

# ANIMAL DIVERSITY & WILDLIFE CONSERVATION

Zoology Complementary Course for I Semester B.Sc. Botany  
Complementary Course I

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**SUPER-PHYLUM ASCHELMINTHES**

**PHYLUM NEMATODA**



# ASCHELMINTHES

- Aschelminthes is an assemblage of several divergent groups of animals.
- Aschelminthes are pseudocoelomate, mostly vermiform and bilaterally symmetrical organisms, with an unsegmented or superficially segmented body clothed with cuticle.
- Digestive tube is complete, straight or sometimes curved, terminating in an anus at or near the posterior tip.
- The cuticular covering may be tough and resistant, often marked by circular rings, or modified into spines, scales, plates and bristles.
- The sub-cuticular epidermis is usually syncytial in some cases or cellular in others.

# ASCHELMINTHES

- The peri-visceral cavity is a pseudocoel (persistent blastocoel) except in Priapulida where its nature is almost uncertain.
- Respiratory and circulatory systems are absent.
- Typical protonephridia are present in all aschelminthes other than Nematoda and Nematomorpha.
- Sexes are almost always separate. Cleavage is generally indeterminate.

# ASCHELMINTHES

- Free-living Aschelminthes are predominantly aquatic animals inhabiting fresh and salt waters, but some are terrestrial.
- Super-phylum Aschelminthes comprises nine phyla, namely Nematoda, Nematomorpha, Rotifera, Gastrotricha, Kinorhyncha (Echinodera), Priapulida, Entoprocta, Acanthocephala and Loricifera

# PHYLUM NEMATODA

- Nematoda is a group of bilaterally symmetrical, unsegmented and pseudocoelomate aschelminthes, popularly known as “roundworms” or “threadworms”.
- Bilaterally symmetrical, unsegmented and vermiform body: The body of nematodes is soft, cylindrical, unsegmented and bilaterally symmetrical, with tapering ends and without a head.
- Cuticular covering : Body is covered and protected by a tough, resistant and multilayered cuticle, secreted by the epidermis. It is removed and renewed (moulted) four or five times in life.

# PHYLUM NEMATODA

- Syncytial epidermis in the adult : Epidermis is not a definite cellular layer in adult nematodes, but is only a syncytium or multinucleate mass of protoplasm. A cellular epidermis is present in the early stages and it secretes the cuticle. After secreting the cuticle, it ceases to exist as a discrete cellular layer.
- Pseudocoelomic body cavity : Peri-visceral cavity is not a true coelom, but a pseudocoel or false coelom. It is not a mesodermal cavity, but is the persistent embryonic blastocoel. It is filled with the pseudocoelomic fluid, which serves as a hydrostatic skeleton or fluid skeleton. Circulating cells are absent in the pseudocoel, but there are fixed cells called pseudocoelocytes.
- Body muscles are all longitudinal : The muscles of the body wall are longitudinal; circular muscles are altogether absent. Usually, these muscles are arranged in four blocks or quadrants, two dorso-lateral and two ventro-lateral.
- Straight and complete alimentary canal : Alimentary canal is straight and uncoiled with mouth and anus at opposite ends. Mouth is terminal, but anus is subterminal. Pharynx is muscular with triradiate lumen.

# PHYLUM NEMATODA

- Absence of locomotor cilia and respiratory and circulatory systems : Locomotor cilia are altogether absent at any stage in the life of nematodes. But, in some primitive species, cilia-like processes, called microvilli, are present in the gastrodermal cells.
- Excretory tubules and renette cells :The excretory system of nematodes consists of one or two excretory tubules or one or two gland cells, called renette cells.
- Simple nervous system without brain :The nervous system of nematodes is very simple. It consists of a circum-pharyngeal nerve ring, a few ganglia and some anterior and posterior nerves. A distinct brain is absent.
- Gonochorism and sexual dimorphism : In most nematodes, sexes are separate and male and female exhibit sexual dimorphism in morphological features.



# PHYLUM NEMATODA

- 20,000 species of nematodes are known.
- Many of them are parasites in plants and animals.
- The others are free living forms, inhabiting moist soil, fresh-water and salt water.
- Examples :Ascaris, Ancylostoma, Enterobius, Dracunculus, Wuchereria, Rhabditis, Heterodera, Trichiuris, Trichinella.

# CLASSIFICATION OF NEMATODA

- The classification of Phylum Nematoda has always been a controversial issue, since the formulation of a general consensus in this regard has never been entirely successful.
- Two classes - Adenophorea or Aphasmidia and Secernentea or Phasmidia.

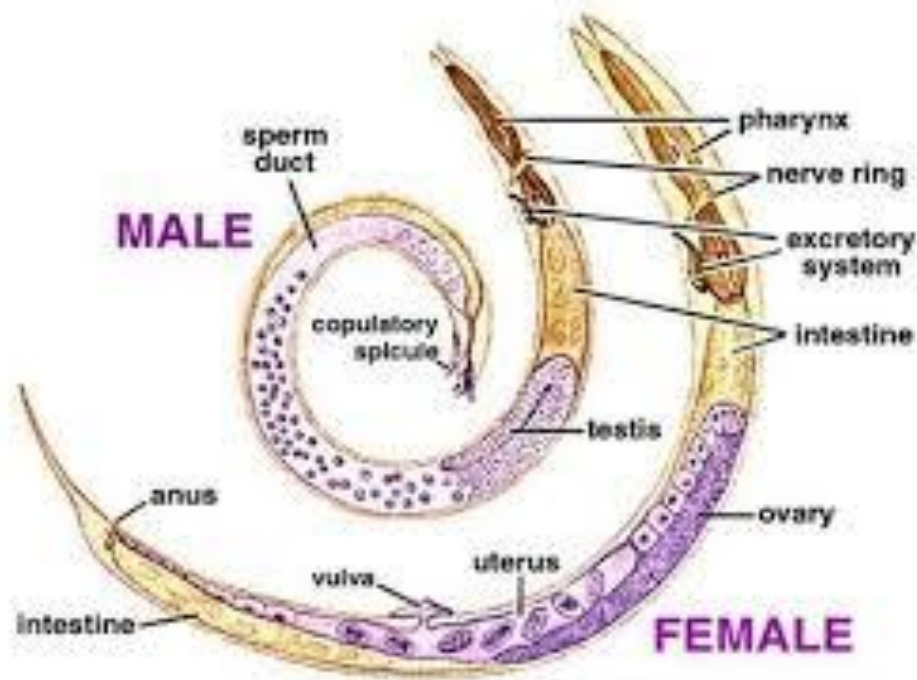
## CLASS - ADENOPHOREA (APHASMIDIA)

- This is a polyphyletic group of nematodes, with the following characteristics:
- Presence of amphids and absence of phasmids - Amphids are paired saccular or tubular chemoreceptor and mechanoreceptor sensory pits on the oral lips. On the other hand, phasmids are porous caudal papillae which are chemosensory, glandular, or excretory in function.
- Uninucleate epidermal cells.
- Excretory glands are present, but excretory tubules and canals are absent.
- Testes are usually paired.
- Free-living members are microphages or detritivores.
- Adenophorea comprises free-living as well as parasitic forms. Most of the free-living species are aquatic, and some are terrestrial.
- Examples: Chromadora, Desmadora, Draconema, Desmoscolex, Onchulus, Trichuris, Trichinella.

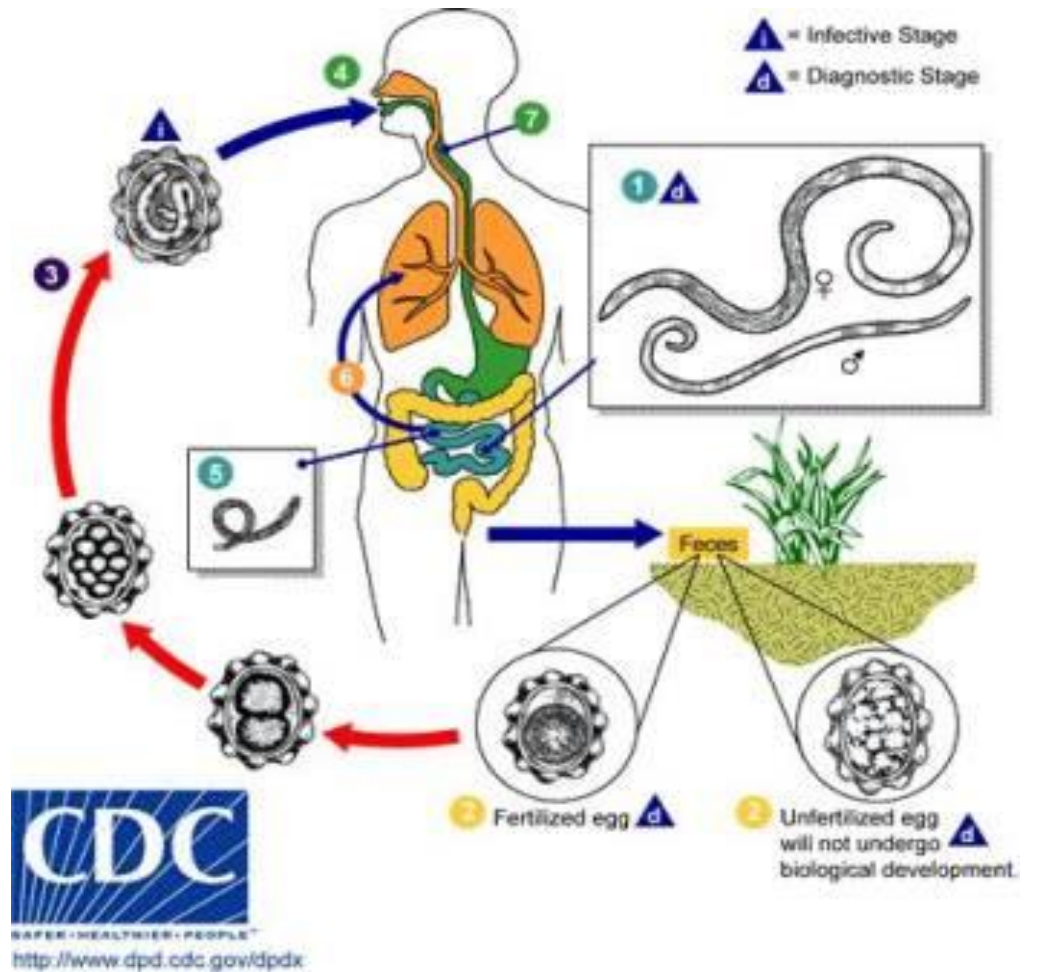
## CLASS-SECERNENTEA (PHASMIDIA)

- This is a group of mostly terrestrial nematodes.
- Presence of both amphids and phasmids.
- Epidermal cells are uninucleate or multinucleate.
- Excretory canals and excretory glands are present.
- Single - testis and paired ovaries .
- *Secernentea comprises both free-living and parasitic forms.*
- *Most free-living species are terrestrial.*
- *Examples: Ascaris, Dracunculus, Enterobius, Wuchereria, Ancylostoma, Loa, Rhabditis, Caenorhabditis.*

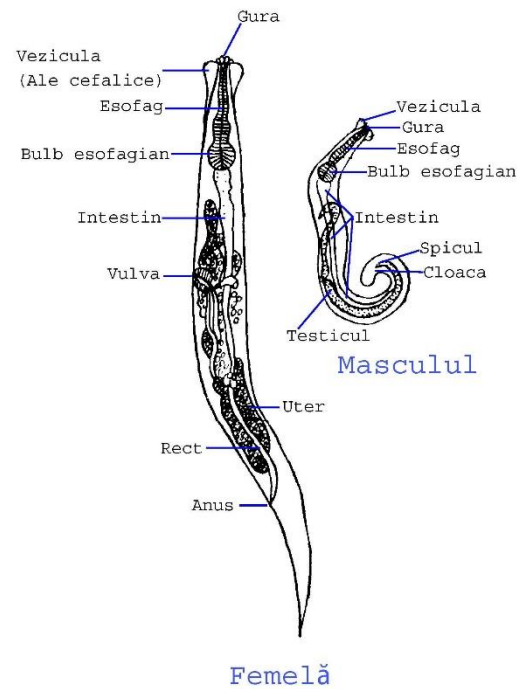
# ASCARIS LUMBRICOIDES



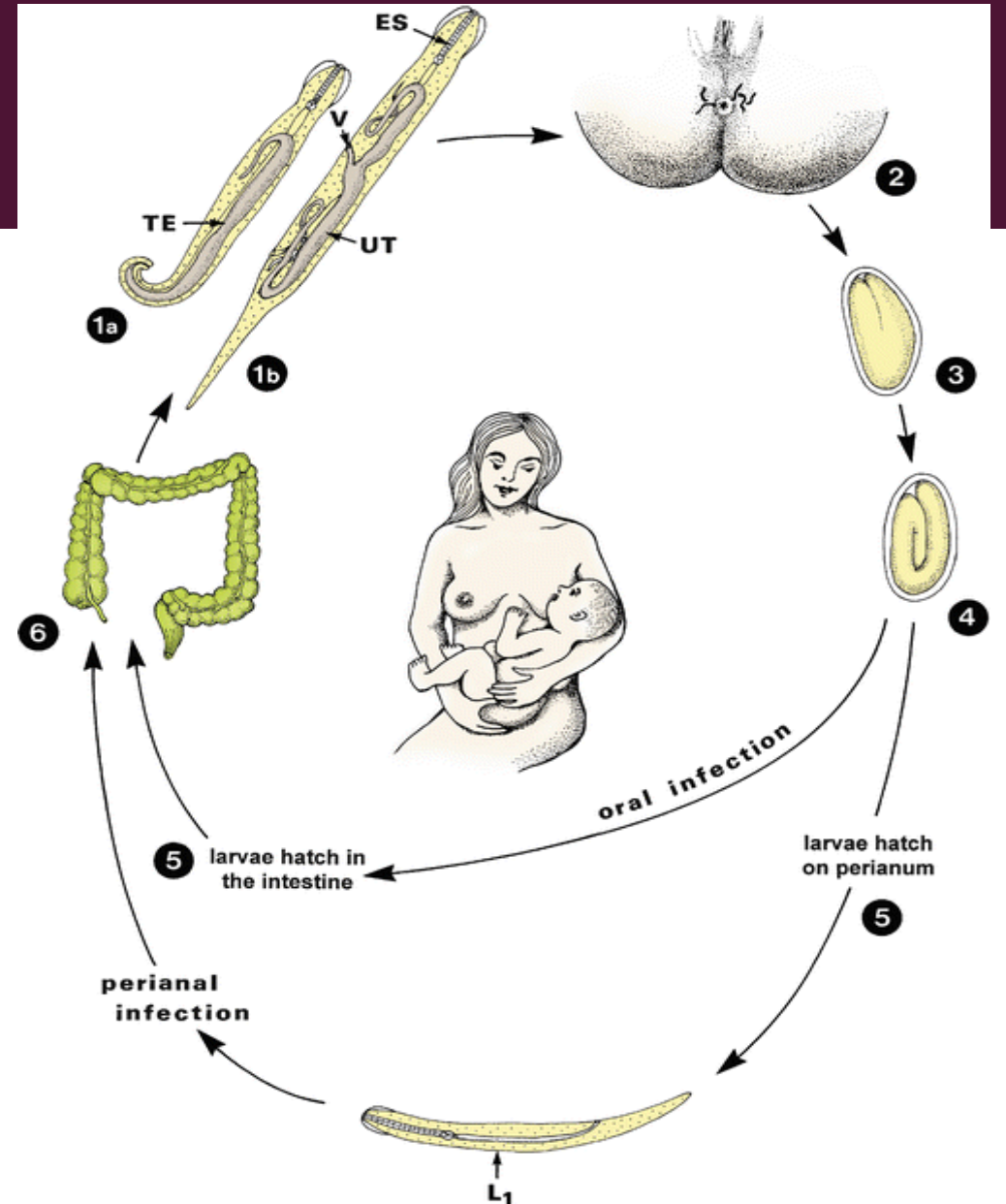
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# ENTEROBIUS VERMICULARIS



Oxiur (*Enterobius vermicularis*)





THANK YOU!