ORDER: COLEOPTERA

Coleo = sheath, pteron= wing Includes Beetles and weevils



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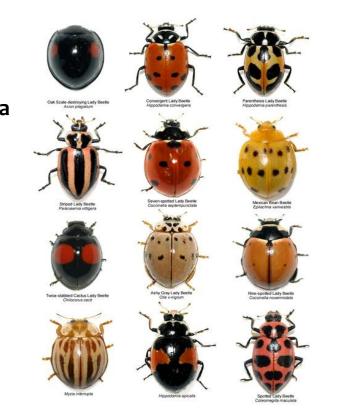
- largest order in class insecta and Animalia with about 330,000 Species
- Frons and vertex are prolonged in to snout as in weevils
- Ventral floor of head is represented by **Gular sclerite** except in all weevils
- The mandibles attain their greatest length in the males of the stag beetles (Lycanidae)
- Forewings are horny or leathery elytra which always meet to form a straight mid dorsal suture
- Hind wings membranous and are highly reduced in weevils and few beetles
- First tergum membranous and one or more of the sterna from the first to third are aborted
- Last abdominal segments are **refractile and tubular, function as ovipositor** (eg: cerambycidae)
- The larvae are known as grubs
- Adults possess stridulatory organs on Mandibles and maxillae in Scarabidae and on prothorax mesonotum in Cerambycidae
- **Pygidial glands** open near anus which are **defensive** in function
- Malphigian tubules are **cryptonephric** in condition





- Coccinellidae: Lady bird beetle
- Convex dorsally and horizontal ventrally, brightly coloured or spotted
- Head partly concealed under pronotum
- Tarsal formula is **4:4:4**
- Grubs covered with minute tubercles or spines known as **setose or rugose**
- Elytra covers the abdomen completely
- Both adults and grubs are highly predacious feeding on aphids, coccids, mites, psyllids
- Genus epilachna are phytophagous

Eg.Predator on aphids – Menochilus sexomaculata Predator on cottony cushion scale-Rodalia cardinalis Lady bird beetle on brinjal -Henosepilachna vigintioctopunctata



Bruchidae: Pulse beetles or seed beetles

- The head is produced anteriorly in to a **short and broad snout**
- Antennae serrate or pectinate
- Elytra shortened, never cover the tip of abdomen
- Tarsal formula is **5:5:5**
- Larvae usually undergo hypermetamorphosis
- First instar with well developed legs and
- toothed thoracic plates to aid in entering into seeds
- After first moult it becomes **partially** / **wholly apodous**
- **Eg.** Pulse beetles: Callsobruchus chinensis Callosobruchus maculatus



Scarabaeidae: horn beetles, dung rollers, chaffer beetles

- Head often slender, recurved, sometimes toothed or bilobed frontal horn
- Antennae lamellate type
- Prothorax large simple or with horny structure
- Elytra not usually completely covering the abdomen
- Grubs typically scaraboid and feed on roots known as root grubs
- Tarsal formula **5:5:5,** the hind tibiae more or less dilated with the outer edge toothed
- Adults usually feed on **dung and on palm trees** or **organic matter** living in manure pits
- Eg. Oryctes rhinoceros Rhinoceros beetle









Chrysomelidae: Flea beetles, leaf beetles

- Upper surface bare and shining, frequently with **metallic colouration**
- Tarsal formula is 5:5:5
- Adults generally feed on leaves causing **numerous holes** and also on flowers
- Some grubs feed on foliage, some act as leaf miners and some feed on roots and stems
- Eg: Sweet potato tortoise beetle Metriona circumdata

Rice hispa - Dicladispa armigera

Pumpkin beetles - Raphidopalpa foveicollis









Lachnaia sexpunctata 9 - 13 mm

Cryptocephalus sericus c 7 - 8 mm

phalus Criocerus us duodecimpunctata nm 5 - 6,5 mm



Cheilotoma musciformes 3 - 5 mm



vigintipunctata

6.5 - 8,5 mm



Donacia crassipes 9 - 13 mm



Cerambycidae: Long horned beetles

- antennae 2/3 of the body inserted on **prominent tubercles**, capable of **flexing backwards**
- Prothorax is spined or tuberculate
- Tarsal formula is 5:5:5
- Most of the grubs are **tree borers**
- Few are confined to **roots with powerful mandibles boring** into deep and hardwood
- Most of the adults feed on flowers and some produce squeaking sound when picked up

Eg.Mango stem borer - Batocera rufomaculata

Grapevine stem gridler - Sthenias grisator

Longicorn beetles on cucurbits - Apomycyna pertigera



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Curculionidae Weevils, snout beetles

- Head prolonged to form a pronounced **snout or rostrum** of variable length and shape
- Head exhibits **sexual dimorphism** being **better developed in females for boring eggs**
- Antennae geniculate arising about the middle of the snout
- Mouth parts small and **arranged at the end of the snout**
- Elytra are attached together
- Adults and larvae are phytophagous and stored grain pests
- Larvae usually **apodous**
- Eg: Red palm weevil Rhynchophorus ferrugenius Rice weevil - Sitophilus oryzae

Apionidae

- Antennae clavate, rarely geniculate
- Eg. Sweet potato weevil Cylas formicarius



