INSECT

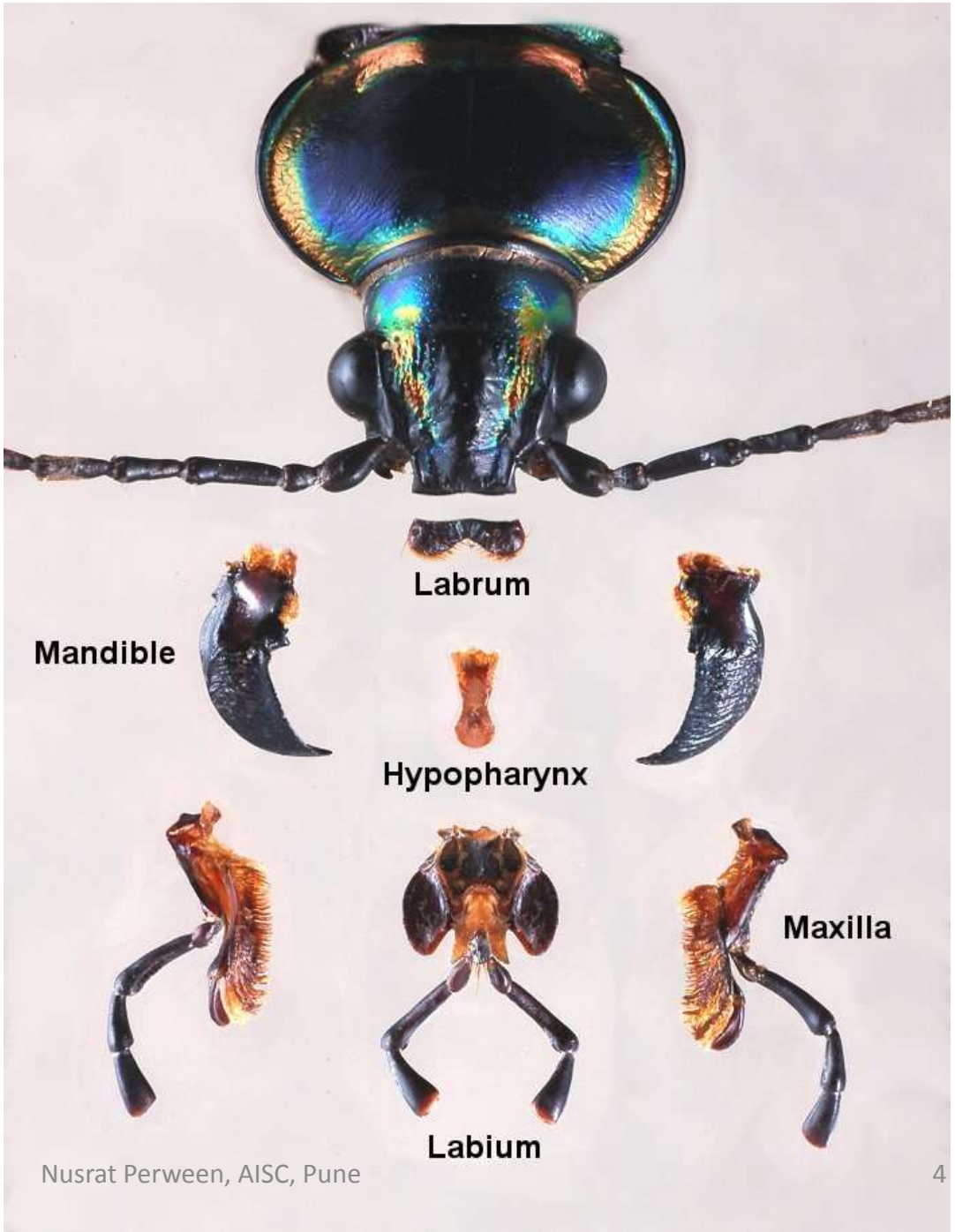
MOUTH PARTS


SPONGING MOUTHPARTS
SIPHONING MOUTHPARTS
SUCKING MOUTHPARTS
CHEWING MOUTHPARTS

Mandibulate Mouthparts

- In all "primitive" insects, the mouthparts are adapted for grinding, chewing, pinching, or crushing solid food. These are known as "**mandibulate**" mouthparts because they feature prominent chewing mandibles.

five basic components of mouthparts:



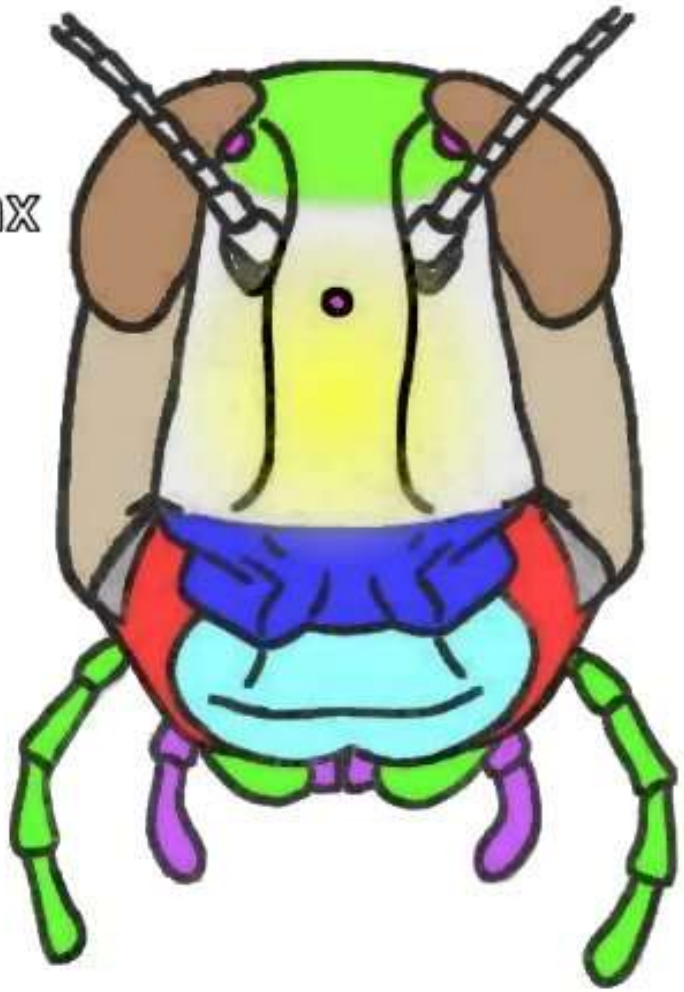
Labrum

Mandibles

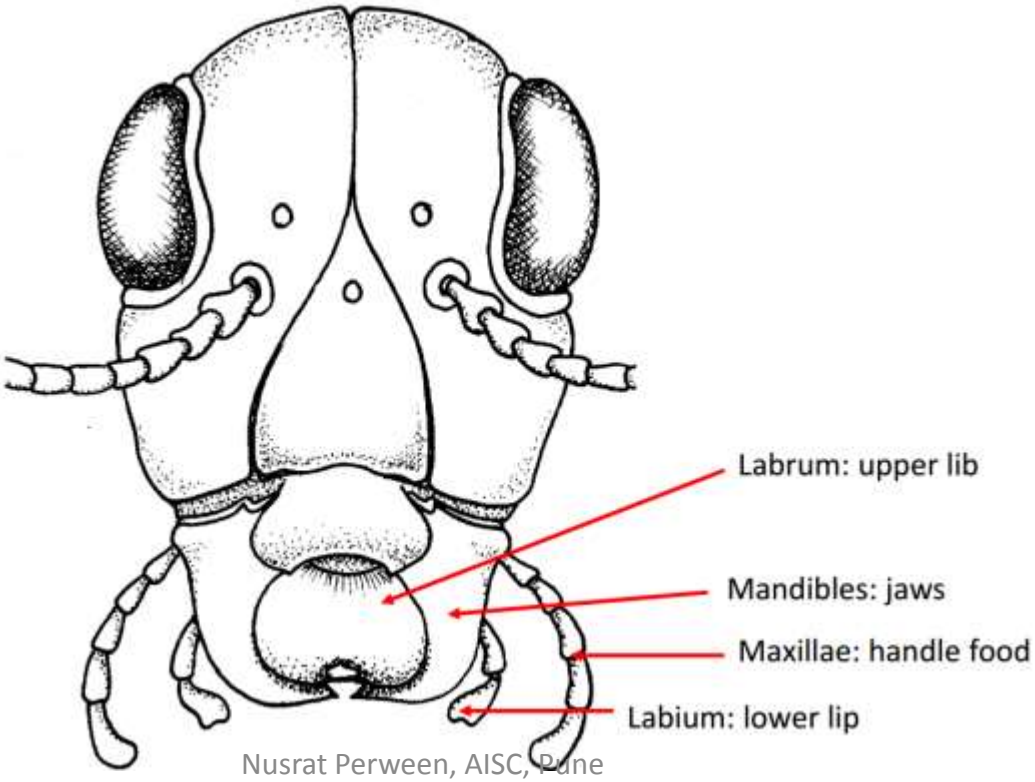
Maxillae

Hypopharynx

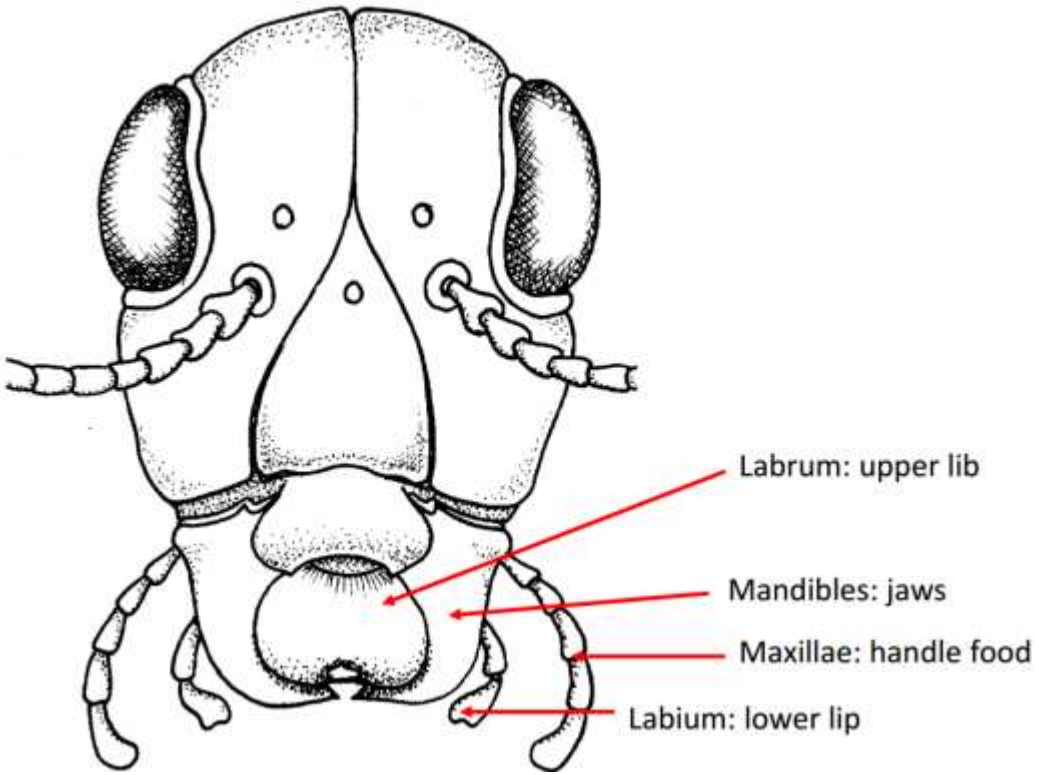
Labium



- **Labrum** (upper Lip)— simple flap ,covers the upper jaw
- **Mandibles** (upper jaw)— a pair of jaws for crushing or grinding the food.



- **Maxillae** (lower Jaw)— sensory in function, taste
- **Hypopharynx** (tongue) — a tongue-like process that helps mix food and saliva.
- **Labium** — (lower lip) sensory in function



Types

- Biting and chewing

- lapping

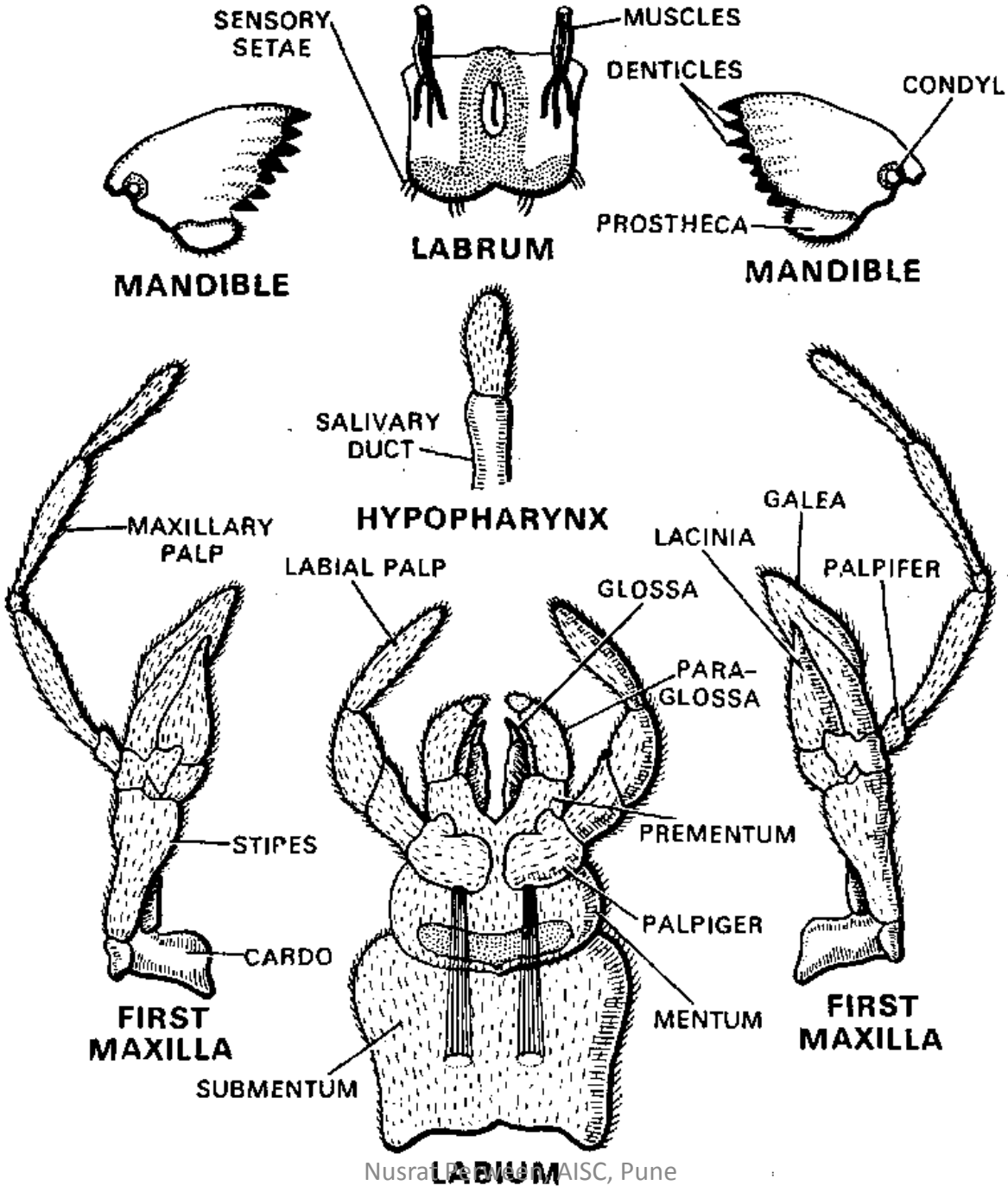
- Piercing and sucking

- Sponging

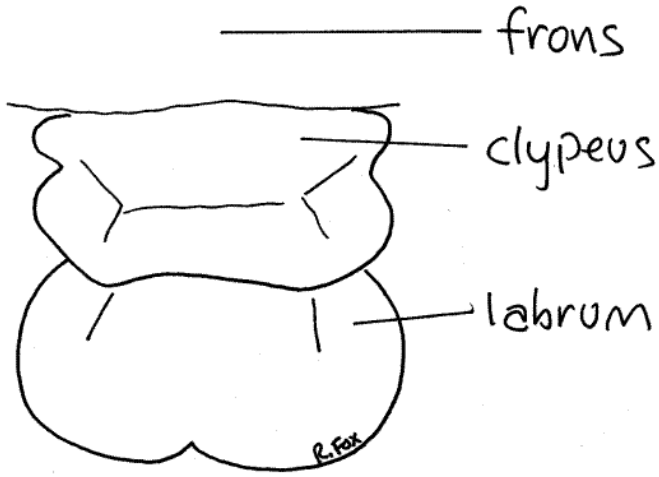
- Siphoning

Biting and chewing

- basic and most primitive type of mouthparts
- grasshopper, cockroach and beetles
- **i. Labrum**
- **ii. Epi-pharynx**
- **iii. Mandibles**
- **iv. Maxillae**
- **v. Labium**
- **vii. Hypopharynx**


SENSORY SETAE
MUSCLES
DENTICLES
CONDYL
PROSTHECA
LABRUM
MANDIBLE
MANDIBLE
SALIVARY DUCT
HYPOPHARYNX
MAXILLARY PALP
LABIAL PALP
GLOSSA
PARA-GLOSSA
GALEA
LACINIA
PALPIFER
STIPES
CARDO
PREMENTUM
PALPIGER
MENTUM
FIRST MAXILLA
FIRST MAXILLA
SUBMENTUM
LABIUM

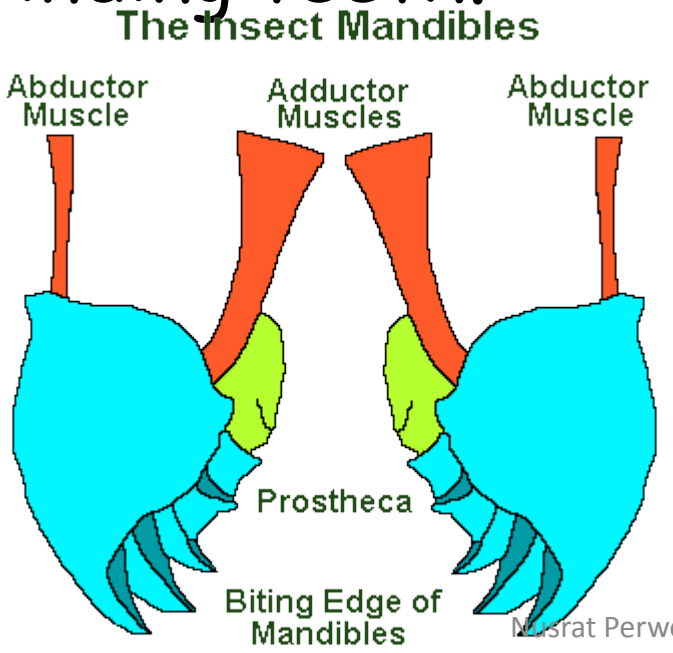
- **i. Labrum:**
- flap like bilobed structure attached to the clypeus.
- It helps to guide the food into the mouth and also holds the food in position so that mandibles can act on it.

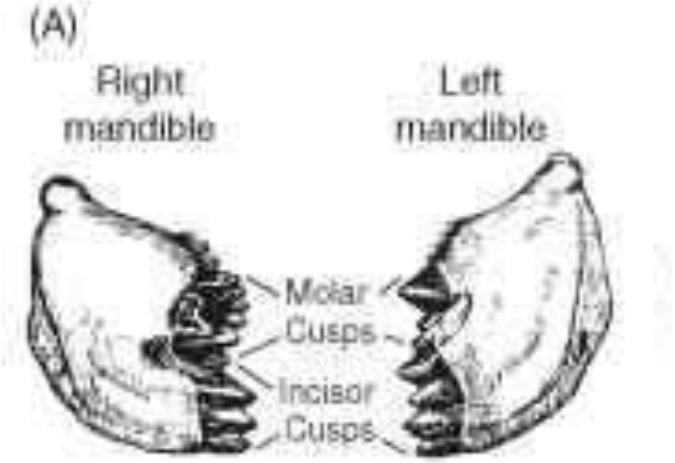


- ii. **Epipharynx** is identified as a swollen area of the ventral surface of the labrum, which is an organ of taste.

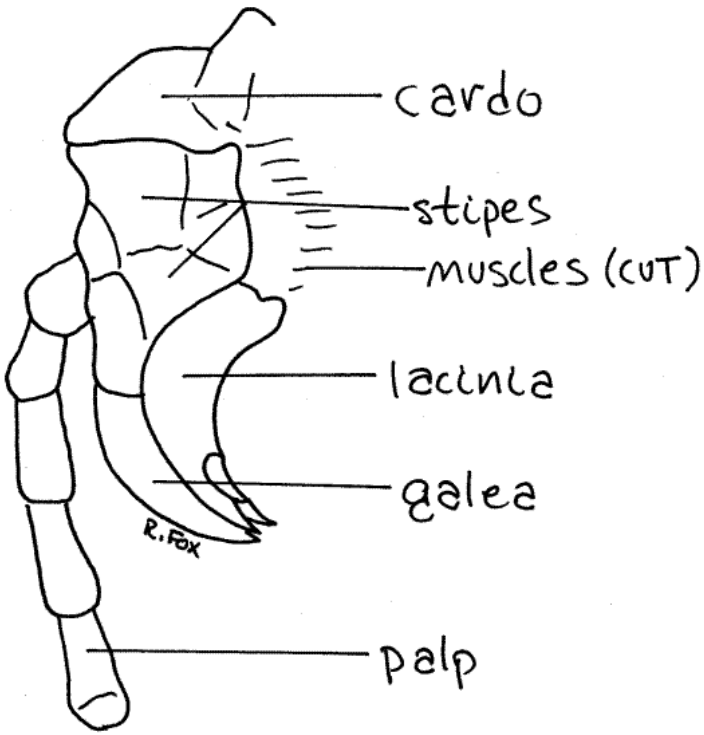
- **iii. Mandibles:**
- They are also called as primary or true jaws
- and concerned with chewing and grinding the food.

- movement produced by abductor (outer) and adductor (inner) muscles.
- heavily sclerotized
- Distal teeth are sharply pointed and area called incisors or cutting teeth.
- The proximal teeth are called molar or grinding teeth.

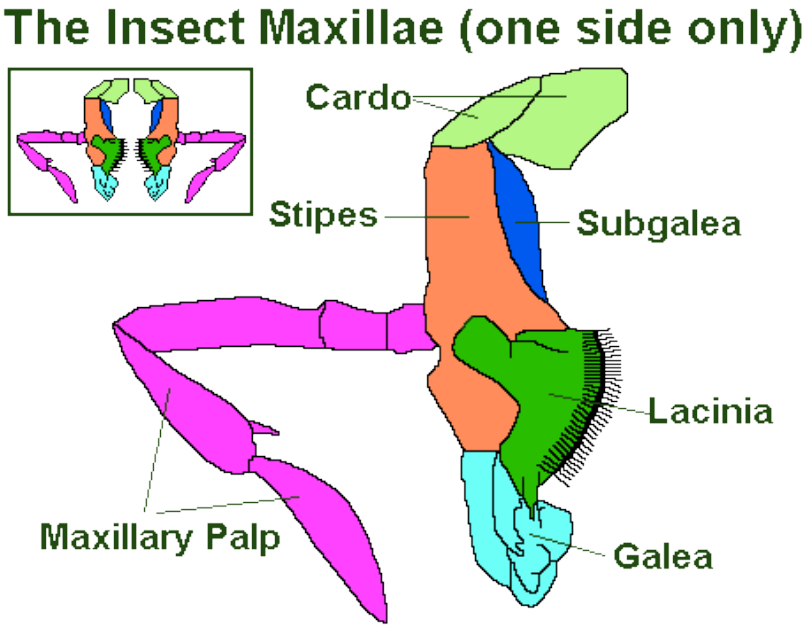




- **iv. Maxillae:**
- They are called as secondary jaws or accessory jaws.
- May be employed for grasping/cutting/chewing food.
- The basal segment, known as the cardo, joins the maxilla to the head.
- This is joined to the central body of maxilla, the stipes.
- On the outer side of the stipes is a more or less distance sclerite known as the palpifer to which the palpus is attached.

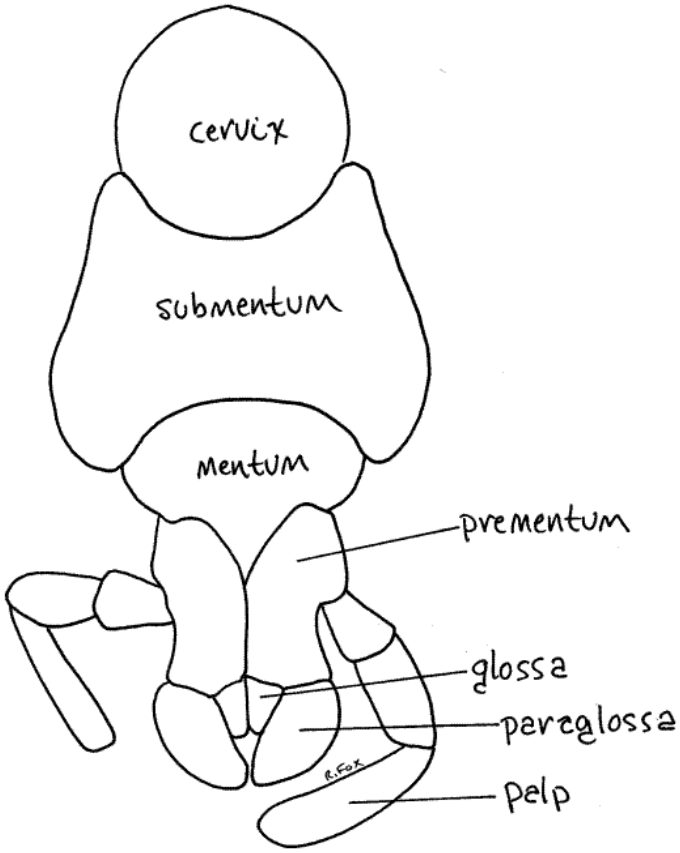


- Antennae like five segmented Palpi, bears tactile hairs and also probably organs of smell or taste.
- On the distal end of the stipes there are two lobes.
- The outer lobe is called galea and the inner lobe lacinia which is toothed.

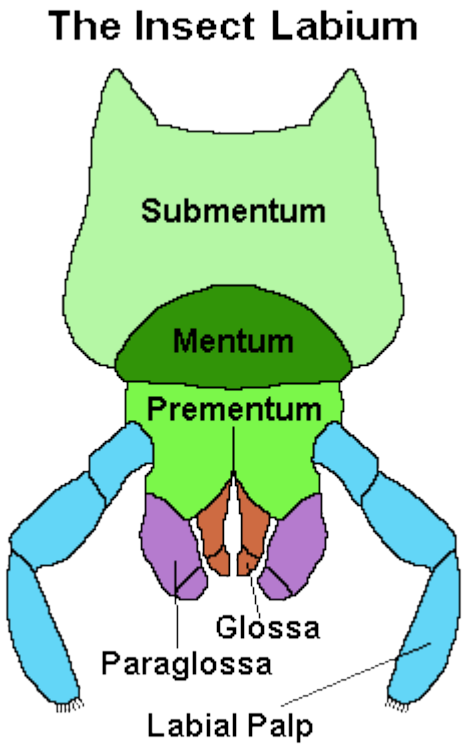


v. Labium:

- It closes the mouth cavity from below or behind.
- It consists of three median sclerites viz. submentum , mentum and prementum
- On the lateral side of the prementum, there are two small lateral sclerites called palpiger bearing 7 segmented labial Palpi.



- Distally prementum bears two pairs of lobes.
- The outer pair is called paraglossae and inner pair glossae.

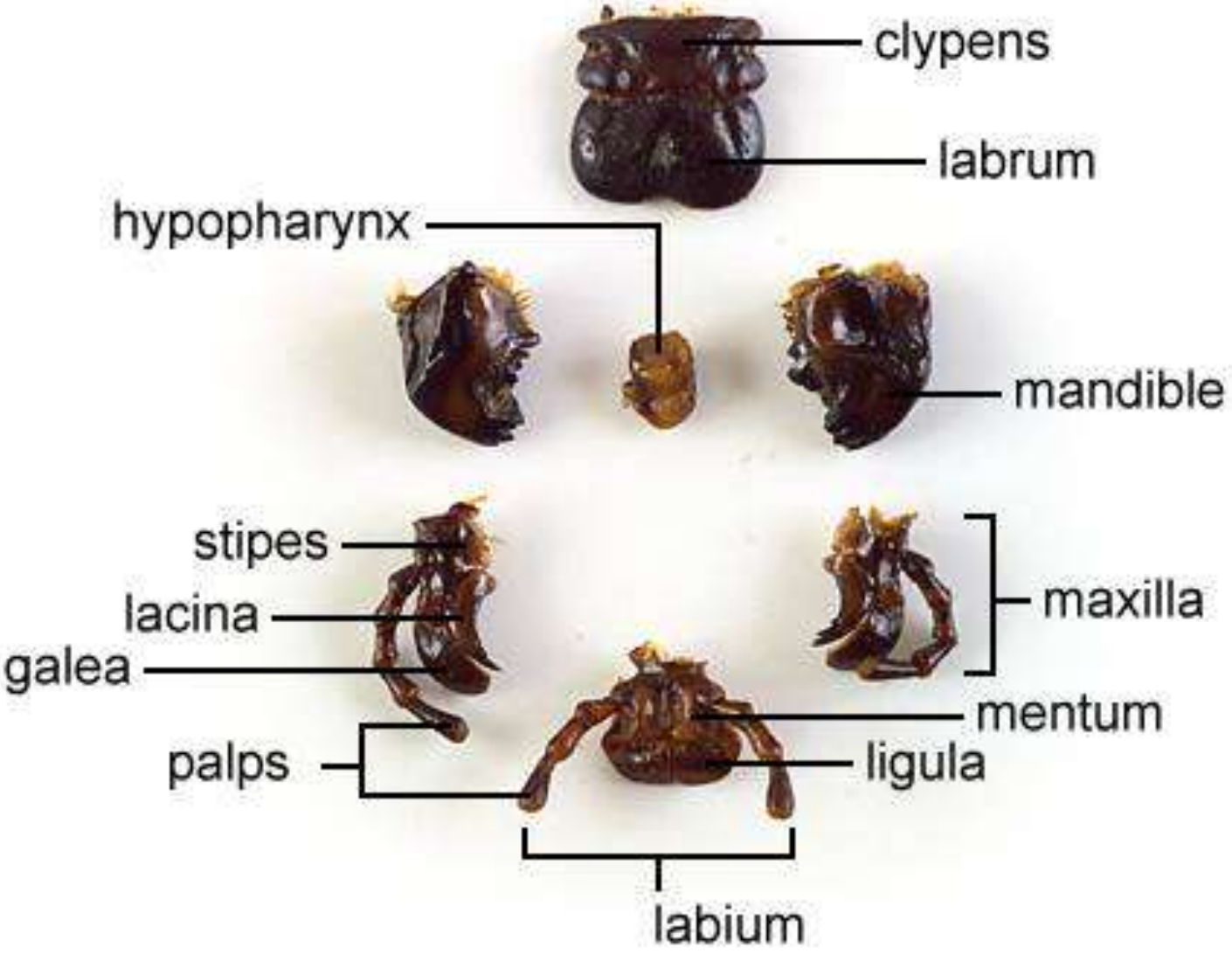


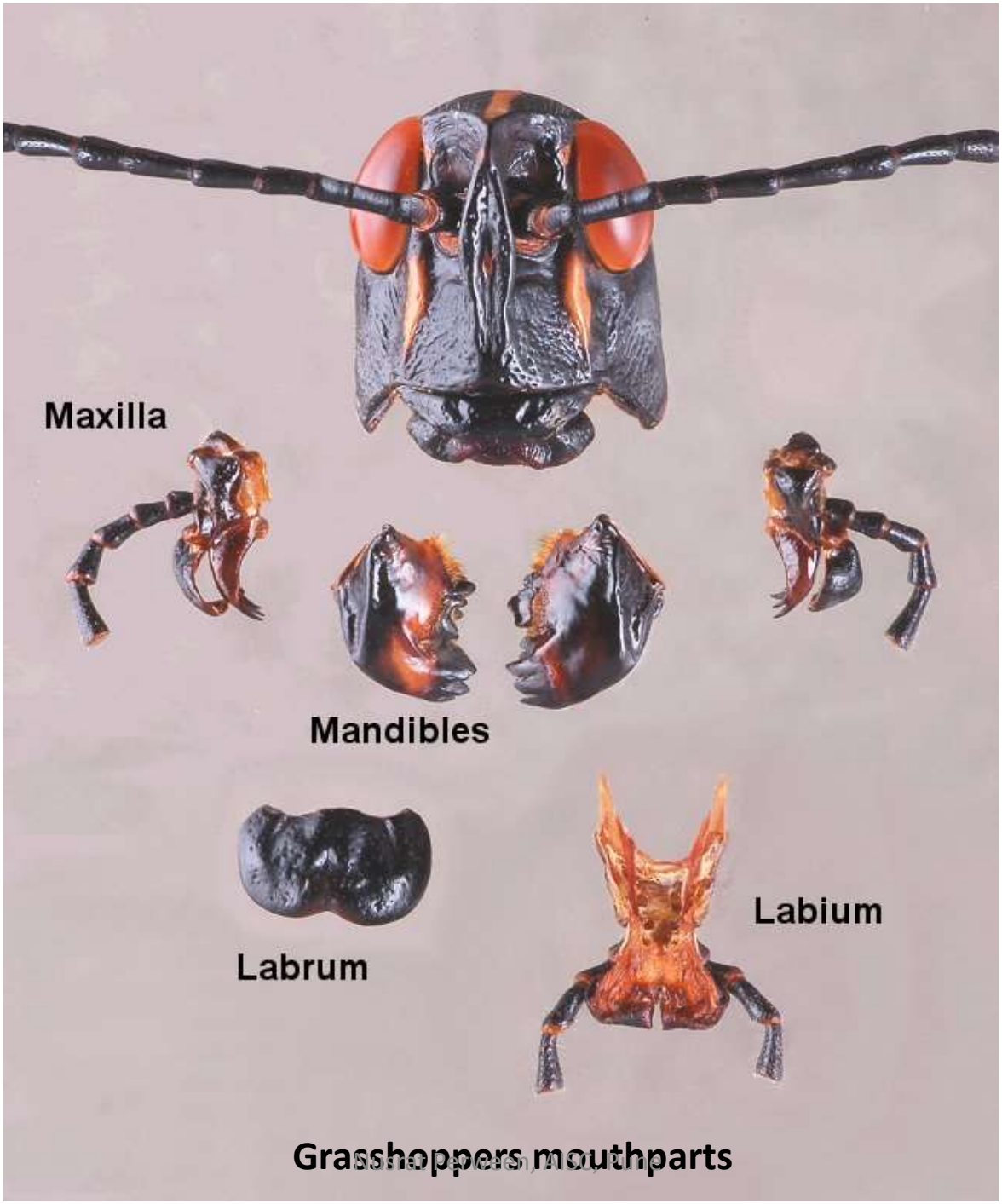
vi. **Hypopharynx** is located medially to the mandibles and the maxillae.

- It is behind the preoral cavity and in front of the labium.
- The hypopharynx is mostly membraneous and closely associated with the salivary glands and/or salivary ducts.
- The hypopharynx functions as a tongue, moving food around in the preoral cavity. .

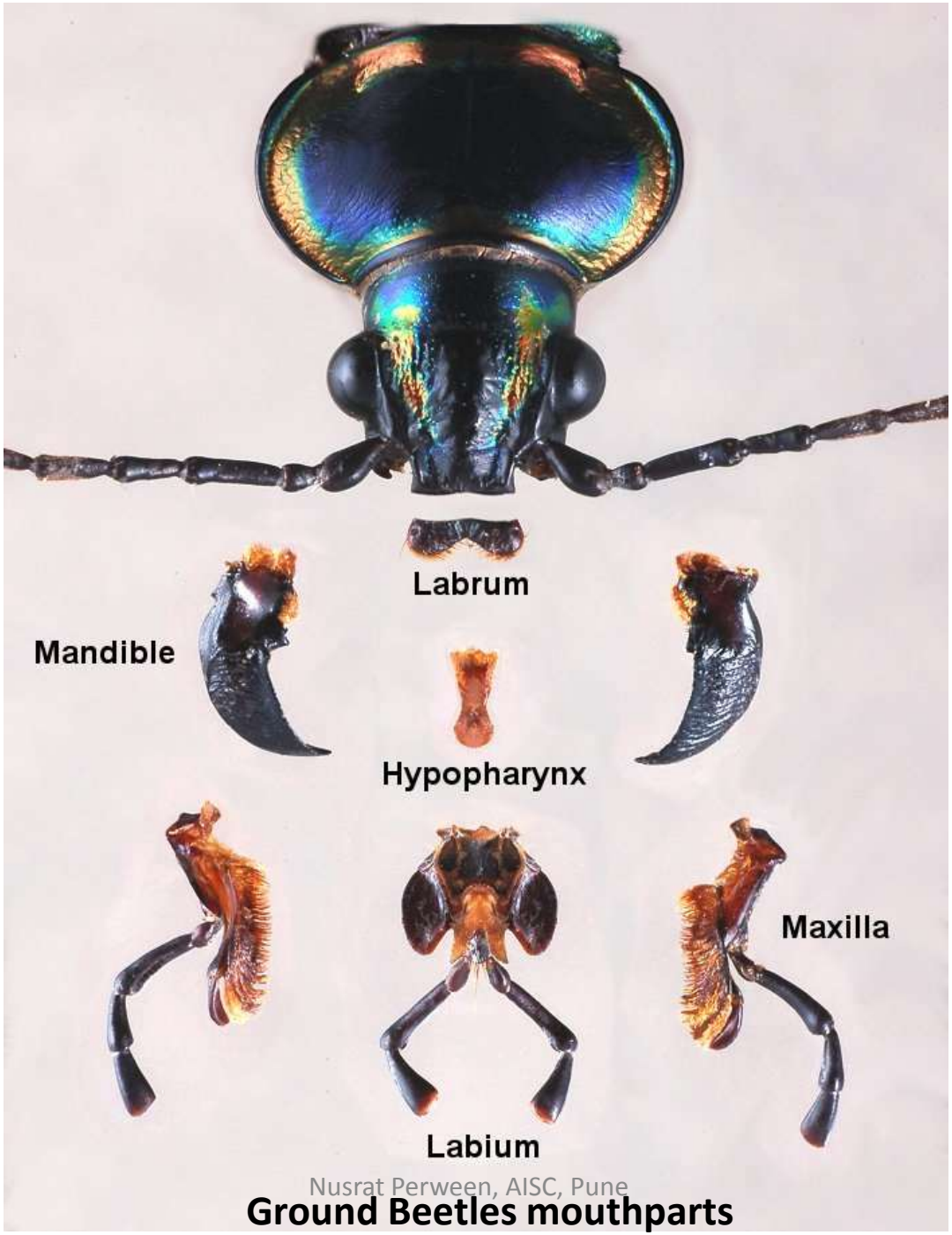
HYPOPHARYNX

Grasshopper - Mouthparts

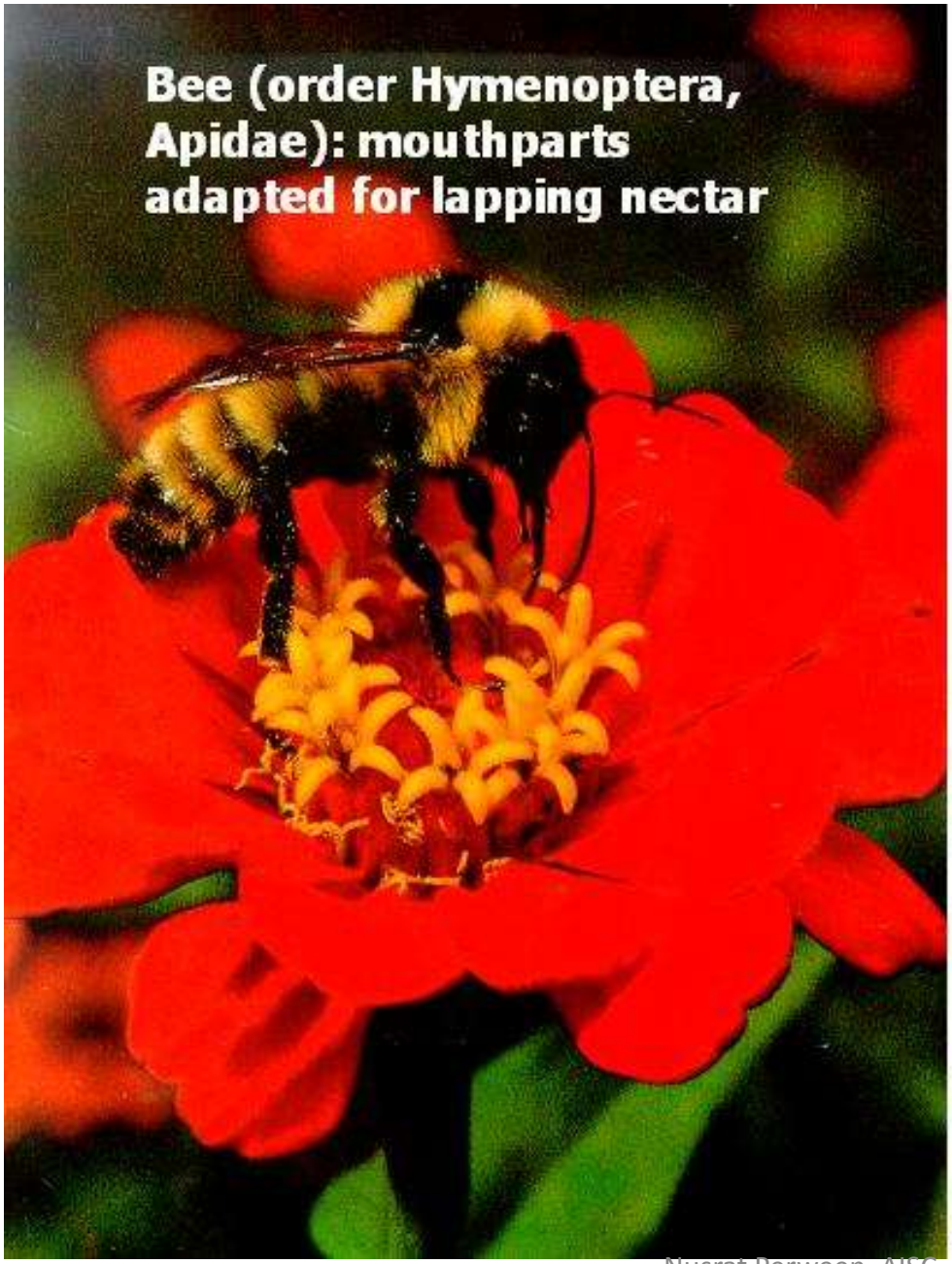




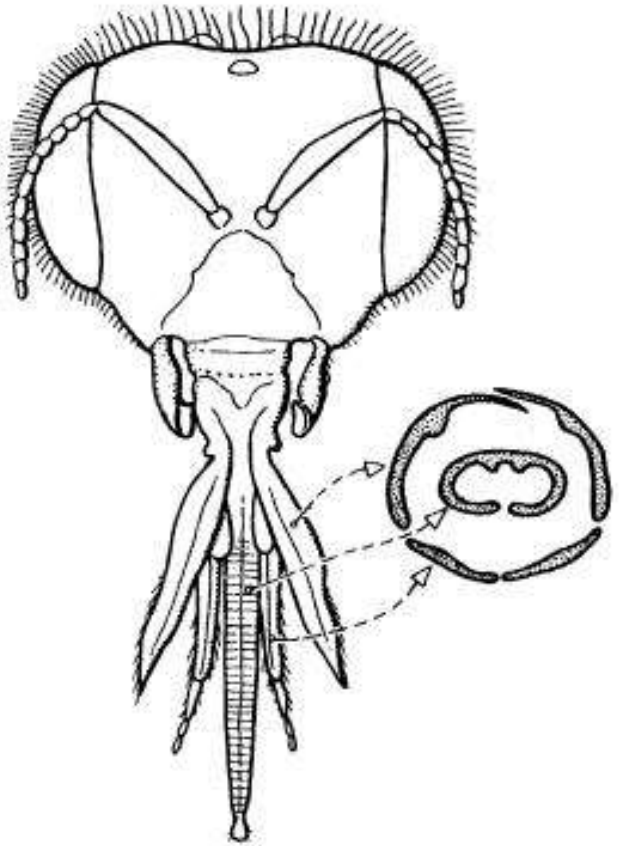
Grasshoppers mouthparts



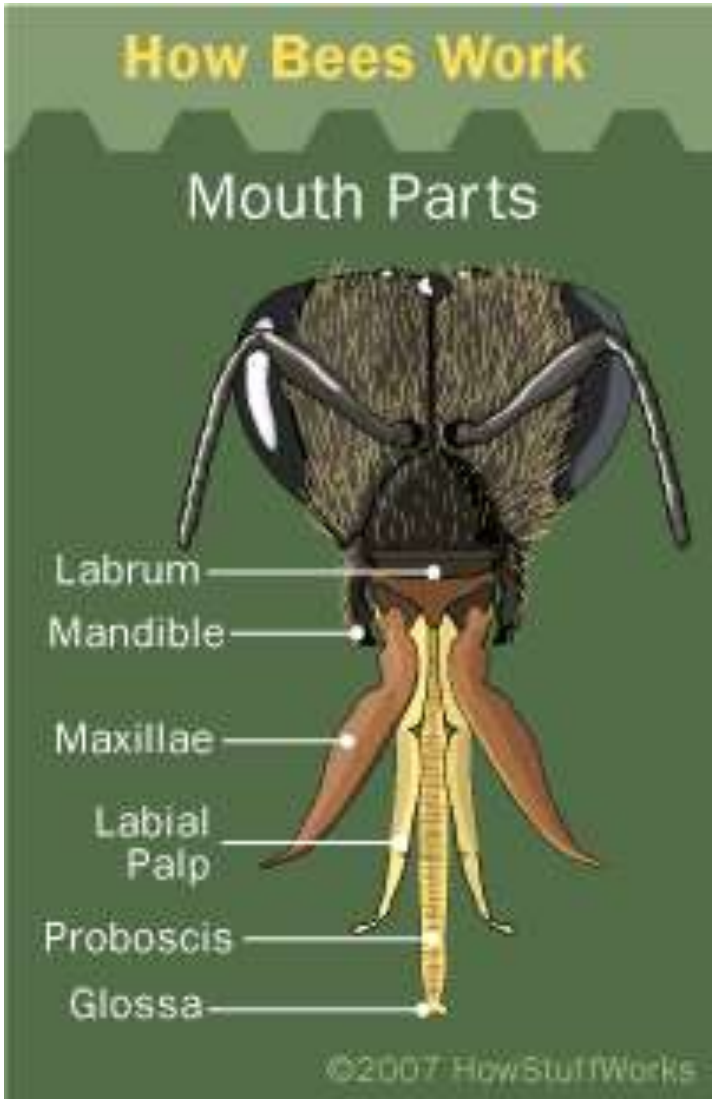
Ground Beetles mouthparts



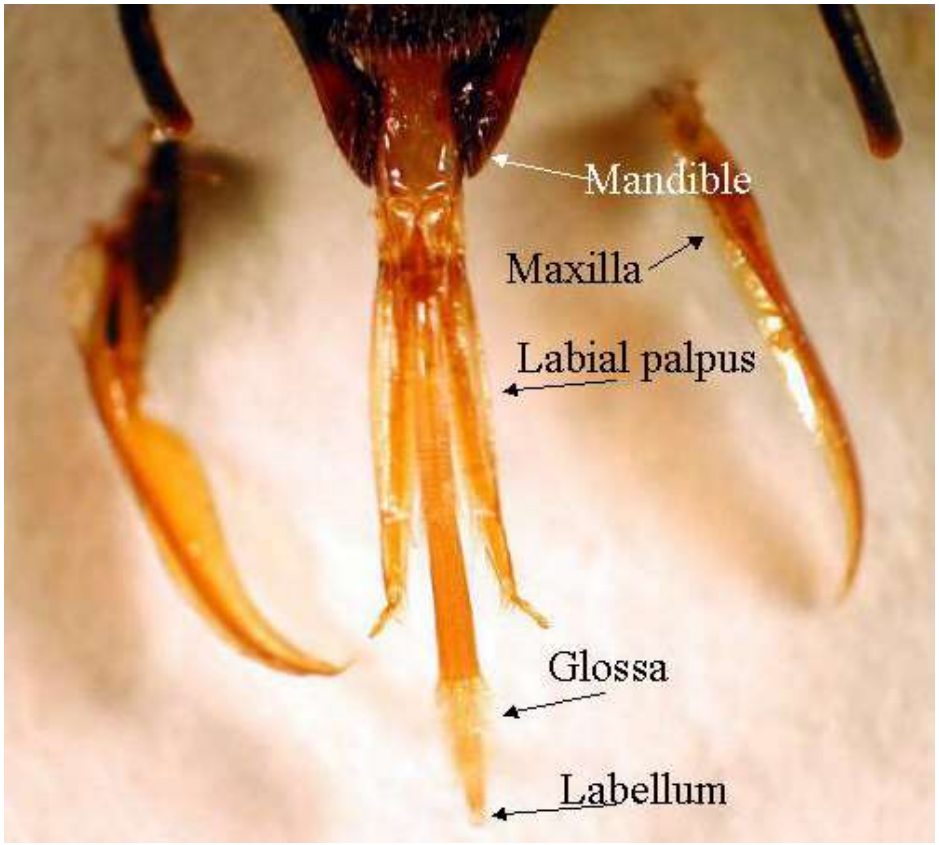
lapping mouthparts



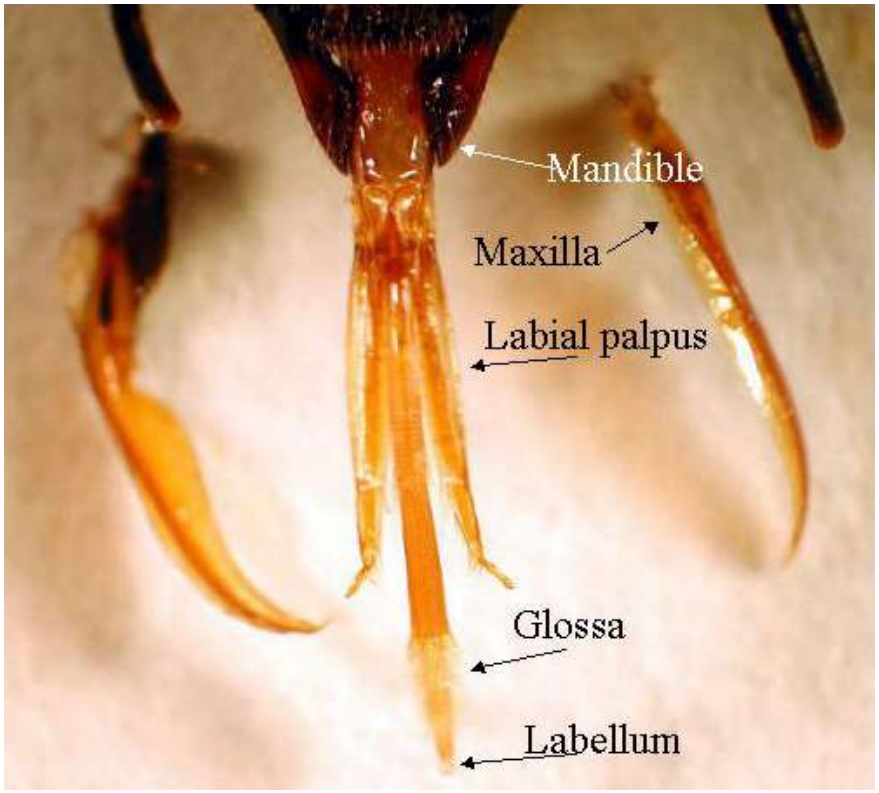
- **Chewing and Lapping Type**
- **e.g. Honey bee**
- Labrum & Mandibles remain more or less similar as that of the Generalized type,
- Maxillae & Labium are greatly modified

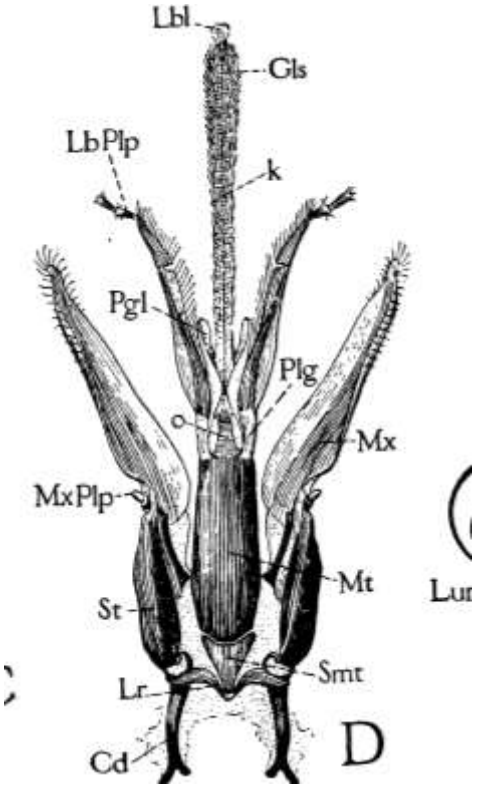


- **Labrum**. It is narrow and quite simple.
- **Mandibles:** They are blunt dumble shaped and are not toothed.
- They are not used for feeding but are useful for moulding wax into cells for comb (next) building.

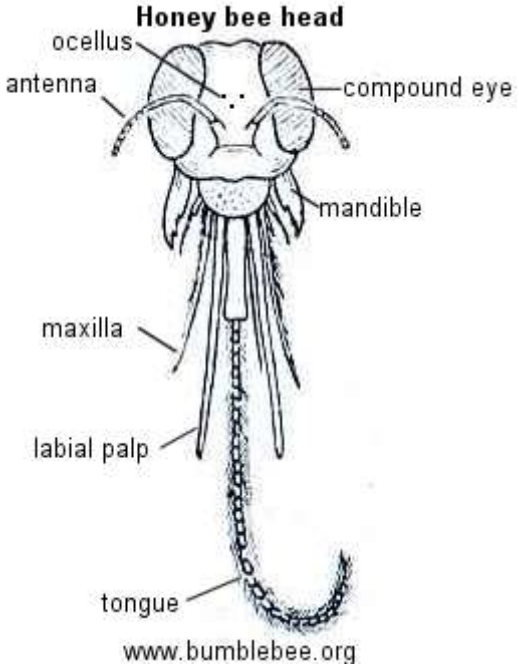


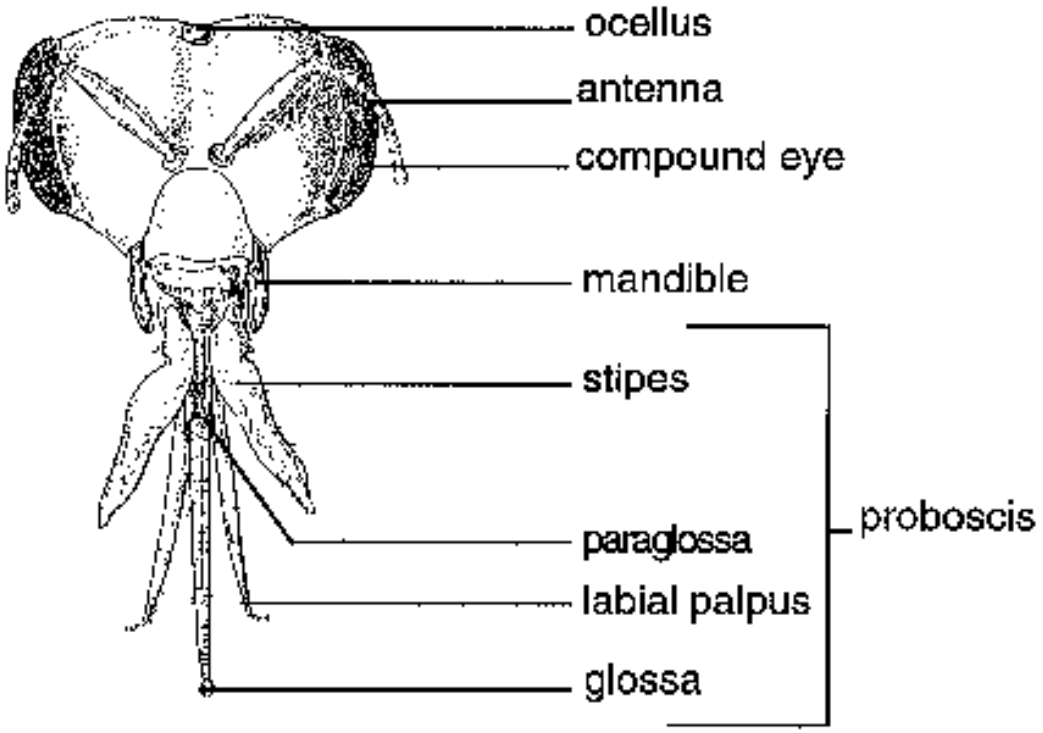
- **Labium:** The glossae are greatly elongated to form a hairy, flexible tongue.
- The glossa terminates into a small circular spoon shaped lobe called labellum, which is useful to lick the nectar.

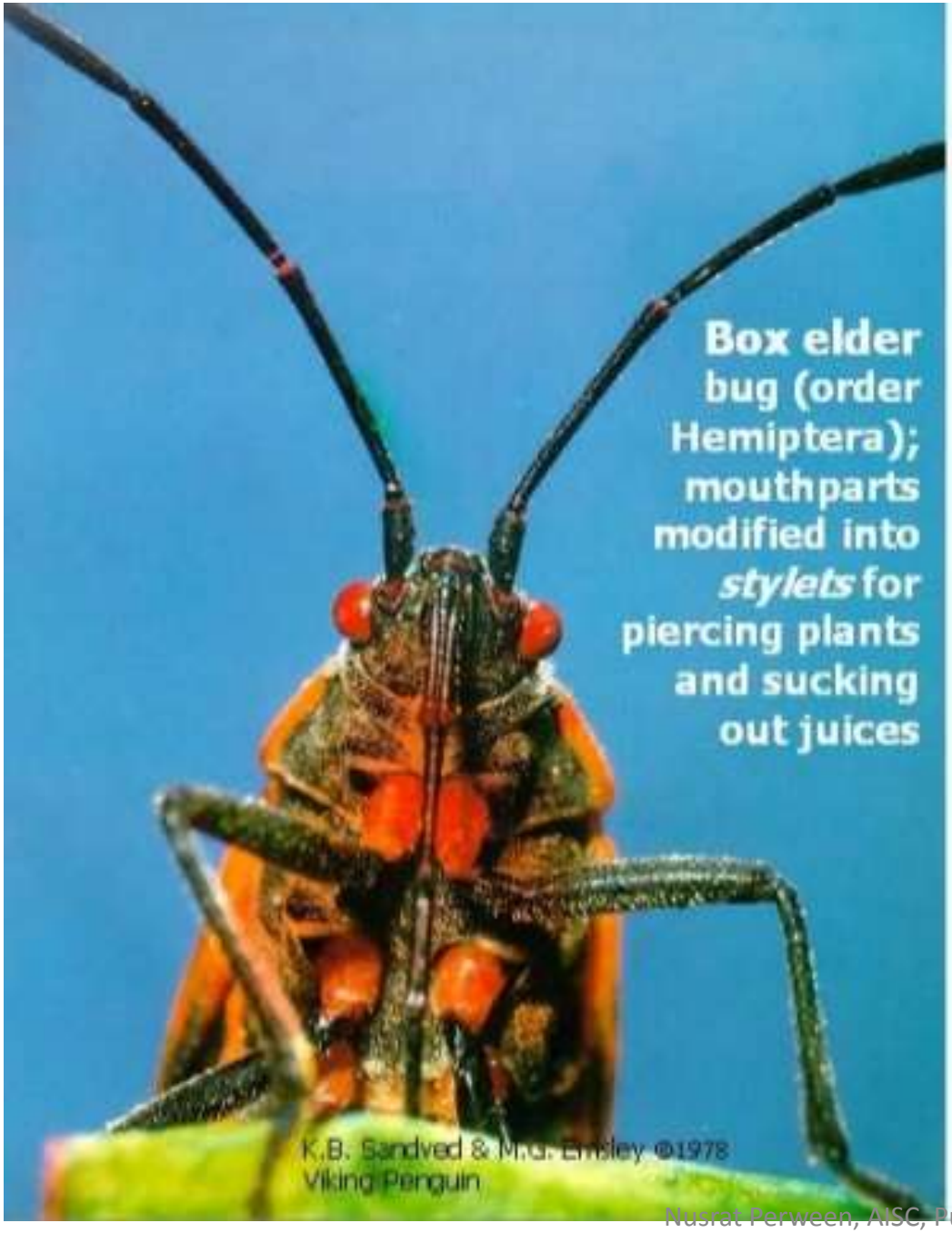




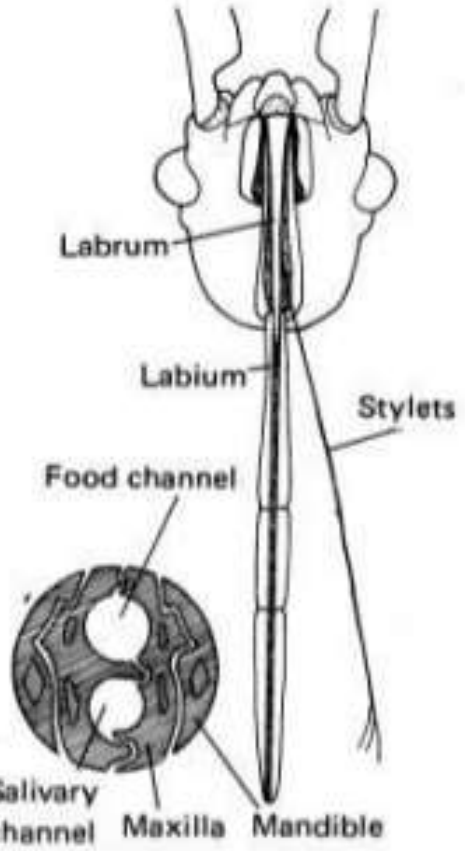
- **Maxillolabial Structures:**
- Maxillobial Structure are modified to form the lapping tongue.
- The tongue unit consists of the two galeae of maxillae, two labial Palpi and elongated flexible hairy glossa of labium.



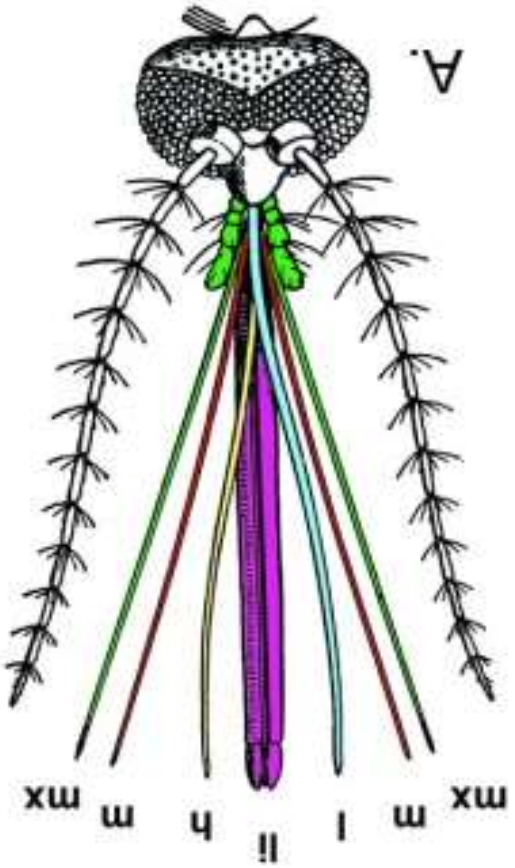

ocellus
antenna
compound eye
mandible
stipes
paraglossa
labial palpus
glossa
proboscis



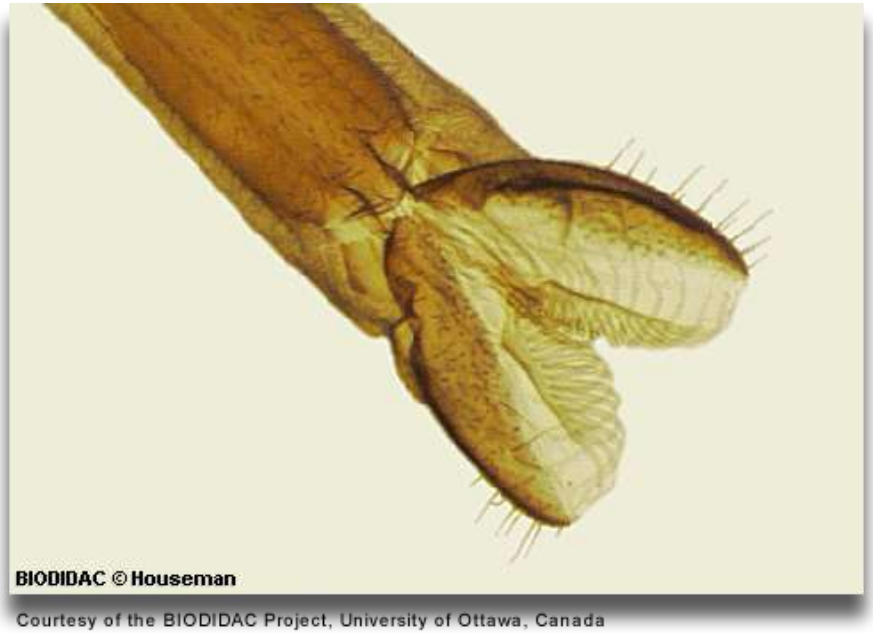
piercing-sucking mouthparts



- In mosquito, mouth parts are **piercing & sucking** type i.e. they are adapted for piercing the tissues of animal or plants to suck blood or plant juice.
- The mouth parts consist of labium, labrum-epipharynx, hypopharynx, mandibles & maxillae
- Mouth parts:-
  - **Labium:-**
- _The labium is modified to form a long, straight, fleshy tube called proboscis.
- It has a deep labial groove on its upper side.



- At the distal end of labium is a pair of small tactile **labella** which are reduced labial palps.
- **Function:-**
- The labial groove lodges all other mouthparts.
- During piercing, labella guides the mandibles & maxillae.
- The whole labium bends back to allow needle like mouthparts to go in the flesh.

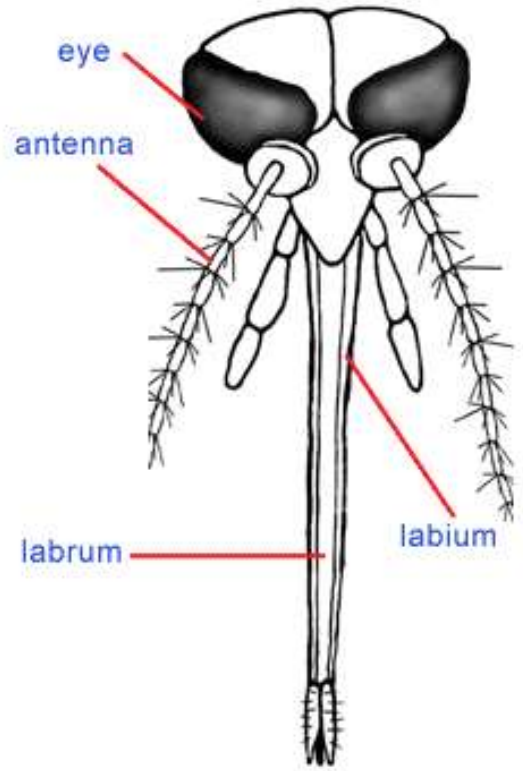


– **Labrum**

- The labrum is long & needle like with ventral groove.
- **Function:-**
- This structure appears C – shaped in transverse section having a groove called food channel.

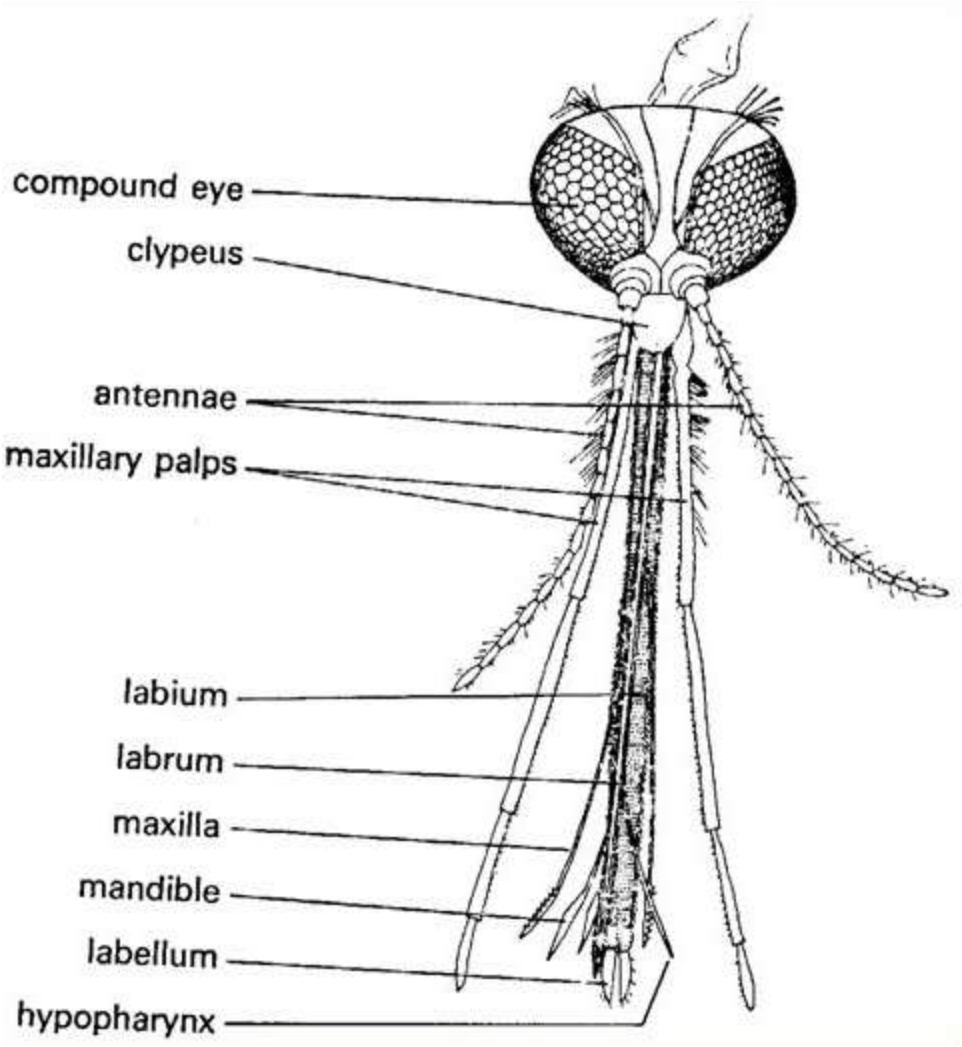
– **Hypopharynx:-**

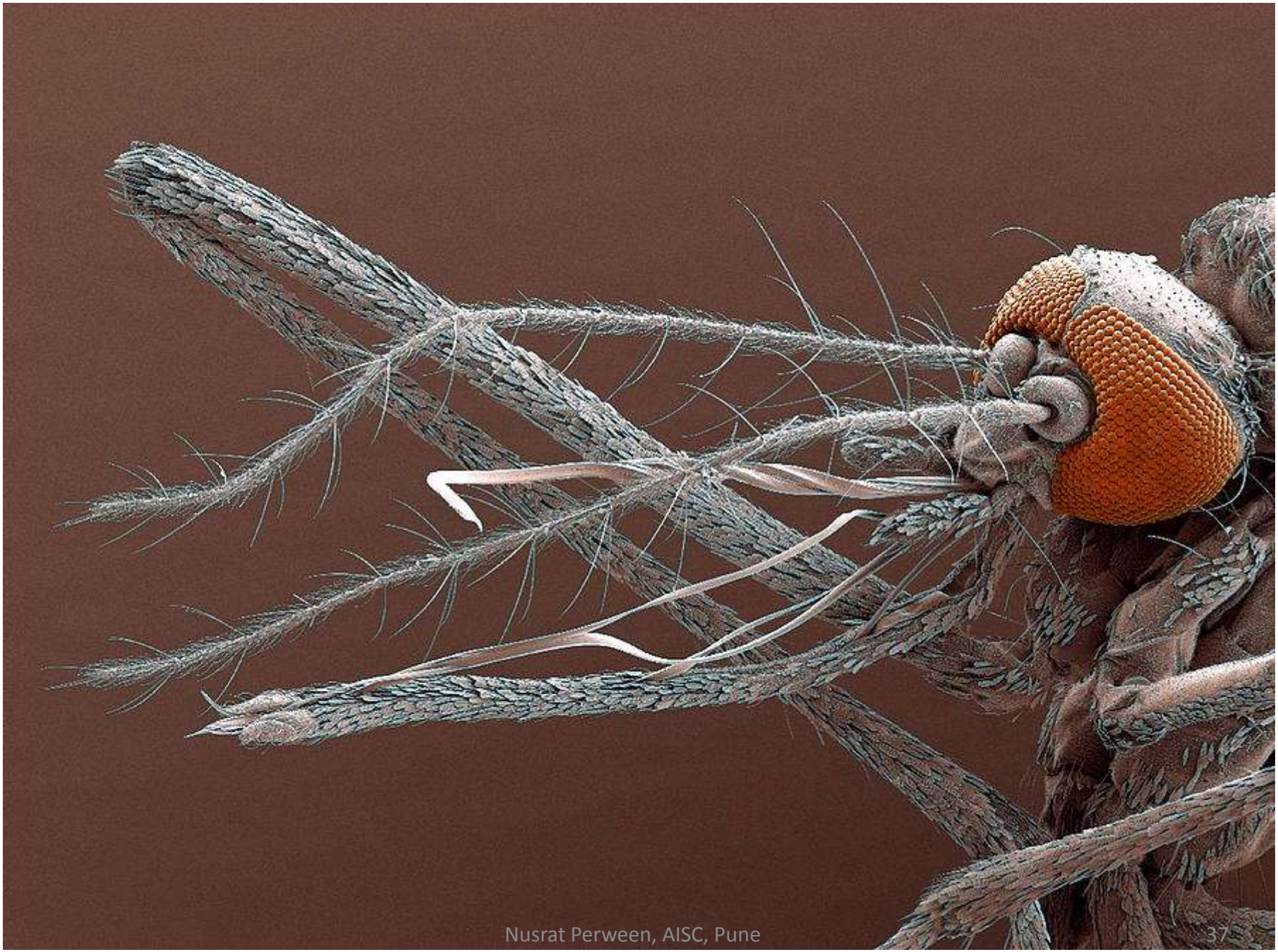
- Food channel is closed below by a long, pointed & flattened plate, like a double edged sword, called hypopharynx. It possesses a salivary duct, opening at its tip.
- **Function:-**
- Through this duct saliva is poured to prevent coagulation of blood during sucking.



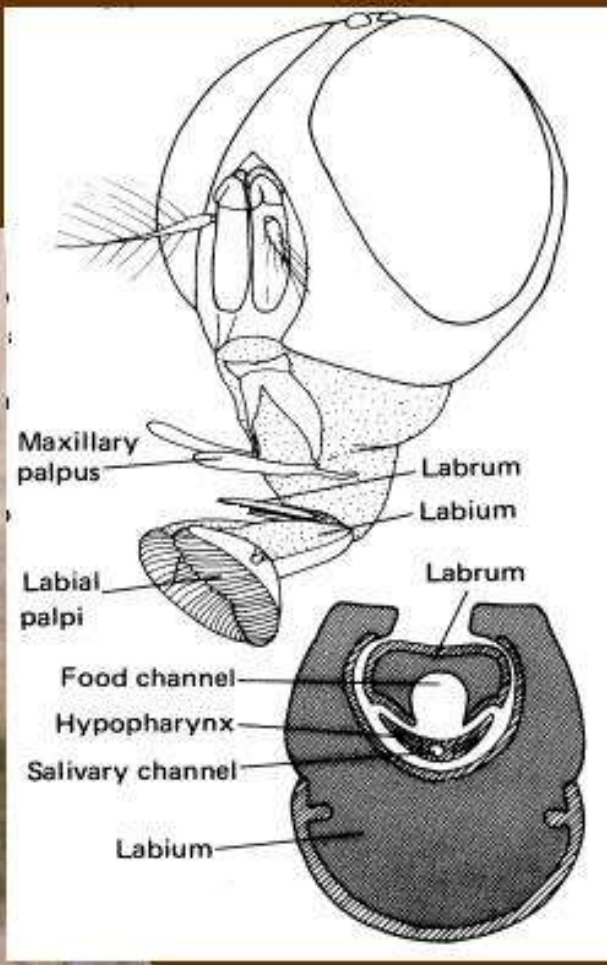
Mandibles & maxillae:-

- long, needle shaped mandibles & maxillae.
- Mandibles end in sharp tiny blades, while maxillae into saw like blades bearing teeth.
- **Function:-**
- Mandibles & maxillae act as piercing organs.
- In male mandibles & maxillae are very short & functionless

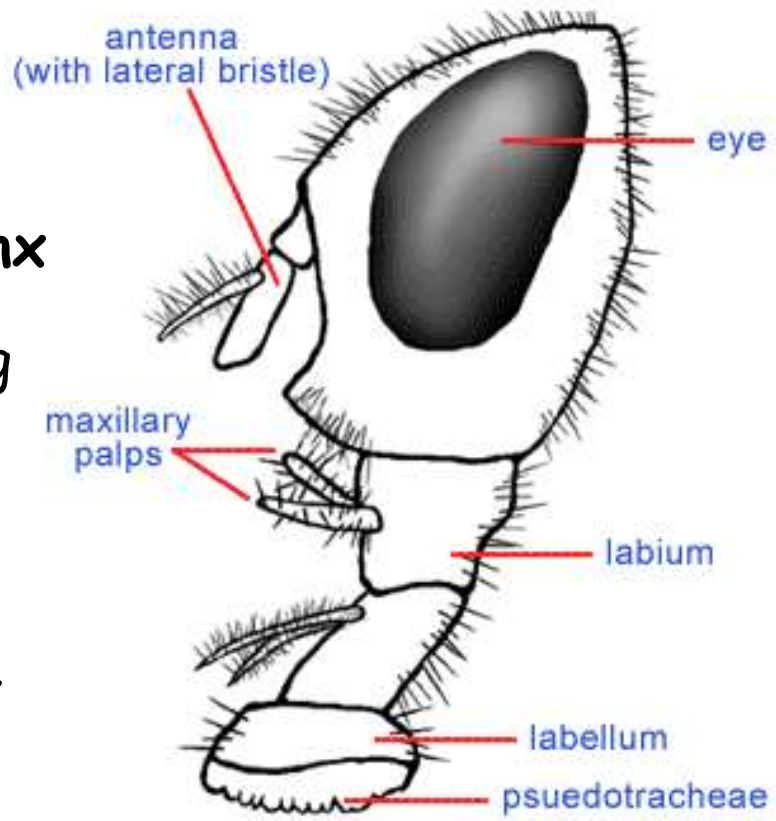




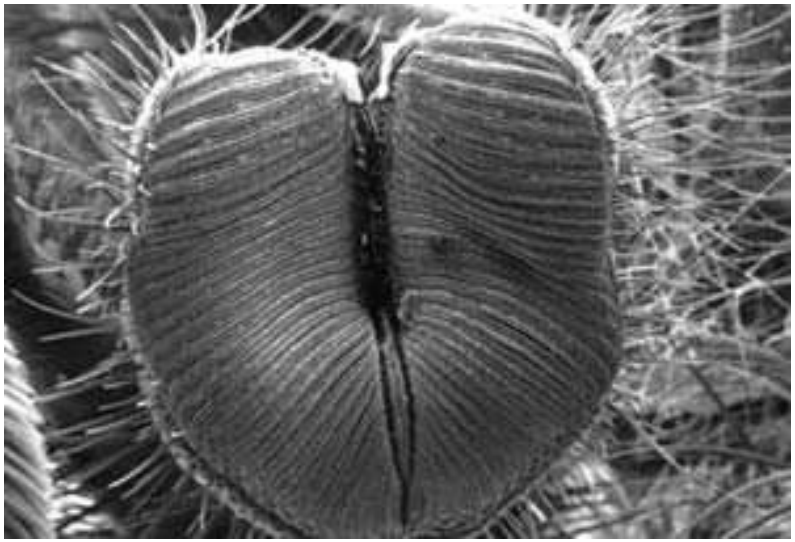
sponging mouthparts

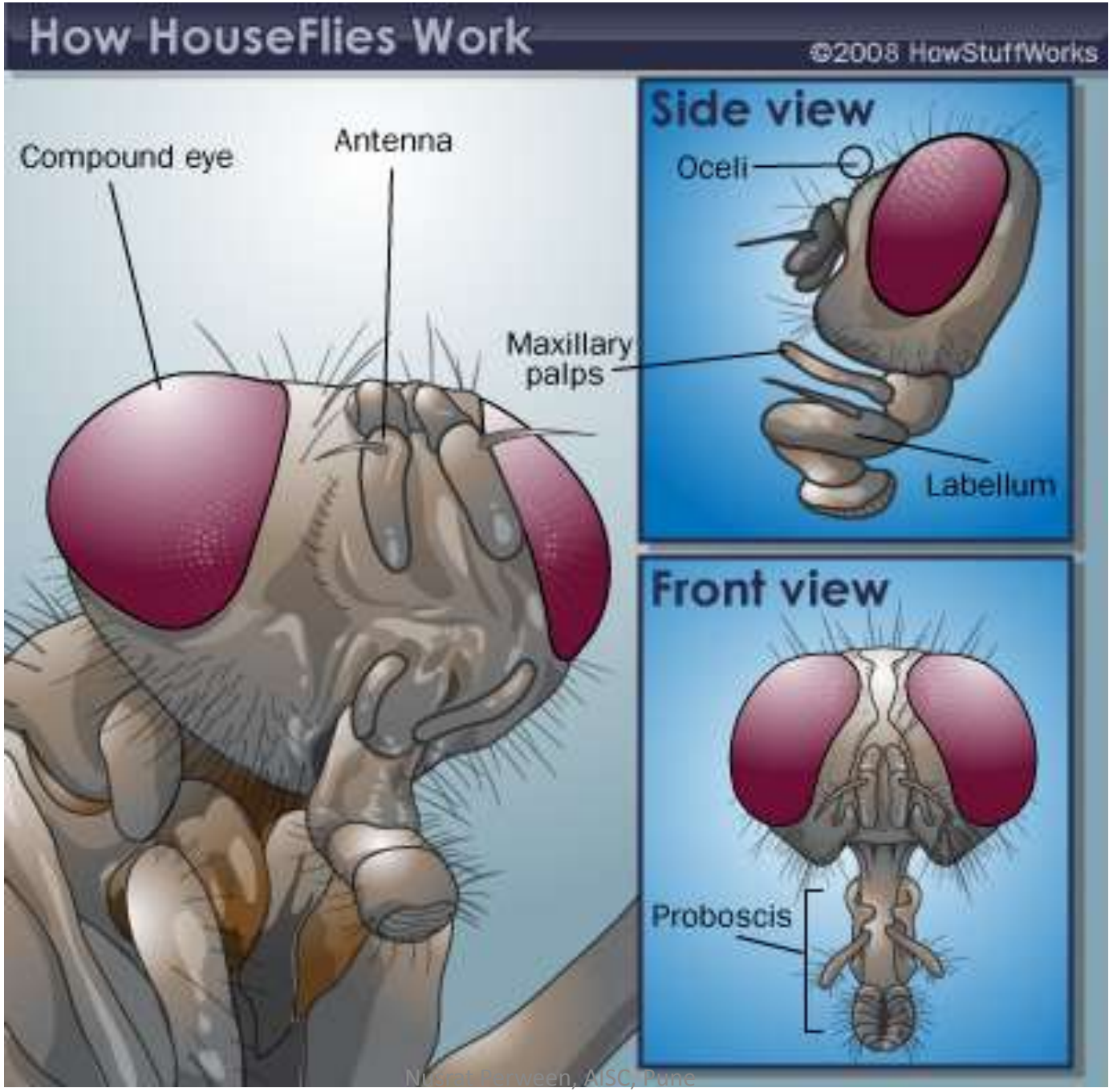


- **Sponging Type of Mouth Parts (e.g. Housefly)**
- The prominent fleshy and retractile proboscis consists mainly of the labium
- The proboscis is grooved on its anterior surface, within this groove lie the **labrum-epipharynx** (enclosing the food canal) and slender **hypopharynx** (containing the salivary canal).
- **Mandibles** are absent.
- The **maxillae** have evidently become fused with the fleshy elbow of proboscis, and only the prominent single segmented maxillary palpi remains.



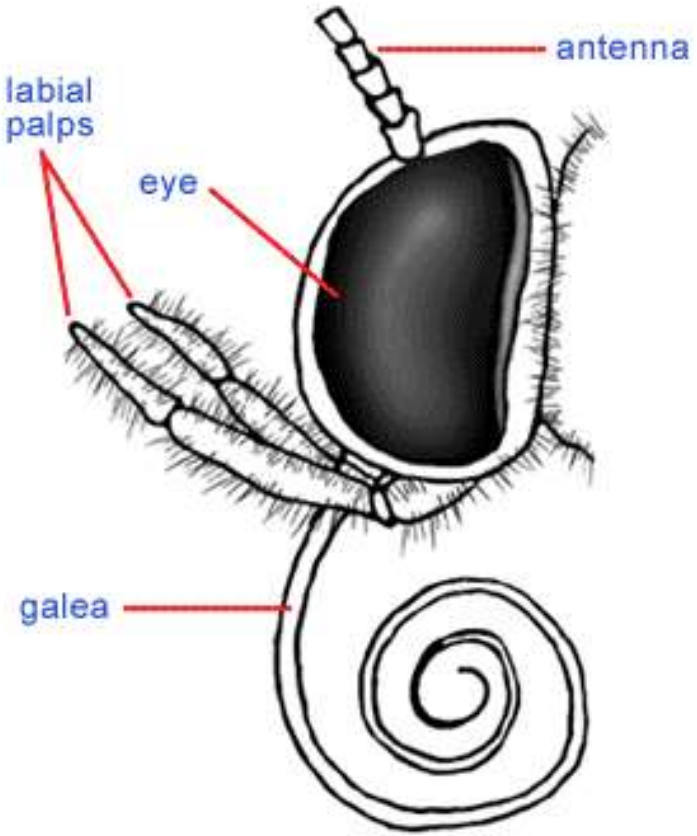
- The end of the proboscis is enlarged, sponge like and two-lobed which acts as suction pads.
- They are called labella.
- collect the liquid food and convey it to the food canal.
- These insects often spit enzyme-containing saliva onto solid foods to liquefy them and then sponge up the mixture.




How HouseFlies Work
©2008 HowStuffWorks
Compound eye
Antenna
Maxillary palps
Side view
Ocelli
Labellum
Front view
Proboscis

- **SIPHONING TYPE OF MOUTH PARTS:**
- Mouth parts of butterfly and moths
- They are modified for sucking the juices from flowers or nectar from flowers
- The proboscis which helps in sucking the food is formed by apposition of two galea of 1st maxillae.

- **Maxillary** palps and labial palps are present in reduced condition.
- **Labium** or upper lip is reduced.
- **Mandibles** are absent
- **Hypopharynx** is absent.
- **Labium** is reduced to a triangular plate represented by a pair of labial palps.



- During the resting phase proboscis is highly coiled and is situated beneath the head, it is also called watch spring like proboscis.
- While ingesting the food material proboscis is uncoiled and inserted into the interior part of flower to suck the nectar due to flow of haemolymph into it under high pressure.