

### **Class Onychophora e.g. peripatus**

#### Characteristics

1. Thin cuticle, soft muscular body wall
2. Longitudinal and circular muscles
3. Spiracles scattered, irregularly over the body
4. Cilia present in genital organs
5. Body wormlike and externally unsegmented with imperfectly jointed legs each with 2 claws
6. Possession of nephridia
7. Separate sexes, direct development.

### **Class Crustacea:** Aquatic lobsters, crayfish, shrimps, crabs, water fleas and others.

#### Characteristics

1. Possession of gills.
2. Queen or antennary gland for excretion
3. Possess antennae and antennules
4. Well developed mouthparts
5. Appendages modified for swimming, walking and food capture
6. Body divided into two 2 regions, cephalothorax and abdomen
7. They possess exoskeleton

### **Class Myriapoda**

#### Characteristics

1. possess tracheate, land living
2. Arthropods with elongated body
3. Possess a distinct head with a pair of antennae
4. Excretion by malpighian tubules.

Subclass Chilopoda \_\_\_ Centipedes

Subclass Diplopoda \_\_\_ Millipedes

### **Class Arachnides** (scorpion, spiders, ticks, mites)

#### Characteristics

1. Arthropods with fully chitinised exoskeleton
2. They have two regions, proxoma and opisthosoma
3. Well developed appendages modified for various purposes, maybe sensory, prehensile or for walking but typically four pairs of walking appendages

4. Respiration by gill or lung books or by trachea
5. Excretion by coxal glands or malpighian tubules
6. Poison glands in some
7. Sexes separate with direct development
8. Possession of a pair of chelicerae (instead of antennae)

### **Class Insecta**

#### Characteristics

1. The body is segmented
2. The body is covered by chitinous exoskeleton
3. Body divided into three regions, head, thorax and abdomen
4. On the head are found the following: - a pair of antennae, a pair of mandibles and 2 pairs of maxillae, adapted for sucking, biting, piercing, and chewing.
5. Two pairs of wing, some a pair, some none, when two pairs on meso and Meta thorax.
6. Three pairs of walking legs
7. Respiration is by trachea, branched spiracles
8. They have a complete digestive system, fore, mid and hind gut.
9. Salivary gland
10. An open circulatory system
11. Malpighian tubules open into the hind gut.
12. Nervous system
13. Possess a pair of large compound eye
14. Separate sexes. Internal fertilization
15. Complete or incomplete metamorphosis. When complete egg – larva – pupa – adult.  
When incomplete egg – nymph – adult.
16. Pathonogenous , some of them reproduce by parthenogenesis in form of sexual reproduction

Insect have about 29 orders.

#### Success of insects

1. Small size
2. Produce large number of eggs
3. Exoskeleton for conservation of water
4. Possession of different types of mouthparts for chewing, piercing, sucker create less competition among the insects
5. Excretory product of uric acid, so they lose little or no water
6. Leg appendages modified for jumping, leaping and swimming. Locomotion.

7. A pair of large compound eyes for easy sight
8. Protective colouration or a mode of protection against enemies
9. Ability to live anywhere, air, land, water.
10. Possession of trachea for respiration
11. Possession of antennae for feeling
12. Possession of wings for flight, escape and colonization of the species and finding of food
13. Ability to metamorphose the metamorphosis stages can exist on their own because of their possession of adaptations for their own survival e.g. gills and spiracles
14. Colonies, special insect, ability to live together and work as a committee with division of labour.

### **Economic importance of insects**

#### Usefulness

1. Agents of pollination
2. Source of protein, source of food
3. Production of honey
4. Production of silk
5. Some enrich the soil
6. Some used as a means of biological control.

#### Harmful effects

1. Vectors of parasites, causing diseases, tsetse fly, mosquitoes
2. Pests of fresh, stored products
3. Some secrete poisons

### **Phylum MOLLUSCA**

#### Characteristics

1. Soft body animals which are not segmented
2. Body enclosed in a mantle which secretes the shell
3. Some with ventral muscular foot
4. They have head with tentacles
5. Complete digestive system, radula, gills, lungs, body surface
6. Some are aquatic, marine and freshwater, terrestrial, some are parasitic
7. Possession of nephridia for excretion

#### **Class Amphineura e.g. chiton**

#### Characteristics

1. No tentacles, no eyes
2. Elongated body

#### **Class Gastropoda e.g. Helix**

##### Characteristics

1. Possess head with tentacles
2. Show spiral coiling and torsion
3. Possession of large flattened foot

#### **Class Scaphopoda e.g. Dentalium**

##### Characteristics

1. Live in a tubular shell opening at both ends
2. They have reduced foot
3. No tentacle

#### **Class Lamellibranchiata e.g. Anodonta, mytilus**

##### Characteristics

1. They have bivalve shell
2. Laterally compressed rudimental head.
3. No tentacles

#### **Class Cephalopoda e.g. logilo, sepia, octopus**

##### Characteristics

1. Well developed head with a crown of tentacles
2. Possess siphon
3. Chambered shell
4. Possess well developed eyes

#### **Phylum Echinodermata**

This phylum includes very peculiar forms which are quite different from the preceding ones. They are unsegmented coelomate animals which are radially symmetrical in the adult (usually five rayed), but bilaterally symmetrical in the larval stage.

They possess a DERMAL SKELETON which consists of calcareous ossicles (bones) that may develop short or long spines.

The nervous system is diffuse and remains attached to the epidermis.

No nephridia or any other special excretory organs.

The sexes are separate and gonads discharge by special ducts directly to the exterior.

The echinoderms are very common as fossil forms (since the Cambrian period) and are entirely marine.

None of them are parasitic.

The phylum Echinodermata is classified into two sub-phyla

Subphylum I            Eleutherozoa

Subphylum II         Pelmatozoa

The subphylums Eleutherozoa are free living forms, without a stalk, and have 4 living classes.

Class I                    Asteroidea    e.g. Starfishes

Class II                   Ophiuroidea   e.g. Bristle Stars

Class III                Echinoidea    e.g. Sea urchins

Class IV                Holothuroidea e.g. Sea cucumbers

The subphylum Pelmatozoa are sessile forms, usually stalked, and are represented among the living echinoderms by the class Crinoidea e.g. Sea lilies and Sea feathers.

This phylum is of great interest on account of its affinity to the Phylum Chordata. Thus, 2 super phyla are recognized.

Super phylum I        Annelid which include the phylum Annelids

Phylum Arthropods

Phylum Mollusca and

Super phylum II       Echinoderm made up of phylum Echinodermata and phylum Chordata.

### **Phylum Chordata**

The chordata form one of the most successful phyla of the animal kingdom.

The chordata are classified into 4 sub phyla.

Sub phylum I           Hemichordata e.g. Acorn worms

Sub phylum II         Urochordata e.g. Sea-squirts

Sub phylum III        Cephalochordata e.g. Amphioxus

Sub phylum IV        Craniata or vertebrata e.g. lampreys, fishes, amphibians, reptiles, birds and mammals.

The first three sub phyla are collectively called the PROTOCHORDATA which are entirely marine.

Among them, the cephalochordates are also called the ACRANIA in contradistinction to the CRANIATA, being without or with a cranium respectively. The Acrania and Craniata are sometimes grouped together and referred to as the EUCHORDATA.

The chordates have a common basic plan of organization with the following three main features.

1. The presence of a NOTOCHORD, an axial rod of the skeleton, which extends in the dorsal region of the body.
2. The CENTRAL NERVOUS SYSTEM is tubular, i.e. containing a cavity, and lies dorsal to the notochord.
3. The anterior part of the alimentary canal, THE PHARYNX, is perforated by a variable number of gill – slits which lead into the gills.

However, these characteristics may be modified to a greater or lesser extent, either early in development or in the adult form. Thus, the notochord may disappear in the post larval stage as in the adult Urochordates, or may be transformed by the addition of skeletogenous tissues into a jointed backbone or VERTEBRAL COLUMN, as is characteristic of the vertebrates.

The gills never function at any stage of development of the Amniota (reptiles, birds and mammals) nor in the adult of most Amphibia.