ZOO 261 INVERTEBRATE ZOOLOGY

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Phylum NEMATODA (roundworms)

They are thread-like, cylindrical, round worms. They are triploblastic acoelomate animals. They are bilaterally symmetrical and unsegmented. There is a peculiar perivisceral cavity. The body is covered by a smooth non-chitinous cuticle. There is a single layer of longitudinal muscle underlying the epidermis. They are divided into four quadrants. The excretory system consists of two intracellular tubes with a single excretory pore. The alimentary canal is simple straight and opens by a mouth and an anus. Sexes are usually separate and gonads are tubular. No vascular or respiratory system. The cilia are absent even in the developmental stage.

Classification

Class Ascarididae e.g. Ascaris.

They have between three to six lips around the mouth. Males have curve posterior ends while female ends are straight. They have two spicules, they have no corpulatory bursai.

Class Stronglylidae e.g. Ancylostoma

These are nematodes with simple mouth without papillae. The males have two corpulatory spicules and three bursai for ejaculation.

This phylum is one of the largest phyla in the animal kingdom as regards number of individuals and species. Its members live either freely in the sea, soil or decaying organic matter, or parasitically on other animals as well as plants i.e. they are parasitory both plants and animals. In spite of their very wide dispersal, their anatomy is remarkably simple and uniform.

Phylum ANNELIDA

Characteristics

12. Metamerically segmented worms.
13. Body wall with well developed outer circular and inner longitudinal layers of muscle with glandular epidermis.
14. Transparent thin, moist cuticle
15. Possession of chitinous chatae which are borne on parapedia in some.
16. Possession of COMPLETE DIGESTIVE SYSTEM.
17. Respiration by skin or gills
18. Excretory system consists of segmentally arranged nephridia.
19. Well developed nervous system
20. May be hermaphrodite or of separate sexes
21. Presence of a trocophore larva in some, others have direct development.
22. Closed blood vascular system with haemoglobin.

There are three main classes

4. Class Polychaeta e.g Nereis
5. Class Oligochaeta e.g. Eathworm
6. Class Hirudinea e.g. Parasites, leeches

Class Polychaeta

Characteristics

7. Possession of parapodia on which are borne numerous chatae
8. Possession of distinct head with eyes, palps and tentacles, cephalisation
9. No clitellum
10. Separate sexes
11. They are mostly marine.
12. They have trocophore larva.

Class Oligochaeta

Characteristics

7. No parapodia
8. Few setae
9. Possess clitellum
10. They are hermaphrodite
11. They have direct development
12. Their head is not clearly distinct.

Class Hirudinea

Characteristics

8. They are ectoparasites
9. Possession of anterior and posterior suckers
10. Body with fixed number of segments which is subdivided into annuli
11. No parapodia or chaeta
12. They are hermaphrodite, direct development.
13. They develop clitellum when sexually mature.
14. They have direct development.

Phylum ARTHROPODA

Characteristics

17. Tripoloblastic, coelomate, metametrically segmented.
18. Jointed appendages modified for various purposes.
19. Exoskeleton of chitin
20. Body usually divided into 3 regions, head, thorax and abdomen.
21. Possession of striated and non-striated muscles
22. Complete digestive system with mouth-parts for different methods of feeding
23. Open blood system, haemocyanis which are blue in colour
24. No nephridia
25. No cilia except in peripatus
26. Respiration is through body surface, spiracles, trachea, gills or lung books
27. Excretory system by green or antennary gland in aquatic ones and malphighian tubules in terrestrial ones.
28. Well developed nervous system
29. Sensory organs well developed consisting of eyes, antennae and antennules, balancing organs and in some auditory organs
30. Pronounced cephalisation with definite anterior end where sensory organs are concentrated.
31. Sexes nearly always separate
32. Some show metamorphosis

There are many classes of arthropods

Class Onycophora e.g. peripatus

Characteristics

8. Thin cuticle, soft muscular body wall
9. Longitudinal and circular muscles
10. Spiracles scattered, irregularly over the body
11. Cilia present in genital organs
12. Body wormlike and externally unsegmented with imperfectly jointed legs each with 2 claws
13. Possession of nephridia
14. Separate sexes, direct development.

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

Characteristics

8. Possession of gills.

9. Queen or antennary gland for excretion
10. Possess antennae and antennules
11. Well developed mouthparts
12. Appendages modified for swimming, walking and food capture
13. Body divided into two 2 regions, cephalothorax and abdomen
14. They possess exoskeleton

Class Myriapoda

Characteristics

5. possess tracheate, land living
6. Arthropods with elongated body
7. Possess a distinct head with a pair of antennae
8. Excretion by malphighian tubules.

Subclass Chilopoda ___ Centipedes
Subclass Diplopoda ___ Millipedes

Class Arachnides (scorpion, spiders, ticks, mites)

Characteristics

9. Arthropods with fully chitinised exoskeleton
10. They have two regions, proxoma and opisthosoma
11. Well developed appendages modified for various purposes, maybe sensory, prehensile or for walking but typically four pairs of walking appendages
12. Respiration by gill or lung books or by trachea
13. Excretion by coxal glands or malpighian tubules
14. Poison glands in some
15. Sexes separate with direct development
16. Possession of a pair of chelicerae (instead of antennae)

Class Insecta

Characteristics

17. The body is segmented
18. The body is covered by chitinous exoskeleton
19. Body divided into three regions, head, thorax and abdomen
20. 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.

21. Two pairs of wing, some a pair, some none, when two pairs on mero and Meta thorax.
22. Three pairs of walking legs
23. Respiration is by trachea, branched spiracles
24. They have a complete digestive system, fore, mid and hind gut.
25. Salivary gland
26. An open circulatory system
27. Malphighian tubules open into the hind gut.
28. Nervous system
29. Possess a pair of large compound eye
30. Separate sexes. Internal fertilization
31. Complete or incomplete metamorphosis. When complete egg – larva – pupa – adult. When incomplete egg – nymph – adult.
32. Pathonogenous , some of them reproduce by parthenogenesis in form of sexual reproduction

Insect have about 29 orders.

Success of insects

15. Small size
16. Produce large number of eggs
17. Exoskeleton for conservation of water
18. Possession of different types of mouthparts for chewing, piercing, sucker create less competition among the insects
19. Excretory product of uric acid, so they lose little or no water
20. Leg appendages modified for jumping, leaping and swimming. Locomotion.
21. A pair of large compound eyes for easy sight
22. Protective colouration or a mode of protection against enemies
23. Ability to live anywhere, air, land, water.
24. Possession of trachea for respiration
25. Possession of antennae for feeling
26. Possession of wings for flight, escape and colonization of the species and finding of food
27. Ability to metamorphosise the metamorphosis stages can exist on their own because of their possession of adaptations for their own survival e.g. gills and spiracles
28. Colonies, special insect, ability to live together and work as a committee with division of labour.

Economic importance of insects

Usefulness

7. Agents of pollination
8. Source of protein, source of food
9. Production of honey
10. Production of silk
11. Some enrich the soil
12. Some used as a means of biological control.

Harmful effects

4. Vectors of parasites, causing diseases, tsetse fly, mosquitoes
5. Pests of fresh, stored products
6. Some secrete poisons

Phylum MOLLUSCA

Characteristics

8. Soft body animals which are not segmented
9. Body enclosed in a mantle which secretes the shell
10. Some with ventral muscular foot
11. They have head with tentacles
12. Complete digestive system, radula, gills, lungs, body surface
13. Some are aquatic, marine and freshwater, terrestrial, some are parasitic
14. Possession of nephridia for excretion

Class Amphineura e.g. chiton

Characteristics

3. No tentacles, no eyes
4. Elongated body

Class Grastropoda e.g. Helix

Characteristics

4. Possess head with tentacles
5. Show spiral coiling and torsion
6. Possession of large flattened foot

Class Scaphpoda e.g. Dentalium

Characteristics

4. Live in a tubular shell opening at both ends
5. They have reduced foot
6. No tentacle

Class Lamellibranchiata e.g. Anodonta, mytilus

Characteristics

4. They have bivalve shell
5. Laterally compressed rudimental head.
6. No tentacles

Class Cephalopoda e.g. logilo, sepia, octopus

Characteristics

5. Well developed head with a crown of tentacles
6. Possess siphon
7. Chambered shell
8. Possess well developed eyes

Phylum Echinodermata

This phylum includes very peculiar forms which are quite different from the preceding ones. They are unsegmented coelemate 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 Eleutheroza 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.