

# MOUTH PARTS OF INSECTS

Insects are the largest group of animals that occupy every type of habitat available on earth with the possible exception of sea. They also feed on a variety of food in different habitat condition. They are plant feeding, predators, parasitic and decomposers, for which they must possess different types of feeding apparatus. When the insects evolved, they had biting and chewing type of mouth parts to feed on the plant material available on land but as their food choices changed with time, these mouth parts modified to suit the type of food eaten.

## **BITING & CHEWING TYPE or MANDIBULATE TYPE**

This type of mouth parts are found in cockroaches, grasshoppers, locusts, termites, wasps, book and bird lice, earwigs, dragonflies and other large number of insects.

On the dorsal side there is an upper lip called labrum, which is attached to the base with the **clypeus** of face. This is a modified appendage of the 3<sup>rd</sup> body segment. The appendages of the 4<sup>th</sup> body segment are a pair of **mandibles**, which are broad containing sharp teeth for biting and chewing. The appendages of the 5<sup>th</sup> segment are a pair of **maxillae**, which can also be called side lips. Each **maxilla** is made of a basal piece called **cardo** attached to **stipes** and **palpiger**, the last piece carries 3-4 segmented palp that carries chemoreceptors. At the apical end of the maxilla are attached **galea** and **lacinia**, the former functions like a cover and the latter is toothed and is used for chewing food.

Labium is single median mouth part which has evolved by the fusion of the appendages of the 6<sup>th</sup> body segment. This is also called lower lip. It is made of three basal plates, namely, **submentum**, **mentum** and **palpiger**, the last plate carries a chemoreceptor bearing segmented palp. On the tip of labium are attached paired **glossa** and **paraglossa** that function like a tongue. However, the true tongue of insects is called **hypopharynx** or **lingua** that is located in the middle of these mouth parts and carries the openings of salivary glands.

## PIERCING & SUCKING TYPE

These types of mouth parts are suitable for piercing the skin of animal or plant and suck blood or fluid. They are found in mosquitoes, sand flies, biting midges, bugs and lice.

In **mosquitoes** and sand flies, all pieces of mouth parts are narrow and elongated to form a proboscis. **Labium** forms a sucking tube over which **labrum** fits like a lid. **Maxillae** and **mandibles** are sharp and needle-like to pierce the skin to draw blood which is sucked by labium. Saliva is injected by the hypopharynx. None of the mouth parts are fused together. Maxillary palps bear chemoreceptors.

Piercing and sucking mouth parts of **bugs** form a three-segmented **proboscis** formed by labium which is the main sucking tube. Maxillae and mandibles are sharp needle like and are called **stylets**. Labrum is reduced and forms the basal part of proboscis.

Piercing and sucking mouth parts of **lice** are entirely different. None of the conventional mouth part pieces are seen in lice. Instead, there is a sharp spine-like **stabber** that rests in a **trophic sac**. It is used to pierce the skin and draw blood which is then sucked by suctorial pharynx through the mouth.

## SIPHONING TYPE

This type of mouth parts are found in butterflies and moths that belong to the order Lepidoptera. Only **galea** of maxillae of the two sides join to form a long coiled proboscis through which nectar of flowers can be sucked. Labrum is small and forms the base of the proboscis and mandibles are entirely absent. Labium is reduced and is represented by a pair of labial palps. Such mouth parts cannot penetrate and can only suck fluids.

## CHEWING & LAPPING TYPE

These mouth parts are found in honey bees which have to lap up nectar and honey and chew pollen balls and wax. **Labrum** forms the upper lip and **labium** is large and long and forms a lapping tongue-like structure along with labial palps. Maxillae and maxillary

palps are reduced. **Mandibles** are quite well developed with teeth for biting and chewing pollen and wax.

### **HAUSTELLATE OR SPONGING TYPE**

Found in houseflies these mouth parts are suitable for feeding on liquid food only. The long proboscis-like structure is made of basal **rostrum** and an apical **haustellum**. These are formed by the fusion of maxillae and labium as maxillary palps can be seen near the base. The apical part of labium forms a broad bilobed sponging apparatus called **labellum**, which consists of lamella-like **pseudotracheae** that quickly absorb fluid that is then sucked through the mouth and a food channel located inside the proboscis. Labrum forms a small portion at the base of proboscis. Mandibles are completely absent in flies.