General Entomology

Lecture (4)

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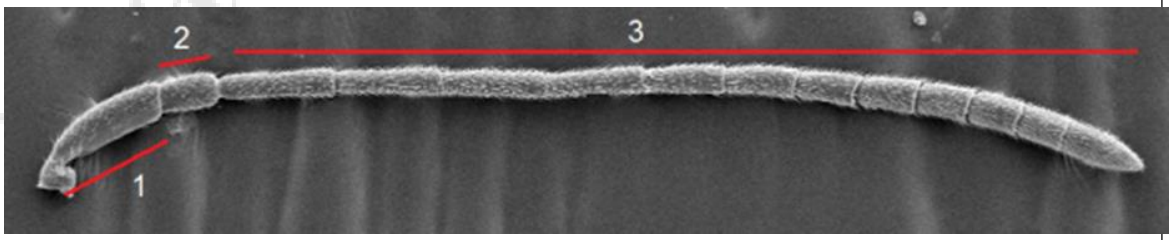
Lecture Topics

- **Insects Body parts**
- **Head**
  - **Antennae**
  - **Eyes**

Antennae

- An insect's sense organs.
- Other jobs e.g., holding females during mating (i.e. males of *Meloe*)
- Antennae are absent from the Protura.
- Males have more elaborate antennae than the females.
- Consist of 3 parts.



1) <u>Scape</u>: contains muscles.

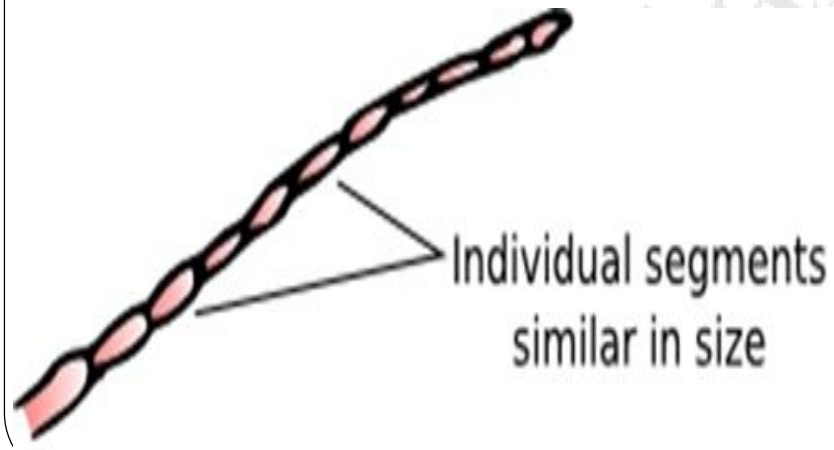
2) <u>Pedicel</u>: contain mechanosensory organ called 'Johnston's organ’.

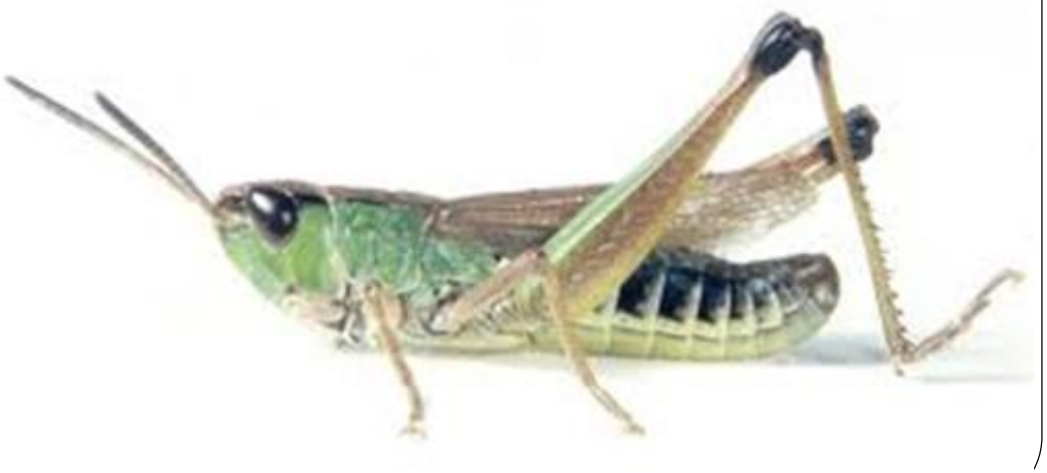
3) <u>Flagellum</u>: the remaining segments (flagellomeres) connected by membrane.

Types of antennae

1. **Filiform**

- The basic form of antennae.
- Long, thin and made of equally sized and shaped segments.
- e.g., grasshoppers (Order: Orthoptera).

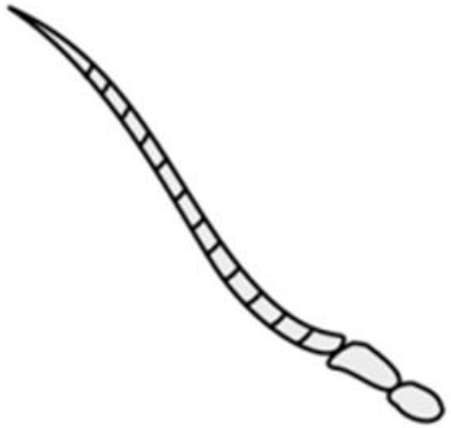




Types of antennae

2. Setaceous

- The segments tapers (become thinner) gradually from the base to the tip.
- Example: Cockroaches and dragonflies (Order: Odonata).

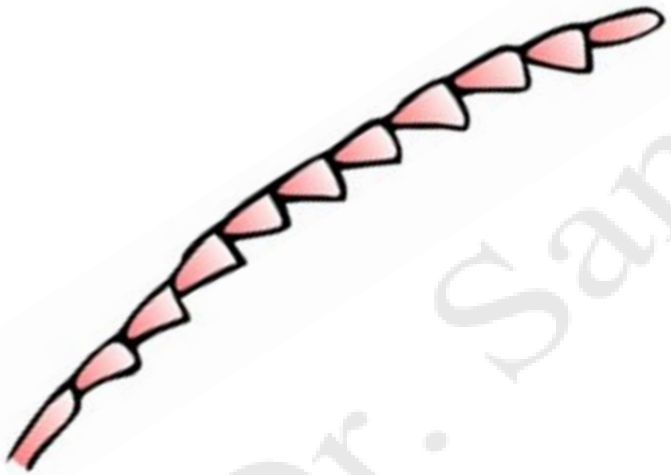


Species *Periplaneta americana*

Types of antennae

3. Serrate

- The segments are angled on one side giving the appearance of a saw edge.
- e.g. Beetles (Order: Coleoptera).

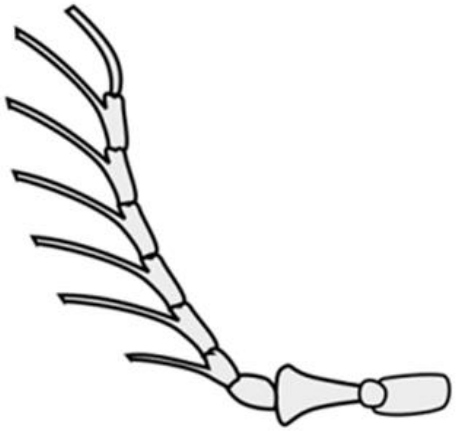


California Prionus

Types of antennae

4. Pectinate

- Segments with long slender lateral processes on one sides
- They look like combs.
- e.g., sawflies (Symphyta, Hymenoptera), parasitoid wasps (Hymenoptera), some beetles (Coleoptera).



Beetle - *Megacerus discoidus*

Types of antennae

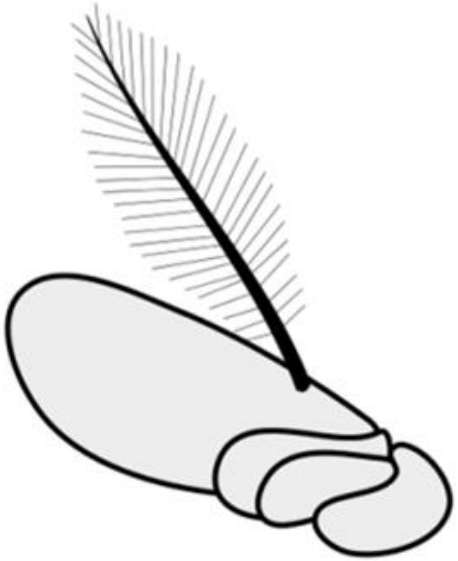
5. <u>Bipectinate</u>

- Segments with long slender lateral processes on both sides
- e.g., silkworm

Types of antennae

6. <u>Aristate</u>

- Reduced antennae with a pouch-like shape and a small bristle that emerges from its third modified segment.
- E.g., the house fly *Musica domestica* (Diptera)



Types of antennae

7. Capitate

- Have a club or knob at their ends.
- e.g., butterflies (Lepidoptera) and some beetles (Coleoptera).

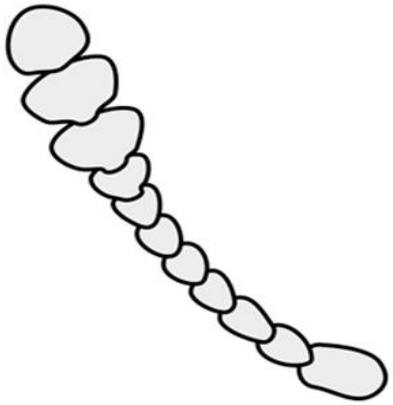
Platysoma moluccanum

butterfly

Types of antennae

8. Clavate

- Unlike the capitate ones, clavate antennae get progressively thicker in their ends.
- e.g., moths (Lepidoptera), carrion beetles (Silphidae: Coleoptera).

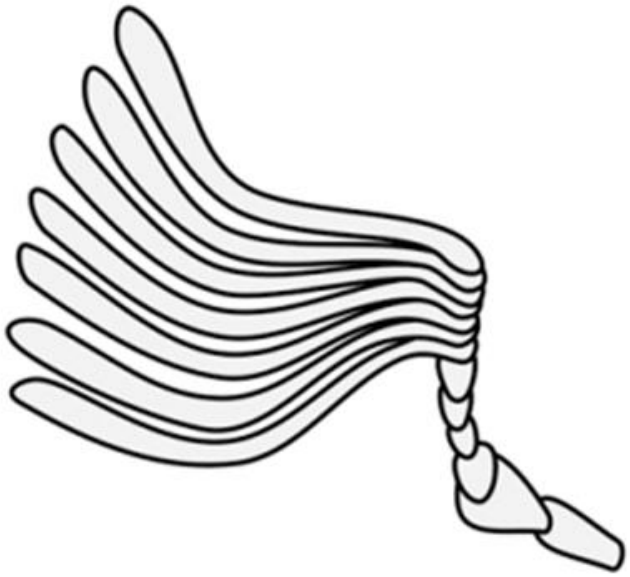


Thanatophilus sinuatus (Silphidae)

Types of antennae

9. Lamellate

- the segments towards the end are flattened and plate-like (like a fan).
- e.g., beetles of the family Scarabaeidae (Coleoptera).



beetle of the family Scarabeidae

Types of antennae

10. <u>Moniliform:</u>

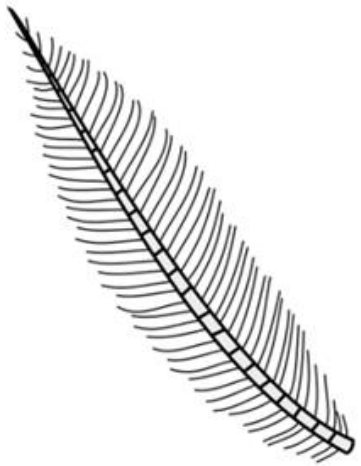
- Segments are spherical and equally sized.
- The antennae like a string of bead.
- e.g., termites (Isoptera).

picture of a termite

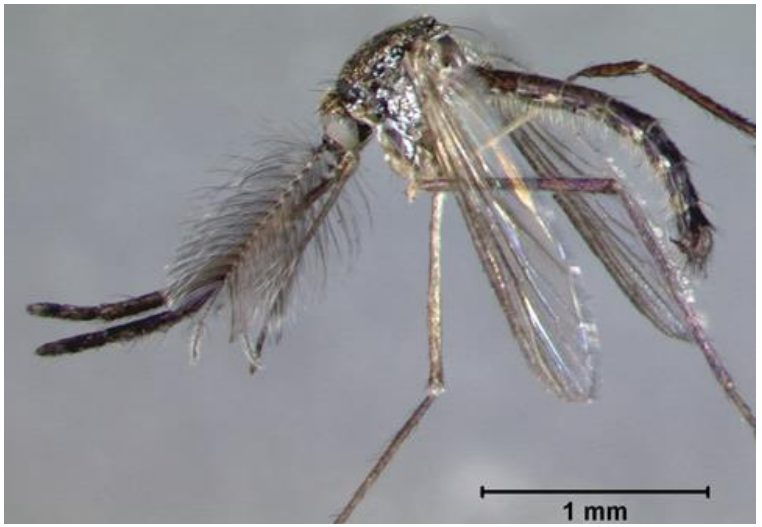
Types of antennae

11. Plumose:

- like feathers.
- Segments have numerous thin branches.
- Having a bigger antennal surface allows them to detect more suspended molecules, like pheromones.
- e.g., Mosquito (Diptera) and moth (Lepidoptera) males.



Moth male of the genus polymohemus

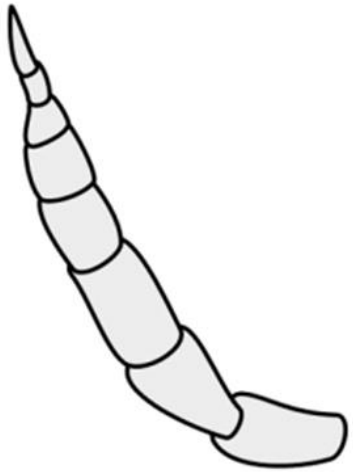


Psorophora ferox

Types of antennae

12. Stylate

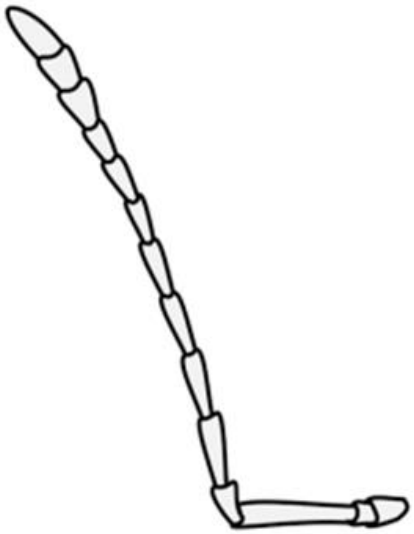
- Similar to filiform antennae, the terminal segments are pointed and slender, looking like a style.
- The style can either have bristles or not.
- Example: brachycerous flies (Diptera).



Types of antennae

13. Geniculate

- These are bent, almost like a knee joint.
- E.g., some bees and wasps (Hymenoptera), weevils (Curculionidae, Coleoptera).



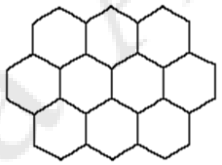
Parasitoid wasps of the species *Trissolcus mitsukurii*

Eyes

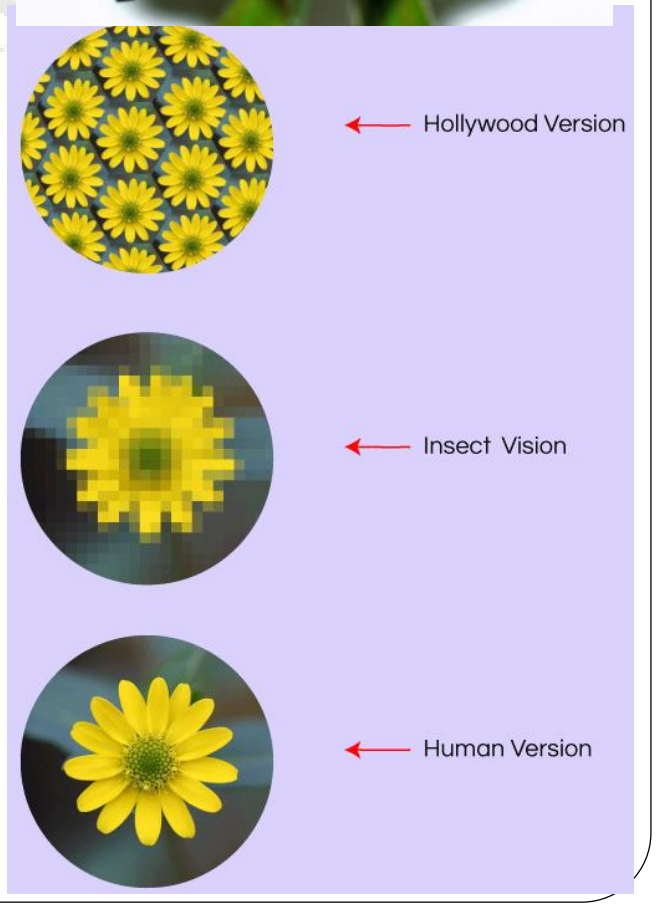
- **Insects have two types of eyes**

a. Compound eyes

- Large and obvious.
- Cornea = number of ommatidia (lenses).
- Ommatidia has hexagonal pattern.



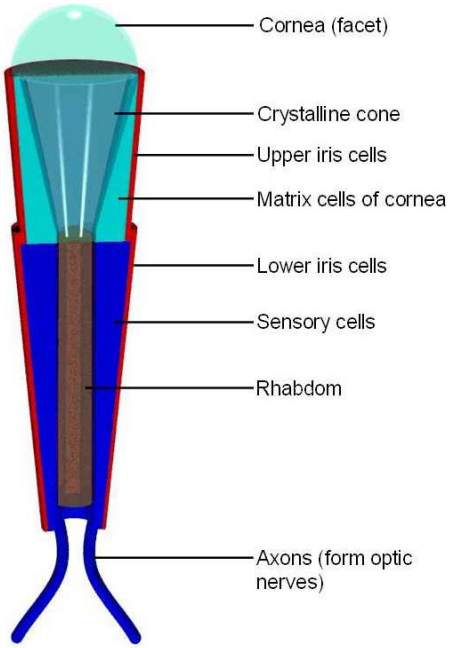
- Ommatidia varied (in worker ant species 1- 600, in male Odonata 28,000).
- Each ommatidium is pointed at a single area and contributes information about only one small area in the field of view.



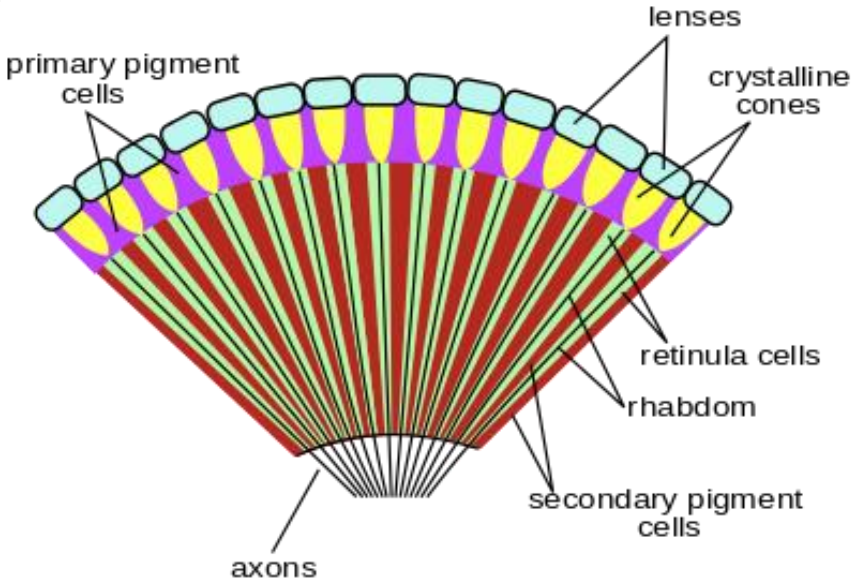
Eyes

Each ommatidium consists of

- A lens (facet; the front surface).
- A transparent crystalline cone.
- Light-sensitive visual cells arranged in a radial pattern.
- Pigment cells > only light entering the ommatidium to its long axis reaches the visual cells and triggers nerve impulses (separate the ommatidium from its neighbors).



Structure of an ommatidium



Eyes

b. Simple Eyes (Ocelli)

- Can generate no image but respond to changes in light, consist of **5** parts.

1.Corneal lens > serves as a lens.

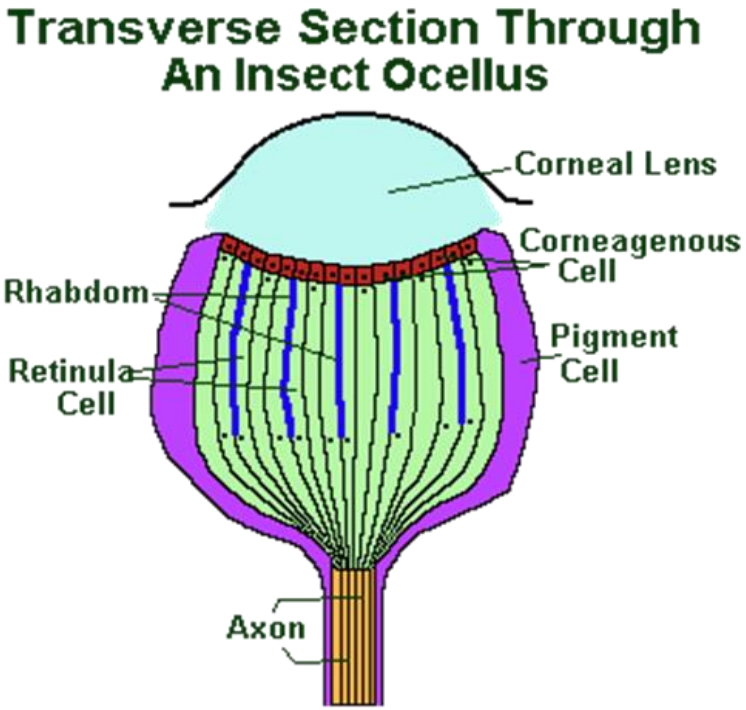
2. Corneagen layer > secrete the cornea.

3. Retina sensory cells> convert light.

into an electrical stimulus and transfer it.

4. Axon > nerve transfer info to brain.

5.Pigment cells > separate the ocilli



Usfel websites

https://www.thoughtco.com/insect-antennae-and-their-forms-1968065

https://genent.cals.ncsu.edu/bug-bytes/head/antennae/

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