

**Classification of sericigenous insects, characteristic features of the order
Lepidoptera and the detailed study of the families
Bombycidae and Saturnidae.**

Dr. Mahesha H B, Yuvaraja's College, Mysore.

The insects comprise the largest and most highly developed group in the phylum Arthropoda. Silk spinning insects are called sericigenous insects. Silkworm belongs to the phylum Arthropoda and class insecta. The insects are characterized by the division of the body into three distinct regions called head, thorax and abdomen. The head consists of six fused segments and bears a pair of compound eyes, a pair of antennae and mouth parts. Thorax comprises three segments, each bearing a pair of legs and two pairs of wings born on the second and third segments. Abdomen comprises 7-11 segments and devoid of appendages. Respiration by branched tracheae, that divide and subdivide internally until they terminate the delicate network of tracheoles that reaches every organ, tissue and cell of the body. The circulatory system is of open type without capillaries and veins. Heart is elongated, tubular and is divided in to 8 chambers situated in the abdomen. Excretion by malpighian tubules. The nervous system consists of 2 large ganglia, a circum oesophageal ring and gangleonated ventral nerve cord. The exoskeleton / integument or body wall of the insect furnishes ample protection to the animal.

The class insecta is divided in to two subclass depending on the presence and absence of wings. They are apterigota and pterigota. The apterogota comprises primitive, wingless insects whereas pterigota contains winged insects. All wingless insects are grouped in to 4 orders. They are 1. Thysanura, 2. Protura, 3. Aptaera and 4. Collembola.

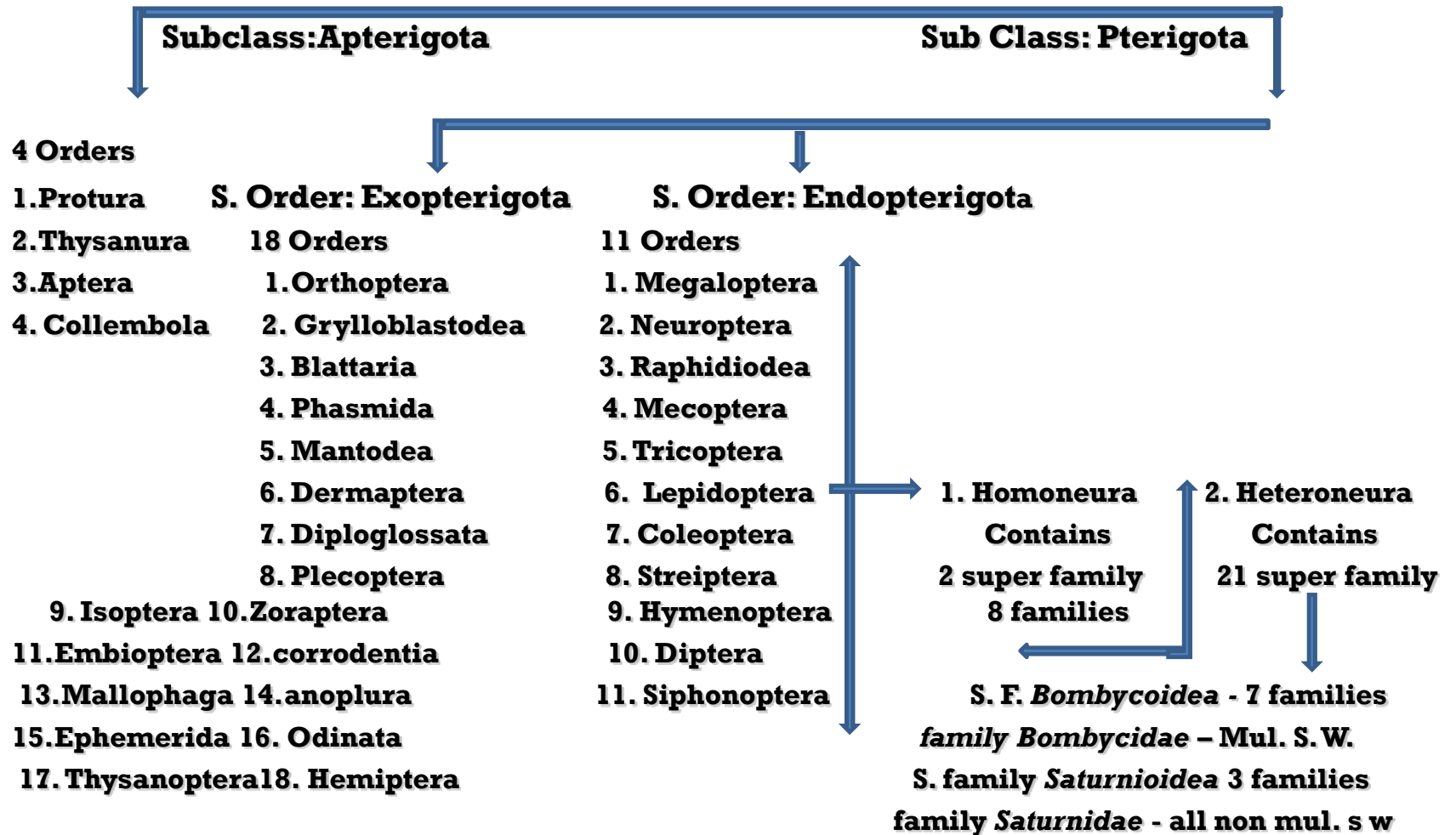
The winged insects or pterigota further bifurcated into two super order based on the type of development of wings. They are 1. Super order exopterigota and 2. Super order endopterigota.

Exopterigota is characterized by the external development of wings and simple metamoephosis (Heterometamorphosis) without pupal instar and represented by primitive larva called numph.

The super order endopterigota comprises the insects possessing a complete metamorphosis with pupal instar. Wings developed from internally and other organs are specialized and advanced. Exopterigota is further divided in to 18 orders 1.Orthoptera, 2. Grylloblastodea, 3. Blattaria, 4. Phasmida, 5. Mantodea, 6. Dermaptera, 7. Diploglossata, 8. Plecoptera, 9. Isoptera, 10.Zoraptera, 11.Embioptera, 12.Corrodentia, 13.Mallophaga, 14.Anoplura, 15.Ephemerida, 16.Odonata, 17. Thysanoptera and 18. Hemiptera.

The super order endopterigota is grouped as 11 orders including order Lepidoptera, which comprises all economically important moths and butterflies. They are 1. Megaloptera, 2. Neuroptera, 3. Raphidiodea, 4. Mecoptera, 5. Tricoptera, 6. Lepidoptera, 7. Coleoptera, 8. Streiptera, 9. Hymenoptera, 10. Diptera, and 11. Siphonoptera. (Refer following chart).

Insects belong in the Kingdom Animalia, Phylum Arthropoda
class insecta / hexapoda



MULBERRY SILKWORM CLASSIFICATION

Class – INSECTA

Order- LEPIDOPTERA

Super Family – BOMBYCOIDEA

Family- BOMBYCIDAE

Eg.,

1. *Bombyx mori* – Cultivated Silkworm

2. *Bombyx mandarina* – Wild ancestor of cultivated Silkworm

NON MULBERRY SILKWORM CLASSIFICATION

Class – INSECTA

Order- LEPIDOPTERA

Super Family – SATURNIOIDEA

Family - SATURNIDAE

Eg.,

1. *Antheraea pernyi* – The Chinese tasar silkworm

2. *Antheraea mylitta* - The Indian tasar silkworm

3. *Antheraea yamamai* – The Japanese tasar silkworm

4. *Antheraea assamensis* – The Indian muga silkworm

5. *Philosamia ricini* – The Indian eri silkworm

Characteristic features of order Lepidoptera

The name Lepidoptera, derived from the Greek words "*lepido*" for scale and "*ptera*" for wings, refers to the flattened hairs (scales) that cover the body and wings of most adults. Lepidoptera is the second largest order in the class Insecta.

- Medium to large sized flying terrestrial insects.
- Presence of flat overlapping scales & hairs covers body and wing.
- Metamorphosis is complex; eyes are large with 2 or more ocelli.
- The antennae variable; often clavate/serrate/hooks/plumose. In males it is large.
- Adult mouth parts are mandibulate to siphoning type, sometimes vestigial.
- Adults have two pairs of wings; rarely vestigial.

- The larvae/caterpillars are terrestrial, smooth, hairy, spiny, mandibulate/chewing mouth parts and phytophagous.
- 3 pairs of thoracic legs, 2-4 pairs of abdominal legs are present.
- The pupae are enclosed in either earthen/silken cocoon/mud/feces. Pupa exarate (having the antennae, legs, and wings free) to obtect (covered in a hard case with the legs and wings attached immovably against the body).

Characteristic features of the family Bombycidae

- The moths are medium sized, robust and densely covered with hairs or scales.
- Antennae are bipectinate in both the sexes and it large in males.
- The larvae are smooth with a dorsomedian horn / anal horn.
- Pupates in silken cocoons. Cocoons may be white/coloured.
- This group contains all mulberry silkworms.

Characteristic features of the family Saturniidae

- The adults are medium to large.
- The entire body and wing bases are covered with soft hairs.
- The wings often with transparent eye spot at the centre.
- Antennae are prominent, bipectinate in both the sexes and it is large in males.
- The larvae are fleshy, often conspicuously armed with long hairs, tubercles and spines. Larvae are polyphagous in nature.
- The cocoons are dense. Colour may be brown, green, silvery silk etc.,
- This group contains all non mulberry silkworms.
