

# Insect Antennae

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**DR. SAMEER KUMAR SINGH**

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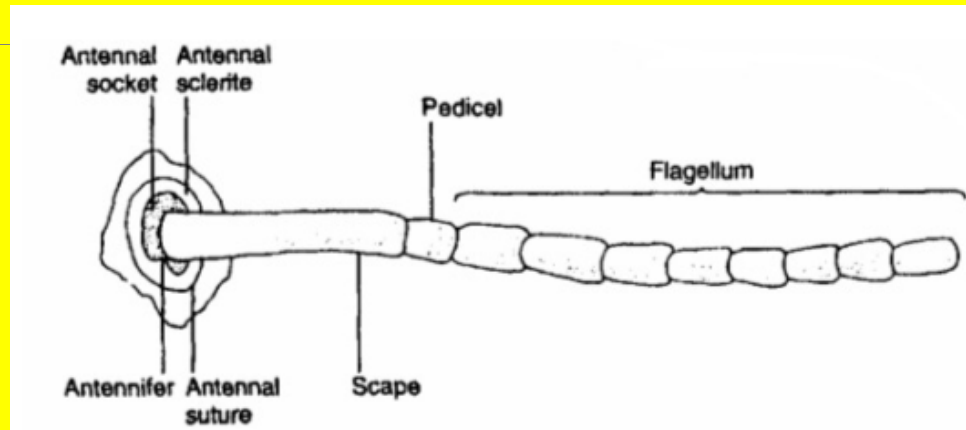
**ASSISTANT PROFESSOR**

**DEPARTMENT OF ENTOMOLOGY, COLLEGE OF AGRICULTURE  
ACHARYA NARENDRA DEVA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY,  
AYODHYA, (U.P.), INDIA**

## Insect Antennae

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- Antenna is also called feelers. They are paired, highly mobile and segmented.
- Antennae are located between or behind the compound eyes.
- All insects excepts Protura have a pair of antenna.
- Antennae are well developed in adults and poorly developed in immature stages.
- The antenna is set in a socket of the cranium called antennal socket.
- The base of the antenna is connected to the edge of the socket by an articulatory membrane. This permits free movement of antennae.



## STRUCTURE OF ANTENNA

- Antennae consist of three parts.
- **Scape:** It is first basal segment of antenna by which the antennae is attached to the head. It is often distinctly larger than the other succeeding joints. It articulates with the antennal ridge.
- **Pedicel:** The joint immediately followed the scape is pedicel. It is usually small and contains a special sensory structure known as Johnston's organ, which is absent in Diplura and Collembola.

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**Flagellum:** It is also known as clavola which lack individual muscles, and is the remaining part of the antenna. Flagellum segments (flagellomeres) increase in number in certain insects. It is modified according to the surroundings and habits of the insects. Flagellum is subdivided into ring segments, funicle and club. Surface of flagellum is supplied by many sensory receptors that are innervated by duetocerebrum of brain.

## FUNCTIONS OF ANTENNAE

1. Antenna is useful to detect chemicals including food and pheromones (chemicals secreted into air by opposite sex).
2. It perceives smell, humidity changes, variation in temperature, vibration, wind velocity and direction.
3. Antenna is useful to perceive the forward environment and detect danger.
4. It is useful for hearing in mosquitoes and communication in ants.
5. Rarely it is also useful to clasp the mate (e.g. Flea) and grasp the prey.

# TYPES OF INSECT ANTENNAE

1. **Setaceous (Bristle like):-** Size of the segments decreases from base to apex. e.g., Leafhopper, Dragonfly, Damselfly, Cockroach.
2. **Filiform (Thread like):-** Segments are usually cylindrical. Thickness of segments remains same throughout. e.g. Grasshopper. Ground beetle.
3. **Moniliform (Bead like):-** Segments are either globular or spherical with prominent constriction in between e.g. Termite.
4. **Serrate (Saw like):-** Segments have short triangular projections on one side. e.g. Longicorn beetle, Pulse beetle.
5. **Uni-pectinate (Comb like):-** Segments with long slender processes on one side e.g. Sawfly, Sugarcane root borer.

**Setaceous  
(Whip like or bristle  
like)**

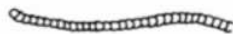


*American Cockroach*



*Dragon fly*

**Filiform  
(Thread like)**



*Asian Long Horned Beetle*



*Grasshopper*

**Moniliform**  
(like string of beads)



*Termites (Isoptera)*

**Serrate** (saw like)



*Click Beetle (Coleoptera)*

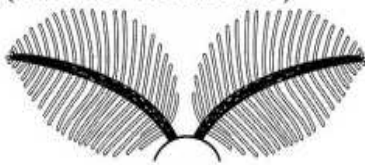
6. **Bipectinate (Double comb like):**- Segments with long slender lateral processes on both the sides e.g. Silkworm moth.
7. **Clavate (Clubbed):**- Antenna enlarges gradually towards the tip and last segment finally ending into a round cone. e.g. Blister beetle, Butterflies.
8. **Capitate (Knobbed):**- Terminal segments become enlarged suddenly e.g. Nitidulid beetle.
9. **Lamellate (Plate or leaf like):**- Antennal tip is expanded laterally on one side to form flat plates e.g. lamellicorn beetle.
10. **Aristate (with a bristle):**-The terminal segment is enlarged. It bears a conspicuous dorsal bristle called arista e.g. House fly.

**Pectinate (comb like)**



Fire fly (Coleoptera)

**Bipectinate (double comb like)**



Mulberry Silk Moth

**Clavate (clubbed):**



Order Coleoptera: *Oeceoptoma thoracica*



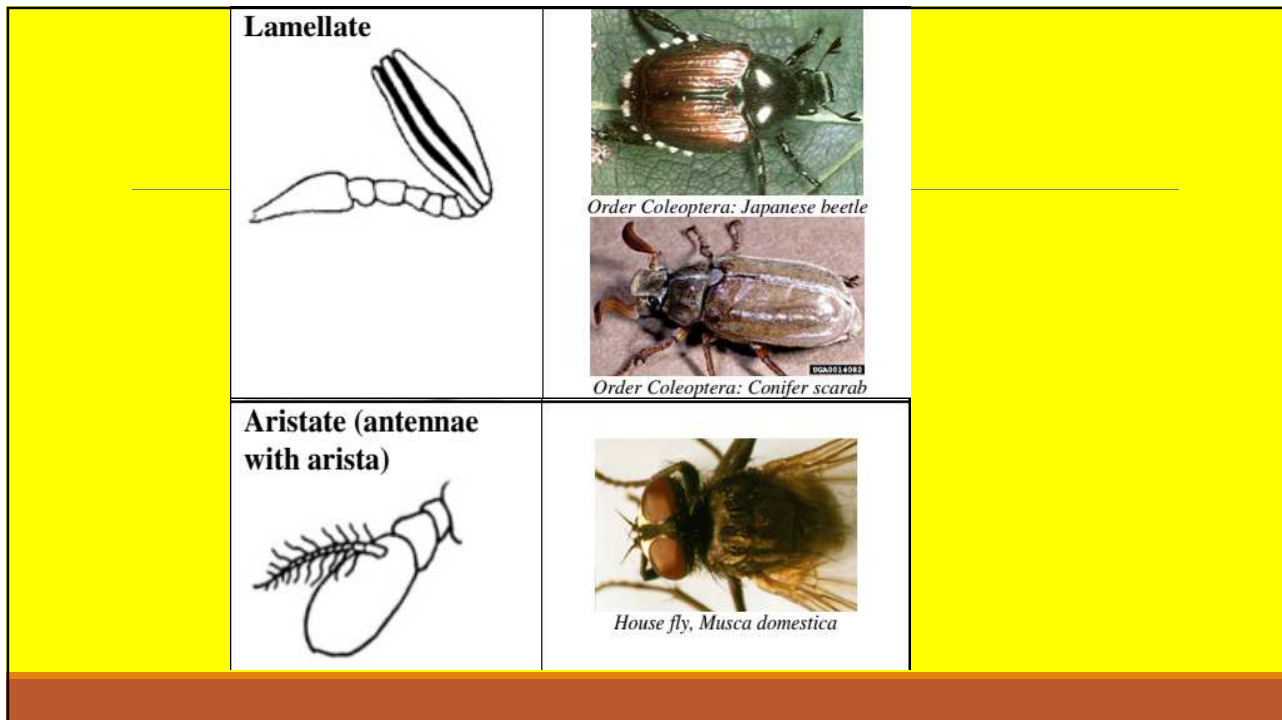
**Capitate (clubbed with knob)**



Speckled wood butterfly

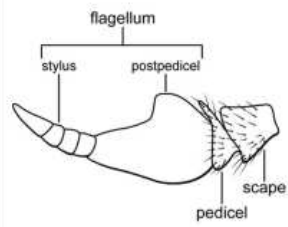


Red-banded hairstreak



11. **Stylate (with a style)**:- The last segment of flagellum is modified into a long bristle known as style. eg. Horse fly, Robber fly.
12. **Plumose (Feathery)**:- Segments with long whorls of hairs e.g. male mosquito.
13. **Pilose (Hairy)**:- Antenna is less feathery with few hairs at the junction of flagellomeres. e.g. Female mosquito.
14. **Geniculate (Elbowed)**:- Scape is long remaining segments are small and are arranged at an angle to the first resembling an elbow joint. e.g. Ant, weevil and honey bee.
15. **Flabellate (Plate like)**:-The terminal segments expand on one side into lateral lobes. The sides of the lobes are parallel. Examples: Stylopids.

**Stylate  
(antennae with style)**



*Robber fly*

**Plumose (brush like  
with dense hairs)**

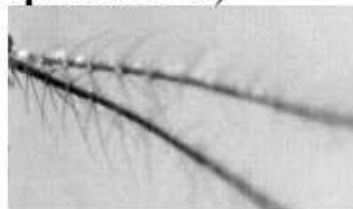


*Mosquito male, Culex*

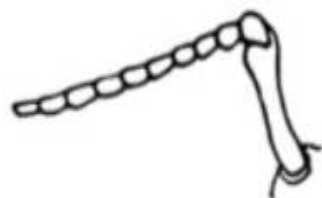


*Luna moth, Actius luna*

**Pilose (brush like with  
sparse hairs)**



**Geniculate (elbowed)**



*Order Hymenoptera: Carpenter ant*



**Flabellate (Plate like)**

- 16. Whorled:-** Usually setaceous, filiform or moniliform type with one or more whorls of hairs around each segment. e.g., Male of mango mealy bug.