

Insect classification and biodiversity

ENT-304

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PLECOPTERA (ptera-wings)

- Hind wing - large anal lobe
- Commonly called **Stoneflies**
- Adults mostly sit on stones

Characters:

Head:

- Antennae - long and setaceous.
- Mouthparts - chewing type but vestigial.

Thorax:

- Hind wings - larger than the front wings - anal lobes

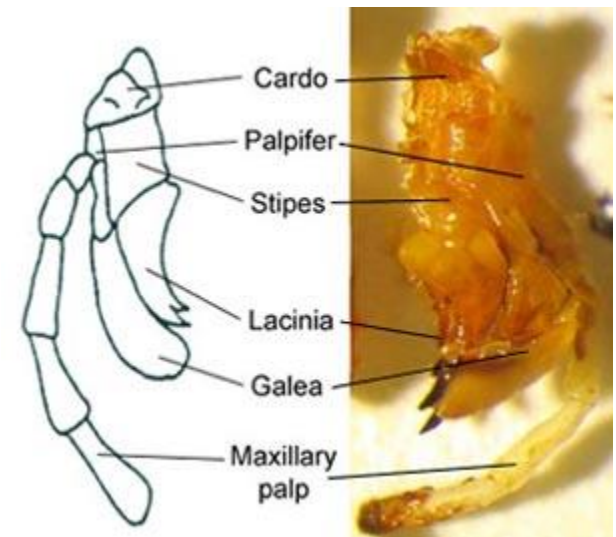
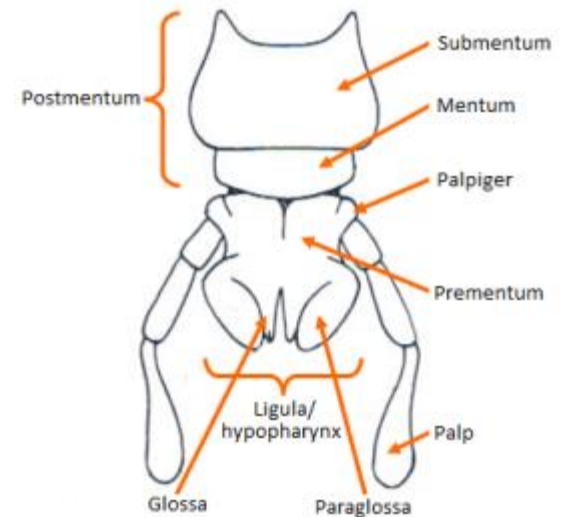
Abdomen:

- Abdomen ends into usually two long cerci.



Important characters

- **Glossa and Paraglossa:** Pair of small appendages of the labium of various insects – squeezing nectar from food
- The whole maxilla, including the lacinia and galea, move food particles backwards into cavity.
- The **maxillary palps** are sensory organs used to test the quality of the food.
- In addition to its role in directing food into the mouth, the galea is used to clean the palps



Classification

1. Suborder Archiperlaria:

- Large numbers of cross veins are found in wings.
- Glossae are equal to paraglossae.
- Maxillary palpi are filiform type.

2:-Suborder Filipalpia:

- Cross veins are much less.
- Glossae and paraglossae are equal in size.
- Maxillary palpi are filiform type.

3:-Suborder Setipalpia (with one family Perlidae *e.g. perla sp.*)

- Cross veins are much less
- Glossae are much shorter than the paraglossae.
- Maxillary palpi are seta like.

PLECOPTERA MOUTHPARTS



Collection

Collect from the stones lying near the lakes, streams, rivers etc in hilly areas

GRYLLOBLATTODEA (A cricket-to avoid light)

These insects are similar to crickets and avoid light and live in the caves in the mountains under the stones.

They are commonly called **grylloblattids** or **Rock crawlers**.

Characters

Head:

Antennae are long filiform

Mouthparts are chewing type

Thorax:

They are wingless or apterous insects.

All legs are similar, legs are not thick.

Abdomen:

Abdomen ends in two long and 8 segmented cerci.

The ovipositor is well developed



Classification

This order has only one family

Grylloblattidae

Collection

Can be collected at a height of 4,500 ft or above in the dark caves under the stones



ORTHOPTERA (straight wings)

- Front wings - long narrow and straight
- Grasshoppers, Locusts and Crickets etc.

Characters

Head:

- Antennae - long and of various types
- Mouthparts - chewing type

Thorax:

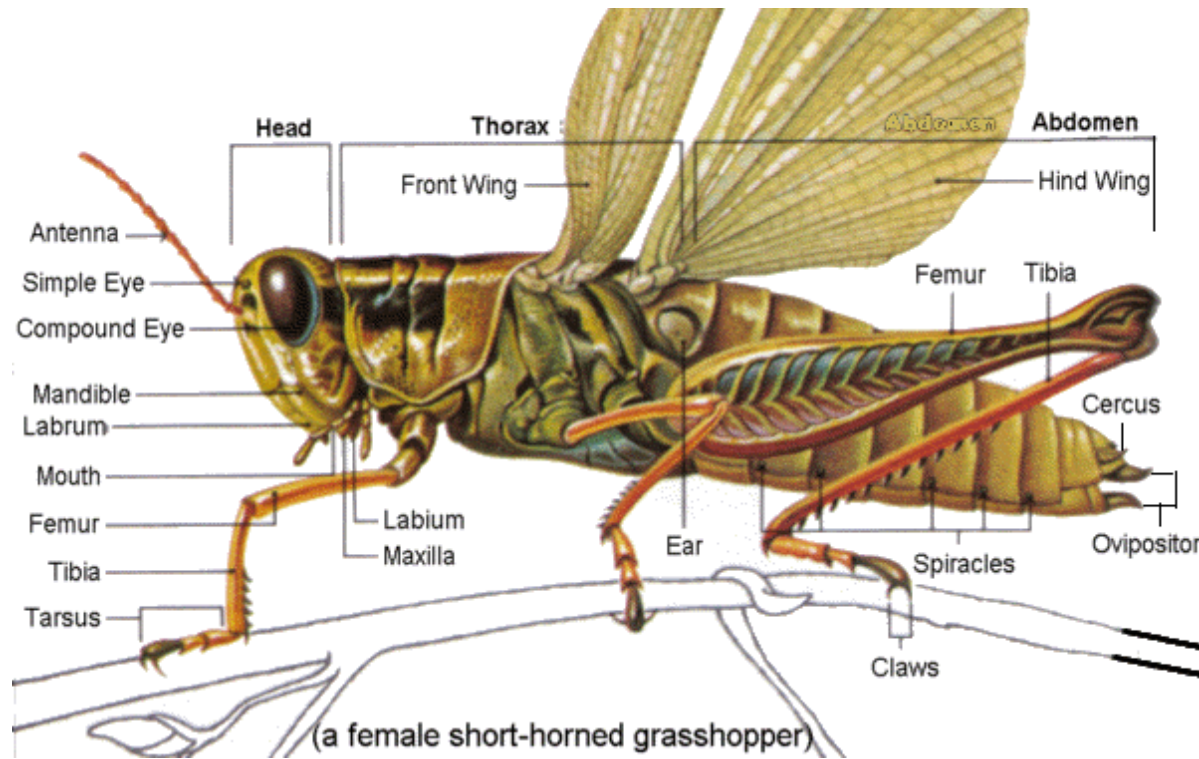
- Apterous - brachypterous, or macropterous
- Forewings - long narrow and slightly thickened and are thus called **tegmina**
- Hind wings - very broad, thin and membranous and folded under the front wings during rest



Abdomen:

- End of abdomen - cerci are short and unsegmented
- Female ovipositor - well developed
- **Specialized auditory** (hearing organs or ears)
- **Stridulatory organs** (sound producing organs)

- The best-known auditory organs of orthopterans [Tympanic organs](#)
- Found on each side of the abdomen in grasshoppers
- On the front tibiae of most crickets



STRIDULATORY MECHANISM

- Moving the hind leg across the folded front wing (tegmen)
- Rubbing one body part against another
- Striking some body part, such as the feet
- Vibrating some body part, such as the wings, in air
- Vibrating drum-like membranes
- Forcibly ejecting air or fluid

Classification

It is divided into two suborders

Suborder Ensifera

- Tympanum - on the tibial base of the proleg
- Antennae – equal or longer than the body and setaceous

Suborder Caelifera

- Tympanum - on the first abdominal segment
- Antennae are short and filiform

Families of the suborder Ensifera

1 - Family Shizodactylidae (Giant grasshopper)

- All legs are modified for digging purpose.
- Wings are coiled at their apex and apical margin somewhat coiled



Fig. 1. Giant grasshopper, *Tropidacris cristata*.

2 - Tettigonidae (Kattids and long horn grasshopper)

- Wings always green color
- Wings have midrib like structure
- Base of left tegmina overlap right tegmina
- In male cubito-anal portion – circular and transparent – modified for stridulation



3 - Family Gryllidae (crickets, house, field cricket)

- The auditory organs are present on the base of fore tibia
- The stridulatory organs present almost similar to the Tettigonidae but the size of mirror is larger than that of Tettigonidae



4 - Gryllotalpidae (Mole cricket)

- Fore leg modified for digging
- Fore tibia expanded – and claw present on it

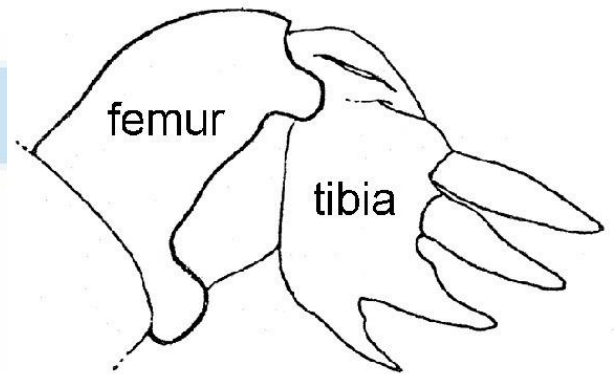
MOLE CRICKET

large black eyes

about one inch

Stocky, shovel-like front legs

gray to grayish tan in color



Families of suborder Caelifera

1 - Family Acrididae (e.g. locust)

- Pronotum short, not covering abdomen from above
- Tarsi are provided with an arolium between the claws
- Lower basal lobe of femur is shorter than the upper lobe



2 - Family Pyrgomorphidae (e.g. AK grasshopper)

- Lower basal lobe of hind femur is longer than the upper lobe
- Head is acutely conical.

Collection

These insects can be found on all types of vegetation, desert areas, ground cracks and crevices and beneath stones etc.

PHASMIDA (A Ghost)

Insects having protective resemblance to the foliage or more frequently twigs of the vegetation on which they occur or feed.

Leaf insects and **Stick insects**.

Characters

Head:

Antennae are short and filiform.

Mouthparts are chewing types.

Thorax:

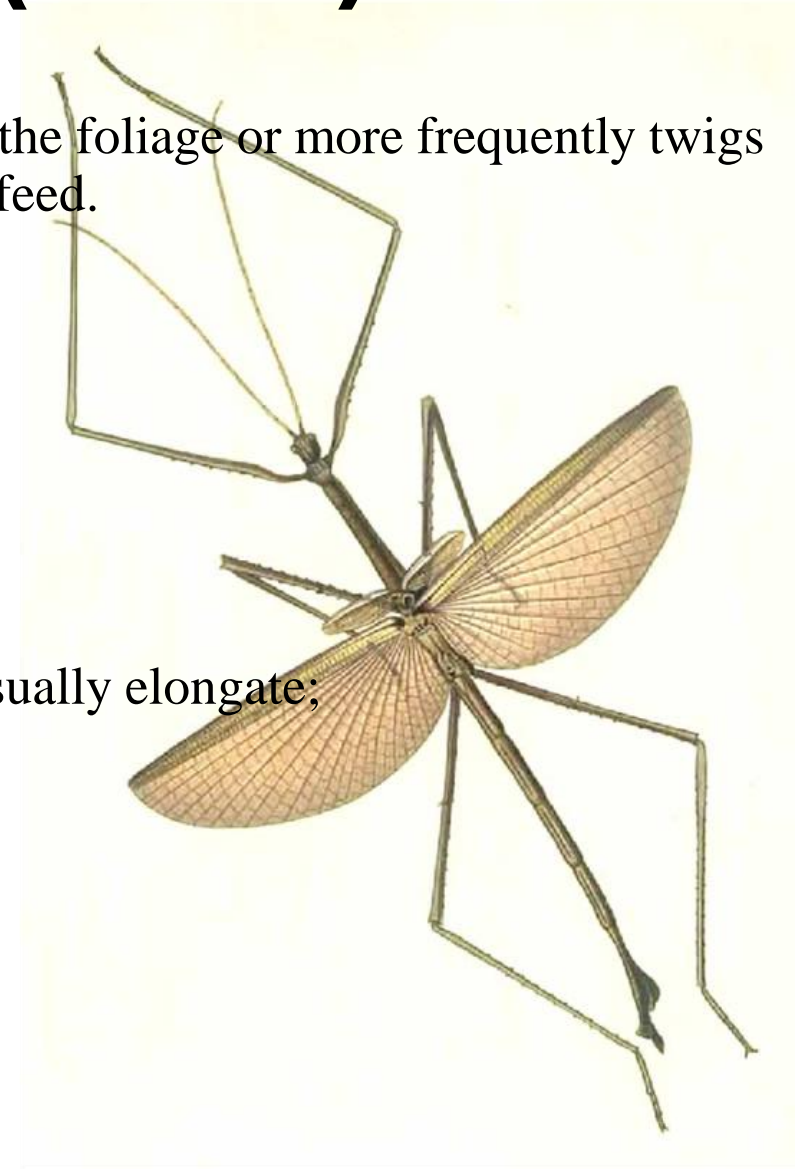
Prothorax short; meso and meta thorax usually elongate;

Tarsi always five segmented.

Abdomen:

Female genitalia (ovipositor) small.

Cerci are short and un-segmented.



Classification

It has two families

1. Family Phasmidae (e.g. Stick insect)

Body is enlarged, elongate, thin and cylindrical

2. Family Phylliida e(e.g. Leaf insect)

Body is depressed, flattened and leaf like



Collection

These insects can be collected from natural vegetation in tropical areas.

DERMAPTERA (skin wings)

Earwings with short skinny forewings

Characters:

Head:

Antennae are long filiform.

Mouthparts are chewing type.

Thorax:

Forewings - short, thick and without veins

Hind wings - semi-circular, membranous and thin

Abdomen:

Cerci terminate in a forceps like structure



Classification

1. Family Forficulidae (*Forficula sp.*)

Antennae are 14-15 segmented.

2. Family Labiduridae:

Antennae are 16-30 segmented. 4-6 segments are not longer than the 1st segment.

3. Family Labiidae:

Antennae are 11-13 segmented and segments 4-6 longer than 1st segment.

Collection

These insects are found in humid areas, in the crevices, under the heaps of leaves.

EMBIOPTERA

These are gregarious and active insects living in silk tunnels. They are commonly called **Web-spinner**.

Characters:

Head:

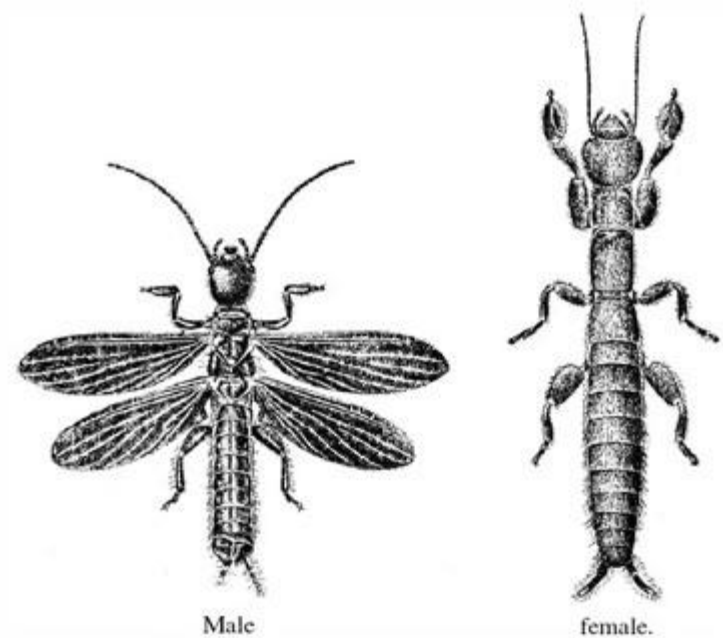
- Antennae are filiform.
- Mouthparts are chewing type.

Thorax:

- Wings are similar.
- Radius is thick to form a broad black stripe.
- In case of male wings are well developed, While the female is wingless (larviform).
- The phenomenon is known as (**sexual dimorphism**).
- Tarsi 3 segmented.
- 1st segment of front tarsi is greatly swollen to contain silk gland.

Abdomen:

- Abdomen is 10 segmented,
- cerci are 2 segmented



Embia major (Embiodoptera).

From A. D. Imms, 1913, On *Embia major* n. sp. From the Himalayas, *Trans. Linn. Soc. Zool.* 11:167-195.



Collection

These can be collected from silk tunnels on the ground

Family Embiididae (e.g. *Embia* sp.)