Course Title :-Zoology practical paper
Course Code :- ZO123
Sem – II

Prof D. R. Borhade

Practical No. – 1
Aim:- Museum study of phylum Aschelminthes: *Ascaris lumbricoides*

Salient features of phylum Aschelminthes:-

- Include pseudocoelomates and triploblastic
- Sexes are separate and fertilization is internal
- There is no sexual reproduction
- A cavity is present between the body wall and the digestive tract but it not linked by an epithelium
- The body wall consists of a firm resistant cuticle, epidermis and muscle layer
- They are aquatic, terrestrial or parasitic, elongated roundworms.

Eg.- *Ascaris lumbricoides*

- **Systematic position:-**
- Kingdom : Animalia
- Phylum: Aschelminthes
- Class: Nematoda
- Family: Ascaridae
- Genus: *Ascaris*
- Species: *lumbricoides*

Comments :

- They are elongated roundworms, terrestrial, aquatic or parasitic.
- Body is covered with cuticle
- No circulatory and respiratory systems
- Alimentory canal complete with muscular pharynx, anus present
- Sexes are separate

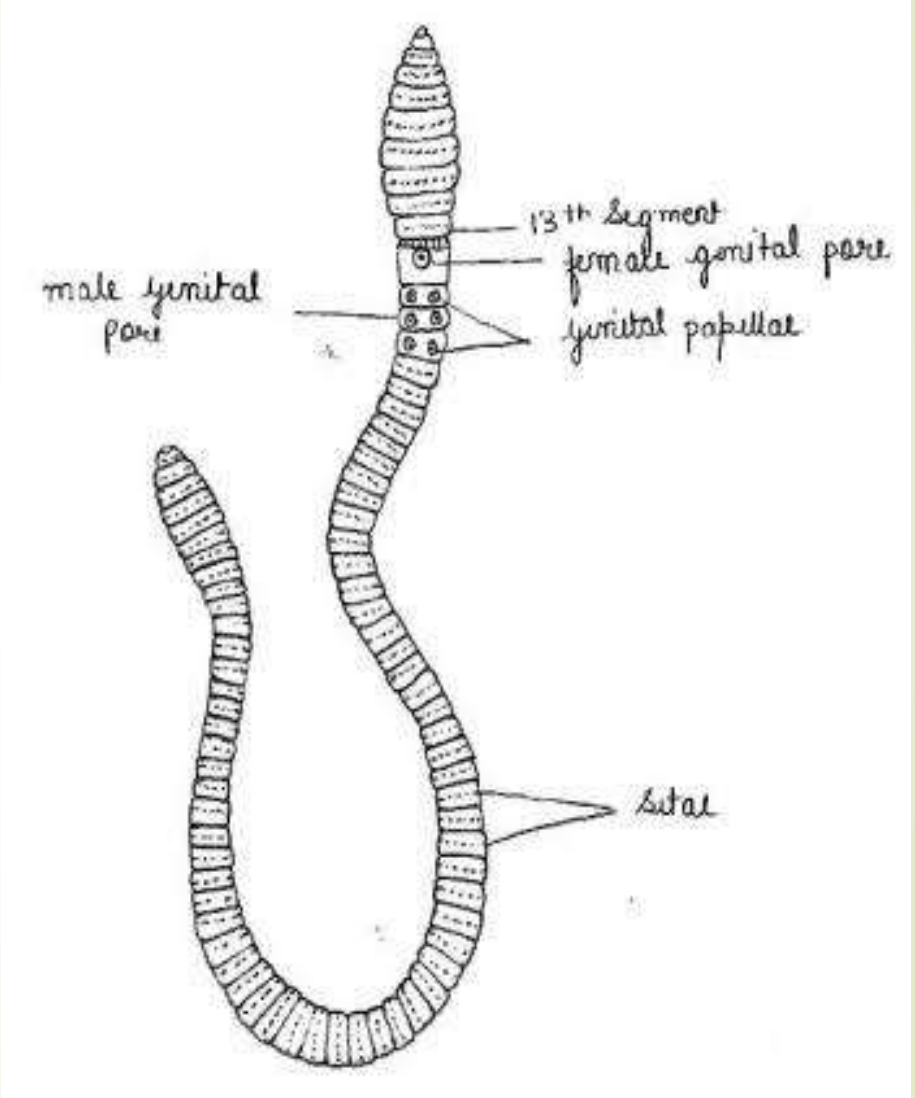
Practical No.:- 2
Aim:- Museum study of Phylum Annelida : *Neris*, Earthworm, Leech.

Salient features of phylum Annelida :-

- Triploblastic, coelomate, bilaterally symmetrical and metsmerically segmented animals
- The body is elongated,cylindrical or flattened
- Closed circulatory system present
- Segmental nephridia for excretion and osmoregulation
- Cylindrical body divided into segments by ring like grooves called as annuli
- Trochophore larva during development

Eg.:- Earthworm

- **Systematic position:-**
- Kingdom: Animalia
- Phylum: Annalida
- Class: Oligochaeta
- Genus: Pheretima
- Species: posthuma

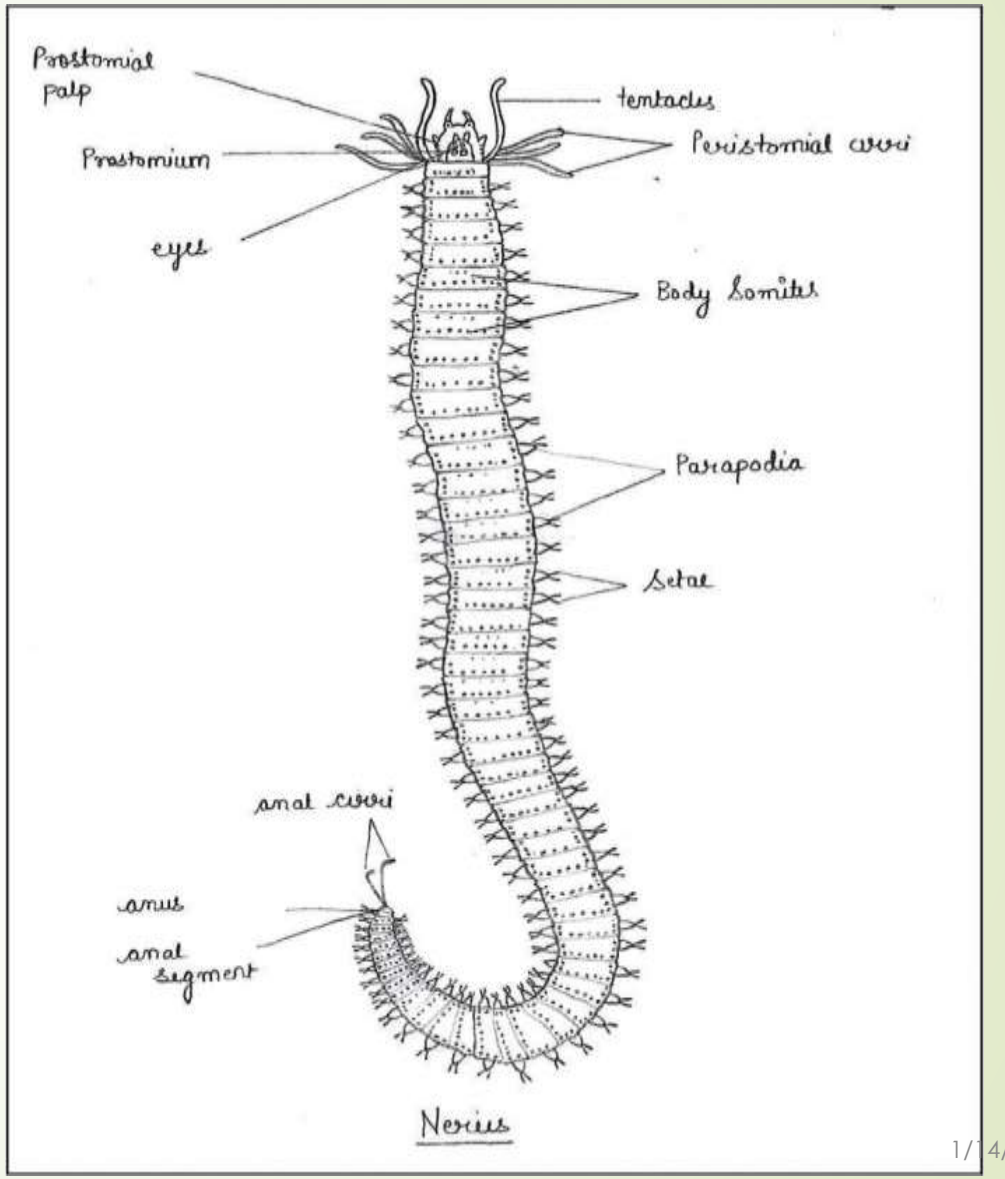


Comments:-

- Body is long, elongated, vermiform, cylindrical and billaterally symmetrical
- Body is about 15-20 cm long dark brown in colour
- Coelom cavity is present and lined with epithelium
- Well developed digestive system is present
- Setae are the locomotory organs
- They are hermaphrodite
- Well developed nervous system is present

Eg.- *Neris*

- **Systematic position:-**
- Kingdom: Animalia
- Phylum: Annalida
- Class: polychaeta
- Family:Nereidae
- Genus: *Neris*

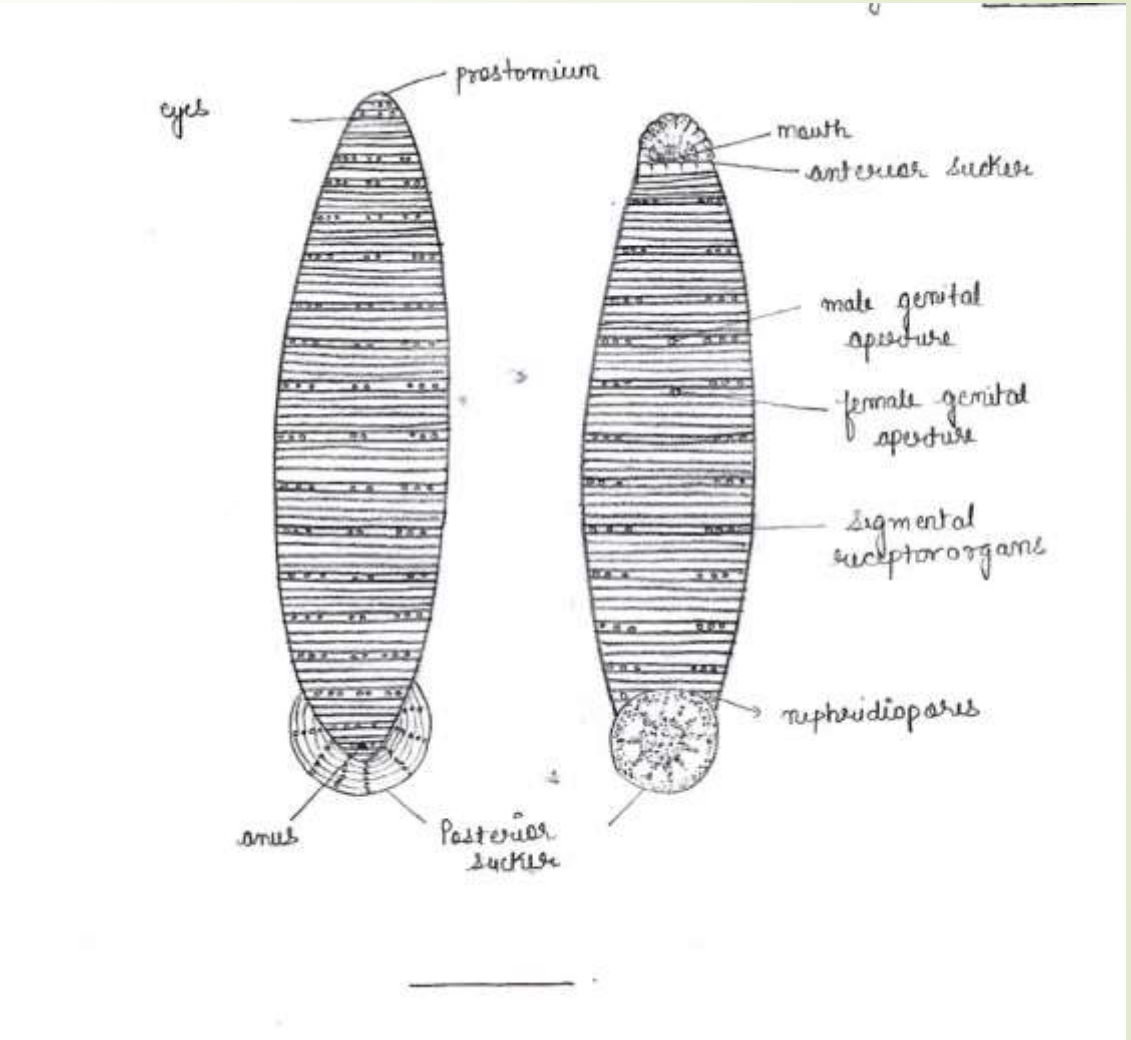


Comments:-

- They are aquatic or terrestrial, nocturnal and carnivores
- Cosmopolitan in distribution
- The body is long, narrow, bilaterally symmetrical
- Metameriacally segmented body, Metamers arrange in linear series
- Digestive system is present
- Parapodia present for the locomotion
- Excretion with the help of nephridiopores

Eg.:- Leech

- **Systematic position:-**
- Kingdom: Animalia
- Phylum: Annalida
- Class: *Hirudinaria*
- *Genus*: *Hirudi*



Comments:-

- Freshwater and terrestrial form. Ectoparasitic blood-sucking leeches.
- Each typical body segment consists of 5 rings or annuli
- Bloodd is red-colored.
- The body is elongated and usually flattened and dorso-ventrally or cylindrical.
- Segmentation external without internal septa.
- Par podia and setae are absent.
- Both anterior and posterior ends of the body with ventrally situated suckers.
- Coelom much reduced due to filling by botryoidal tissues, and form haemocoelomic sinuses.
- Hermaphrodite with one male and one female gonopore.Fertilization internal.

Practical No. :- 3
Aim:- Museum study of Phylum Arthropoda: Prawn, Cockroach, Melliped, Centipede, Crab.

- **Salient features of phylum Arthropoda :-**
- Largest Phylum of kingdom Animalia
- Exhibit organ system level of organization
- Bilaterally symmetrical, triploblastic, segmented and coelomate animals
- Metameric segmentation but not separated from each other by septa
- Consist of exoskeleton of chitinous cuticle and shows moulting or ecdysis
- Body divisible into head, thorax and abdomen or divisible into cephalothorax and abdomen
- They have joined appendages
- An open circulatory system is present. Body cavity known as haemocoel
- Respiratory system is present and excretion by green glands in aquatic form and malpighian tubules in terrestrial form
- Sexes seperate, fertilization internal

Eg.- Prawn

- **Systematic position:-**
- Kingdom: Animalia
- Phylum: Arthropoda
- Class: Crustacea
- Genus: Macrobranchium
- Species: rosenbergii

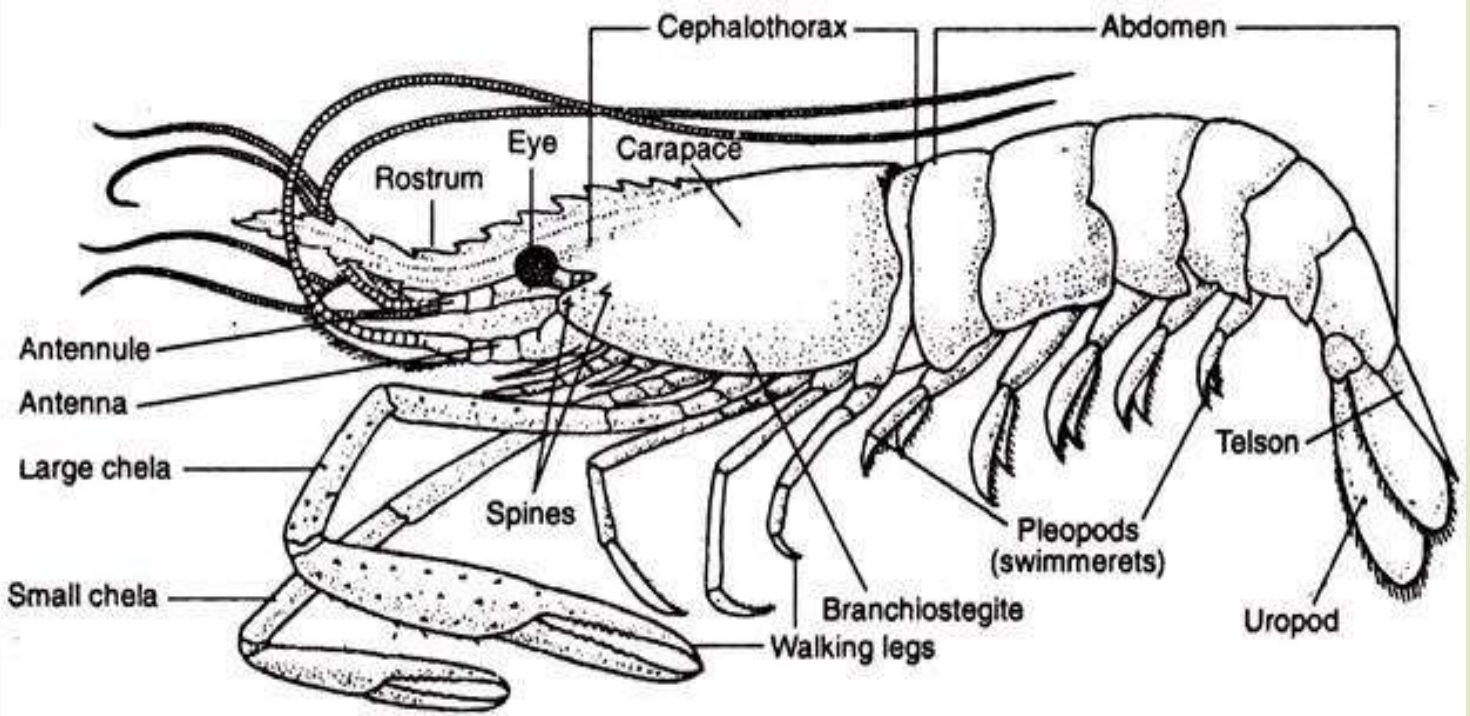


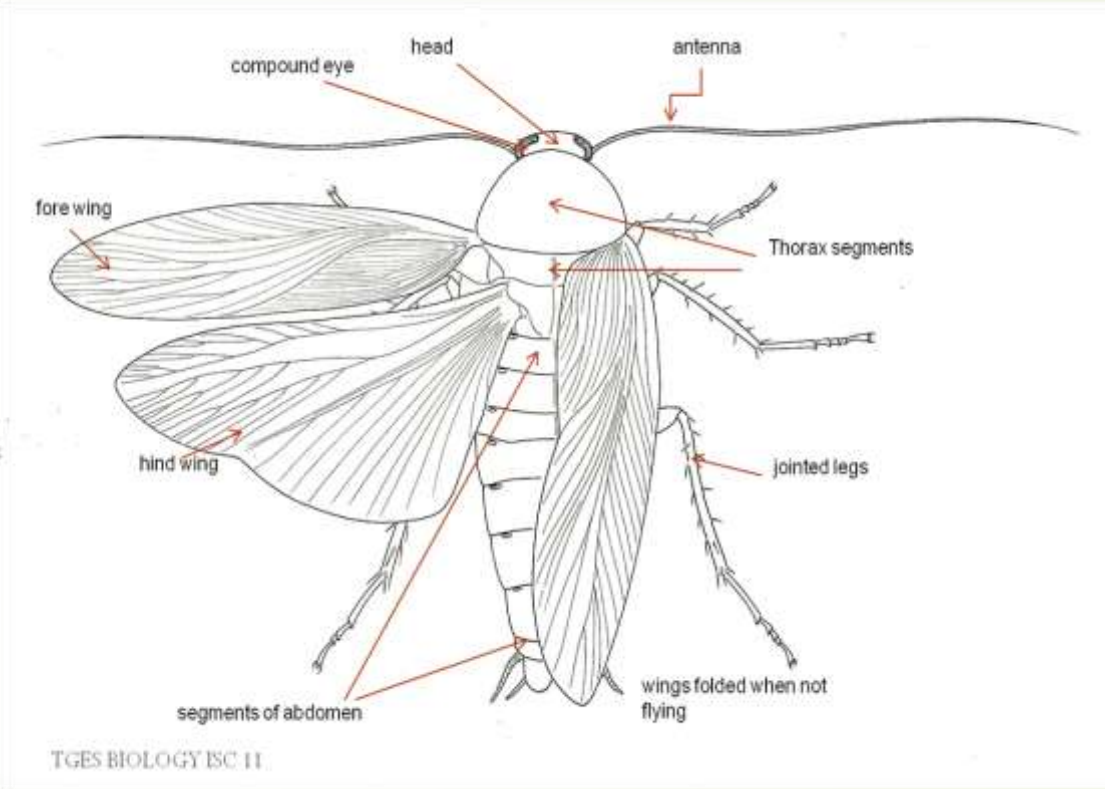
Fig. 18.2: Lateral view of a fresh-water Prawn (*Palaemon carcinus*).

Comments:-

- The prawn is common in rivers, ponds and other fresh-water areas.
- It is nocturnal and body of Prawn is elongated, hemispherical and slightly tapering at the posterior end
- The body is distinctly divided into two parts— cephalothorax and abdomen.
- The alimentary canal of Prawn is distinctly divisible into three parts—fore gut, mid gut and hind gut.
- The blood circulation in prawn is open type
- Excretory organs of Prawn are known as green glands or antennal glands
- Sexes are separate in prawn and shows sexual dimorphism

Eg.:- Cockroach

- **Systematic position:-**
- Kingdom: Animalia
- Phylum: Arthropoda
- Class: Insecta
- Genus: *Periplaneta*
- Species: *americana*

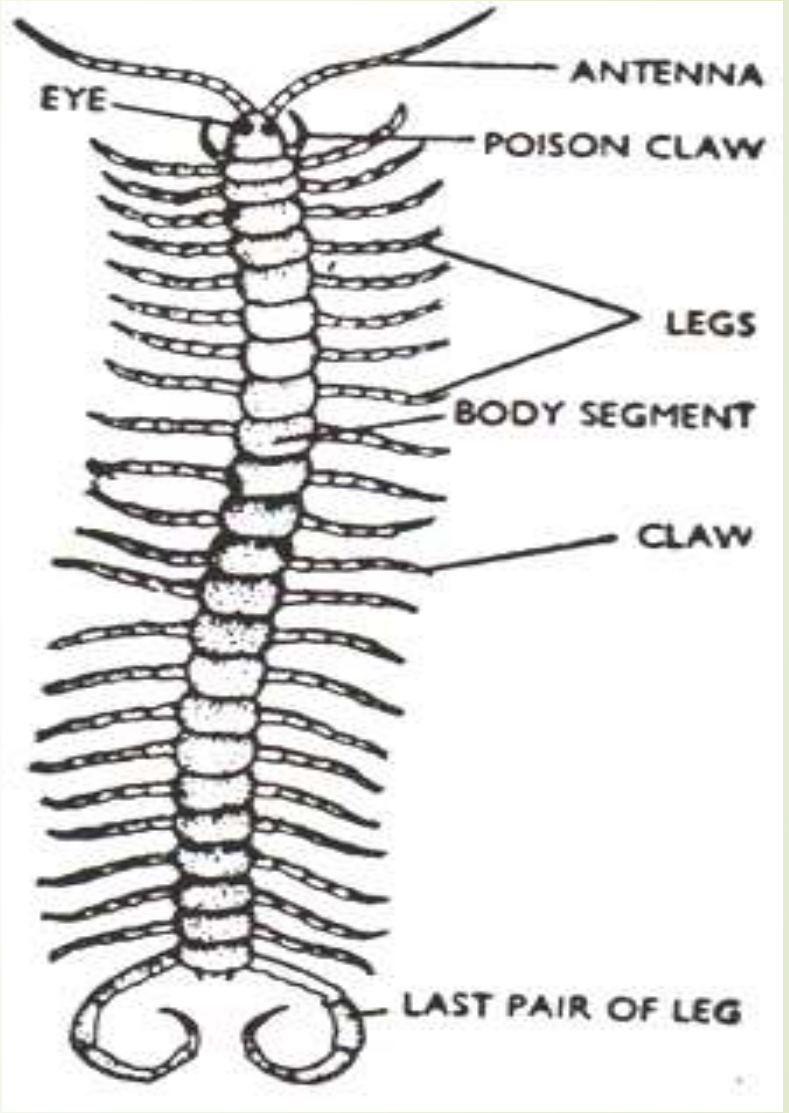


Comments:-

- The body of the cockroach is elongated and segmented.
- It is dark brown or reddish brown in colour.
- The exoskeleton is thick and hard made up of calcareous plates called sclerites.
- The body is divisible into head, thorax and abdomen.
- The cockroach has three pairs of jointed appendages and two pairs of wings.
- Pair of compound eyes are present on head
- Well developed digestive system, respiratory system and nervous system is present.
- Sexes are separate

Eg.:- Centipede

- **Systematic position:-**
- Kingdom: Animalia
- Phylum: Arthropoda
- Class: Chilopoda
- *Genus*: Scolopendra
- Species: cataracta

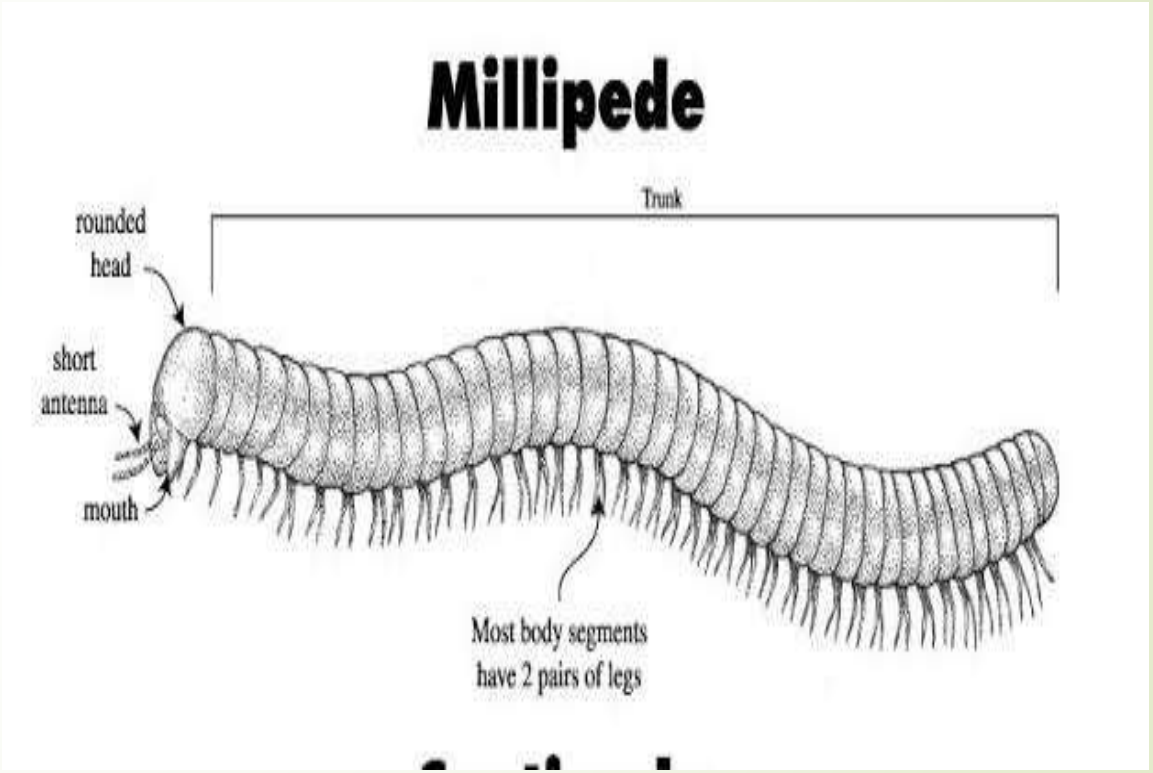


Comments:-

- They are swift moving, carnivorous, nocturnal
- Body elongated and flattened dorsoventrally and is generally comprised of about 21-23 segments.
- Body is divisible into a head and a trunk.
- All the trunk segments, except the last two and one just behind the head, bear a pair of jointed appendages with each.

Eg.:- Millipede

- **Systematic position:-**
- Kingdom: Animalia
- Phylum: Arthropoda
- Class: Diplopoda
- *Genus*: *Julus*



Comments:-

- They have an elongated body that can be 1 to 12 inches long.
- Their body is divided into two: the head and trunk.
- Millipedes are herbivores that eat plants and decaying plant matter, while few are carnivores or meat-eaters.
- Millipedes have two pairs of legs attached to each segment of its body
- Millipedes have a hard exoskeleton helps to protect them against predators.
- Sexes are separate

Eg.:- Crab

- **Systematic position:-**
- Kingdom: Animalia
- Phylum: Arthropoda
- Class: Crustacea
- Order : Decapoda

Comments:-

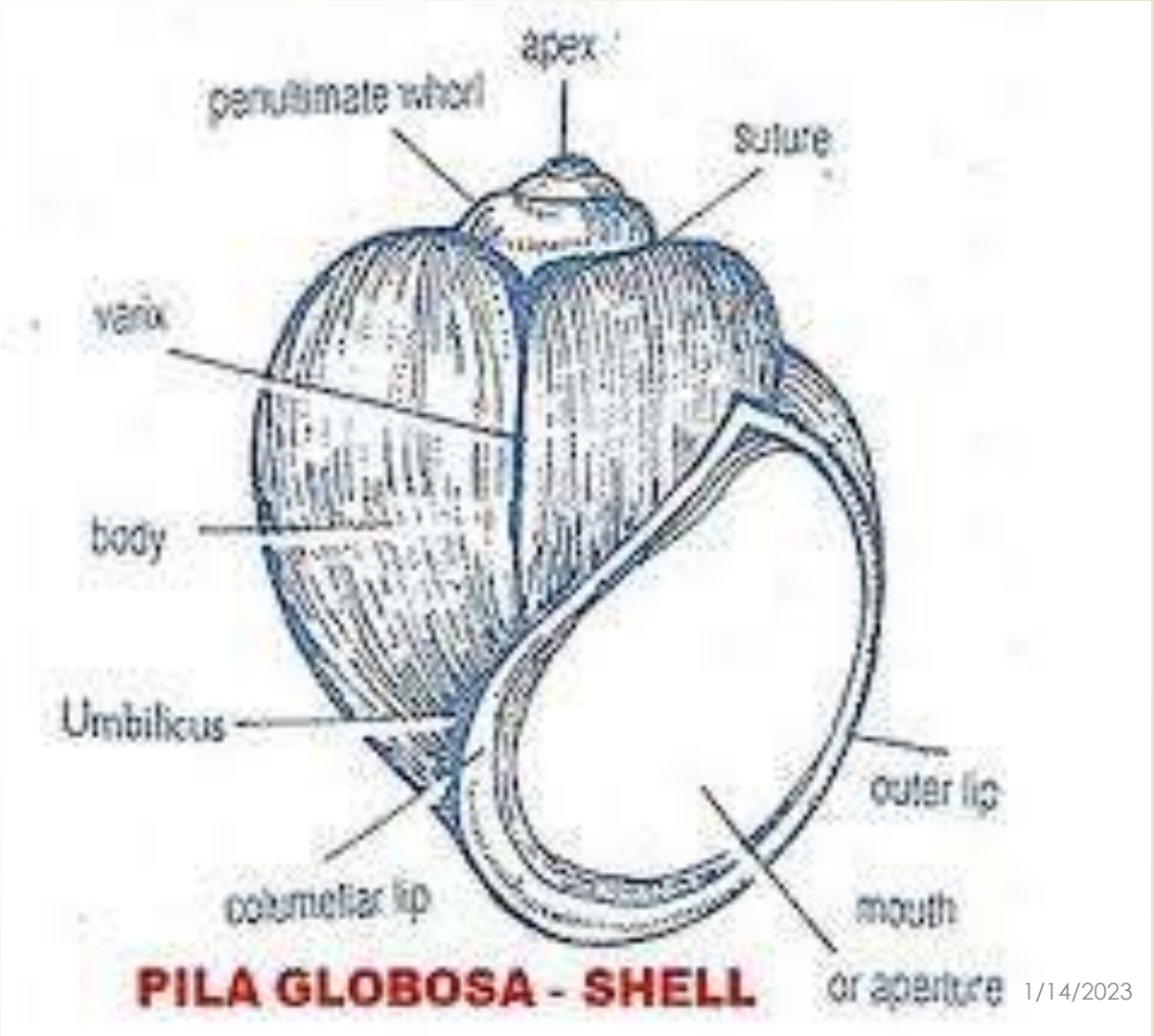
- Cephalothorax is present
- Hard carapace covers the head and thorax dorsally.
- Crabs have a very small tail, which they keep tucked underneath their body.
- In the anterior portion of the cephalothorax o a crab are the mouth parts are present
- Apandages are present at the ventral side to cephalothorax

Practical No. :- 4
Aim:- Museum study of Phylum Mollusca: Pila, Chiton, Bivalve, Octopus

- **Salient features of phylum Mollusca :-**
- The animals belonging to the phylum Mollusca have soft-bodies, triploblastic and bilaterally symmetrical and coelomate
- Thesese organisms are found in the terrestrial as well as in deep seas
- Thee body is divided into head, visceral mass, muscular foot and mantle.
- The head comprises of tentacles and compound eyes.
- The body is covered by a calcareous shel and the muscular foot helps in locomotion.
- They have a well-developed digestive system, the radula is the rasping organ for feeding.
- They respire through the general body surface, gills or pulmonary sac.
- The blood circulates through the open circulatory system.
- They have a pair of metanephridia that helps in excretion.
- The nervous system consists of number of paired ganglia and nerves.
- The tentacles, eyes, osphradium, and statocysts act as the sensory organs.
- The sexes are separate in most of the molluscs but some species are hermaphrodite.
- They are generally oviparous with indirect development

Eg.:- *Pila*

- **Systematic position:-**
- Kingdom: Animalia
- Phylum: Mollusca
- Class: Gastropoda
- Genus: Pila
- Species: globusa

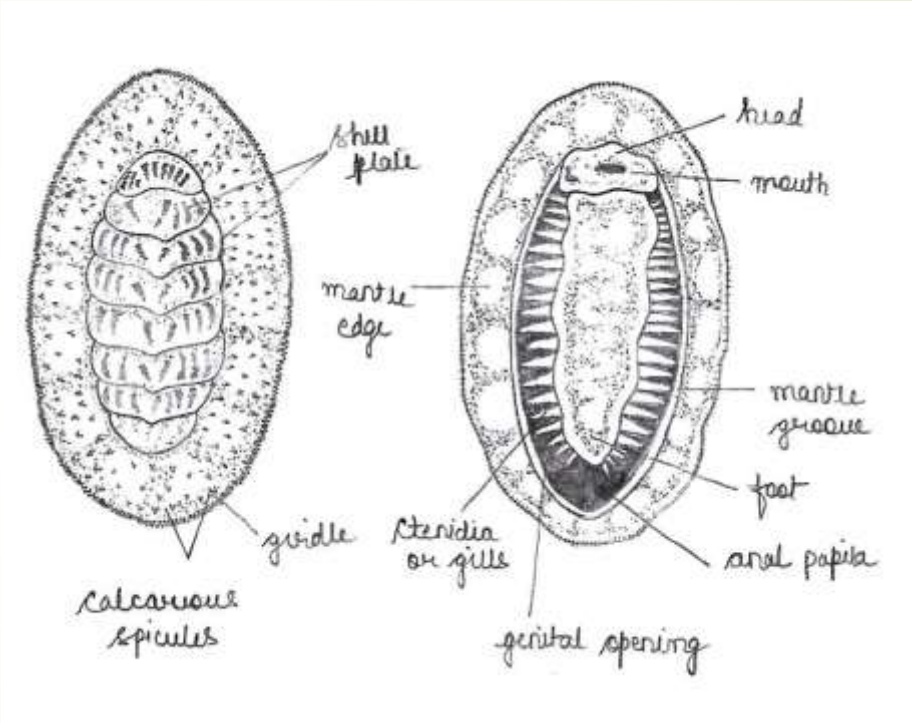


Comments:-

- It is commonly called **“apple snail”** and is found in fresh water ponds, pools and ditches in India and adjacent regions.
- Shell is external and spirally coiled and is comprised of 6 whorls.
- The axis around which coiling takes place is known as columella, the top whorl is known as apical whorl and the large and ultimate whorl is known as animal chamber.
- The animal chamber is covered over by operculum.
- Along the animal chamber runs a vertical groove the varix, which connects the penultimate whorl and inner lip of mouth.
- The animal comprises a head, foot and a visceral mass.
- A part of mantle is modified into pulmonary sac and serves for aerial respiration.

Eg.:- Chiton

- **Systematic position:-**
- Kingdom: Animalia
- Phylum: Mollusca
- Class: Polyplacophora
- Genus: Chiton

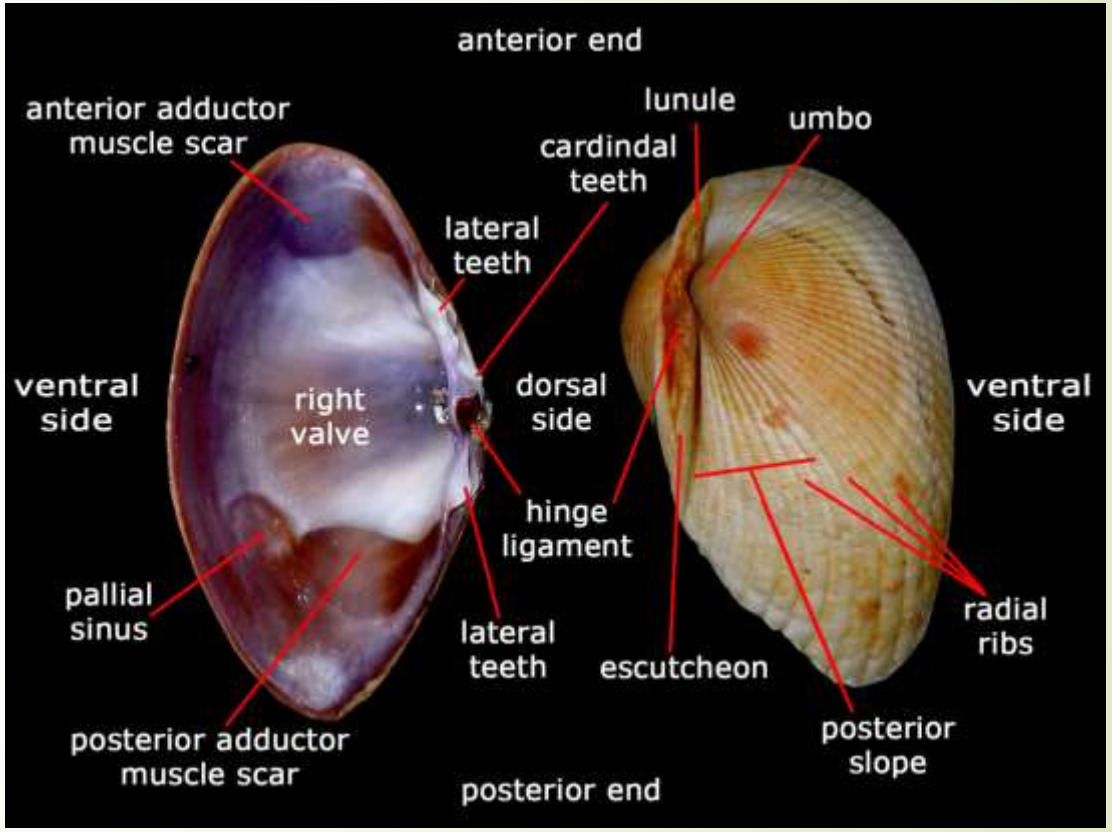


Comments:-

- Chiton is a sluggish, marine animal found attacked to the rocks.
- Body is elongated, bilaterally symmetrical and dorsa- ventrally compressed.
- It consists of shell, foot, mantle and the visceral mass.
- Shell composed of a series of eight calcareous pieces.
- Foot is flat and ventral.
- Mouth and anus are at opposite ends.
- Head is not distinct. Eyes and tentacles are absent.
- Mantle covers the main part of the body and covered the shell plates.
- Foot is ventral, muscular with a flat sole exe whole extending along the length of the body.

Eg.:- Bivalve

- **Systematic position:-**
- Kingdom: Animalia
- Phylum: Mollusca
- Class: Bivalvia



Comments:-

- They are marine animals.
- Bivalves are characterized by a laterally compressedbody with an external shell of two halves that is hinged dorsally.
- The head is rudimentary and have lost the buccal or radular apparatus
- They are mostly ciliary feeders, with sieving and sorting mechanisms on labial palps and leaf-like ctenidium.
- The mouth and anus are located at opposite ends of the body and the gut is typically convoluted.
- The foot is compressed and adopted for burrowing, except in sedentary forms where it is rudimentary.
- Fertilization occurs usually external.

Eg.: Octopus

- **Systematic position:-**
- Kingdom: Animalia
- Phylum: Mollusca
- Class: Cephalopoda
- Genus: Octopus

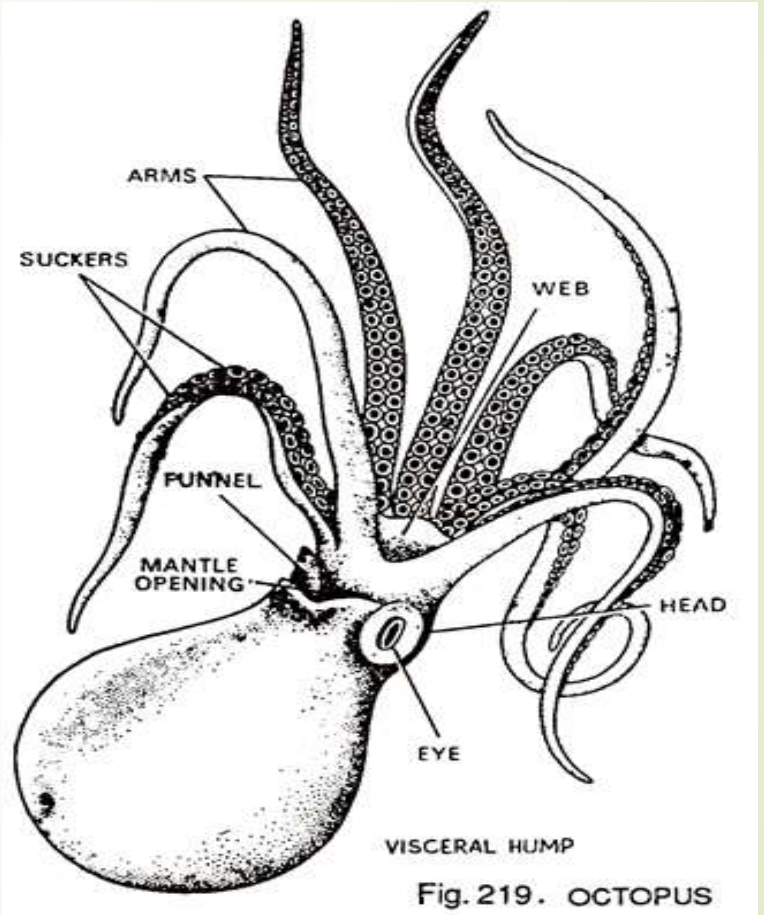


Fig. 219. OCTOPUS

Comments:-

- It is commonly called as “sea-devil” and is a marine and cosmopolitan animal
- It is normally found in holes or crevices or under stones along sea bottom
- Body globular and is divided into visceral hump and head. The head is comparatively small and undifferentiated.
- Foot modified Into 8 small and thick arms which are all arranged around mouth.
- Head bears a pair of large conspicuous eyes.
- Each arm is beset with two rows of large cuplike suckers all along its length.
- The third right arm of male is modified into a spatulate structure for transfer of spermatophores into the female.
- Shell and tentacles are altogether absent

Practical No. :- 4
Aim:- Museum study of Phylum Echinodermata: Sea Star, Sea Urchin, Brittle Star, Sea Cucumber.

- **Salient features of phylum Mollusca :-**
- They have a star-like appearance and are spherical or elongated.
- They are exclusively marine animals & organisms are spiny-skinned.
- They exhibit organ level of organization & they are triploblastic and have a coelomic cavity.
- The skeleton is made up of calcium carbonate.
- They have an open circulatory system & They respire through gills or cloacal respiratory tree.
- They have a simple radial nervous system and the excretory system are absent.
- The body is unsegmented with no distinct head. The mouth is present on the ventral side while the anus is on the dorsal side.
- The tube feet aids in locomotion.
- They reproduce sexually through gametic fusion and asexually through regeneration. Fertilization is external.
- They possess the power of regeneration.
- They have poorly developed sense organs. These include chemoreceptors, tactile organs, terminal tentacles, etc.

Eg.: Sea Star

- **Systematic position:-**
- Kingdom: Animalia
- Phylum: Echinodermata
- Subphylum: Asterozoa
- Class: Asteroidea
- Order : Phanaerozonia
- Family: Ophidiasteridae
- Genus: Asterias

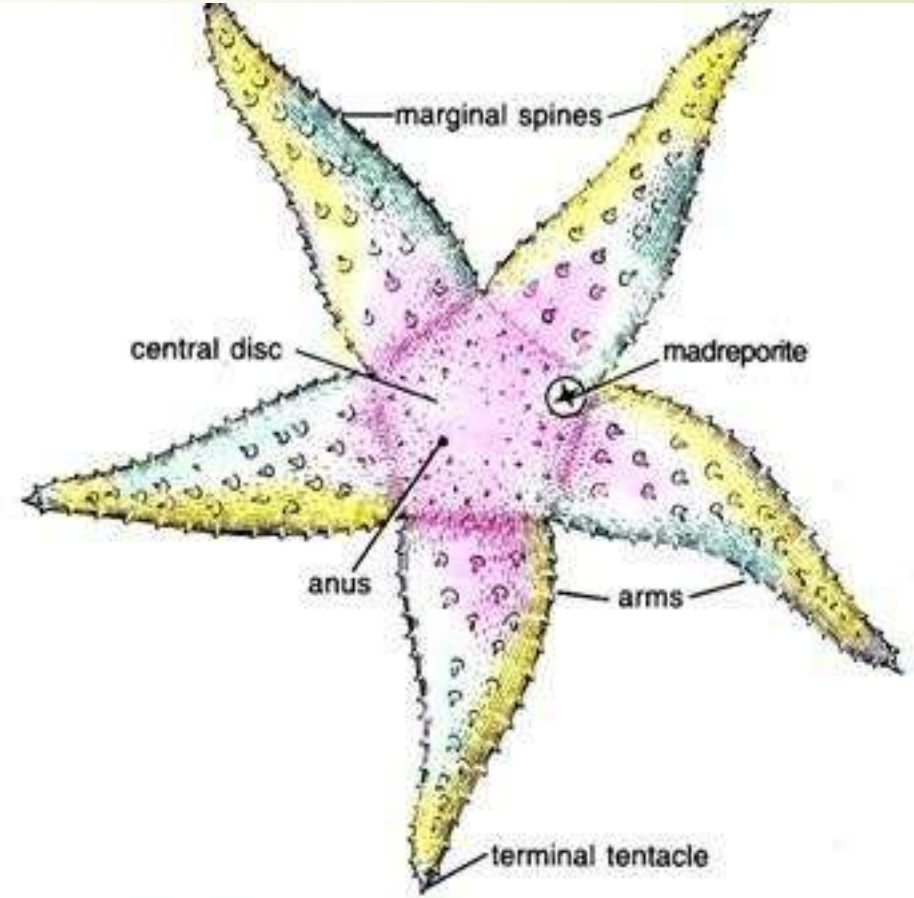


Fig. 85.2. *Asterias*. External features (Aboral view).

Comments:-

- Starfish are also referred to as sea stars because of their star-shaped appearance.
- Starfish are mostly predators and feed on invertebrates such as mussels and clams that live on the ocean floor.
- In their ventral side, starfish contain thousands of tube-like feet that contain cells that are specialized for adhesion.
- Most species of starfish can regenerate, or regrow, damaged or lost arms. They can also shed arms as a means of defense.
- Asterias is exclusively marine, bottom dwelling or benthonic animal, inhabiting various types of bottom
- At the aboral surface of the central disc occurs a flat, sub-circular, asymmetrical and grooved plate called madreporite plate

Eg.: Sea Urchin

- **Systematic position:-**
- Kingdom: Animalia
- Phylum: Echinodermata
- Class: Echinoidea

Comments:-

- It is commonly known as “sea urchin” and is formed in shallow water in both rocky and sandy place in sea.
- Body is Sub-globular and convex or dome-shaped above and flattened below. The aboral and oral surfaces are distinct.
- Central dise and arms are completely wanting and body is covered over with long, strong, sharp, solid and movable spines bone on protuberance and groups of dermal brabchiae.
- Exoskeleton is made up of closely fitted calcareous plates, which form a corona enclosing the soft body organs.
- Pedicillariae are present and are having three jaws instead of two.
- Mouth lies in the centre of oral surface and is bound by a membranous rim the peristome.
- Anus is eccentric and lies on the aboral surface bordered by a papillated rim – the periproct. Madreporite and genital pore are also present on aboral surface near anus.
- The whole oral and aboral surface, leaving the periproct, are traversed by 5 ambulacral areas and 5 inter ambulacral areas made up of definite plates.
- The ambulacral areas, in addition to spines and branchiae, bear 5 double rows of tube feets.
- Sexes are separate. Development includes Echinopluteus larva.

Eg.: Brittle Star

- **Systematic position:-**
- Kingdom: Animalia
- Phylum: Echinodermata
- Class: Ophiuroidea
- Genus: Ophiothrix
- Species: fragilis

Comments:-

- The common brittle has a hairy appearance, due to all the fine spines, seven on each arm segment.
- There are also spines on the central disk.
- It comes in a wide range of colors like green, brown, orange, yellow or red.
- The disk may reach a diameter of 2 cm and the five arms a length of 10 cm.
- It can be found hard substrate, sand or gravel from the subtidal zone and down to 350 meters.

Eg.:Sea Cucumber

- **Systematic position:-**
- Kingdom: Animalia
- Phylum: Echinodermata
- Class: Holothuroidea
- Genus: *Holothuria*

Comments:-

- Holothuroidea has elongated body and leathery skin, which is found on the sea floor worldwide.
- Tentacles are shield-shaped. Respiratory trees are present.
- The calcareous ring is without posterior projections.
- Most forms live in shallow water, though one family is restricted to the deep sea.
- Sea cucumber whose soft and somewhat cylindrical body can be from 15 to 40 cm in length.
- The surface is covered by numerous conical short outgrowths, generally white. The colour is variable, brown, black, yellowish with brown mottlings.
- The mouth, at one end of the tube-shaped body is surrounded by small oral tentacles used to collect the mud from which the sea cucumber extracts various nutrients.