

Subject: Fundamental of Entomology

Class: Ist yr, II Sem

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STRUCTURE OF INSECT HEAD

Insect head is a Anterior most part of insect body it is hard and highly **sclerotized** compact structure which consisting of six segments that are fused to form a **head capsule**. The insect head consists of mouthparts, compound eyes, simple eyes (ocelli) and a single pair of antennae.

The head segments can be divided in to two regions i.e. **procephalon** and **gnathocephalon** (mouth).

Insect head formed by the fusion of six segments that can be divided in to two regions i.e. **procephalon** and **gnathocephalon** (mouth parts).

Six segments of head are represented as.

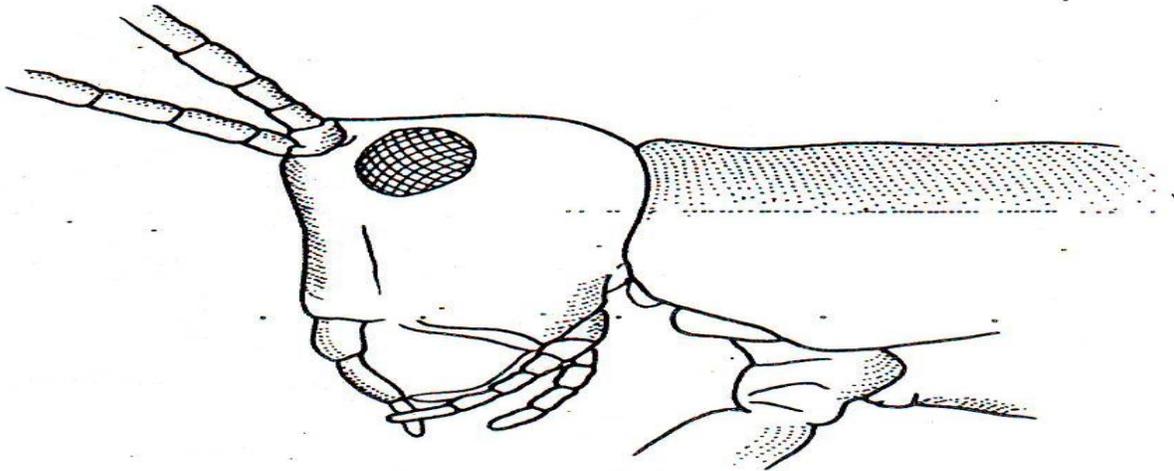
Segment	Appendages
I Pre antennary segment	No appendages
II Antennary segment	Antennae
III Intercalary segment	No appendages
IV Mandibular segment	Mandibles
V First maxillary segment	Maxillae
VI Second maxillary / labial segment	Labium

TYPES OF INSECT HEADS

Based on the inclination of long axis of the head and orientation of mouth parts there are three types of insect heads.

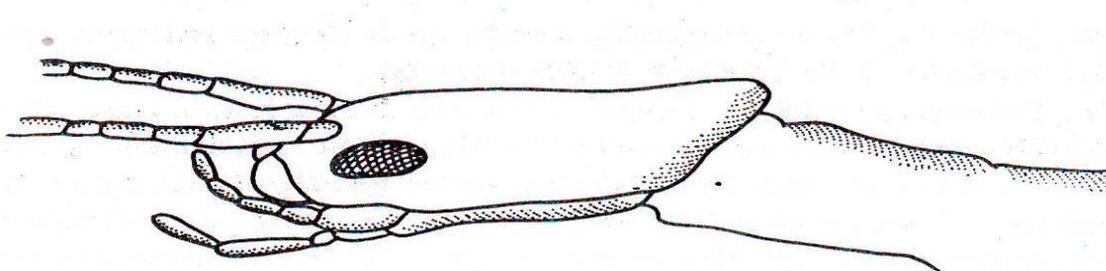
(a) Hypognathous (Hypo – Below: Gnathous – Jaw)

The head remain vertical and is at right angle to the long axis of the body and mouth parts are ventrally placed and projected downwards. This is also known as **Orthopteroid** type.. **Eg:** Grass hopper, Cockroach



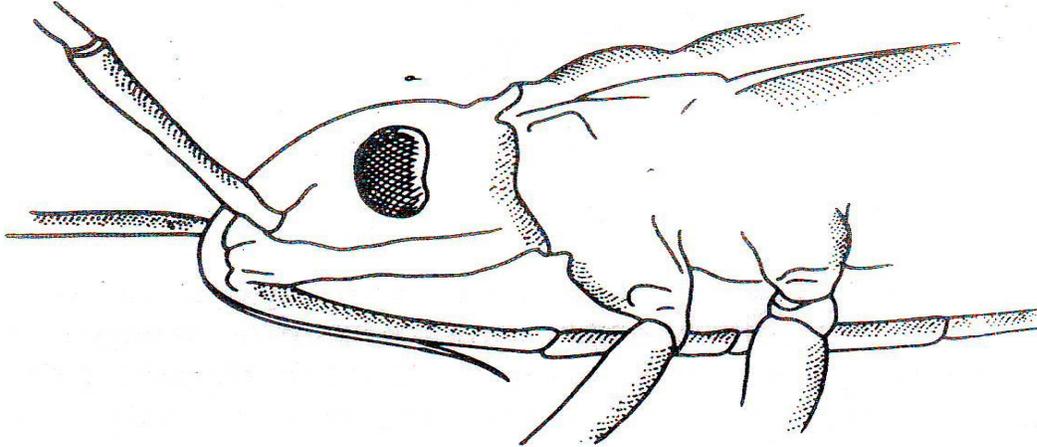
(b) Prognathous : (Pro – in front: Gnathous – Jaw)

The head remains in the same axis to body and mouth parts are projected forward.. This is also known as **Coleopteroid** type..Eg: beetles



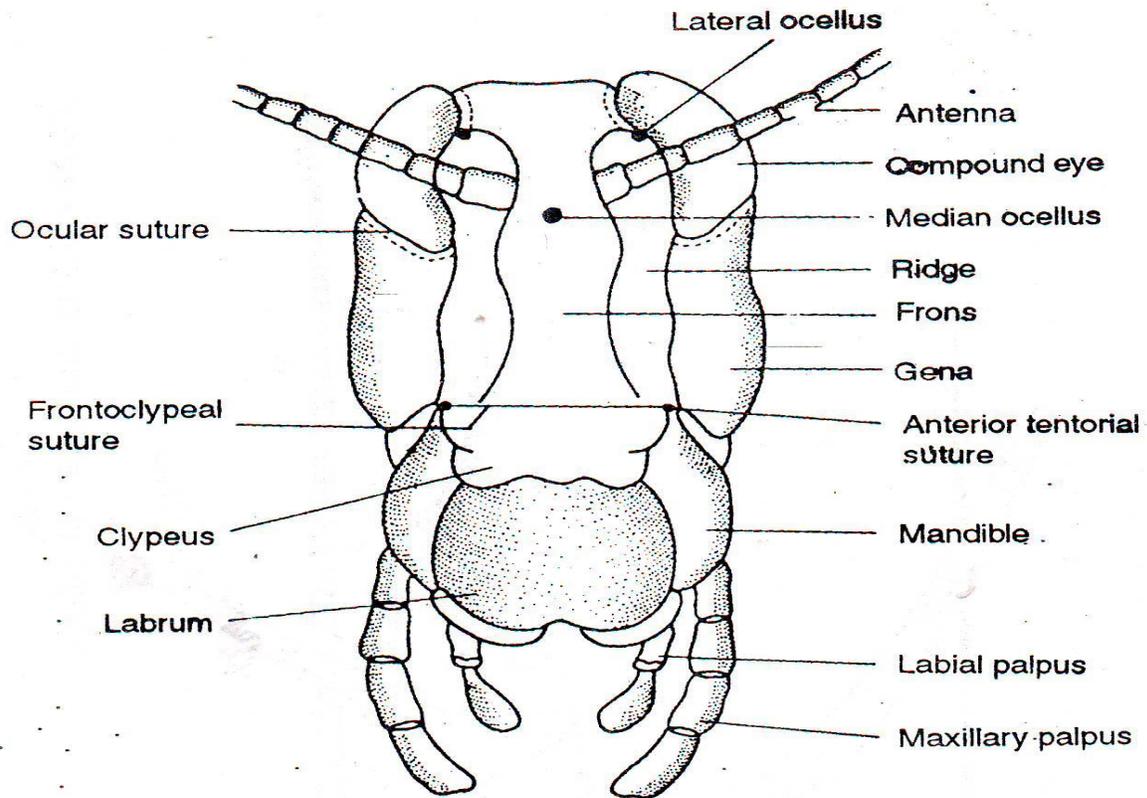
(c) Opisthognathous : (Opistho – behind: Gnathous – Jaw)

It is same as prognathous but mouthparts are directed back ward and held in between the fore legs. .This is also known as **Hemipteroid or Opisthorhynchous..** Eg: bugs

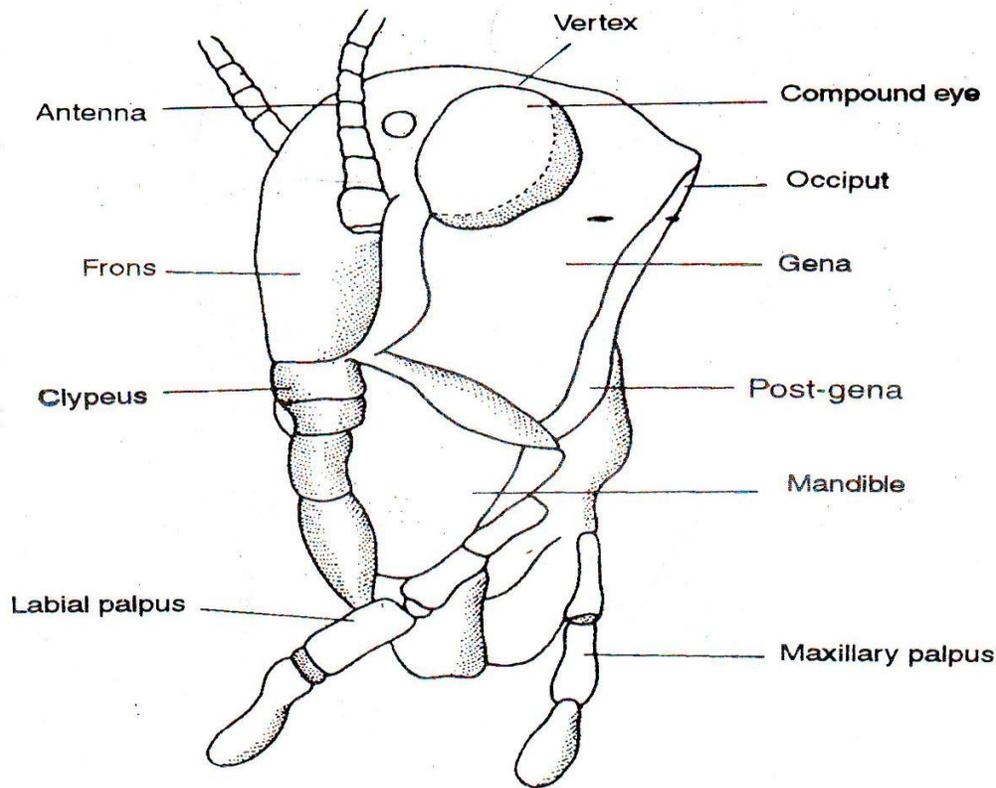


Sclerites and Sutures of Head

The head capsule is formed by the union of number of sclerites or cuticular plates or areas which are joined together by means of cuticular lines or ridges known as **Sutures**. These sutures provide **mechanical support** to the cranial wall.



Frontal View of Insect Head



Lateral View of Insect Head

Sclerites of Head

A general insect posses the following sclerites.

1. **Labrum** : It is small sclerite that forms the upper lip of the mouth cavity. It is freely attached or suspended from the lower margin of the **clypeus**.
2. **Clypeus**: It is situated above the labrum and is divided in to anterior **ante-clypeus** and posterior **post-clypeus**.
3. **Frons** : It is the facial part of the insect consisting of **median ocellus**.
4. **Vertex** : It is the top portion of the head behind the frons or the area between the two compound eyes.
5. **Epicranium** : It is the upper part of the head extending from vertex to occipital suture.
6. **Occiput** : It is an inverted “U” shaped structure representing the area between the epicranium and post occiput .

7. **Post occiput** : It is the extreme posterior part of the insect head that remains before the neck region.
8. **Gena** : It is the area extending from below the compound eyes to just above the mandibles.
9. **Ocular sclerites** : These are cuticular ring like structures present around each compound eye.
10. **Antennal sclerites** : These form the basis for the antennae and present around the scape which are well developed in Plecoptera (stone flies).

All the above sclerites gets attached through cuticular ridges or sutures to provide the attachment for the muscles inside.

Sutures of Head

The common sutures present in head are

- 1) **Clypeolabral suture** : It is the suture present between clypeus and labrum. It remains in the lower margin of the clypeus from which the labrum hangs down.
- 2) **Clypeofrontal suture or epistomal suture**: The suture present between clypeus and frons.
- 3) **Epicranial suture**: It is an inverted 'Y' shaped suture distributed above the facial region extending up to the epicranial part of the head. It consists of two arms called **frontal suture** occupying the frons and stem called as **coronal suture**. This epicranial suture is also known as **line of weakness** or **ecdysial suture** because the exuvial membrane splits along this suture during the process of ecdysis.
- 4) **Occipital suture**: It is 'U' shaped or horseshoe shaped suture between epicranium and occiput.
- 5) **Post occipital suture**: It is the **only real suture** in insect head. Posterior end of the head is marked by the post occipital suture to which the sclerites are attached.

As this suture separates the head from the neck, hence named as real suture.

6) **Genal suture:** It is the sutures present on the lateral side of the head i.e. gena.

7) **Ocular suture:** It is circular suture present around each compound eye.

8) **Antennal suture:** It is a marginal depressed ring around the antennal socket.