

DIPTERA - CECIDOMYIIDAE, TRYPETIDAE, TACHINIDAE, AGROMYZIIDAE.

DIPTERA

Etymology : Di-two; ptera-wing

Common names : True flies, Mosquitoes, Gnats, Midges,

Characters

- ✓ They are small to medium sized, soft bodied insects.
- ✓ The body regions are distinct.
- ✓ Head is often hemispherical and attached to the thorax by a slender neck.
- ✓ Mouthparts are of sucking type, but may be modified.
- ✓ All thoracic segments are fused together. The thoracic mass is largely made up of mesothorax. A small lobe of the mesonotum (scutellum) overhangs the base of the abdomen.
- ✓ They have a single pair of wings.
- ✓ Forewings are larger, membranous and used for flight.
- ✓ Hindwings are highly reduced, knobbed at the end and are called **halteres**. They are rapidly vibrated during flight. They function as organs of equilibrium. Flies are the swiftest among all insects.
- ✓ Metamorphosis is complete. Larvae of more common forms are known as maggots. They are **apodous** and **acephalous**. Mouthparts are represented as mouth hooks which are attached to internal sclerites. Pupa is generally with free appendages, often enclosed in the hardened last larval skin called **puparium**. Pupa belongs to the coarctate type.

Classification

This order is sub divided in to three suborders.

I. NMATOCERA (Thread-horn)

- ✓ Antenna is long and many segmented in adult.
- ✓ Larval head is well developed.

- ✓ Larval mandibles act horizontally.
- ✓ Pupa is weakly obdect.
- ✓ Adult emergence is through a straight split in the thoracic region.

II. BRACHYCERA (Short-horn)

- ✓ Antenna is short and few segmented in adult.
- ✓ Larval head is retractile into the thorax
- ✓ Larval mandibles act vertically
- ✓ Pupa is exarate.
- ✓ Adult emergence is through a straight split in the thoracic region.

CYCLORRHAPHA: (Circular-crack)

- ✓ Antenna is aristate in adult.
- ✓ Larval head is vestigial with mouth hooks.
- ✓ Larval mouth hooks act vertically.
- ✓ Pupa is coarctate.
- ✓ The coarctate pupa has a circular line of weakness along which the pupal case splits during the emergence of adult. The split results due to the pressure applied by an eversible bladder **ptilinum** in the head.

Sub order: NEMATOCERA

1. CULICIDAE (Mosquitoes)

- ✓ They are delicate, fragile, slender insects
- ✓ Females have piercing and sucking type of mouthparts with six stylets.
- ✓ Antenna is plumose (bushy) in male and pilose (less hairy) in female.
- ✓ Legs are slender, delicate and long.
- ✓ Wings are fringed with hairs and scales on hind margin and on some veins.
- ✓ Males are short lived and feed on nectar or decaying fruits.
- ✓ Females live long and are blood feeders.

- ✓ Larvae are called **wrigglers**. Larval head is large with chewing mouthparts and mouth brush aiding in filter feeding. Thorax is large without legs. Respiratory siphon is located in the penultimate abdominal segment. Anal gills are present at the terminal end of the abdomen.
- ✓ Pupa is known as **tumbler**. It is very active. It has a pair of prothoracic horns which houses the anterior pair of spiracles. A pair of anal paddles is present at the terminal end aids in swimming.

Malarial mosquito

Anopheles sp transmits malaria



Filarial mosquito .

Culex sp transmits filariasis



Mosquito larvae wiggler



Mosquito pupa tumbler

2. CECIDOMYIIDAE (Gall midges)

- ✓ They are minute delicate, mosquito like flies.
- ✓ Antennae and legs are long
- ✓ Wing venation is reduced. Wings are covered with long hairs.
- ✓ A dark sclerotised area is present midventrally on the prothorax in the larva called 'chest bone'.

Rice gall midge : *Orseolia oryzae* - maggot feeding produces galls.



Sub order: BRACHYCERA

3. ASILIDAE (Robber flies)

- ✓ They are elongate bristly flies.
- ✓ Head is broad and hollowed out in between the compound eyes
- ✓ Compound eyes are protuberant. A prominent tuft of hairs is found on the head forming the mouth-beard. The proboscis is thick and stout.
- ✓ Legs are stout, hairy and suited for catching the prey.
- ✓ Abdomen is tapering and has a pair of large claspers at the tip of the male and a horny ovipositor in female.
- ✓ They are most active, non selective predators.



4. TABANIDAE (Horse flies)

- ✓ Body is stout
- ✓ Head is large. Eyes are large and often brilliantly coloured. In male eyes are holoptic (contiguous) and in female dichoptic (seperate). The third antennal segment is annulated. The proboscis is strong and pointing downwards.
- ✓ They are swift fliers.
- ✓ Male feeds on nectar. Female sucks blood from cattle and horses. They spread anthrax.



Sub order: CYCLORRHAPHA

5. SYRPHIDAE (Hover flies, Flower flies)

- ✓ They are brightly coloured and brilliantly striped. A vein like thickening (spurious vein) is present in between the radius and median in the forewing.

- ✓ Abdomen has distinct black and yellow markings.
- ✓ Maggots prey on soft bodied insects especially aphids.
- ✓ Adults are excellent flies. They hover over flowers. They feed on pollen and nectar. They aid in pollination.



Hover flies



Flower flies

6. TEPHRITIDAE (Fruit flies)

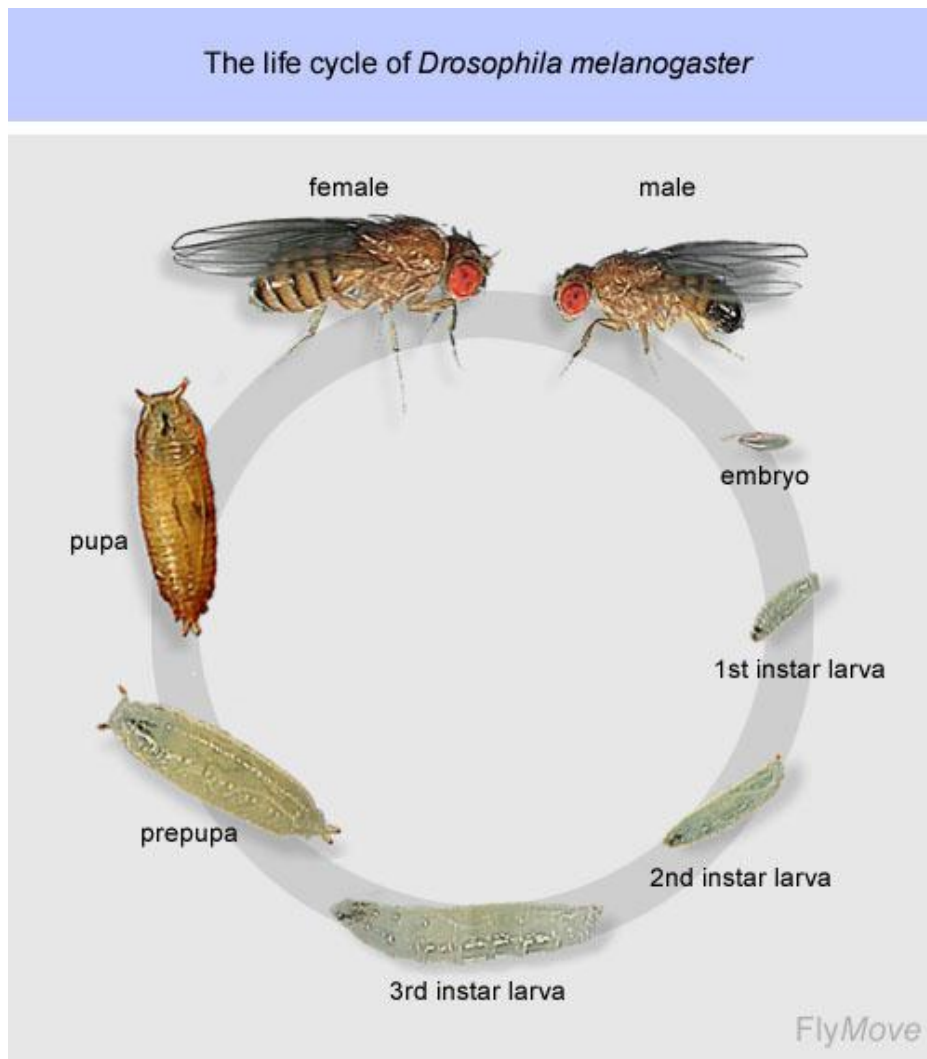
- ✓ Sub costa bends apically and fades out.
- ✓ Wings are spotted or banded.
- ✓ Female has a sharp and projecting ovipositor.
- ✓ Maggots can hop. They are highly destructive to fruits and vegetables.
- ✓ Curcubit fruit fly : *Dacus cucurbitae*



7. DROSOPHILIDAE (Vinegar gnats, Pomace flies)

- ✓ Eyes are usually red.
- ✓ They are attracted to rotting vegetables and fruits.
- ✓ Larvae feed on yeast and products of fermentation.
- ✓ Life cycle is very short (7 days).

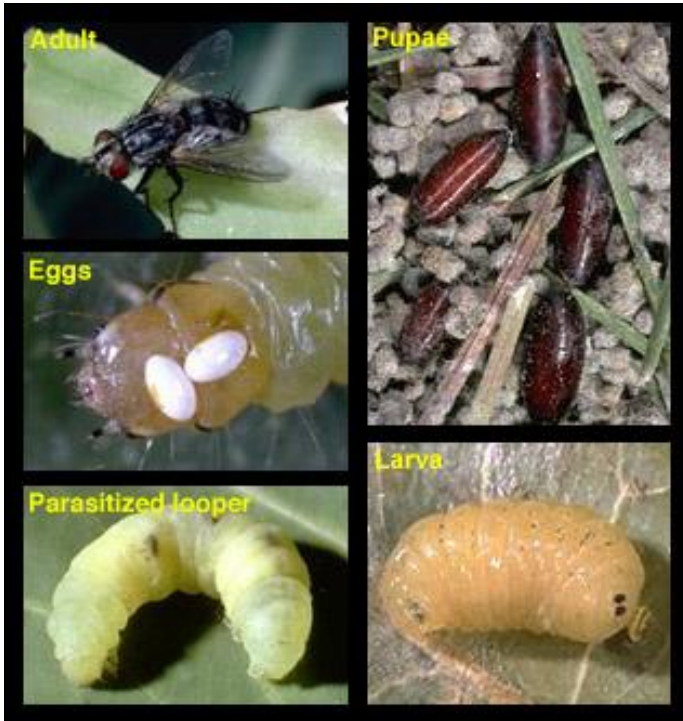
Pomace fly : *Drosophila melanogaster*. They are extensively used in the study of animal genetics.



8. TACHINIDAE (Tachinid flies)

- ✓ Arista is completely bare.
- ✓ Abdomen is stout with several noticeable bristles.

- ✓ They are non specific endoparasites on the larvae and pupae of Orthoptera, Hemiptera, Lepidoptera and Coleoptera.



9. MUSCIDAE(House fly)

- ✓ Antennal arista is plumose.
- ✓ Mouthparts are sponging type. Labium is distally modified into a pair of oval shaped fleshy lobes called **labella**.
- ✓ Pretarsus consists of two claws and two adhesive pads.
- ✓ First abdominal segment is yellow in colour. Terminal abdominal segments are telescopic forming a pseudo ovipositor. Abdomen is not bristly on basal part.
- ✓ Maggots are scavengers. Adults carry certain disease causing microbes on its legs, body hairs and mouthparts.

Common house fly: *Musca domestica*



10. HIPPOBOSCIDAE

- ✓ Body is flat and leathery.
- ✓ Legs are short, strong and useful for clinging to the host.
- ✓ Wings are present or absent.
- ✓ They are viviparous. They give birth to mature larvae which are glued to the hairs of the host. The young larva is retained in a special uterine pouch and nourished by special nutritive glands. Larva once laid never feeds. It pupates immediately.
- ✓ They are blood sucking ectoparasites on cattle and dogs. *Hippobosca maculata* is associated with cattle and *H. capensis* is parasitic on dogs.