

Salahaddin University - Erbil
Collage of Agricultural Engineering sciences
plant protection Department



2nd Lab.

The modifications of insect mouth part & Role of beneficial insects in agriculture:-

Lecturer: Hero Muhyaddin Muhammad

Horticulture Insects- 4th stage

E. mail: hero.muhammad@su.edu.krd

Date: 4/10/2023

MOUTHPARTS

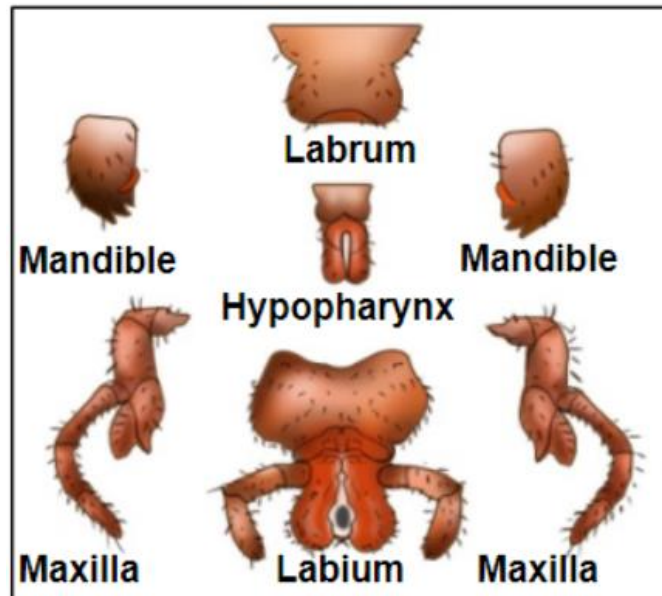
Insects are the largest group of animals that live in every type of habitat available on earth. They are plant feeding, predators, parasitic and decomposers,

a structure or appendage use in gathering or eating food.

The second appendages of head developed during embryonic period ,from segments of head.,

In each insect the mouth parts compose of 5 segments

- 1.Labrum**
- 2.Labium**
- 3.Mandibles**
- 4.Maxillae**
- 5.Hypopharynx**



3

Mouthparts of insects vary among insects depending upon their **feeding habitus**:-

Mandibulate and haustellate.

1.Mandibulate:-feeding mainly solid food (chewing) mouthparts.

2.Haustellate:-feeding mainly liquid food mouthparts can be further classified as piercing-sucking, sponging, and siphoning.

4

TYPES OF MOUTHPARTS

1-**Biting & chewing** mouthparts are used for biting and grinding solid foods .

EX: Beetles (Order: Coleoptera)

cockroaches (Order: Blattaria)

Grasshoppers, crickets

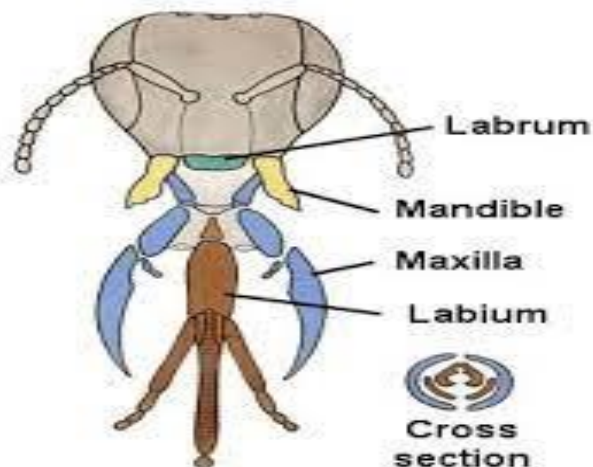
(Order: Orthoptera)

Caterpillars(larvae) (Order: Lepidoptera). Adult

Lepidoptera have siphoning mouthparts.

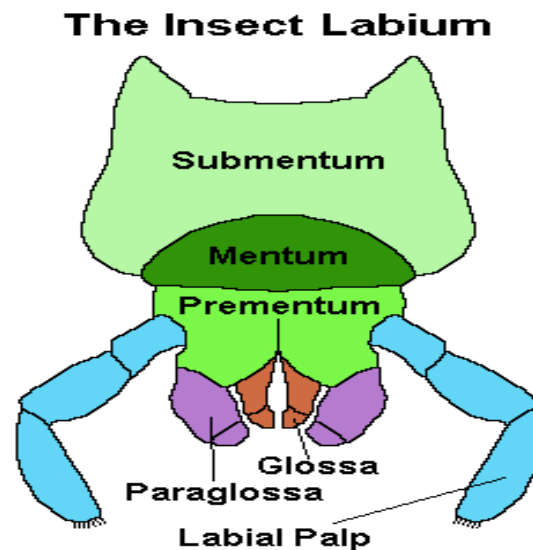


1. **labrum:-** (often called the **upper lip**) is a simple flattened piece of cuticle, , covers the mouth cavity from above helps to pull the food in to mouth.



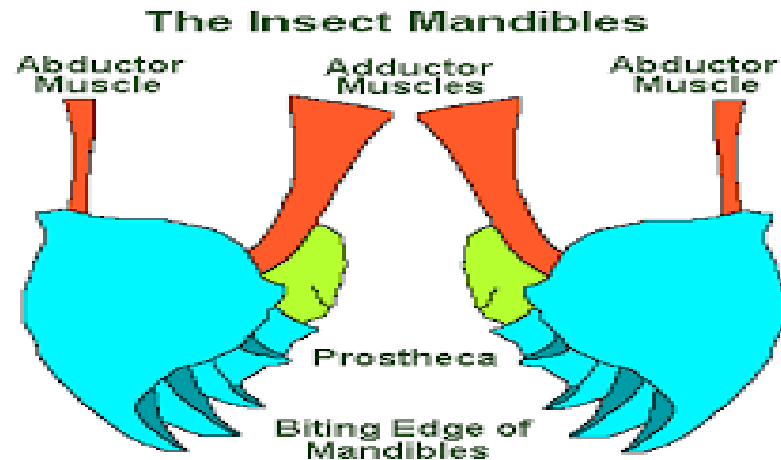
2. labium (often called the lower lip):- It is made of three basal plates, namely, **submentum**, **mentum** and **prementum**, the last plate carries a chemoreceptor bearing segmented palp. On the tip of labium are attached paired **glossa** **paraglossa**

7



8

3.Mandibles, primary jaws:- are highly sclerotized paired structures. They are used for biting, chewing and severing food.

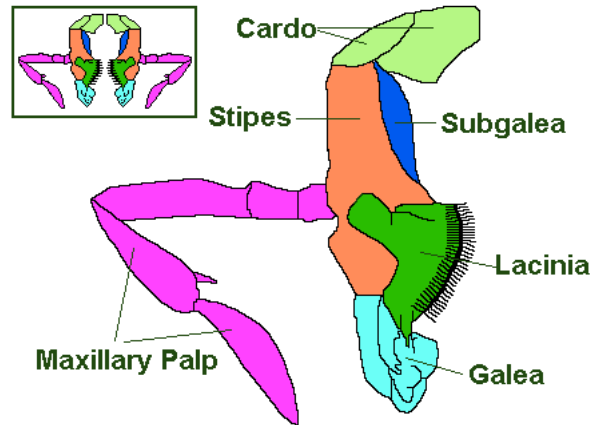


4.Maxillae, secondary jaws:- The maxilla are paired and arranged behind the mandibles. They are used to hold and control food so that it can be chewed or cut up by the mandibles.

Each maxilla is made of 5 parts :-

- 1.cardo
- 2.stipes
- 3.Galea
- 4.Lacinia
- 5.Maxillary palp

The Insect Maxillae (one side only)



11

5.Hypopharynx:- or true tongue that is located in the middle of these mouth parts and carries the openings of salivary glands.

12

Haustellate mouthparts:- are primarily used for sucking liquids and can be divided into two subgroups: those that possess stylets and those that do not. For example adult of butterfly and moth of order (lepidoptera)
House fly (diptera)
Truebug (hemiptera)

13

2-Piercing & Sucking mouth part

Stylets are needle-like projections used to penetrate plant and animal tissue. The modified mandibles, maxilla, and hypopharynx form the stylets and the feeding tube.

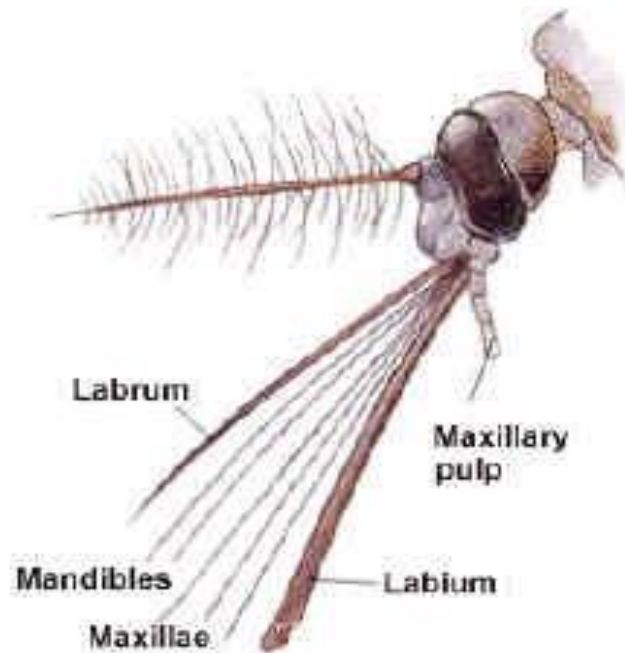
After piercing solid tissue, insects use the modified mouthparts to suck liquids from the host.

For example: mosquito in order diptera

True bug in order hemiptera



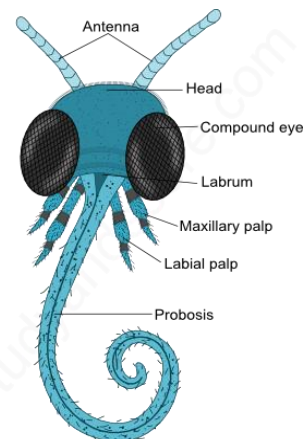
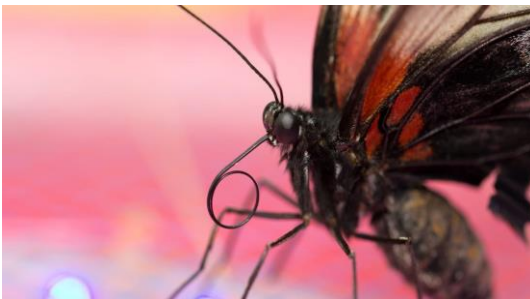
14



15

3.Siphoning(sucking) M. P.

This type of mouth parts are adapted wonderfully for sucking flower nectar, found in butterflies and moths belonging to the order Lepidoptera. They have a long tube which they usually carry curled up and called proboscis.



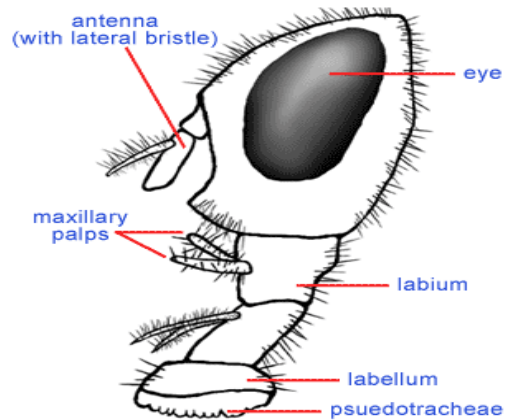
MOUTHPARTS OF BUTTERFLY - SIPHONING TYPE
©studyandscore.com

16

4. Spinging or lapping m.p.

Sponging mouthparts are used to sponge and suck liquids.

Examples: House flies (order Diptera)

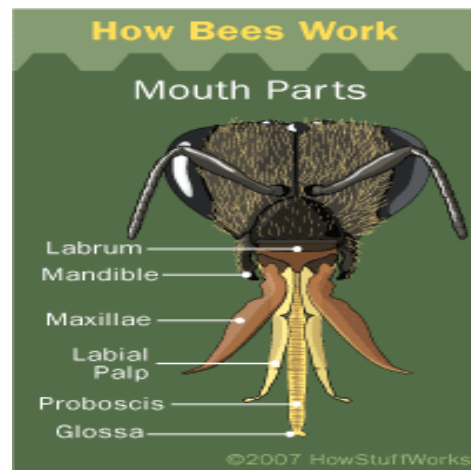


17

5-Chewing –lapping M.P.

This insect feeding on different types of food : solid (pollen) and liquid (flower juice)

Ex : Honeybee worker



18

Food of insects

According to nutritional requirements ,insects are categorized into:

Omnivorous: which feed on both plant and animal ,ex. Wasps and cockroache.

Carnivorous: Which feed on other animal as parasites and predators . Ex. Lady bird beetle and Mantids.

Herbivorous : which feed on living plant (crop pests).

a/ Polyphagous : which feed on wide range of cultivated and wild plants.

b/ Monophagaous : which feed on single species of plants ex.Rice stem borer.

c/ Oligophagous : which feed on plants of one botanical family ex. Cabbage butterfly .

19

Role of beneficial insects in agriculture:-

1.Pollinators: Insect pollinators are flower visiting Insects that feed on flowering plants to obtain plant-provided food (nectar, pollen). Flower-visiting insects have the potential to transfer male gametes (contained in pollen) to the female gametes while foraging, resulting in pollination.

Example:- bees, flies,, beetles, butterflies and moths.



2.Natural Enemies:

Insect predators and parasitoids that attack and feed on other insects, particularly on insect pests of plants are considered natural enemies.

Example ladybeetle. Lacewings, ground beetle, and parasitic wasp



3.Weed Killers:

So many insects feed upon unwanted weeds just the same manner they do with the cultivated crops. In many cases the occurrence of these insects has contributed much towards eradication of the weeds. Examl: grasshopper, weevil, larvae of butterfly



4. Soil Builders:

Insects which live in soil make tunnels, creating channels for smaller organisms, water, air, and roots to travel through.

Insects improves soil ventilation example: earthworm, termite



23

5. Scavengers:

Insects which feed on dead and decaying matter of plants and animals are called as scavengers. Insects (scavengers and decomposers) help in the recycling of the nutrients in the ecosystem. Examples: Bark beetle, water scavenger beetle, Cockroaches.



24

Some Products from Beneficial Insects:-

1. Production of Honey and Bee Wax: From thousands of year *Apis mellifera* L. (Honey bees) are important for ahead Honey and bee wax.

- 2. Production of Silk: A unique natural fiber silk cloth, which usually derives from silkworm, *Bombyx mori*

