have an elongate body and short elytra that leave one or more abdominal segments exposed. These beetles are attracted to animal carcasses, which provide food and shelter to their larvae. The large and striking American burying beetle, *N. americanus*, is one of the few insects listed in the U.S. federal endangered species list. It was formerly found throughout the eastern half of the U.S., but now its geographic range is limited to eastern Oklahoma and three other states, or about 10% of its original range.

Oiceoptoma inaequalis (Fig. 14) is one of the most common carrion beetles in our area. It colonizes fresh carcasses, usually arriving soon after blow flies. The larva is flat and elliptical, wider anteriorly and tapering toward the back (Fig. 15). Depending on their time of arrival, fly and beetle larvae may compete for limited resources. Initially the beetles may feed on fly eggs and larvae, which provides nourishment to the beetles and ensures that more carrion will be available to their offspring. The larvae feed exclusively on carrion.

Figure 14. Carrion beetle, *Oiceoptoma inaequalis*

Figure 15. Carrion beetle, *Oiceoptoma inaequalis* larva

Family Passalidae (bess or peg beetles)

The horned passalus, *Odontotaenius disjunctus*, (Fig. 16) is one of three species of peg beetles found in the U.S. It is widely distributed and is common in our area. This beetle is 1¼ - 1½ inches long, shiny black, with deep striations on the elytra, a longitudinal groove on the middle of the prothorax, and a constriction between prothorax and abdomen. The jaws are large and protrude forward, the antennae are slightly curved, and on the front of the head there is a short, bent horn or peg that faces forward. The larva is pale, almost translucent, cylindrical, with well-developed thoracic legs (Fig. 17).

Figure 16. Horned passalus, *Odontotaenius disjunctus*,

This unusual beetle is subsocial. The adults provide care to the larvae, and the adults and larvae communicate by means of faint, squeaking sounds produced by rubbing body parts together. The adults feed on rotting wood, mainly oak, and the larvae feed on rotting wood previously chewed by the beetles. Both adults and larvae tunnel inside soft rotting logs and stumps and contribute to the decomposition of dead wood. This beetle is found only where soil moisture contributes to dead wood decay.

Figure 17. Horned passalus larvae

Family Scarabaeidae (scarab beetles)

This family consists of some 130 genera and 1,300 species in North America north of Mexico. Most scarabs are ¼ - 2 inches long and robust. The antennae have an apical club that consists of three to seven flat, plate-like segments, or lamellae. Males of some species have a horn on the head, pronotum, or on both. Most scarabs have one generation per year, although the life cycle of some of the larger species may take two years to complete. Most adults and larvae are plant feeders, and several species are agricultural or garden pests.

The larvae have a well developed head, strong mandibles, a c-shaped body, thoracic legs, and a whitish coloration (Fig. 18). Many of them live and develop in the soil, feeding on the roots of a wide range of native and cultivated plants, especially grasses. Others feed on decomposing organic matter, manure, and even dry carrion.

The adults of several species in the genus *Phyllophaga* (Fig. 18) are known as May or June beetles. In spring these common nocturnal beetles are attracted to lights outside well-lit homes, especially in rural areas, where their large numbers attract predators, such as toads. These beetles are mostly tan or dark brown and range from ½ to ¾ inch in length.

Figure 18. May or June beetle, *Phyllophaga* sp.

The larvae of June beetles are known as white grubs (Fig. 19). White grubs live in the soil, feeding mainly on the roots of grasses, and when abundant can be a problem in lawns and golf courses. White grubs can also damage various crops, including corn, wheat, and alfalfa.

Figure 19. *Phyllophaga* sp. larva or white grub

Another locally common scarab is the green June beetle, *Cotinis nitida* (Fig. 20), a diurnal species that is often seen flying low in spring and summer. The adult is slightly less than one inch long. The pronotum and elytra are dull green, bordered by a yellow stripe. The head and legs are bright green. Its larvae resemble the *Phyllophaga* larvae, but the two can be separated by comparing leg size. The legs of *Phyllophaga* larvae (Fig. 19) are longer than those of *Cotinis* larvae (Fig. 21). In addition, an exposed *Cotinis* larva will crawl on its back (Fig. 21) for a short distance before burrowing back in soil, while the *Phyllophaga* larva will crawl normally, using its legs.

Figure 20. Green June beetle, *Cotinis nitida*

Figure 21. Green June beetle larva crawling on its back

Euphoria sp. (Fig. 22) superficially resembles *C. nitida*, but is uniformly shiny green and slightly smaller.

The spotted Pelidnota, *Pelidnota punctata* is another scarab attracted to outside lights in summer. This one inch long, attractive beetle is tan or light brown, with a round black spot on each side of the pronotum and three lateral spots on each elytron (Fig. 23). In the daytime it may congregate in large numbers on some shrubs and small trees.

Figure 22. *Euphoria* sp.

Figure 23. Spotted Pelidnota, *Pelidnota punctata*

Many scarabs feed on decomposing plant material, dung, or carrion. Among he dung beetles found in our area are *Onthophagus* spp. (Fig. 24), the rainbow scarab, *Phanaeus vindex* (Fig. 25), *Geotrupes* spp. (Fig. 26), and *Bolbocerosoma* spp. (Fig. 27). Both male and female dung beetles dig a burrow under fresh dung, bury part of it, and the female lays an egg on the buried dung. The beetles then seal the burrow and go in search of more dung for their larvae.

Figure 24. Dung beetle, *Onthophagus* sp.

Figure 25. Rainbow scarab, *Phanaeus vindex*

Figure 26. Dung beetle, *Geotrupes* sp.

Figure 27. *Bolbocerosoma* sp.

Hide beetles are carrion feeders and among the last insects to colonize carcasses, usually after most other carrion insects have departed. The larvae feed on old carrion remnants, such as the dry skin. *Trox suberosus* (Fig. 28) is a greyish beetle found throughout the U.S., including our area. The body is convex, about ½ inch long, and usually coated with dry soil. Both pronotum and elytra are covered with protuberances arranged in longitudinal rows. These beetles will make an audible chirping sound if handled.

Figure 28. Hide beetle, *Trox suberosus*

Family Buprestidae (metallic wood-boring beetles)

Most buprestids are about ½ inch long. The body is compact, stream-lined, and tapering posteriorly (Figs. 29 - 30). Some species have a metallic hue, especially on the underside. The mouth parts project downward, and the antennae are shorter than the pronotum.

Figure 29. A metallic wood borer, *Acmaeodera* sp.

Figure 30. A metallic wood borer

The larva is legless, whitish, and spends its life tunneling in wood, which provides both shelter and food. The first thoracic segments are enlarged, flattened, and shield-like. Most species are found inside twigs, branches, and the inner bark and sapwood of a wide variety of native and cultivated trees, including fruit, shade, and ornamental varieties. Some species are common in weakened or dying trees, while others attack healthy ones. The larvae can only be seen in recently cut wood, but the adults are common on wild flowers. There are about 675 species and 40 genera in the U.S. and Canada.

Family Elateridae (click beetles)

Click beetles have a hard, rather flat and streamlined body (Fig. 31), and average ½ inch long or less in length. The mandibles are short and inconspicuous. The pronotum is about half as long as the elytra, with sharp corners that may extend backward. Almost 900 species and 73 genera are found in the U.S. and Canada, several of which are common in our area.

Figure 31. A click beetle

If placed on its back, a click beetle will snap, flip into the air, land on its feet, and escape. A spine that extends back on the underside of the thorax (Fig. 32) are a key part of the flipping mechanism. The tip of the spine is held inside a groove under tension. To flip, the beetle arches its body forcing the spine to slip off the grove, releasing tension and producing an audible snap. If the beetle lands on its back it continues to flip until it is able lands on its feet and can escape. Click beetle larvae, known as wireworms, are long, slender, cylindrical, shiny, and have a hard integument (Fig. 33). Most live in the soil or in rotting wood, feeding on decomposing organic matter. Some feed on the stems and roots of various wild and cultivated plants, including grasses, tubers, and root crops. Depending on the species, the life cycle is completed in one to five years.

Figure 32. Close-up of elaterid spine fitting in groove

Figure 33. Elaterid larva (wireworm)

Figure 34. Eyed click beetle, *Alaus oculatus*

The eyed click beetle, *Alaus oculatus* (Fig. 34) is the largest species in the area and one of the largest in the U.S. This striking beetle it is about 1½ inches long and has two conspicuously large false eyes on the pronotum. This species is

found in the eastern half of the U.S., mainly near tree stands. Both adults and larvae live in or under decaying wood. The beetles seem to feed on nectar and plant exudates, while the larva is reported to prey on other insect larvae, including white grubs.

Family Cebrionidae

Cebrionid beetles are not especially abundant, but the males are seen occasionally and are easily identifiable. Most are about ¾ inch in length. The mandibles are curved and clearly protrude. The tip of the shiny and brownish abdomen is narrower than its base. Some species are hairy. It appears that the female is unable to fly.

Figure 35. A cebrionid beetle, male

Family Lampyridae (lightningbugs, fireflies)

This is a family of about 120 species in the U.S. and Canada. The body is soft, elongate, with sides almost parallel, and a hood-like pronotum that in many species entirely covers the head (Fig. 36). These beetles emit light that is produced through complex chemical reactions, known as bioluminescence, a feature also found in other insects, such as glowworms. The light emitting organs are located in the abdomen. In some species the female emits mating flashing signals that attract males of the same species. Lampyrids are predaceous and some species are cannibalistic.

Figure 36. An unidentified lampyirid

Figure 37. A lampyrid, *Photuris* sp.

Photuris sp. is common in our area. This beetle is ½ - ¾ inch long, with large, black, bulging eyes, and a hood-like pronotum that does not entirely cover the head (Fig. 37). The light emitting organs are located in the 5th and 6th abdominal segments. Females in this genus are known to prey on males in the genus *Photinus*, which they attract by mimicking the flashing patterns of *Photinus* females.

Family Cantharidae (soldier beetles)

Soldier beetles have a soft and elongate body, with sides almost parallel. They superficially resemble lampyrids, but are thinner, and the

pronotum is not hood-like, or cover the head, which is visible from above (Figs. 38-39). Soldier beetles are often seen on vegetation, especially on flowers, where they feed on aphids, nectar, and pollen. The body contain the blistering agent cantharidin, although not at the levels found in meloid (blister) beetles.

Figure 38. A soldier beetle

Figure 39. A soldier beetle

Family Dermestidae (dermestid beetles)

This small family consists of about 130 species in the U.S. and Canada. Dermestid beetles are ¼- ½ inch long, compact, and oval-shaped. The head is not visible from above, and the larvae are hairy. The adults and larvae feed on dried animal material, such as hides, skins, leather, feathers, wool, dried meats, and stuffed animals. In museums dermestid beetles can infest and destroy every type of dried animal specimen, including insect collections. Carpet beetles, *Anthrenus* spp., are a common minor nuisance household pest in the U.S. A few species may feed on plant material.

Figure 40. Dermestid beetle and larvae

Dermestes maculatus adults and larvae (Fig. 40) are found in old, dry animal carcasses, such as road kills. This species is common in our area and has a worldwide distribution. The adult is about ¼ inch long, greyish brown, and covered with fine short hairs. The underside is mostly white. The larva is dark brown and covered with long hairs. Museums use this beetle to clean and prepare bones and entire skeletons for study or display.

Family Coccinellidae (lady beetles)

This family consists of some 50 genera and 400 species in North America, north of Mexico. This beetle is round, convex, and ¼ inch or less in length. The antennae are short and end on a weak club. The head is barely visible from above. Most species are colorful, shiny, and often adorned with black spots. Both adult and larva are active and voracious predators, and some species have been used in biological control and integrated pest management programs. The larger species feed on aphids and the small ones prey on spider mites. Only three

species are plant feeders, including the Mexican bean beetle, *Epilachna varivestis*.

Figure 41. Convergent lady beetle

Numerous species are common in the area. The convergent lady beetle, *Hippodamia convergens*, is easily identified by the two white bars on the shiny black pronotum (Fig. 41). The elytra are reddish-orange and the number of black spots is variable. The body is slightly elongate and pointed in the rear. This is a native species and one of the best known lady beetles in the U.S.

The ash gray lady beetle, *Olla abdominalis*, has a round body and grayish to pale orange elytra, usually with 16 black spots, arranged in three horizontal rows of 8, 6, and 2 each (Fig. 42). This beetle is a native species.

Figure 42. Ash gray lady beetle

The seven-spotted lady beetle, *Coccinella septempunctata*, was introduced to control aphids. Its color varies from yellow-orange to red, with a total of seven black spots, three on each elytron and a central spot next to the pronotum (Figs. 43-44).

Figure 43. Seven-spotted lady beetle

Figure 44. Seven-spotted lady beetle

The color pattern of the multicolored Asian lady beetle, *Harmonia oxyridis*, is highly variable, ranging from yellow-orange (Fig. 45) to red, with or without black spots. When spots are present, their number is also variable. In addition, some individuals are black, with red spots. This beetle was also introduced into the U.S. to control aphids.

Figure 45. Multicolored Asian lady beetle

Lady beetles are good fliers and move from plant to plant in search of prey. If aphids are present the beetles remain in the infested plant for as long as prey is available. Females lay eggs on infested leaves and, depending on ambient temperature, within 2-6 days triangular-shaped larvae (Figs. 46-47) hatch and begin to feed on aphids. When the prey supply is depleted the adults fly away in search of new aphid colonies.

Figure 46. Multicolored Asian lady beetle larva

Depending on temperature and prey availability, the larva matures in 7-30 days and pupates with its posterior end firmly attached to a leaf or any other available surface (Figs. 48 - 49). The adults emerge in another 3-10 days and remain on the plant only if prey is still abundant.

Figure 47. Ash grey lady beetle larva

Figure 48. Convergent lady beetle pupa

Figure 49. Multicolored Asian lady beetle pupa

Family Meloidae (blister beetles)

Blister beetles have an elongate body and soft, flexible elytra. Most are ¾ - 1 inch long, and the color varies with the species. The pronotum is

constricted behind the head, forming a narrow and flexible "neck" that allows head rotation. The adults feed on leaves of wild and cultivated plants, including tomato. The larvae feed on the eggs of grasshoppers and solitary bees, including leaf cutting bees. First instar larvae have well-developed thoracic legs and use them to search for hosts. Remaining instars have rudimentary legs, and by the sixth instar the larva is virtually legless and grub-like. This type of development is known as hypermetamorphosis.

The blood of meloid beetles contain cantharidin, a blistering agent secreted from the femur-tibia joints as a chemical defense. Its concentration in a given beetle varies with the individual, species, and locality. Exposure to humans may cause blisters that last a few days. Horses, sheep, and cattle are especially sensitive to ingested cantharidin. Horses are known to become ill and die after ingesting dead blister beetles trapped in alfalfa hay bales.

There are about 300 species in the U.S., several of which are found in this area. *Meloe* sp. is ¾ - 1 inch long, blue-black, and heavy-bodied. Its short wings leave about half of the enlarged, orange and black abdomen exposed (Fig. 50). This striking beetle is flightless and can be in late summer and fall crawling slowly on the ground and on low-growing plants. It feeds on the leaves of various wild and cultivated plants, including tomato.

The striped blister beetle, *Epicauta occidentalis* slender, yellowish, with three dark-brown stripes on each elytron (Fig. 51). It feeds on various wild and cultivated plants, including alfalfa, beans, potato, and tomato. According to the Oklahoma State University, those fatalities caused by blister beetle toxicity in horses examined by OSU veterinarians have been caused by this species.

Figure 50. Blister beetle, *Meloe* sp.

Figure 51. Striped blister beetle, *Epicauta occidentalis*

Figure 52. Blister beetle, *Epicauta ferruginea*

Epicauta ferruginea (Fig. 52) is often found on the flowers of plants in the family Asteraceae, such as goldenrods, and also feeds on the foliage of solanaceous plants, including tomato. It has a golden color and a velvety appearance.

Figure 53. Blister beetle, *Pyrota palpalis*

The head and pronotum of *Pyrota palpalis* are dark orange and the elytra are yellow, with three pairs of black patches (Fig. 53). This striking meloid is often found on flowers of plants in the family Asteraceae.

Family Cerambycidae (long-horned beetles)

With 300 genera and 950 species in North America north of Mexico, the Cerambycidae is the largest family of wood-boring beetles. The antennae are half as long as the body or longer. In most species, the antenna arises within a notch on the inner margin of the eye. The mandibles are large, sharp, and project forward. The larger species can bite if handled. Size varies from under ½ inch to over 2 inches.

The larvae are pale and cylindrical, legless or with minute legs. In most species the first thoracic segment is enlarged, although it is not as flat or shield-like as in buprestid larvae. Most tunnel in wood, feeding on various native and cultivated trees. Some species prefer the trunks, branches, and roots of dead or dying trees, while others attack living trees. Larvae of species found in grasslands feed on grass roots.

The tile-horned prionus, *Prionus imbricornis*, also known as *P. fissicornis* (Fig. 54), is 1 - 1½ inches long, and the largest cerambycid in the area. Males are stout, with the abdomen fully covered by the elytra. Females are slender, with the tip of the abdomen protruding under the elytra. The antennae in males resemble a stack of minute tiles. The larva feeds on oak roots.

Figure 54. Tile-horned prionus, *Prionus imbricornis*, male

The red milkweed beetle, *Tetraopes* sp., likely *T. tetrophthalmus* is about ½ inch long, reddish, with several black dots on pronotum and elytra (Fig. 55). The larva feeds and develops inside milkweed stems, and the adult is often found on milkweed flowers. The eye notch characteristic of cerambycids is so pronounced in this beetle that it actually separates each eye into two parts.

Figure 55. Red milkweed beetle, *Tetraopes* sp.

Family Chrysomelidae (leaf beetles)

This family consists of about 175 genera and 1,500 species, and is the fourth largest beetle family in North America north of Mexico. Most leaf beetles are about ¼ inch or less and colorful. Some species have enlarged hind femora and jump when disturbed. The larvae have well-developed legs and can crawl on leaves and stems. Both the adults and the larvae feed on various wild and cultivated plants. Some species, including the Colorado potato beetle and the western corn rootworm, are major agricultural pests.

The spotted cucumber beetle, *Diabrotica undecimpunctata*, is one of the more common leaf beetles in our area. It is about ¼ inch long, greenish-yellow, with six black spots on each elytron (Fig. 56). It feeds on the leaves of over 100 cultivated and wild plants, especially those in the family Cucurbitaceae. It also feeds on corn. The larva, also known as the southern corn rootworm, bores into the stalk of young corn plants, causing serious damage.

Figure 56. Spotted cucumber beetle, *Diabrotica undecimpunctata*

The colorful pigweed flea beetle, *Disonycha glabrata* (Fig. 57) is commonly found feeding on pigweed leaves. The leaf beetle shown in (Fig. 58) is likely *Chrysolina* sp. The elytra of this small beetle are metallic green and covered with minute pits visible with a 10X hand lens.

Figure 57. Pigweed flea beetle *Disonycha glabrata*

Figure 58. A leaf beetle, likely *Chrysolina* sp.

Family Curculionidae (snout beetles)

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Curculionids are easily recognized by their long snout, which is a prolongation of the frontal part of the head. The snout can be thin and long or short and blunt. At the end of the snout there is a pair of tiny mandibles. The antennae arise from the sides of the snout, are elbowed (bent), and have a short club. The larvae are short, plump, whitish or yellowish, c-shaped legless grubs (Fig. 60). Adults and larvae are plant feeders. Some species, including the pecan weevil, alfalfa weevil, boll weevil, sweet potato weevil, and rice weevil, are agricultural pests.

With some 40,000 species worldwide, this is one of the largest beetle families. There are some 2,600 species and 400 genera in the U.S. and Canada.

The acorn weevils, *Curculio caryae* and *C. fulvus* are abundant wherever oaks grow. The two species are almost identical and not easily separated. These weevils are greyish or brownish, about ¼ inch in length, and covered with short, flattened hairs. Their unusually long, thin, and curved snout may be as long or longer than the body (Figs 59 - 60).

Figure 59. Acorn weevil, *Curculio* sp.

Figure 60. Acorn weevil

The adult feeds on green acorn, using its snout to chew a small hole to get to the seed. While the larvae (Fig. 61) can be collected by the hundreds from acorns that have fallen from a single oak tree, the adults are mostly found on the canopy and are rarely seen. The female deposits an egg inside a hole drilled in an acorn, and several larvae may develop within any one acorn. After the acorns drop, in the fall, the larva emerges leaving a round exit hole (Fig. 62) and buries in the soil, where it remains for up to two years before pupating and emerging as an adult.

Figure 61. Acorn weevil larvae

Figure 62. Acorn weevil larva exit holes

Snout beetles in the genus *Sphenophorus* are known as billbugs. Adults and larvae feed on native and cultivated grasses, and some species can be damaging to grain crops. These weevils have a very hard body. The individual in Fig. 63 is about ½ inch long.

Figure 63. Billbug, *Sphenophorus* sp.

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Family Tenebrionidae (darkling beetles)

There are about 1,000 species of tenebrionids in the U.S. and Canada. Most adults are brownish, grey, or dull black. Shape and size are variable. The elytra can be smooth, pitted, or covered with striations. The antennae are usually thread-like, 11-segmented, and arise below a frontal ridge. The tarsal formula is 5-5-4. Food consists of living and dead plant material. The larvae of *Tenebrio molitor* are known as mealworms and are sold in pet stores. A few species, such as the confused flour beetle, *Tribolium confusum*, are pests of stored grains.

A common tenebrionid in this area is *Eleodes tricostata* (Fig 64). This diurnal beetle is a little over ½ inch long, light gray, with an oval shape. On each elytron there are three longitudinal ridges that consist of a row of protuberances discernible under 10X or higher magnification. Given that their elytra are fused together, these beetles are unable to fly. During the warmer months they can be seen running rapidly on the ground in search of food, mainly bits of plant material and even dead insects. The larva is elongate, has short legs, and lives in the soil where it feeds on the roots of wild and cultivated grasses and herbaceous plants. The larvae of some of the 120 species of *Eleodes* found in the U.S. are known as false wireworms.

Figure 64. A darkling beetle, *Eleodes tricostata*

The false mealworm beetle, *Alobates pennsylvanica*, is shiny black, elongate-oval, and ¾ -1 inch long (Fig. 65). This slow-moving beetle is commonly found on wood piles and under loose bark, where it is reported to prey on other insects.

Figure 65. False mealworm, *Alobates pennsylvanica*

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