

Classification of the Phylum Aschelminthes

BSc. Part I Zoology (Hons) Paper I

The term Aschelminthes has been derived from two Greek words, Askos- meaning cavity, and helmins-worm; together its means animals with internal body cavity. The members of this phylum occupy all habitable space of the earth.

History: Grobbed first coined the term Aschelminthes. The older workers like Gagenbaur (1851), Huxley (1875) etc. included many other groups like Chaetognathus, Nematomorpha under it. Hyman (1951) presented a workable classification of this Phylum and included Priyapullida under it. However, Shopeero (1961) separated Priyapullid from Aschelminthes and placed it among coelomate group.

Definition: A group of animal who have bilaterally symmetrical but unsegmented body and with a pseudocoel in the body and whose bodies are covered with cuticle are known as Aschelminthes.

CHARACTERISTICS

1. Round worms have elongated, cylindrical and vermiform body with tapering ends.
2. Body is unsegmented but may be wrinkled. It is not distinguished into two regions.
3. Body unpigmented being either white or with a yellowish tinge.
4. Caudal end of the body generally straight in female but coiled in males and the males are shorter than females.
5. Anterior cephalization is not prominent; therefore, the body is without any definite regions.
6. Mouth terminal surrounded by lips. In strongyloides the lips are modified into teeth known as leaf-crown.
7. Amphids and papillae are the main sensory organs and are of great taxonomic value in case of free-living forms.
8. Marine nematodes are annulated due to the presence of transverse striations or longitudinal striations that are of common occurrence.
9. Body is covered by rough resistant cuticle, having bristles, spines, warts, papillae etc. Sometimes cuticle modified as cephalic, cervical and lateral cuticle and in the form of vesicle.
10. Caudal end with a pouch of cuticular nature known as phasmids, very common in parasitic forms.

11. Cuticle in the strongyloides is modified into an umbrella-like form known as bursa which is generally supported by muscular rays.
12. The layers of body wall generally made up of cuticle, sub-cuticle or epidermis and muscle layer. The cuticle is generally of keratin which allows only glucose and urea etc.
13. Epidermis is syncytial where they are usually divided in four sections in the four longitudinal chords. One dorsal, one ventral and 2 lateral in position.
14. Muscles consist of longitudinal muscle fibres with variable arrangements which is generally holomyarian, meromyarian and polymyarian etc. The muscles are of great taxonomic value.
15. The body cavity is pseudocoel.
16. Digestive tract well developed generally made up of mouth, buccal cavity, pharynx or oesophagus are of various types, intestine and anus.
17. Nervous system consists of a nerve-ring encircling the oesophagus. From it, nerves are given out anteriorly and posteriorly.
18. Protonephridia absent but the excretory system is made up of canals or gland-like organs.
19. Sexes are separate. Testis and ovaries are tubular and coiled. Usually there is a single testis. The ducts from the testis open into the cloaca and the cloaca is associated with accessory structures such as circular spicules. Ovaries, oviduct and uteri are double.
20. Aschelminthes are ovo-viviparous, oviparous or viviparous.
21. Life-cycle complicated, may be with or without intermediate host.
22. Larval stage four. Third stage of larva is infective.

Phylum Aschelminthes has been divided into five classes-

1. Class I- Nematoda
2. Class II- Nematomorpha
3. Class III- Rotifera
4. Class IV- Gastrotricha
5. Class V- Kinorhyncha

Classification Scheme

1. Class I- Nematoda

- i) They are aquatic, terrestrial or parasitic forms.
- ii) Body is slender, cylindrical, tapering towards both the ends. Body is covered with cuticle.
- iii) Intestine is well formed.
- iv) Body cavity is not lined with epithelium.

- v) Cloaca is absent in female.
- vi) Male and female reproductive organs are well developed.

Examples- *Ascaris*, *Wuchereria*, *Trichinella*

2. Class II- Nematomorpha

- i) Body elongated thread like and unsegmented.
- ii) Well formed head absent.
- iii) Adults are free living, youngs are parasites in the body of insects and crustacean.
- iv) Presence of Cloaca.
- v) Excretory organ absent.
- vi) Anterior and posterior part of the alimentary canal degenerate.

Examples- *Gordius*, *Paragordium*

3. Class III- Rotifera

- i) Very transparent, microscopic, and aquatic.
- ii) Ciliary apparatus is present at the anterior end.
- iii) Body unsegmented and without any coeloms.
- iv) Pharynx with jaw apparatus known as mastax.
- v) Flame cells in excretory organs.

Examples- *Philodina*, *Brachionus*

4. Class IV- Gastrotricha

- i) Microscopic, aquatic fresh water or marine.
- ii) Unsegmented body worm like, cilia in some parts of the body.

- iii) Cuticle with scales and bristles.
- iv) Paired protonephridia, each protonephridia is with a flame cell.

Examples- *Chaetonotus*, *Turbanella*

5. Class V- Kinorhyncha

- i) Microscopic and live at the bottom.
- ii) Body slightly cylindrical with 13 indistinct segment, no cilia in the body.
- iii) Head with spine and is retractile.
- iv) Excretory duct paired with paired protonephridial duct, flame bulbs, multinucleate.

Examples- *Echinoderes*, *Centroderes*