

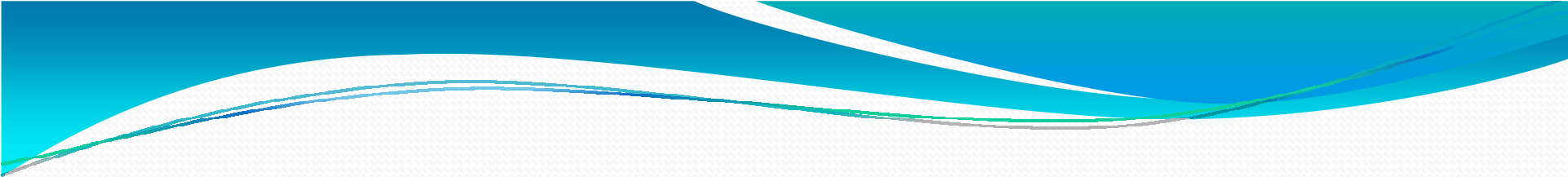


WELCOME

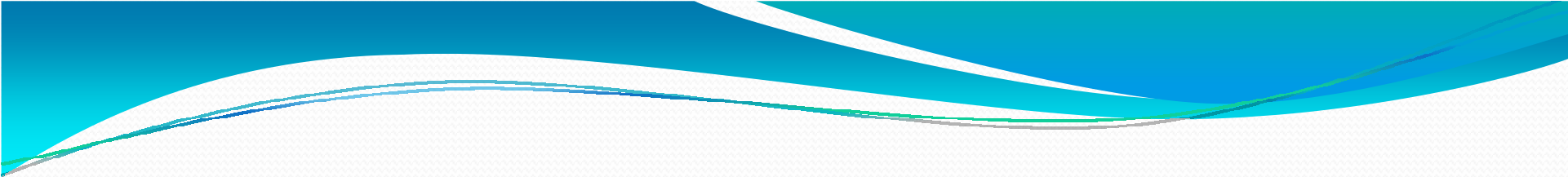
TO

DEPARTMENT OF SERICULTURE

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Classification of Sericigenous Insects



Scientific Classification is a system used to classify all living things starting with the largest grouping called a **Kingdom and continuing down to the smallest grouping called **Individual**.**

Scientific Classification

- **Kingdom**
- **Phylum**
- **Class**
- **Order**
- **Family**
- **Genus**
- **Species**

Kingdom - members of the animal kingdom move, eat food and reproduce

Phylum - Members have at least one major trait in common (ex. having a backbone) /Jointed Legs

Class - smaller group than phylum (ex. maybe these animals produce milk for their young) /Hexapoda/insecta

Order - EVEN smaller (ex. maybe these animals have long and sharp front teeth) /Moths/Butterflies

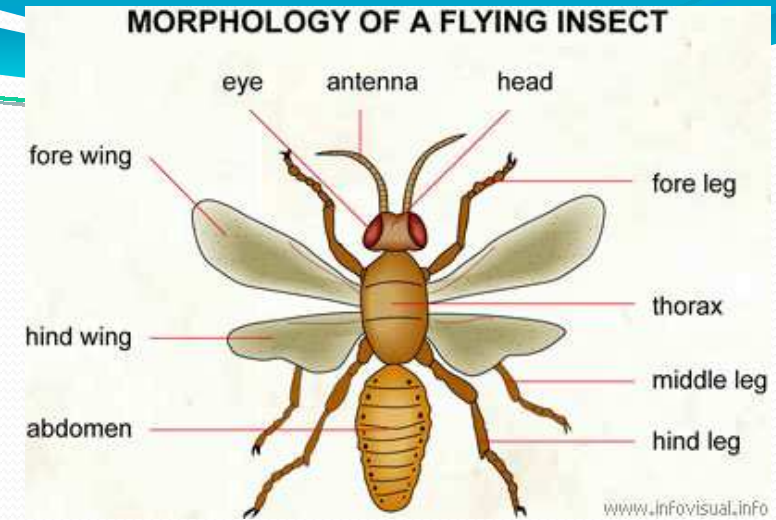
Family - Really small (ex. these animals may have a bushy tail) /Body covered with Scales/Hairs

Genus - Really really small (ex. the members of this group may climb trees)

Species - Really really really small - one type of organism (ex. brown black squirrel)

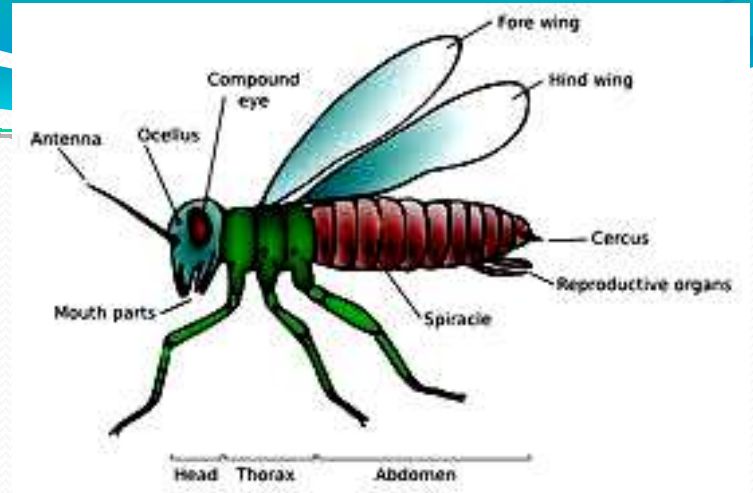
Class Insecta

The insects comprise the largest and most highly developed group in the phylum Arthropoda.

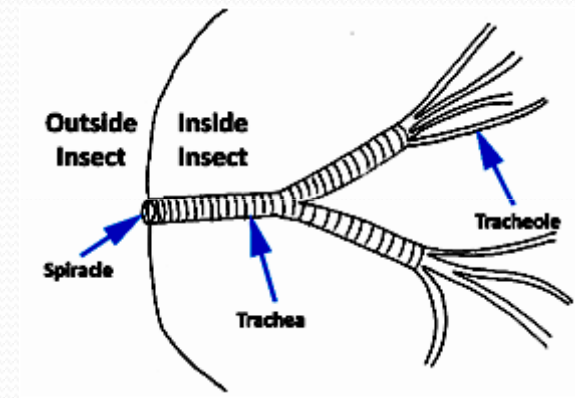


- **Body can be divided into head, thorax and abdomen.**
- **Head consists of 6 segments, compound eyes, a pair of antennae and mouth parts.**
- **Thorax comprises 3 segments, each bearing a pair of legs, 2nd & 3rd segments bear a pair of wings each.**

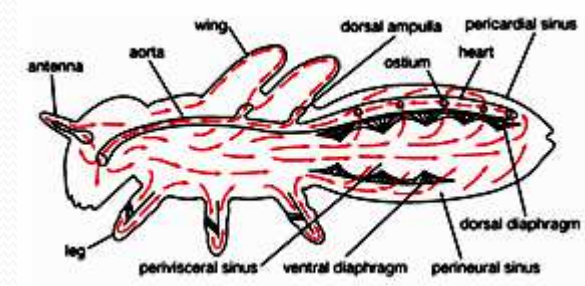
Abdomen comprises 7-11 segments & No Appendages – (A part or organ, such as an arm, leg, tail, or fin, that is joined to the axis or trunk of a body)



- Respiration by trachea.**



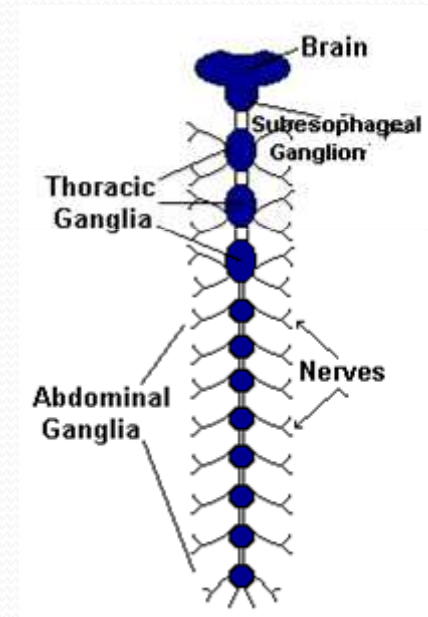
- Circulation is of simple & open type.**



Excretion by Malpighian Tubules.

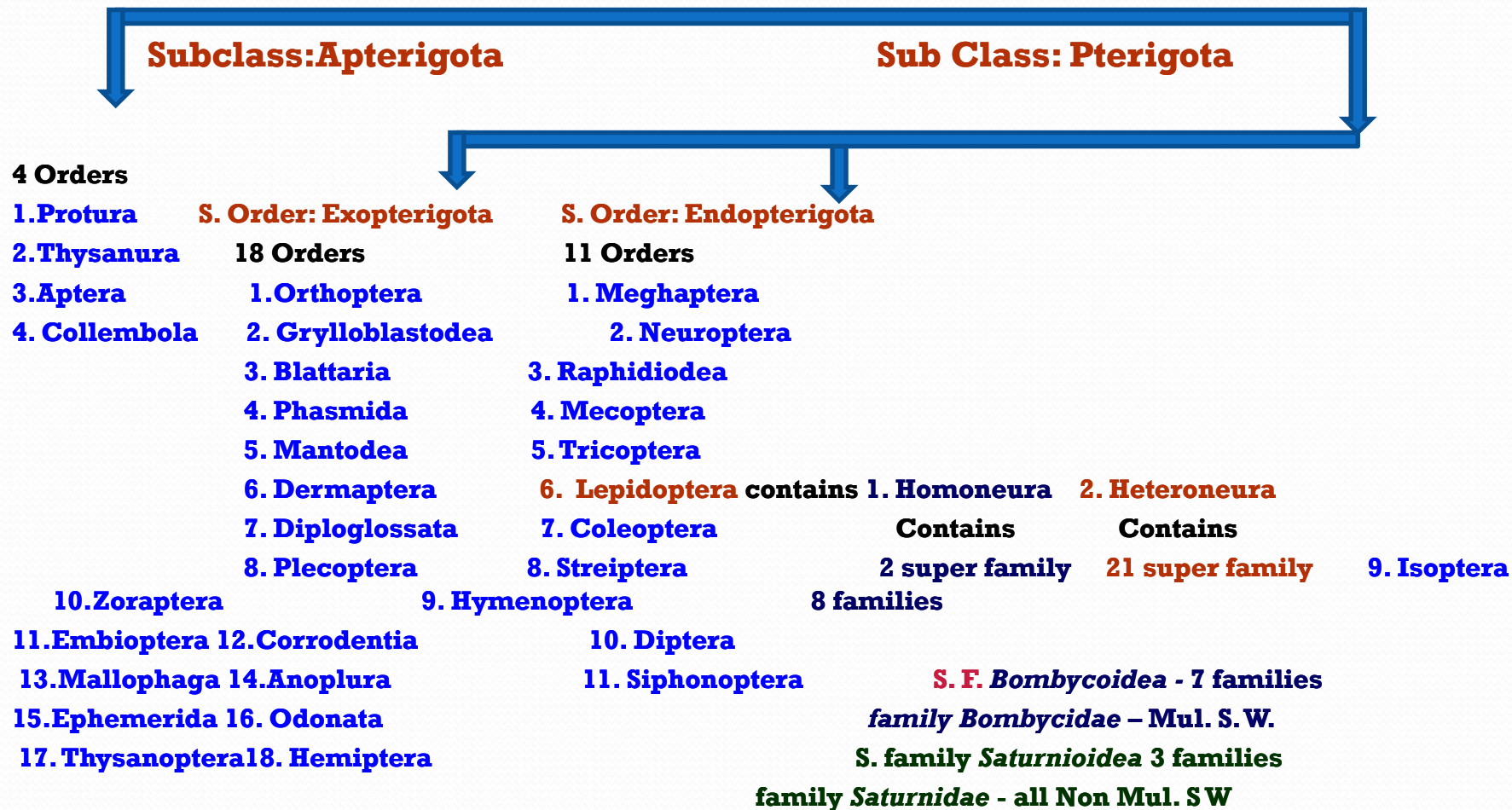


The nervous system – 2 large ganglia (brain) & ganglionated ventral nerve cord.



Exoskeleton made of a substance called chitin.

Insects belong in the Kingdom **Animalia**, Phylum **Arthropoda**
class Insecta / ↓ **Hexapoda**



Kindgom Animalia
Phylum Arthropoda
Class insecta / hexapoda



Family *Bombycidae* – MULBERRY SILKWORM – *Bombyx mori*

Family *Saturnidae* – NON MULBERRY SILKWORMS – *Tasr, Eri, Muga*

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. *Antherarea pernyi* – The Chinese tasar silkworm

2. *Antherarea mylitta* - The Indian tasar silkworm

3. *Antherarea yamamai* – The Japanese tasar silkworm

4. *Antherarea assamensis* – The Indian muga silkworm

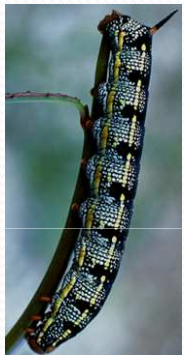
5. *Philosamia ricini* – The Indian eri silkworm

Lepidoptera

Includes:

Butterflies and Moths

- silkworm
- Budworm/Bollworm
- Pink Bollworm
- Tomato Hornworm
- Monarch

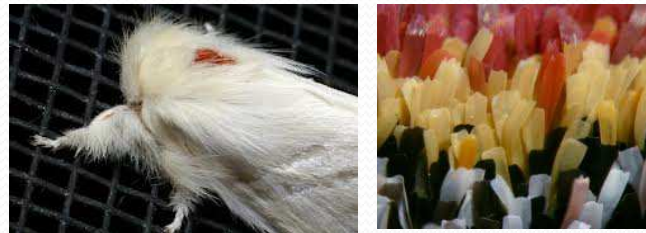


Characteristic features of the order Lepidoptera

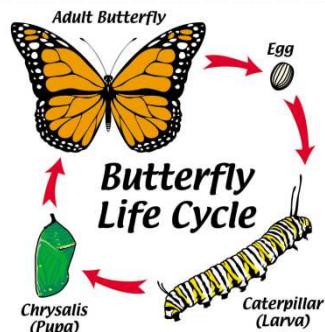
- Medium to large sized flying terrestrial insects.



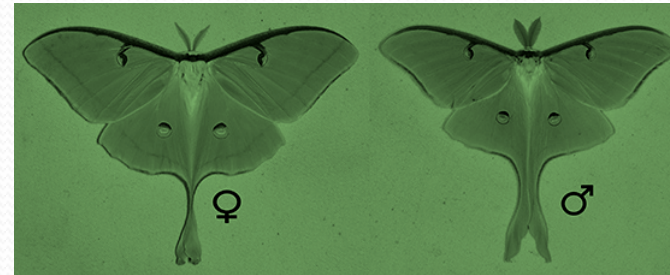
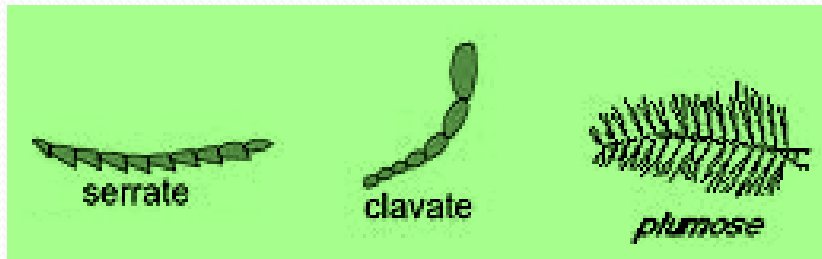
- Presence of flat overlapping scales & hairs, covers body and wing.



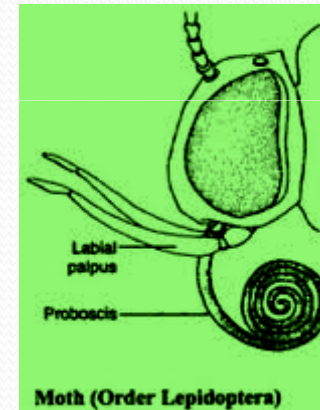
- Metamorphosis is complex, eyes are large with 2 or more ocelli.



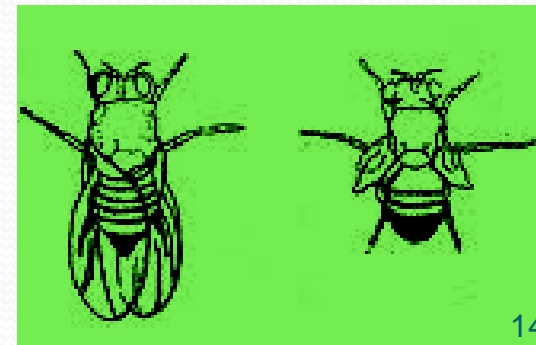
The antennae variable; often clavate/ serrate/ hooked/ plumose. In males it is large.



- Mouth parts is siphoning type in adults.**



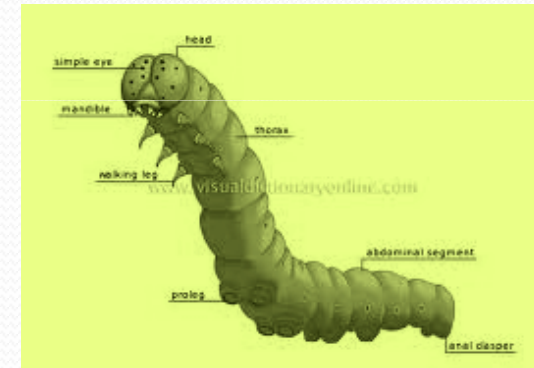
- They have two pairs of wings; rarely vestigial.**



- **The caterpillars are terrestrial, smooth, hairy, spiny, mandibulate/chewing mouth parts & phytophagus.**



- **3 pairs of thoracic legs, 2-4 pairs of abdominal legs are present.**



- **The pupae is enclosed in either earthen/silken cocoon/mud/faces.**



Characteristic features of family *Bombycidae*

- **The moths are medium sized, robust and densely covered with hairs or scales**
- **Antennae are bipectinate in both the sexes. Large in males**



- **The larvae are smooth with a densomedian horn / anal horn.**



- **Pupates in silken cocoons. May be white/coloured.**



- **This group contains all mulberry silkworms.**

Characteristic features of 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 sexes & large in males..**



- **The larvae often conspicuously armed with long hairs, tubercles & spines. & polyphagous.**



- **The cocoons are dense.**



- **This group contains all non mulberry silkworms.**

Definition/meaning



DIAPAUSING/ NON DIAPAUSING EGGS



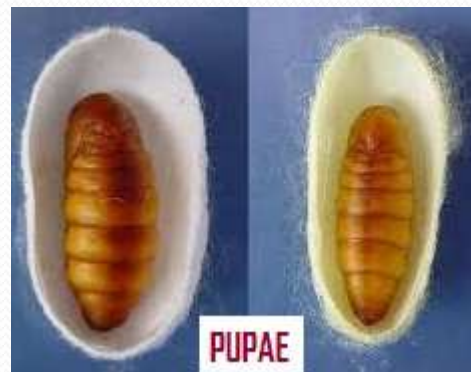
COCOON SHAPE & COLOUR



SILKWORM LARVA



SILKFILAMENT



PUPAE

Definition/meaning continued.....

Fecundity :- Total number of eggs laid by a female moth after mating.

Hatching %:-The number of larvae hatched from disease free layings.

$$\text{Hatching percentage} = \frac{\text{No. of eggs hatched in a laying}}{\text{Total no. of eggs per laying}} \times 100$$

Larval Duration:- Total duration in hours from the time of hatching to that of spinning.

Definition/meaning continued.....

Cocoon yield

Yield of cocoons by number:- This represents the survival rate of larvae that spin cocoons.

$$\text{Yield of cocoons by number} = \frac{\text{Total no. of cocoons harvested}}{\text{Total no. of larvae brushed}} \times 10,000$$

Yield of cocoons by weight:- It is the total quantity of good cocoons in kilograms obtained for a standard unit of 10,000 larvae brushed.

$$\text{Yield of cocoons by weight} = \frac{\text{Total wt. of cocoons}}{\text{Total no. of cocoons harvested}} \times \text{yield of cocoons by number}$$

Definition/meaning continued.....

Filament length: Total length of filament (meters) of single cocoon reeled using epprouvette (A reeling device for monococoon reeling).

Denier: Denier is the thickness of the filament and can be calculated using the following formula.

$$\text{Denier} = \frac{\text{Weight of the reeled silk}}{\text{Length of the reeled silk}} \times 9000$$

Leaf-Cocoon Ratio: Units of mulberry leaf required to produce one unit of cocoons.



**Acknowledgements/References
to**

- 1. Internet**
- 2. College Entomology by E O Essig, India,1982.**
- 3. Sericulture Manual II, FAO, Rome, 1987.**
- 4. Sericulture Manual III, FAO, Rome, 1987.**