

الانبار	الجامعة
العلوم	الكلية
علوم حياة	القسم
الثانية	المرحلة
تصنيف حشرات	اسم المادة باللغة العربية
<b>Systematic Entomology</b>	اسم المادة باللغة الانكليزية
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رتبة (ثنائية و غشائية الاجنحة)	عنوان المحاضرة باللغة العربية
<b>Order(Diptera -Hymenoptera</b>	عنوان المحاضرة باللغة الإنكليزية
<b>6</b>	رقم المحاضرة

## Order: Diptera

(Gr., di= two; ptera = wing); Common name: True flies, Mosquitoes, Midges, Gnats

Dipteran flies are the swiftest among all insects. They are present in aquatic, semi-aquatic or moist terrestrial habitats. They can be traced in soil, plant/animal tissues, dung or decaying organic matter. Most of the species feed on dead and decaying organic matter and are parasitic on other organisms. A few species are phytophagous.

### Characteristic Features

- a) Diptera are small to medium-sized and soft-bodied insects with generally sponging and rarely piercing mouth parts.
- b) Antennae are often annulate type.
- c) These insects are characterized by a single pair of membranous forewings which are used for flight. Hind wings are reduced, called haltere.
- d) Head is often hemispherical and attached to the thorax by a slender neck.
- e) Metamorphosis is complete. Larvae are apodous and acephalous, known as maggots. Pupa is free or enclosed in the hardened last larval skin.

### Importance

The housefly (*Musca domestica*) can be dangerous because it moves from person to food, drink, garbage, carrion, or feces. By transferring infective organisms from decomposing material or from infected people, houseflies are agents in transmitting typhoid, dysentery, cholera, summer diarrhea in children, and other intestinal virus- and bacteria-caused diseases. Other flies pierce the skin of vertebrates and feed on their blood. Mosquitoes, black flies, sand flies, biting midges, and horse flies have evolved mandibles and maxillae that are bladelike, piercing stylets. These piercing organs are developed only in females, which use blood protein in egg production. Males do not feed on blood.

### Some diseases spread by Diptera

Anopheles = malaria

Aedes = Dengue fever

Simulium = river blindness

sand flies = Leishmaniasis

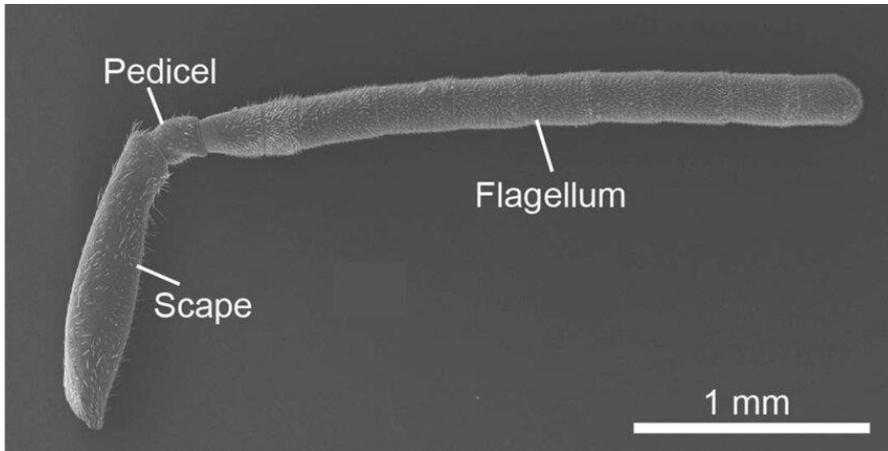
biting midges = dermatitis and skin lesions

horse flies = anthrax

Division into suborders is based on structure of antennae and wing venation

**Suborder Nematocera**

Antennae consist of scape, pedicel, and flagellum with numerous similar segments; larvae usually with well-defined head, mandibles horizontally opposed.



- **Family Mycetophilidae** (fungus gnats)

Fragile, slender; flit about in damp, shady places, among decaying vegetation.



- **Family Cecidomyiidae** (gall midges)

Tiny flies seldom seen as adults; shapeless larvae burrow into plant tissues, cause formation of plant galls, and deform leaves, stems, and roots; some horticultural and agricultural pests.



- Family **Psychodidae** (moth flies)

Tiny, with hairy wings; often seen singly in kitchens, on windows above sinks; some larvae numerous in sewage sedimentation tanks; larvae mostly aquatic.



- Family **Phlebotomidae** (sand flies)

Adult females suck blood, carry dermal and intestinal leishmaniasis and [sandfly fever](#).



- Family **Ceratopogonidae** (biting midges)

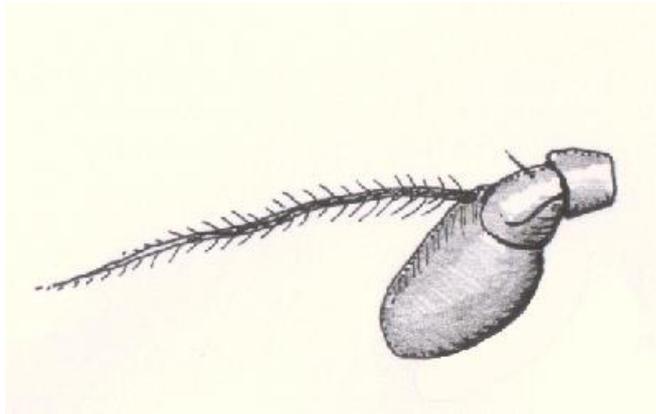
Tiny, often with spotted wings (e.g., *Culicoides*); adult females with irritating bite suck blood, carry some parasitic worms.



- **Family Simuliidae** (black flies)  
Also buffalo gnats; small, with short antennae; females suck blood, carry parasitic worms that cause “river blindness”; forms nodules under skin.
- **Family Culicidae** (mosquitoes)  
Small; elongated; recognized by scaly wings; many females suck blood, carry human diseases (Anophelini carry malaria; Culicini carry **yellow fever**, filariasis, dengue, viral encephalitis); larvae and pupae aquatic.

### Suborder Brachycera

Flagellum of antennae nearly always fused into a compound 3rd segment, remaining form a stumpy “style” or bristle-like arista; palpi seldom with more than 3 segments,



- **Family Tabanidae** (horseflies, deerflies;  
some females (*Chrysops*, *Tabanus*, *Haematopota*) suck blood, are livestock pests
- **Family Glossinidae** (Tsetse fly)  
Tsetse are large biting flies from Africa which live by feeding on the blood of vertebrate animals. Tsetse are **biological vectors** of the African trypanosomiasis, deadly diseases which include **sleeping sickness** in people and nagana in cattle.

### Suborder Brachycera-Cyclorrhapha

- **Family Drosophilidae** (small fruit flies)  
Larvae in decaying and fermenting fruit or any sweet substance; includes *Drosophila melanogaster*, used in genetic studies.
- **Family Calliphoridae - Blow-flies**

Adults are commonly shiny with metallic coloring, often with blue, green, or black. Many species lay eggs on meat or carrion(*Calliphora*).



### Order : Hymenoptera

Hymenoptera (Gr., hymen= membranous; ptera = wing); Common name: Bees, Ants, Wasps, Sawflies.

Hymenopterans are found in almost all terrestrial habitats; soil, vegetation, flowers, leaf litters, near water, etc. A few species live a social life while many species live as parasitoids on other insects. These insects feed on a wide range of food, such as honeydew, nectar, seeds, fungus, decaying organic matter, etc. Roughly, 1,50,000 species are known throughout the world.

#### Characteristic Features

- a) Hymenopteran are common insects with mandibulate, lapping or sucking mouthparts.
- b) They have 2 pairs of membranous wings with reduced venation. Forewings are larger than the hindwings and interlocked with each other by a row of hooklets
- c) Ovipositor of females is variously modified for oviposition or stinging, sawing or piercing the plant tissue.
- d) the Hymenoptera are most important to humans as **pollinators** of wild and **cultivated flowering plants**, as **parasites** of destructive insects, and as makers of **honey**. The Hymenoptera are divided into two suborders: **Symphyta** (mainly sawflies and horntails) and **Apocrita** (wasps, ants, bees, and most parasitic forms).

## Difference Between Symphyta and Apocrita

pect	Symphyta	Apocrita
Antennae	Usually have 12 or more segments in antennae	Generally have 12 or fewer segments in antennae
Larval feeding habits	Larvae often feed externally on plants	Larvae usually feed internally or are parasitic
Social behavior	Mostly solitary	Often social insects
Venomous species	Rarely have venomous species	Include venomous species (e.g., wasps)
Ovipositor	Female ovipositor is saw-like	Female ovipositor is typically modified for stinging or egg-laying
Diversity	Less diverse in terms of species	Highly diverse with bees, ants, and wasps

### Suborder Symphyta

- **Family Xyelidae** (xyelid sawflies)  
Mostly less than 10 mm long; ovipositor long to very long; larvae feed on hickory, on elm, and on pine flowers.
- **Family Cimbicidae** (cimbicid sawflies)  
often large and bumblebee-like; antennae clubbed; larvae often covered with waxy powder.
- **Family Diprionidae** (conifer sawflies)  
Includes serious pests of conifers; 13 or more antennal segments.
- **Family Cephidae** (stem sawflies)  
Slender insects; larvae live in stems of grasses (including commercial grains) and berry plants.

### Suborder Apocrita

- **Family Braconidae** (braconids)  
A large group; some forms highly beneficial to humans by being parasitic on insect pests.
- **Family Halictidae** (mining bees)  
Usually nest in the ground; often important in plant pollination; small to medium in size; often metallic in color.

- **Family Sphecidae** (sphecid wasps)

A large group; adults most often found in flowers; most nest in wood, earth burrows, or in cells of mud.

- **Family Apidae** (bumblebees, honeybees, and digger, or mining, bees)

Social as well as solitary; important in flower pollination; the **western honeybee**, *Apis mellifera* in particular, is one of the few domesticated insects.

honeybees are **eusocial insects** noted for providing their nests with large amounts of honey. A colony it usually consists of the **1-** queen bee, a fertilized female capable of laying a thousand or more eggs per day; **2-** from about 10,000 to 65,000 adult but sexually undeveloped female worker bees; **3-** and from none to 1,000 male **drones**. For all three forms of honeybees, eggs hatch in three days and then develop into **larvae** that are known as grubs,. When fully grown, the grubs transform into **pupae**. Adult queens emerge in 16 days, workers in about 21 days (on average), and drones in 24 days.



**Kingdom:** Animalia

**Phylum:** Arthropoda

**Subphylum:** Hexapoda

**Class:** Insecta

**Subclass:** Pterygota

**Order:** Hymenoptera

**Suborder:** Apocrita

**Superfamily:** Apoidea

**Family:** Apidae

**Genus:** Apis

**species:** mellifera L