SOME INSECT ORDERS

1. ORDER Coleoptera: beetles and weevils

- It is the largest group of insects comprising 40% of all insects and nearly 30% of all animal species.
- The fore wings are hardened and kept folded over the abdomen, the edges joining each other in a straight line. This is the most important identification feature of coleopterans.
- The larger, membranous hindwings are kept protected beneath.
- The beetles have conquered both terrestrial and aquatic habitats and feed on a variety of diet.
- Some are predatory feeding on other insects, some feed on plants, fungi, lichen etc.
- Some interesting beetles you would see around you are given below

Predators

<table>
<tr>
<td>1. Coccinellidae (Lady beetles) —most adults and larvae are predators
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<td>2. Carabidae (Ground beetles and Tiger beetles) — predators
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<tr>
<td>Dytiscidae (Predaceous diving beetles) — large aquatic predators
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<td>3. Gyrinidae (Whirligig beetles) — aquatic predators
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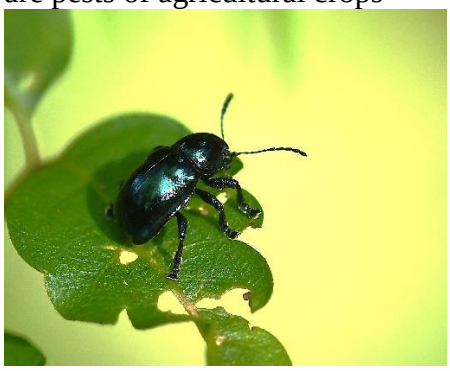
Herbivores

1. Chrysomelidae (Leaf beetles) —Many are pests of agricultural crops



2. Scarabaeidae - (Flower chaffers, june beetles, Scarabs) robust beetles with heavy spines on femur and tibia and lamellate antennae

3. Cerambycidae (Long-horned beetles): Larvae are wood borers. Adults have distinctively long antennae.

4. Elateridae (Click beetles) — Larvae are called as wireworms and many are destructive to the roots of crop plants. When adults are turned on their back, they can snap (click) the head and abdomen against the substrate to right themselves.

5. Buprestidae (metallic wood borers) —Larvae are known as flat-headed wood borers. Adults are metallic and are priced for their aesthetics.

Interesting facts about beetles and weevils

Beetle with four eyes

https://bugoftheweek.com/blog/2020/1/27/why-four-eyes-whirligig-beetles-gyrinidae

Ironclad beetle

The diabolical ironclad beetle, *Phloeodes diabolicus,* is an insect of the deserts of California. A fungus feeder, it lacks the ability to fly away from predators. The beetle's survival depends on two key factors its ability to convincingly play dead. It has also developed an extremely robust elytra, that is impact-resistant and crush-resistant, produced by complex and graded interfaces. Quoting authors of a study published in Nature, Brian Bell, UC Irvine states that "they found that the diabolical ironclad beetle can withstand a force of about 39,000 times its body weight. A 200-pound man would have to endure the crushing weight of 7.8 million pounds to equal this feat". This is an inspiration for engineers to construct strong and resistant material.

By Jesse Rorabaugh - https://www.inaturalist.org/photos/3873391, CC0, https://commons.wikimedia.org/w/index.php?curid=112195366

(Rivera et al., 2020. Toughening mechanisms of the elytra of the diabolical ironclad beetle, Nature 586: 543–548.)

Bombardier beetle

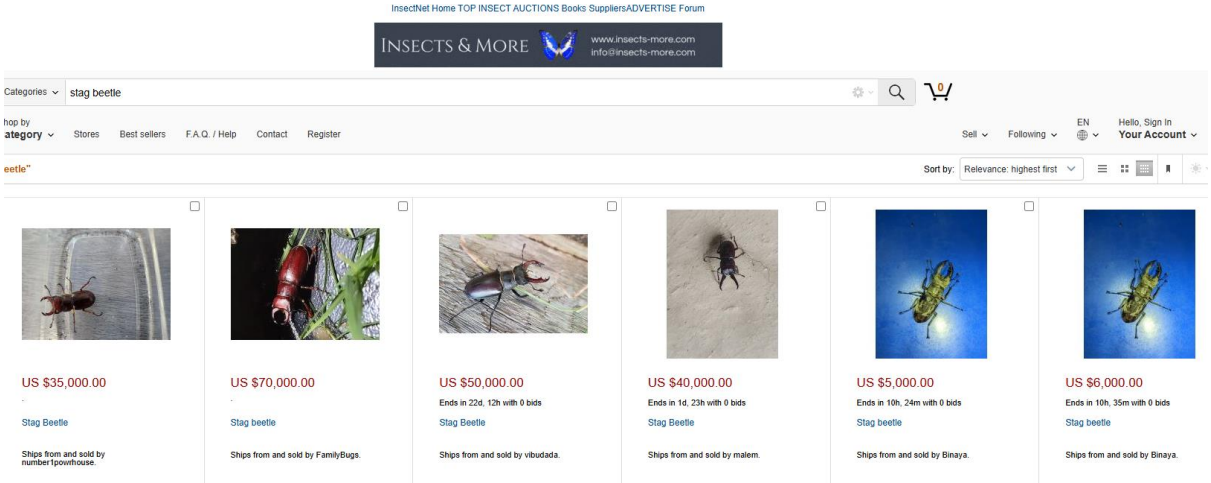
Bombardier beetles are a group of ground beetles belonging to the family Carabidae. They are nocturnal predators of other insects. Their name is derived from a most notable for the defence

mechanism that gives them their name: when disturbed, they eject a hot noxious chemical spray from their pygidial glands with a popping sound. Most species of bombardier beetles are carnivorous, including the larva. The beetle typically hunts at night for other insects but will often congregate with others of its species when not actively looking for food.

Pulsed Chemical Rocket with Green High Performance Propellants is a technique that has been mimicked from these beetles (Pasini et al. (2013). Pulsed Chemical Rocket with Green High Performance Propellants. 49th AIAA/ASME/SAE/ASEE Joint Propulsion Conference. 10.2514/6.2013-3756).

Stag beetles

Stag beetles belonging to the family Lucanidae, are considered one of the costliest beetles in the world. Male stag beetles are known for their oversize mandibles used to wrestle each other. Despite its appearance, they are non-aggressive to humans. Female stag beetles are usually smaller than the males, with smaller mandibles. Being rare and considered as a good luck charm, it has great demand on the insect market, and some can sell for huge sums.

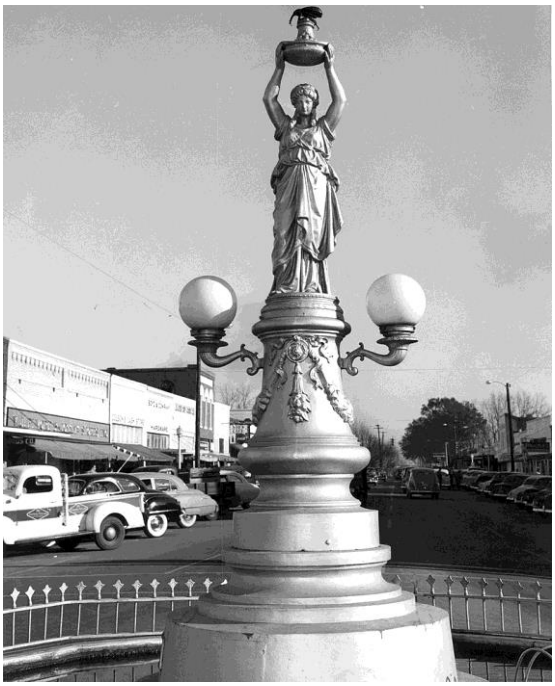


Marketplace price for a stag beetle.

World's first and only monument built to honor an agricultural pest

The boll weevil, *Anthonomus grandis*, appeared in Alabama in 1915 and by 1918 caused total loss of crops of cotton. This made farmers to diversify to groundnut and other crops, a practice which brought new money to Coffee County. Bon Fleming, a local businessman, came up with the idea to build a statue and helped to finance the cost. As a tribute to how something disastrous can be a catalyst for change, and a reminder of how the people of Enterprise adjusted in the face of adversity, the monument was dedicated on December 11, 1919, at the intersection

of College and Main Street, the heart of the town's business district. A large monument erected in 1919 on the town square of Enterprise, Alabama is inscribed: “In profound appreciation of the boll weevil and what it has done as the herald of prosperity.”



By USDA - https://www.nal.usda.gov/exhibits/speccoll/files/original/e206a9e12a57032e9bbc6add4b02d4ae.jpg

- The smallest beetle is the fringed ant beetle, *Nanosella fungi* (family Ptiliidae). At 0.25 mm in length it is some 16 million times smaller in volume than the largest beetle, *Goliathus giganteus* (family Scarabaeidae), which may have a body length up to 10 cm.

Fireflies and Glow worms

- Two families of Coleoptera are bioluminescent.
- Fireflies belong to family Lampyridae and glow worms to family Phengodidae.
- In some species, the females are wingless and larviform.

Source: https://en.wikipedia.org/wiki/Firefly

Sacred Scarabs

Ancient Egyptians believed that a scarab beetle rolled the sun across the sky each day. The scarab icon became associated with Ra, the sun god, and scarab beetles, *Scarabaeus sacer*, were worshiped as a symbol of immortality.

Source: https://en.wikipedia.org/wiki/Scarabaeus_sacer

Spanish Fly

The Spanish fly, *Lytta vesicatoria* a blister beetle belonging to the family Meloidae, is the source of cantharidin, a chemical, once thought to be an aphrodisiac. It is now used for other treatments.

Source: https://en.wikipedia.org/wiki/Lytta_vesicatoria

Dung beetles are ecosystem engineers

Dung beetles live in many habitats and are found on all continents except Antarctica. They eat the dung of herbivores and omnivores. Three functional types based on their feeding and nesting strategies have been observed – the rollers, tunnelers, and dwellers. The rollers roll and bury a dung ball either for food storage or for making a brooding ball. When brooding, two beetles, one male and one female, stay around the dung ball during the rolling process. Usually, it is the male that rolls the ball, while the female hitch-hikes or simply follows behind. In some cases, the male and the female roll together. When a spot with soft soil is found, they stop and bury the ball, then mate underground. After the mating, one or both of them prepares the brooding ball. When the ball is finished, the female lays eggs inside it, a form of mass provisioning. Tunnelers on the other hand bury the dung wherever they find it. A third group, the dwellers, neither roll nor burrow but they simply live within dung.

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