

LEPIDOPTERA - NOCTUIDAE, SPHINGIDAE, PYRALIDAE, GELECHIIDAE, ARCTIIDAE

LEPIDOPTERA

Synonym : Glossata

Etymology : Lepido - scale; ptera - wings.

Common names : Moths, Butterflies, Skippers

Characters

- ✓ Body, wings, appendages, are densely clothed with overlapping scales, which give colour, rigidity and strength. They insulate the body and smoothen air flow over the body.
- ✓ Mouthparts in adults are of **siphoning** type. Mandibles are absent. The galeae of maxillae are greatly elongated and are held together by interlocking hooks and spines. The suctorial proboscis is coiled up like a watch spring and kept beneath the head when not in use.
- ✓ Wings are membranous and are covered with overlapping pigmented scales. Forewings are larger than hind wings. Cross veins are few. Wings are coupled by either **frenate** or **amplexiform** type of wing coupling.
- ✓ Larvae are **polypod-eruciform** type. Mouthparts are adapted for chewing with strong mandibles. A group of lateral ocelli is found on either side of the head. The antenna is short and three segmented. There are three pairs of five segmented thoracic legs ending in claws. Two to five pairs of fleshy unsegmented **prolegs** are found in the abdomen. At the bottom of the proleg, **crochets** are present.
- ✓ Pupa is generally **obtect**. It is either naked or enclosed in a cocoon made out of soil, frass, silk or larval hairs.

Classification

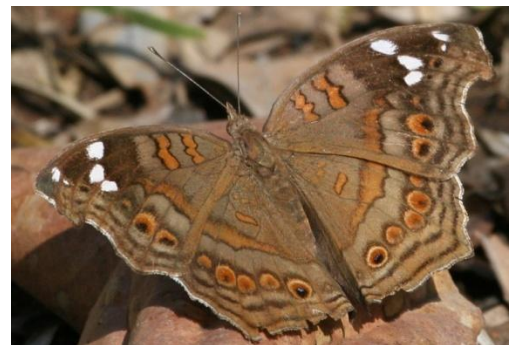
Majority of Lepidopteran insects (97%) are grouped under the suborder **Ditrysia** in which the female insects have two pores. The copulatory pore is located in eighth abdominal sternite

and the egg pore in ninth abdominal sternite. Remaining insects are grouped under the suborder **Monotrysia** in which the female insects have one pore.

BUTTERFLY FAMILIES

1. NYMPHALIDAE (Brush footed or four footed butterflies)

- ✓ Forelegs are short, functionless, hairy and folded on thorax.
- ✓ Foretibia is short and covered with long hairs.
- ✓ Larva is with many processes or spines on the body.
- ✓ e.g. Castor butterfly : Ergolis merione. It is a defoliator.



2. LYCAENIDAE (Blues, Coppers, Hair streaks)

- ✓ Compound eyes are white rimmed.
- ✓ Antennae are with white rings.
- ✓ Upper wing surface is either metallic blue or coppery. Lower wing surface is lighter in colour.
- ✓ Hindwings is often with delicate hair like prolongations and two or three black spots.
- ✓ Larvae are flattened with retractile head.
- ✓ e.g. Pomegranate fruit borer : *Virachola isocrates*.



3. PAPILIONIDAE (Swallow tails)

- ✓ They are often large and brightly coloured.
- ✓ Prothoracic legs have tibial epiphysis.
- ✓ In many species hindwings has tail like prolongation.
- ✓ **Amplexiform** type of wing coupling is present.
- ✓ Larval body is either smooth or with tubercles.
- ✓ Retractable **osmeteria** are present on the prothoracic tergum of the caterpillar
- ✓ e.g. Citrus butterfly , *Papilio demoleus*.



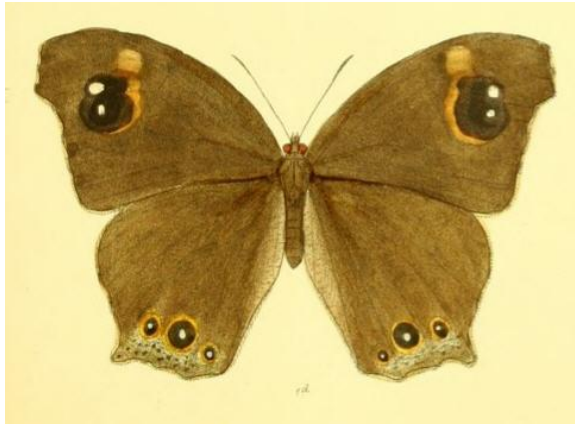
4. PIERIDAE (whites or Sulphurs)

- ✓ They are white or yellow or orange coloured with black markings.
- ✓ Larva is green, elongate and covered with fine hairs.
- ✓ Larval body segments have annulets.
- ✓ e.g. Daincha caterpillar, *Eurema hecabe*.



5. SATYRIDAE (Browns, Meadow - browns)

- ✓ They are dull brown or blackish in colour.
- ✓ Wings are with eye like spots both on the upper and lower surface.
- ✓ e.g. Rice horned caterpillar, *Melanitis ismene*.



MOTH FAMILIES

6. ARCTIIDAE (Tiger moths)

- ✓ Wings are conspicuously spotted or banded.
- ✓ They are nocturnal and attracted to light.
- ✓ Larva is either sparsely hairy or densely hairy (wooly bear).
- ✓ e.g. Black hairy caterpillar, *Estigmene lactinea*.



7. BOMBYCIDAE (Silk worm moths)

- ✓ Antenna is bipectinate.

- ✓ Larvae is either with tuft of hairs or glabrous with medio dorsal horn on the eighth abdominal segment.
- ✓ Pupation occurs in dense silken cocoon.
- ✓ e.g. Mulberry silk worm, *Bombyx mori* an important source of natural silk.



8. COCHLIDIDAE (Slug caterpillar)

- ✓ They are medium sized moths with stoutly built body.
- ✓ Larva resembles the slug. Larva is thick, short, fleshy and stout. Larval head is small and retractile. Thoracic legs are minute. Abdominal segmentation is indistinct.
- ✓ Prolegs are absent. Poisonous urticating hairs are present on the body.
- ✓ Pupal cocoon is hemispherical with urticating hairs.
- ✓ e.g. Castor slug caterpillar *Latoia lepida*.



9. CRAMBIDAE (Grass moths)

- ✓ Labial palps are extended.
- ✓ Forewings are narrow and elongated. At rest they are wrapped around the body.

- ✓ Larva bores into root, stem or crown of graminaceous plants.
- ✓ e.g. Sorghum stem borer, *Chilo partellus*.



10. GELECHIIDAE

- ✓ Forewings trapezoidal and narrower than hindwings.
- ✓ Caterpillars bore into the seeds, tubers, and leaves.
- ✓ e.g. Cotton pink boll worm, *Pectinophora gossypiella*.



11. GEOMETRIDAE (Loopers)

- ✓ Both pairs of wings are angular and thin.
- ✓ Larva is naked and elongate. It shows protective resemblance to twigs or stems. Only two pairs of prolegs are present in sixth and tenth abdominal segments. It walks by drawing the posterior part of the body close to the thorax, the body forming a loop. It is also called inch worm, measuring worm and earth measurer.
- ✓ e.g. Tea looper, *Biston suppressaria*.



12. LYMANTRIDAE (Tussock moths)

- ✓ Antenna is bipectinate
- ✓ Legs are clothed with wooly hairs.
- ✓ Female is provided with a tuft of anal hairs.
- ✓ Larvae is densely hairy.
- ✓ e.g. Castor hairy caterpillar, *Euproctis fraterna*.



13. NOCTUIDAE (Noctua moths)

- ✓ They are medium sized, stoutly built moths.
- ✓ They are nocturnal and attracted to light.
- ✓ Labial palp is well developed.
- ✓ Crochets on the larval prolegs are all of one size and arranged in semi-circle.
- ✓ Some larvae are semiloopers. They have either three or four pairs of prolegs.

- ✓ Larvae attack the plants during night. Larvae of some species remain concealed beneath the surface of the ground or litter on the surface during day and feed on plants during night. They often cut small seedlings close to the ground and hence they are called cut worms.
- ✓ e.g. Tobacco cut worm, *Spodoptera litura*.



14. PTEROPHORIDAE (Plume moths)

- ✓ They are small lightly built moths
- ✓ Forewings are elongate with two to four clefts or fissures.
- ✓ Hindwings have three divisions
- ✓ Legs are long, slender and armed with prominent tibial spurs.
- ✓ e.g. Redgram plume moth, *Exelastis atomosa*.



15. PYRAUSTIDAE

- ✓ Proboscis is vestigial in many species.
- ✓ Labial palp is snout like.

- ✓ Larval habit varies. It may live among aquatic plants and bore into the stem or remain in silken web among spun up plants parts. Some larvae are aquatic and gill breathing.
- ✓ e.g. Rice stem borer, *Scirpophaga incertulas*.



16. SATURNIIDAE (Moon months, giant silk worm moths)

- ✓ They are large sized moths.
- ✓ Antenna is bipectinate.
- ✓ Transparent eye spots are present near the centre of each wing. The spots are either circular or crescent shaped.
- ✓ **Larva is stout and smooth with scoli.**
- ✓ Cocoon is dense and firm.
- ✓ e.g. Tussor silk worm, *Antheraea*
- ✓ *paphia* yields silk



17. SPHINGIDAE (Hawk moths, Sphinx moths, Horn worms)

- ✓ They are large sized stoutly built moths.
- ✓ Antenna is thick towards middle and hooked at the tip.
- ✓ Proboscis is very long.
- ✓ Forewings are elongated and pointed with very oblique outer margin.
- ✓ Hindwings are reduced in width fitting into the indented margin of forewings. They are powerful fliers.
- ✓ Larva is smooth with a middorsal horn (anal horn) on the eighth abdominal segment.
- ✓ Pupation takes place in earthen cells. In many species the proboscis is enclosed in a separate sheath.
- ✓ e.g. Death's head moth, *Acherontia styx* is a defoliator on gingelly. Markings present on the thorax of the adult moth resemble human skull.



SKIPPER FAMILY

18. HESPERIIDAE (Skipper)

- ✓ Antennae are widely separated at the base. They are dilated apically to form a gradual club. Each antenna is apically prolonged beyond the club into a hook or small recurved point.

- ✓ Wings are comparatively small. They are often held partly open at rest. Flight is erratic and darting.
- ✓ Larval head is large. There is a constriction beyond the head. Larva tapers towards both extremities. Larvae are often concealed in the host foliage.
- ✓ e.g. rice skipper, *Pelopidas mathias*.

