## 5.ORDER Diptera: True flies Mosquitoes and Gnats

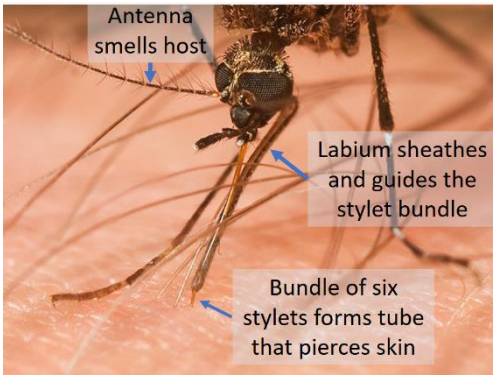
**Etymology**: Greek words “di” meaning two and “ptera” meaning wings

Holometabola i.e. complete metamorphosis

- Front wings membranous; hind wings modified as small halters (small club-shaped organs)


Source: https://www.bobs-bugs.info/2013/12/20/diptera-true-flies/

Haustellate mouthparts (Haustellate describes insect mouthparts that are adapted for sucking up liquids - piercing-sucking in mosquitoes and sponging in some flies like housefly




Mosquito Piercing mouthparts
Image source: https://en.wikipedia.org/wiki/Insect_mouthparts

Housefly sponging mouthpart
( Source: https://www.paul-pfurtscheller.com/cópia-bilder-bestellen)

- All Dipteran larvae are legless and called maggots.

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The Diptera is divided into three suborders:

1. Nematocera (flies with multi-segmented antennae)

2. Brachycera (flies with stylate antennae)

3. Cyclorrhapha (flies with aristate antennae)

Dipterans are highly adaptive strong fliers with the highest wingbeat. They survive in a wide range of substrates. Some of the functional groups of Diptera are given below

| Group | Common Name | Life History Strategy | Families / Species |
|---|---|---|---|
| Saprophagous | Decomposers | Larvae feed on decaying organic matter (plants, animals, dung) | *Calliphoridae* (blow flies), *Sarcophagidae* (flesh flies), *Muscidae* (houseflies) |
| Coprophagous | Dung feeders | Larvae develop in animal faeces | *Scathophagidae*, *Sepsidae* |
| Mycophagous | Fungus feeders | Larvae feed on fungi or mould | *Mycetophilidae* (fungus gnats), *Sciaridae* |
| Phytophagous | Plant feeders | Larvae mine, bore, or gall plants | *Agromyzidae* (leaf miners), *Tephritidae* (fruit flies), *Cecidomyiidae* (gall midges) |
| Predatory | Insect predators | Larvae prey on other insect larvae or eggs | *Syrphidae* (hoverfly larvae), *Asilidae* (robber flies - predatory adults) |
| Parasitic | Internal parasites of other insects | Larvae parasitize other insects (especially caterpillars) | *Tachinidae* (parasitoid flies), *Conopidae* (bee parasites) |
| Hematophagous | Blood-feeders | Adult females feed on vertebrate blood; larvae often aquatic or semi-aquatic | *Culicidae* (mosquitoes), *Tabanidae* (horse flies), *Simuliidae* (black flies), *Phlebotomidae* (sand flies) |
| Nectivorous / Non-feeding Adults | Pollinators / Short-lived | Adults feed on nectar or do not feed; larvae usually detritivores or aquatic | *Syrphidae*, *Tipulidae* (crane flies) |
| Aquatic or Semi-aquatic Larvae | Water-associated | Larvae live in aquatic habitats (clean or polluted) | *Chironomidae* (non-biting midges), *Culicidae*, *Simuliidae* |

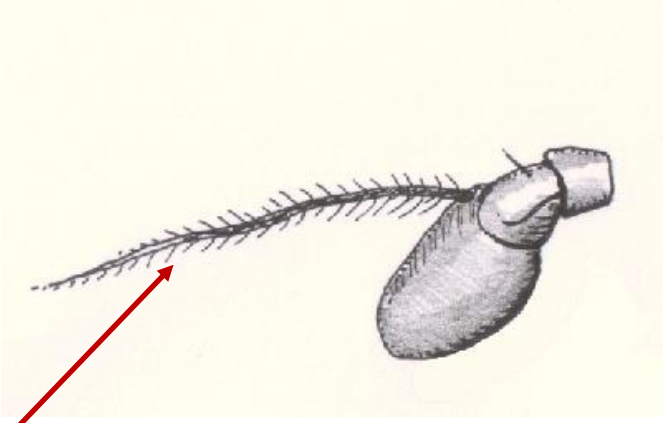
**Robber fly** **Horsefly**

**Economic Importance:**

- The Diptera probably have a greater economic impact on humans than any other group of insects.
- Some flies are pests of agricultural plants, others transmit diseases to humans and domestic animals.
- Many flies are beneficial as pollinators, decomposers and as biocontrol agents of insect pests.

**Some interesting trivia about Dipterans**

1. A shore fly species, *Ephydra brucei*, lives in hot springs and geysers where the water temperature exceeds 112 degrees Fahrenheit.
2. The petroleum fly, *Helaeomyia petrolei* develop in pools of crude oil.
3. The brine fly or **alkali fly**, *Ephydra cinera*, can survive very high concentrations of salt. *Ephydra hians* found in Mono Lake, California, is known for diving into salty waters with an air bubble.
4. The little scuttle fly, *Megaselia scataris* (Phoridae), a true omnivore, has been reared from decaying vegetation, shoe polish, paint emulsions, human cadavers pickled in formalin, and even lung tissue from living people.
5. The arista in the antenna of higher flies is an air speed indicator.



The arista is a simple or variously modified apical or subapical bristle, arising from the third antennal segment

(Image source: By Halvard https://commons.wikimedia.org/w/index.php?curid=34787522)