

Salahaddin University – Erbil
College of Science
Environmental Science and Health Department
2nd Stage



2nd Lecture in Insect Ecology

The Insect Head

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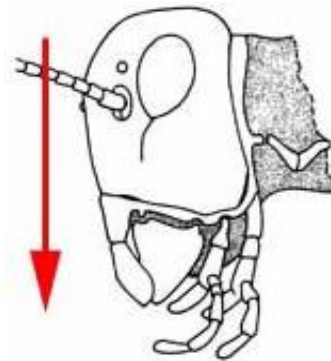
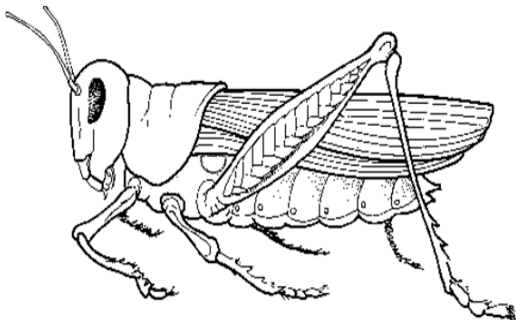
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- The insect head is a strongly sclerotized capsule joined to the thorax by a flexible membranous neck.
- The head of an insect is composed of a series of segments, which are specialized for:
(1) Ingestion of food, (2) major sensory perception, (3) Protection of the coordinating centers.



The Orientation of Mouthparts in Insects can be:

1-Hypognathous condition: long axis of head is at vertical to the long axis of insect body (the mouth part hang at right angles to the body). This orientation occurs most commonly in phytophagous species, e.g. Orthoptera: grasshopper, Hymenoptera: honey bee and Diptera: housefly.





Hypognathous

Hymenoptera: honey bee

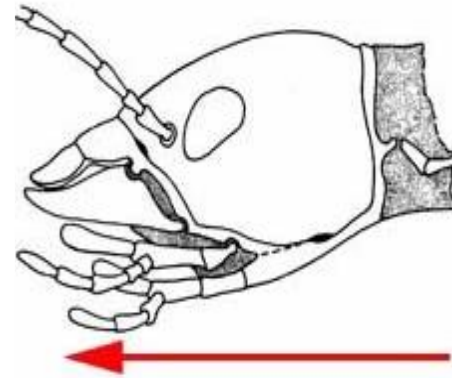
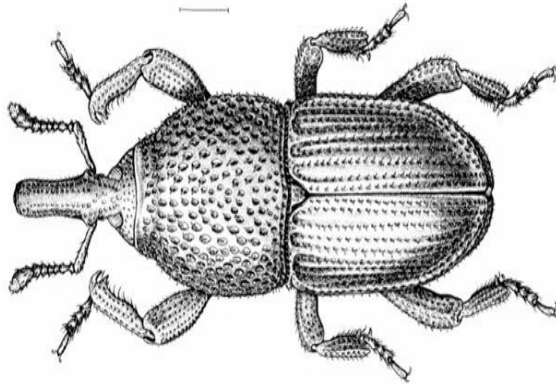


Hypognathous
Orthoptera: grasshopper



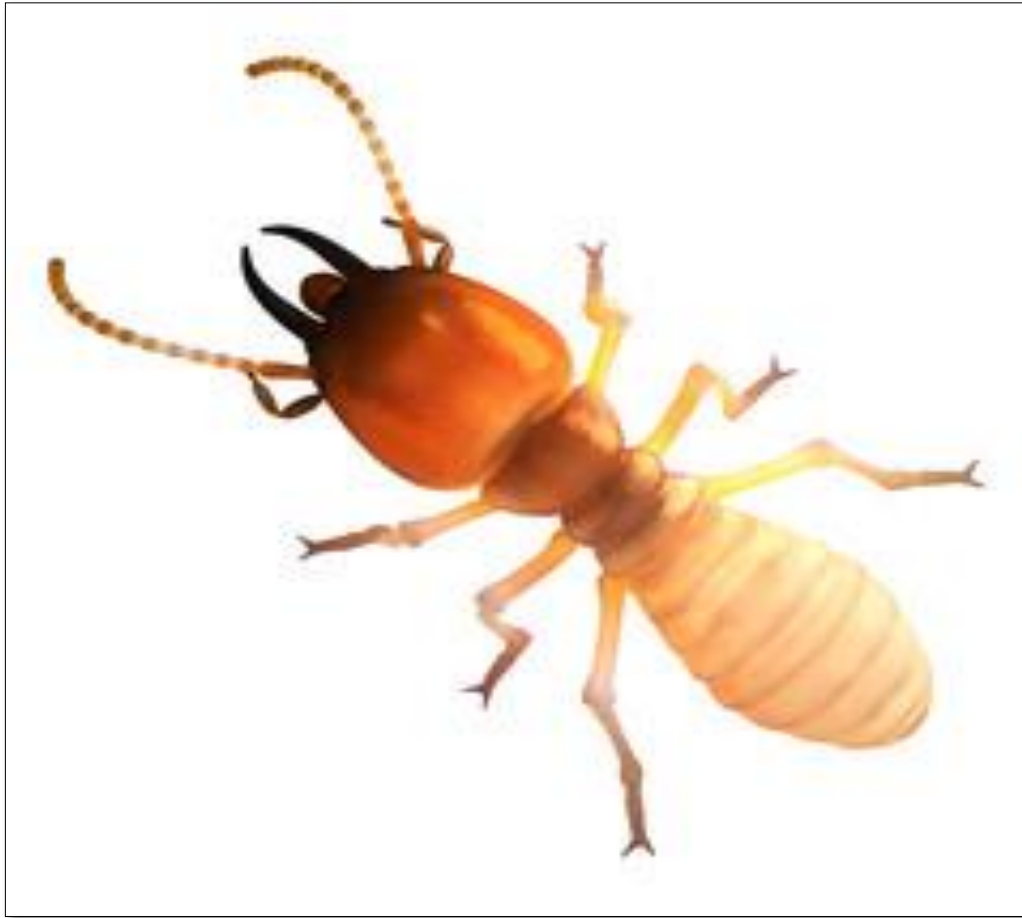
**Hypognathous
Diptera: housefly**

2-Prognathous condition: the mouthparts project forward, is commonly seen in carnivorous species and forms that burrow in wood and soil, e.g. Coleoptera: weevil beetle and Isoptera: termites.



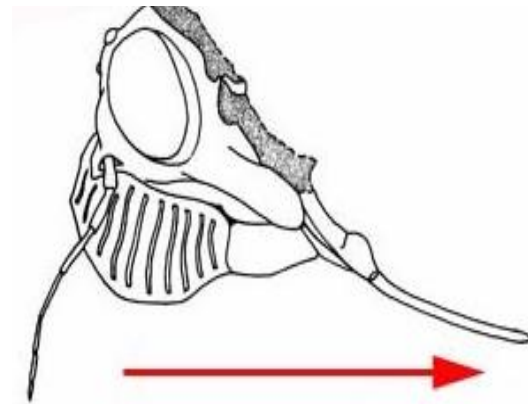


Prognathous
Coleoptera: weevil beetle



**Prognathous
Isoptera: termites**

3-Opisthognathous condition: in which, the elongate proboscis slopes backwards between the forelegs, e.g. Hemiptera: whiteflies and bugs.





**Opisthognathous
Hemiptera: whiteflies**



**Opisthognathous
Hemiptera: bug**

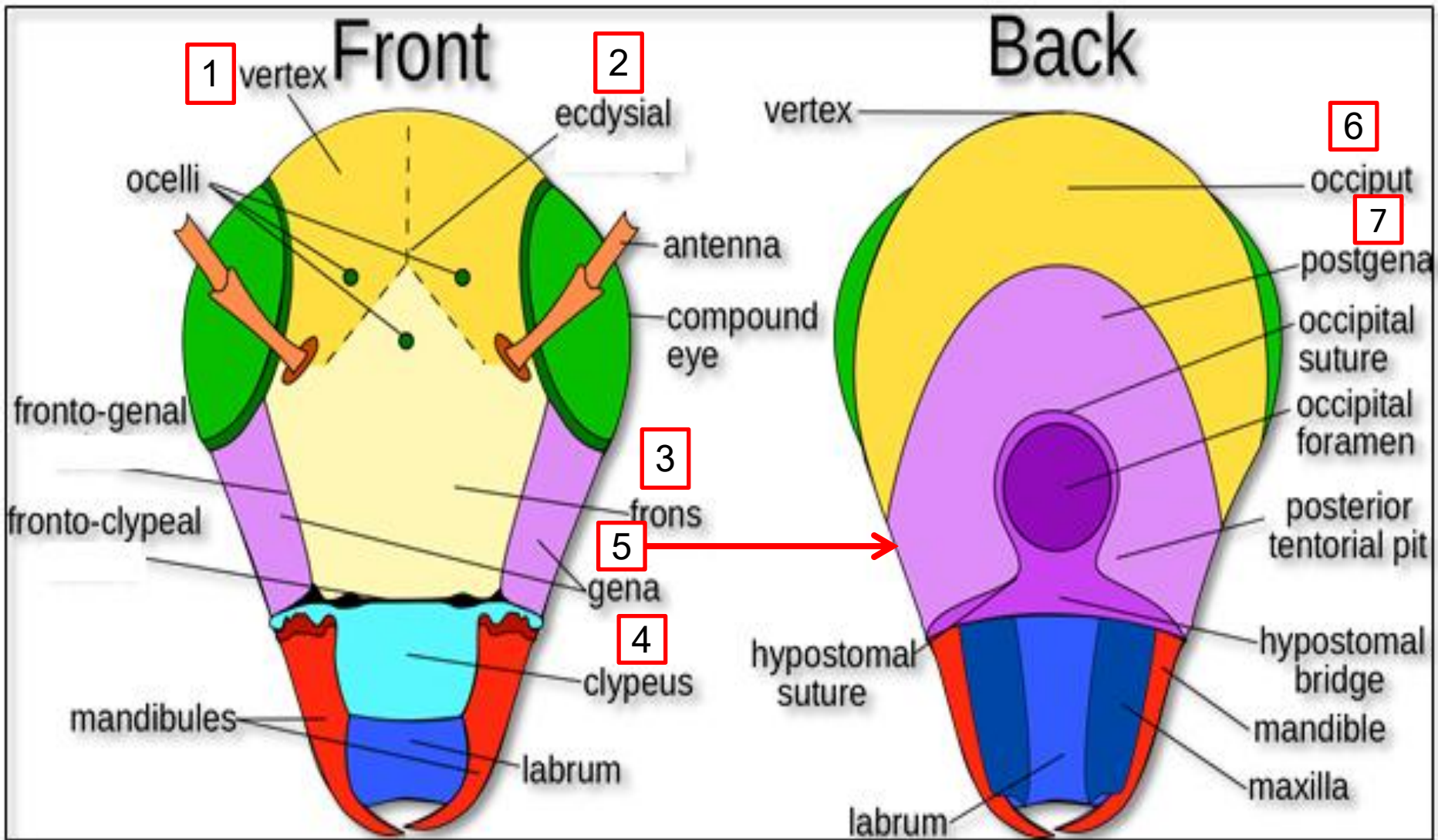
A. Special structure of the head capsule.

- 1. Compound eyes:** are large many faceted structures, each eye surrounded by ocular sclerite.
- 2. Ocelli:** are 3 single-faceted organs situated on the face and usually between compound eyes.
- 3. Antennae (sense organs):** are pair of movable segmented appendages which arise from the face usually between eyes.
- 4. Mouthparts:** include labrum , mandible, maxillae and labium.

B. Principle sclerite and structure

As seen in following figures the head consist of many sclerites and sutures.

1. **Vertex:** Is the top of the head capsule.
2. **Epicranial suture (Ecdysial suture):** Y-shaped suture exists in immature stage between antennae ends, it fracture during molting and permit the old cuticle to shed.
3. **Frons or front:** sclerite located in the forehead, the median ocellus occurs in this sclerite, it is bounded by fronto-clypeal suture (epistomal sulcus).
4. **Clypeus:** is liplike area between epistomal sulcus and labrum.



5. **Gena:** is the lower part of the head beneath the eyes and posterior to the frons.
6. **Occiput:** is the area comprising most of the back of the head, it is divided from the vertex by occipital suture.
7. **Postgena:** the ventral portion of the entire occipital area.
8. **Post occiput:** is narrow ring like sclerite which forms the margin of occipital foramen, it is separated from occiput by the postoccipital suture.

Occipital foramen: which connects the cavity of the head to that of the body; through it the **nerve cord, tracheae, the digestive system, muscles sometimes the dorsal blood vessel,** and so on.

