

<b>Subject</b>	<b>Insect Taxonomy</b>
<b>Lect. No.</b>	5
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## Living Things

The class Insecta has two **subclasses** viz., **Apterygota** and **Pterygota**.

	<b>Apterygota</b>	<b>Pterygota</b>
1.	Primarily wingless-evolved	Winged or secondarily wingless- e.g. Flea, head louse, bed bug.
2.	Metamorphosis is totally absent or slight.	Present.
3.	Mandibular articulation in head is monocondylic i.e.,single	Dicondylic i.e., double.
4.	Pleural sulcus in thorax is absent.	Present.
5.	Pregenital abdominal appen- dages present.	Absent.

## Subclass Apterygota classified in to four Orders

### 1. Thysanura - Silverfish

#### Characters:

1-Its common name derives from the insect's silvery light grey colour, combined with the fish-like appearance of its movement.

2-Thysanura are primitively wingless insects. Most species are covered with overlapping silvery-gray scales although some lack scales.

3- Nocturnal insect typically 13–25 mm (0.5–1.0 in) long.

4- Bodies are dorsoventrally flattening.

5-Newly hatched are whitish, but develop a greyish and metallic

6-Median caudal filament present at the tip of the abdomen between the two long cerci.

7-It also has two small compound eyes; other species are eyeless.

8-It has long antennae. Silverfish typically live for up to three years.

#### Families of Orders.

1-Lepidotrichidae

2-Lepismatidae - The **silverfish** *Lepisma saccharinum*

3-Machilidae -

4-Nicolethiidae-



## 2-Order: Collembola ( Springtails )

### General characters:

1-Minute to medium – small size insects rarely exceeding 5 mm in length.

2-Mouthparts entognathous, principally adapted for biting.

3-Antenna usually 4-segments.

4-Compound eyes absent.

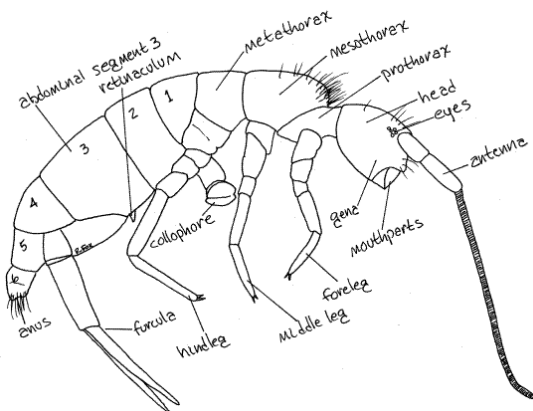
5-Abdomen 6 segments, usually with three pairs of appendages

**a- Collophore or ventral tube or glue peg.**

**b. Retinaculum or tenaculum or catch,**

**c. Furcula or Furca:**

They are found in damp soil, in decaying vegetable matter, under bark of trees. A few species may be found on the surface of fresh-water pools. Some species may occasionally cause damage in gardens, or mushroom cellars.



### **3-Order: Protura ( Telsontails )**

#### **General characters:**

- 1- Minute whitish insects (0.5 – 2) mm in length.
- 2- Head is cone-shaped. eyes and antennae absent.
- 3- Mouthparts are chewing type, well-developed and are largely withdrawn into the head, and consisting of stylet-like mandibles, small maxillae, and membranous labium.
- 4- First pairs of legs is principally sensory in function.
- 5- Styli are present on the 3 basal abdominal segments.
- 6- The abdomen of adult consist of 12 segments.

They feed on decomposing organic matter.

#### ***Acerentomon* sp.**



#### **4-Order Diplura - Two-pronged Bristletails –**

##### **Characters:**

1-Small wingless insects, lacking eyes.

2-Antennae long, with many segments.

3- Mouthparts for biting.

4-Tarsi are 1-segmented.

5- Abdomen with a pair of jointed, filamentous cerci of variable length or with stout terminal pincers.

**Examples :*Campodea*\_sp.**



**The sub-class Pterygota has two divisions, namely Exopterygota and Endopterygota based on the wing development.**

Character	Exopterygota	Endopterygota
1. Wing development	* External	* Internal
2. Type of metamorph-	* Incomplete (Hemimetabola) or gradual	*Complete (Holometabola)
3. Pupal stage	* Absent	* Present
4. Immature stage	* Naiad or Nymph	* Larva
5. No. of orders	* 16	* 9

The class Insecta has 29 orders (4 in Apterygota and 25 in Pterygota)

**EXOPTERYGOTA Orders:**

**EXOPTERYGOTA Orders:**

- 1-Ephemeroptera - Mayflies**
- 2-Odonata-Dragonfly, Damselfly**
- 3. Plecoptera - Stonefly**
- 4. Grylloblattodra - Rock crawlers**
- 5. Orthoptera-Grasshopper, locust,  
cricket, mole cricket**
- 6. Phasmida-stick insect, leaf insect**
- 7. Dermaptera-Earwigs**
- 8. Embioptera-Webspinners/Embids**
- 9. Dictyoptera-cockroach, praying mantis**
- 10. Isoptera - Termites**
- 11. Zoraptera - Zorapterans**
- 12. Psocoptera - Book lice**
- 13. Mallophaga - Bird lice**
- 14. Siphunculata - Head and body louse**
- 15. Hemiptera - Bugs**
- 16.Thysanoptera - Thrips**

## **Subclass: EXOPTERYGOTA**

### **1-Order: Ephemeroptera: mayflies**

Mayflies have only a short adult life ranging from a few hours up to a day or two depending on the species. Mayflies can be recognized by the following characteristics:

- 1-Body are small to medium size, elongated, very soft.
- 2-Antenna small, bristle-like with multiple segments.
- 3-2 pair of membranous wings, the front wing large and triangular shaped, Hind wings are small and rounded, in some species are vestigial or absent.
- 4-Mouthparts in adult are reduced.
- 5-Tip of abdomen usually with 3 very long filamentous cerci with multiple segments , some contain median caudal
- 7-Ovipositor are absent
- 8-Mayfly nymphs are aquatic and have a similar body shape to the adults but lack wings.
- 9-The nymphs have gills along the sides of their abdomen, which look similar to fine leaves

### **Families of Order Ephemeroptera - Mayflies**

- 1-Family: **Leptophlebiae**                      e.g. *Leptophlebia* sp.
- 2-Family: **Ephemeridae**                      e.g. *Hexagenia limbata*





## **2-Order: Odonata: Dragonflies and Damselflies**

Order Odonata includes some of the most ancient, beautiful insects and some of the largest flying invertebrates ever to have lived.

Characteristics:

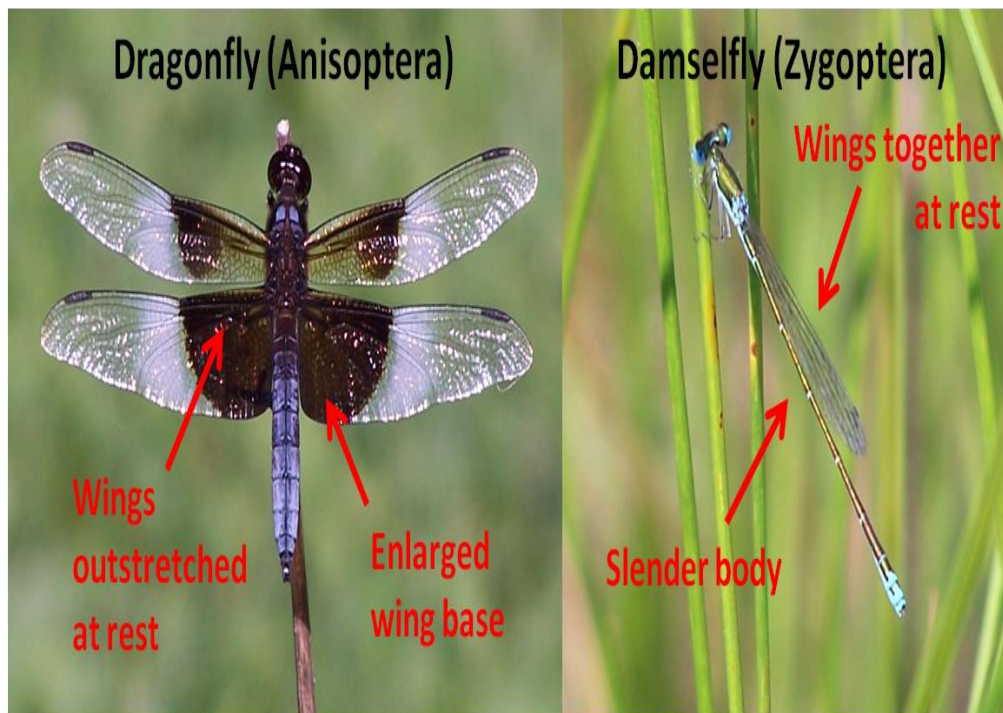
- 1-Odonto' refers to strong teeth on mandibles of adults
- 2-Aquatic larva -> terrestrial adult
- 3-Highly predaceous larva or adult
- 5-Hemimetabolous: egg -> nymph (naiad) -> adult long slender abdomen, an aquatic larval stage with posterior tracheal gills.
- 6- Minute antennae,
- 7-Extremely large eyes (filling most of the head),
- 8-Two pairs of transparent membranous wings with many small veins.
- 9-Long slender abdomen

Odonata consists of three suborder

1- Suborder: **Anisoptera** (which includes dragonflies).

2- Suborder: **Zygoptera** (which includes damselflies).

3- Suborder: **Anisozygoptera** (a relict group represented by only two living species.) This order is very diverse with about 5000 species, and its members are easy to observe



## Differences between Damselfly and Dragonflies

Characteristics	Damselfly	Dragonfly
Size	Typically between 1.5 and 2 inches long	Usually more than 2 inches long
Wing Shape	Both fore and hind wings are the same size and shape but are tapered where they meet the body	Hind wings are much broader than their fore wings and aren't as tapered as damselflies
Wings at Rest	Wings are closed and rest against their bodies when resting	Wings are held open when they are resting
Eyes	Slightly smaller eyes than dragonflies and have a gap between them	Large eyes which are close together
Body Type	Long, thin body like a twig	Chunky body
Flight	Slower and not as strong as dragonflies	Strong, fast, and agile

#### **4- Order: Isoptera: Termites**

Termites are social insects and live in colonies consisting of a queen, sterile workers and soldiers and winged reproductive males and females known as alates. Termites are often known as 'white ants' however these insects are very different from those in the order Hymenoptera to which ants belong.

#### **Description and identification:**

1-Size: Workers and soldiers 6 - 13 mm (1/4- to 1/2-inch); queens much larger

2- Pale, elongate body and soft. Head is heavily sclerotized.

3- Pairs of membranous wings of equal length. Wings are present in reproductive castes only and shed after mating.

4-Chewing mouthparts. Soldiers have enlarged or specially modified mandibles

5-Antennae about the same length as the head

6-Immatures (called nymphs): Similar to adults (except for the reproductives). Metamorphosis: Gradual; nymphs resemble adults and share the same habitat. In those with wings, external wing pads develop as nymphs mature.

7-Colonies in wood or soil; feed directly on wood or wood products.

## Families of Order Isoptera:

1-Family: Kalotermitidae drywood termites e.g. *Neotermes larseni*

2-Family: Mastotermitidae e.g. *Mastotermes darwiniensis*

3-Family Termitidae higher termites e.g. *Microcerotermes gracilis*

4-Family Rhinotermitidae subterranean termites

5-Family: Termopsidae rottenwood termite

