

P.R.GOVERNMENT COLLEGE (A)
DEPARTMENT OF ZOOLOGY

ANIMAL DIVERSITY-I
I SEMESTER
PRACTICAL MANUAL

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I. OBSERVATION OF SLIDES / SPECIMENS / MODELS:

1. Protozoa

- A. Elphidium B. Paramoecium C. binary fission
D. Conjugation.

2. Porifera

- A. Spongilla B. Euspongia.

3. Coelenterata

- A. Physalia B. Aurelia C. Obelia colony,
D. Corallium C. Gorgonia,

4. Platyhelminthes and Nematelminthes

- A. Ascaris-male & female
B. Larval stages of Fasciola Miracidium, Redia, Cercaria
C. Ancylostoma duodenale.

5. Annelida

- A. Nereis B. Hirudinaria C. Trochophore larva.

6. Arthropoda

- A. Sacculina B. Limulus C. Julus
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8. Echinodermata

- A. Ophiothrix B. Echinus C. Cucumaria
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9. Hemichordata

- A. Balanoglossus B. Tornarialarva.

I. DISSECTIONS-Only Demonstration

- a) Mounting of Cephalothoracic and abdominal appendages of Prawn
b) Nervous system of Prawn

Model paper for semester End Examination

I B.Sc., (BZC), SEMESTER-I

ANIMAL DIVERSITY-I

PRACTICAL MODEL PAPER

(AT THE END OF I-SEMESTER-EFFECTIVE FROM 2017-18)

Max marks: 50

Time : 2Hrs

1. Dissect and display the nervous system of Palaemon. Draw a neat labelled diagram **10M**

2. Identification of spotters **4X5=20M**

A)-----

B)-----

C)-----

D)-----

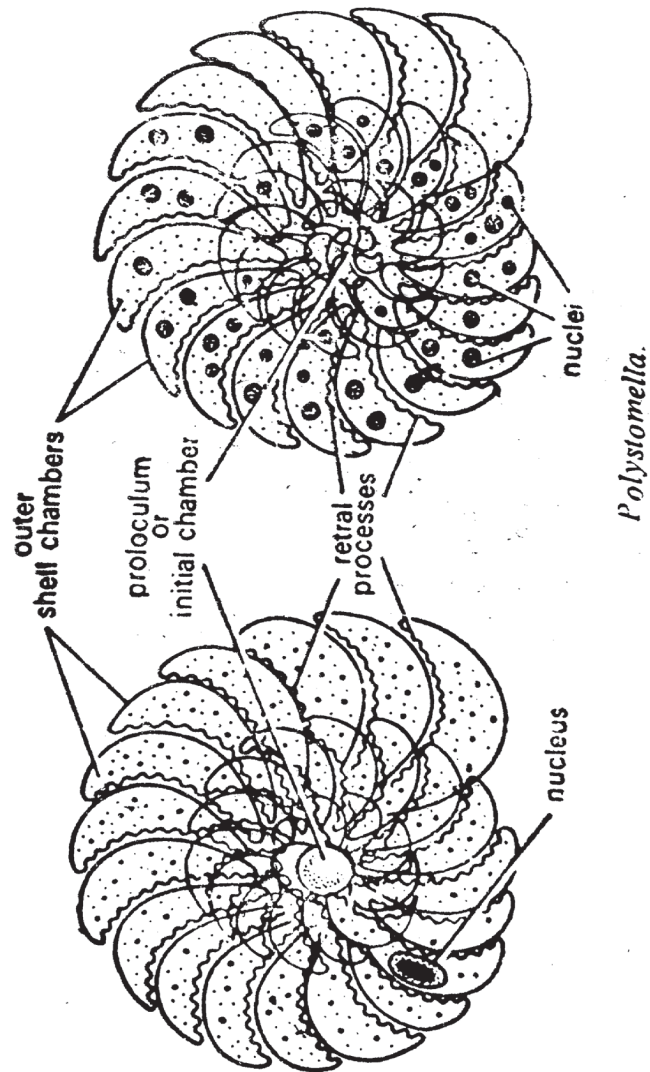
E)-----

3. Record **05M**

4. Continuous Internal Assessment **15M**

Total **50M**

Elphidium (Polystomella)



Elphidium (Polystomella)

Classification

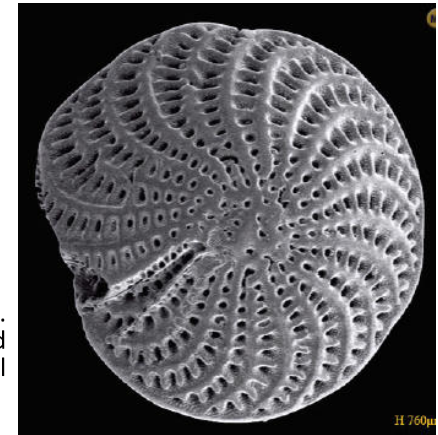
Phylum: Protozoa (Unicellular Eukaryotic organisms)

Class: Rhizopoda (Locomotion and feeding by pseudopodia)

Order: Foraminifera (Large sized with uni or multichambered shell)

Habit and Habitat

Elphidium is also called 'Polystomella'. Elphidium is a marine form. It is found creeping on Sea weeds. It is found all over the world in Deep Seas.



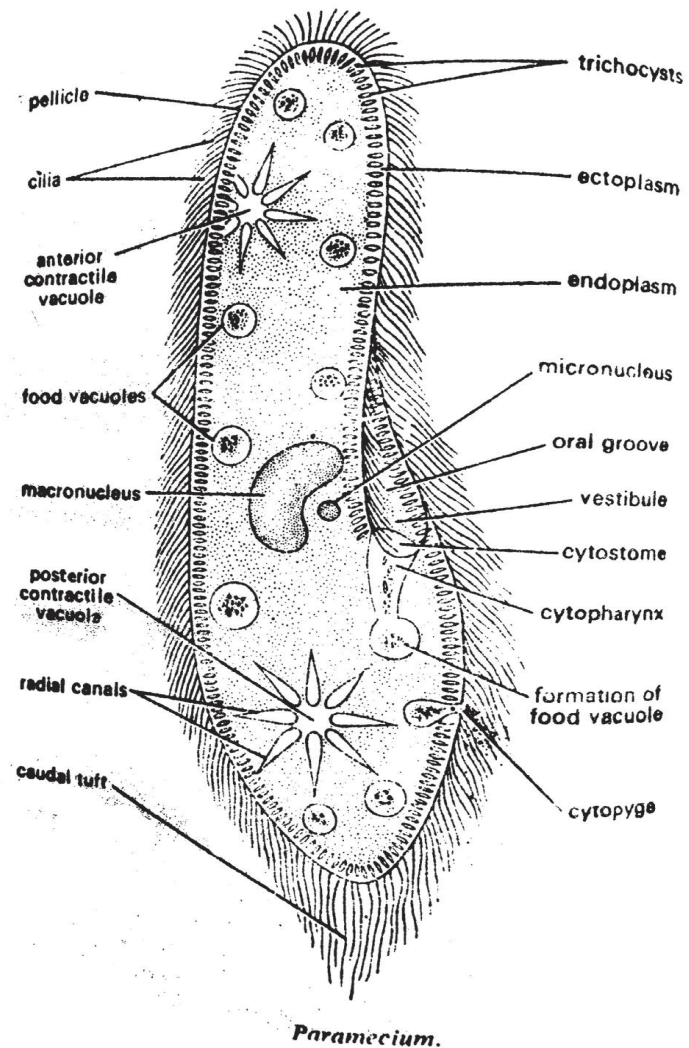
Characters

1. Body enclosed in a many chambered shell and each chamber is perforated with numerous pores.
3. Chambers are arranged in a spiral fashion.
4. Ectoplasm gives rise to numerous thread like extensions-the reticulopodia, which project out of the pores.
5. Adults exhibit dimorphism and alternation of generation between a microspheric and a megalospheric form.
6. Microspheric form has small central chamber – and many scattered nuclei. It reproduces only asexually i.e., through multiple fission.
7. The megalospheric form has large central chamber and only one nucleus. It reproduces only sexually i.e., through gametogamy and conjugation.
8. Nutrition is holozoic.

Identifying features

1. It is Dimorphic. Microspheric form possess small central chamber. Macro-spheric form has large central chamber
2. Dead Shells constitute Foraminiferan Ooze at the bottom of the sea.

Paramecium



Paramecium

Classification

Phylum: Protozoa (Unicellular)

Class: Ciliata (Locomotion by Cilia)

Order: Holotricha (Uniformly distributed cilia)

Habit and habitat

Paramecium is found in fresh water ponds, rivers, lakes, streams, pools, etc.



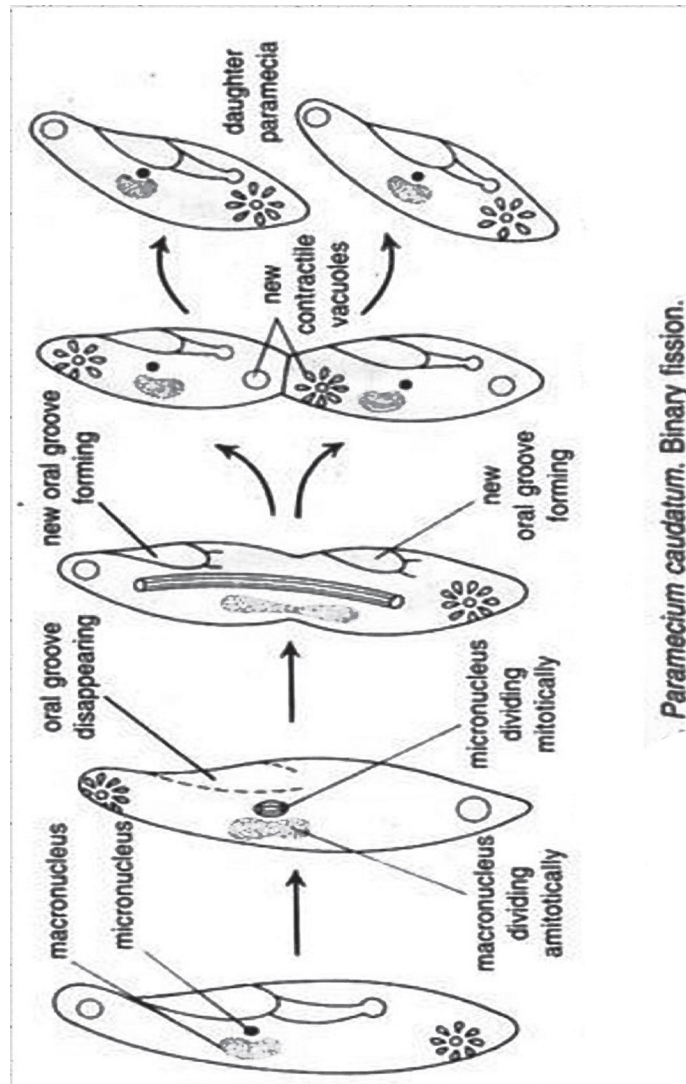
Characters

1. Paramecium is Commonly known as Slipper animalcule.
2. Anterior part is slender with a blunt or rounded end, while the posterior end is pointed or cone shaped.
3. Body is covered by a thin, double layered, elastic and firm pellicle
4. The entire body is covered with numerous small hairs like projections called cilia.
5. Cytoplasm is differentiated into ectoplasm and endoplasm. Ectoplasm has rod-shaped trichocysts.
6. Endoplasm contains food vacuoles, granules, meganucleus, micronucleus, anterior contractile and posterior contractile vacuole, fat and glycogen.
7. Reproduction by binary fission, endomixis, hemixis, automixis and conjugation.

Identifying features

1. The animal contains slipper- shaped body
2. Cytoplasm has two contractile vacuoles

Paramecium Binary Fission



Paramecium Binary Fission

1. Binary fission occurs in transverse fashion in Paramecium.

2. It is a common method of reproduction in Paramecium which occurs during favorable condition.



3. A fully grown Paramecium is divided into two daughter individuals. Division occurs on the longitudinal axis of the body. Nuclear division is followed by the cytoplasmic division.

4. Paramecium stops feeding before initiating binary fission and then its oral groove disappears.

5. Macronucleus divides by amitosis and micronucleus divides by mitosis. After division, they move towards the opposite end. At the same time, the constriction develops at the middle part of the body which divides cytoplasm into two equal parts. In this way, two daughter-Paramecia are produced.

6. Daughter from anterior end is called protor and another daughter from posterior end is called opisthe.

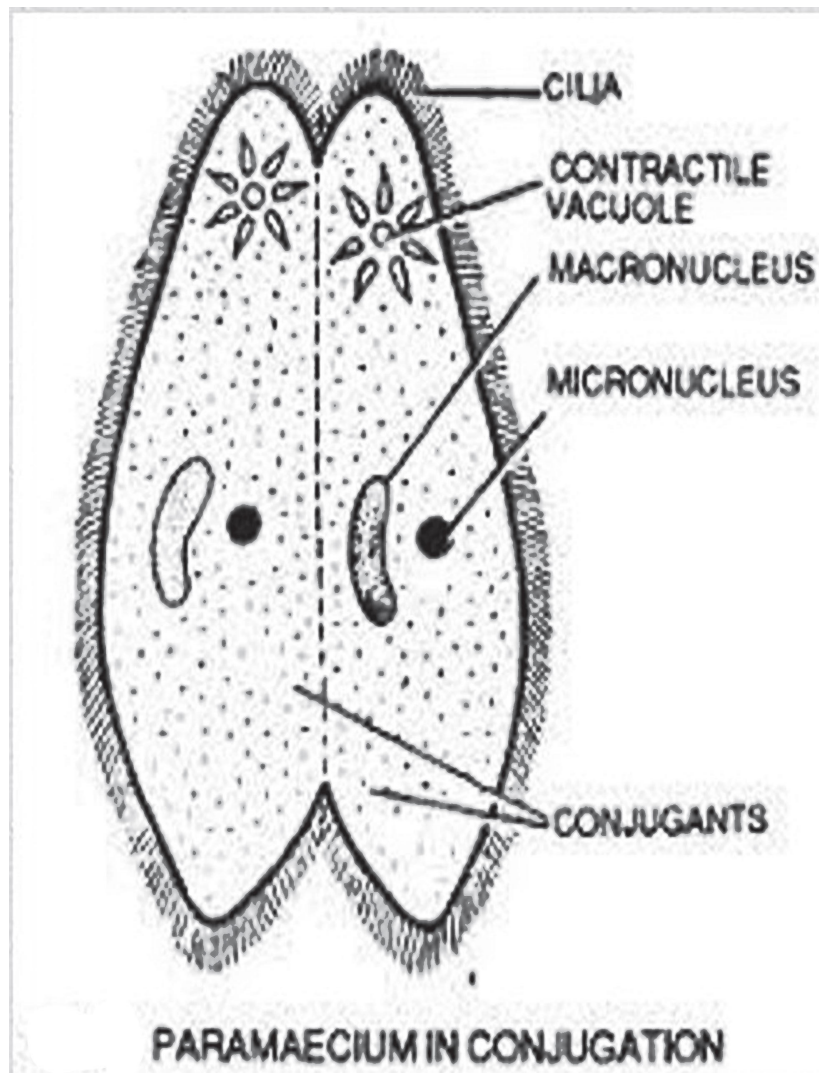
7. Oral groove and cytopharynx are newly formed in both the daughters. One contractile vacuole goes to protor and another to opisthe.

8. The whole process is completed within 2 hours and may occur one to four times a day.

Identification

1. Slide can be identified with a constriction in the centre part of the body.

Conjugation in Paramecium



Conjugation in Paramecium

1. Conjugation is the mode of sexual reproduction in paramecia. In this two paramecia come in contact and unite through the edges of their oral groove.

2. The pellicle, all along the union of two forms, is disintegrated. At this stage they are called conjugants

3. The macronucleus of each conjugant disappears and their micronucleus divides twice and forms 4 haploid micronuclei.

4. Out of these four micronuclei three daughter micro nuclei disintegrate, while remaining one divides into two unequal daughter pronuclei. Of these, the smaller one is the active male migratory pro-nucleus, whereas the larger one is the stationary female pro-nucleus.

5. The migratory male pro-nucleus of each conjugant moves through the protoplasmic bridge into the other conjugant and ultimately fuses with stationary female pro-nucleus forming zygote.

6. The nucleus of zygote is diploid and is called amphinucleus and this type of mixing of two nuclei from different individuals is called amphimixis.

7. After zygote formation the nucleus continue division and forms four daughter paramecia.

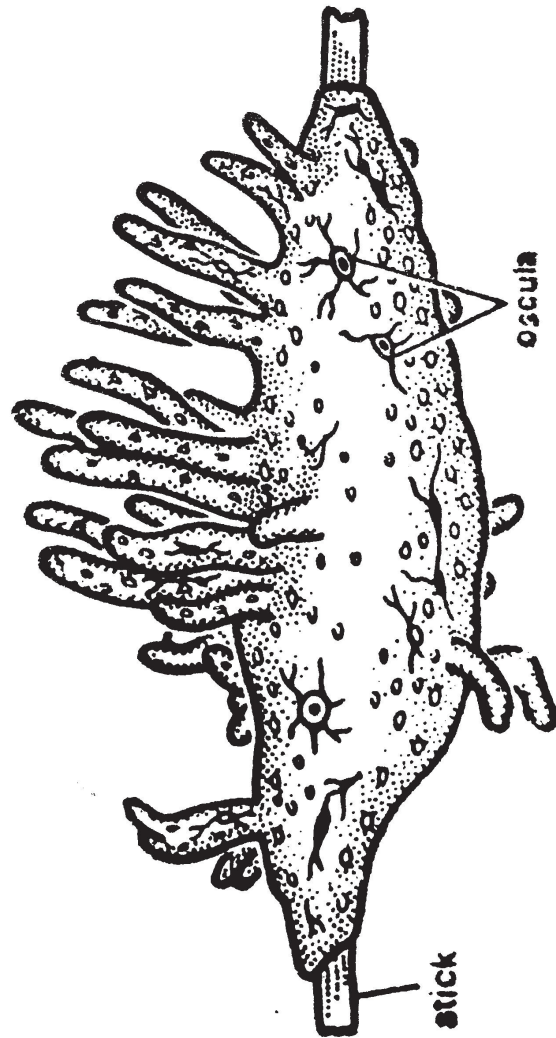
8. The conjugation occurs only when nutrition is deficient and when temperature of water is below the optimum. Conjugation results in rejuvenation of Genetic material

Identification

1. Two paramecia can be seen attached to each other.



Spongilla



Spongilla.

Spongilla

Classification

Phylum: Porifera (pore bearing animals)

Class: Demospongiae
(Skeleton of silicious spicules and / or sponginfibres)

Order: Monoaxonida
(Spicules are monoaxon)

Habit and Habitat

Inhabits fresh water ponds and lakes and is commonly called "Fresh water sponge". It is Colonial, profusely branched colony is associated with twigs and plant sticks.



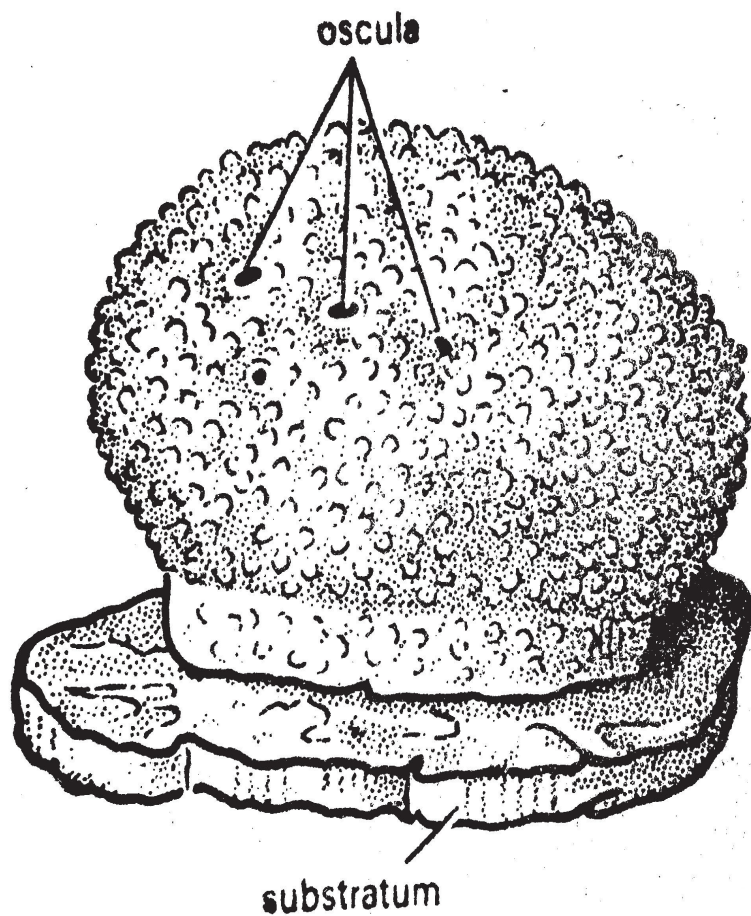
Characters

1. Body is covered with thin dermal membrane.
2. The body consists of several dermal ostia and osculum.
3. Skeleton consists of monoaxon silicious spicules embedded in the mesh work of spongin fibres.
4. Canal system of rhagan type. Course of water current: prosopyle - flagellated chambers - apopyle - spongocoel - osculum.
5. Asexual reproduction under unfavourable conditions by gemmule formation.
6. Sexual reproduction by sperm and ova. Development is indirect involving free swimming larva.
7. The animal shows symbiotic association with unicellular green – Zoochlorella algae which makes its body greenish in colour

Identification

1. Canal system is reghan type.
2. Presence of Zoo chlorella and greenish body colour

SPONGILLA



Euspongia.

Euspongia

Classification

Phylum: Porifera (pore bearing animals)

Class: Demospongiae (Skeleton of silicious spicules and / or sponginfibres)

Order: Keratosa (Skeleton consisting of spongin fibres only)

Habit and Habitat

1. Euspongia is Commonly called Bath Sponge. It is found on rocky bottoms in warm shallow sea water of Mediterranean, U.S.A., Asia and Australia.



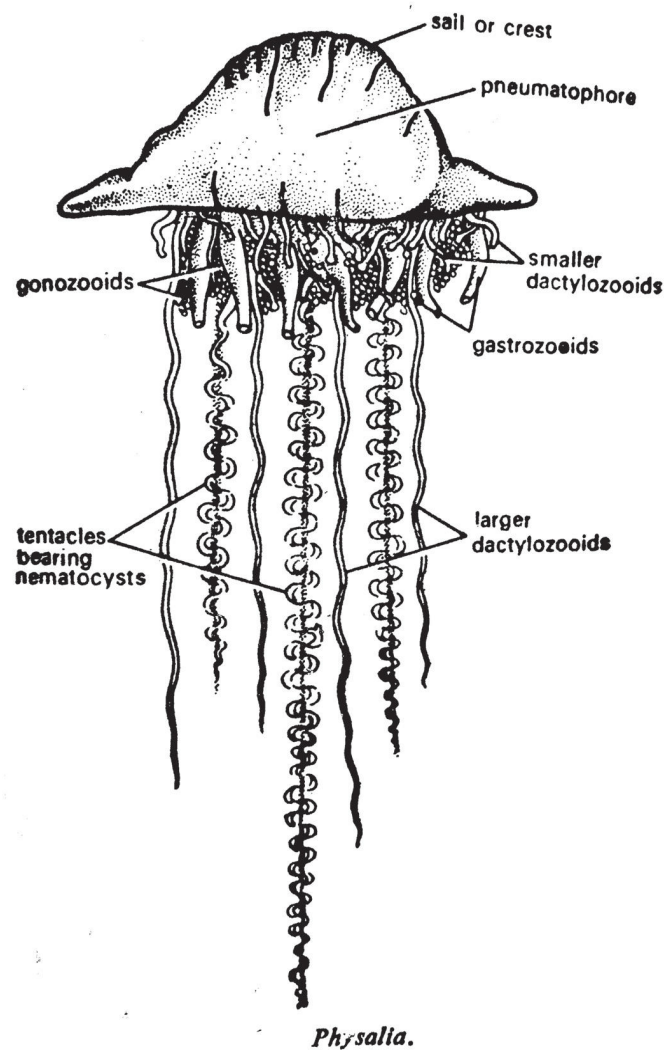
Characters

1. Massive body with variable shape often globose, cup shaped or round.
2. Skeleton consists of network of spongin fibres without spicules.
3. Surface of the body contains large openings called oscula and small openings called inhalent canals.
4. Canal system is leuconoid type. Water current passes through dermal ostia to incurrent canal prosopyle to flagellated chambers to apopyle to excurrent canals to osculum.
5. Dried skeleton of Euspongia is used as a bath sponge as it consists of spongin fibres having the capacity hold a large amount of water.
6. It is used in offices for wetting postal stamps, paper, currency etc.

Identifying characters

1. Oscula, inhalant canals and globose body with meshy spongin fibres

Physalia



Physalia

Classification

Phylum: Coelentrata (Presence of coelenteron, tissue grade of organisation, diploblastic, nematocysts present with radial symmetry)

Class: Hydrozoa (Polyp & medusa are present)

Order: Siphonophora (show polymorphism)

Habit and Habitat

Physalia is a colonial hydroid commonly called Portuguese man of war. It is a marine, colonial, swimming or floating pelagic animal. Distributed in tropical and subtropical seas.

Characters

1. This is commonly named as "Portuguese – man of war", because they suddenly appear and disappear from water like the warrior ships of Portuguese.
2. Prominent feature is a large bladder like float – the pneumatophore, filled with gases.
3. On the upper surface of pneumatophore is a sail like crest.
4. To the lower surface of pneumatophore are attached zooids spread up like fishing tentacles. Gastrozooids are the feeding zooids, small and large dactylozooids are for defence, gonozooids for reproduction.
5. Gelatinous zooids are of unassigned function.
6. The nematocysts on tentacles are highly poisonous.

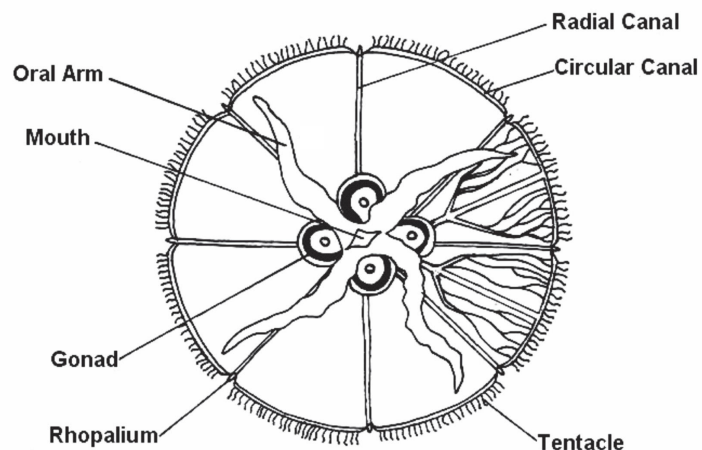
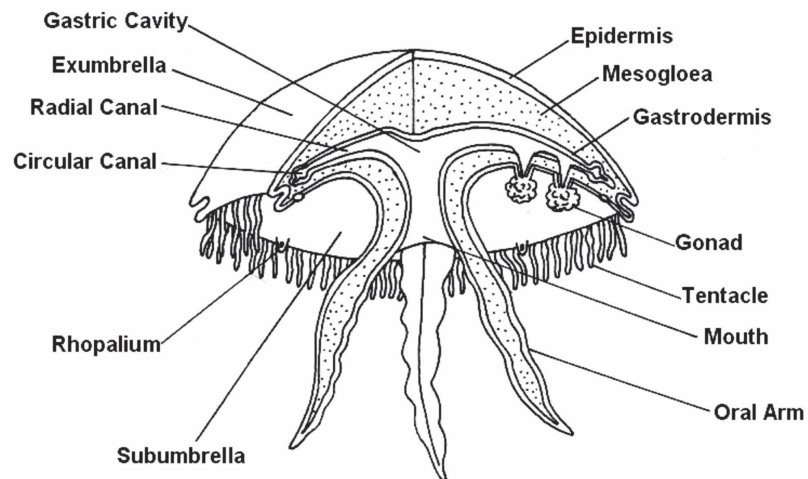
Identifying Characters

Pneumatophore (float), hanging gastrozooids, tentacles and gonozooids.



Aurelia

Aurelia (Moon Jellyfish)



Aurelia

Classification

Phylum: Coelenterata (Presence of coelenteron, tissue grade of organisation, diploblastic, nematocysts present with radial symmetry)

Class: Scyphozoa (Medusa is dominant)

Order: Semaestomeae (Medusae saucer shaped and provided with oral lobes)

Habit and Habitat

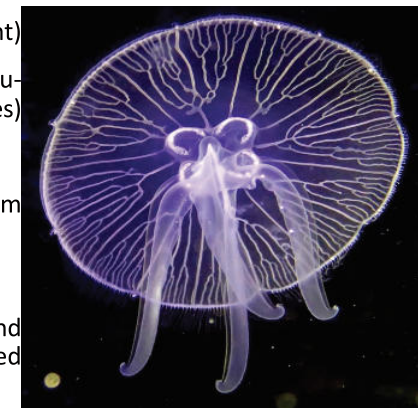
Marine, living mostly in coastal warm waters. - Solitary, free swimming.

Characters

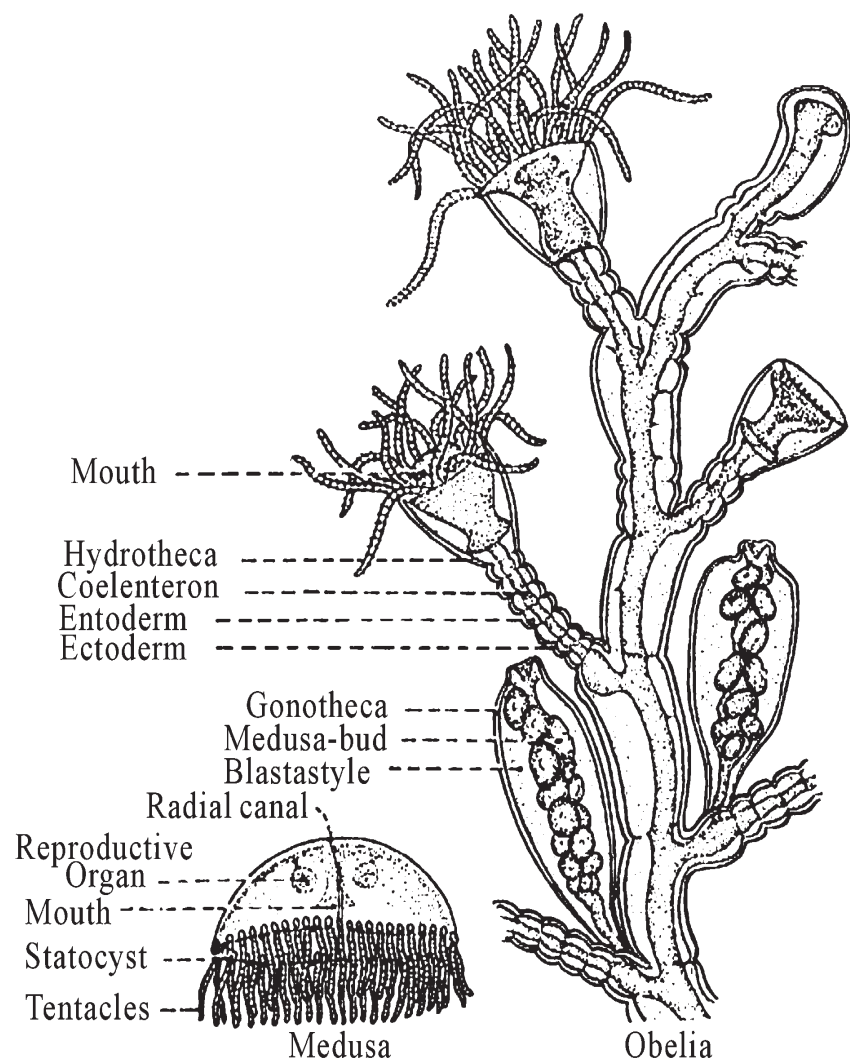
1. The body of aurelia is transparent and gelatinous these are commonly called 'Jelly fish'.
2. Body is saucer shaped or umbrella shaped with two surfaces (a) convex-exumbrellar surface (b) concave – subumbrellar surface.
3. True velum is absent and it is called velarium. (Note: true velum is present in medusae of hydrozoans)
4. The subumbrellar surface bears the following – (a) four cornerd mouth, (b) four oral arms arising from each corner of mouth, (c) ciliated grooves in oral arms, (d) nematocytes on oral arms.
5. The animal is carnivorous.. The animal swims by rhythmic contraction of muscular processes of cells of umbrellar surface.
6. Aurelia is dioecious i.e. male and female individuals are separate. In the cycle – alternation of generation is seen. Fertilization is external. Development indirect – ephyra larva is formed.

Identification

Jelly like texture, marginal tentacles and oral arms



Obelia



Obelia

Classification

Phylum: Coelenterata - (Presence of coelenteron, tissue grade of organisation, diploblastic, nematocysts present with radial symmetry)

Class: Hydrozoa - Hydroids bearing medusa with true velum

Order: Hydrozoa - Polypoid

Habit and Habitat

It is sedentary, marine colonial form found attached on the surface of sea weeds, molluscan shells, rocks and wooden piles in shallow water.

Characters

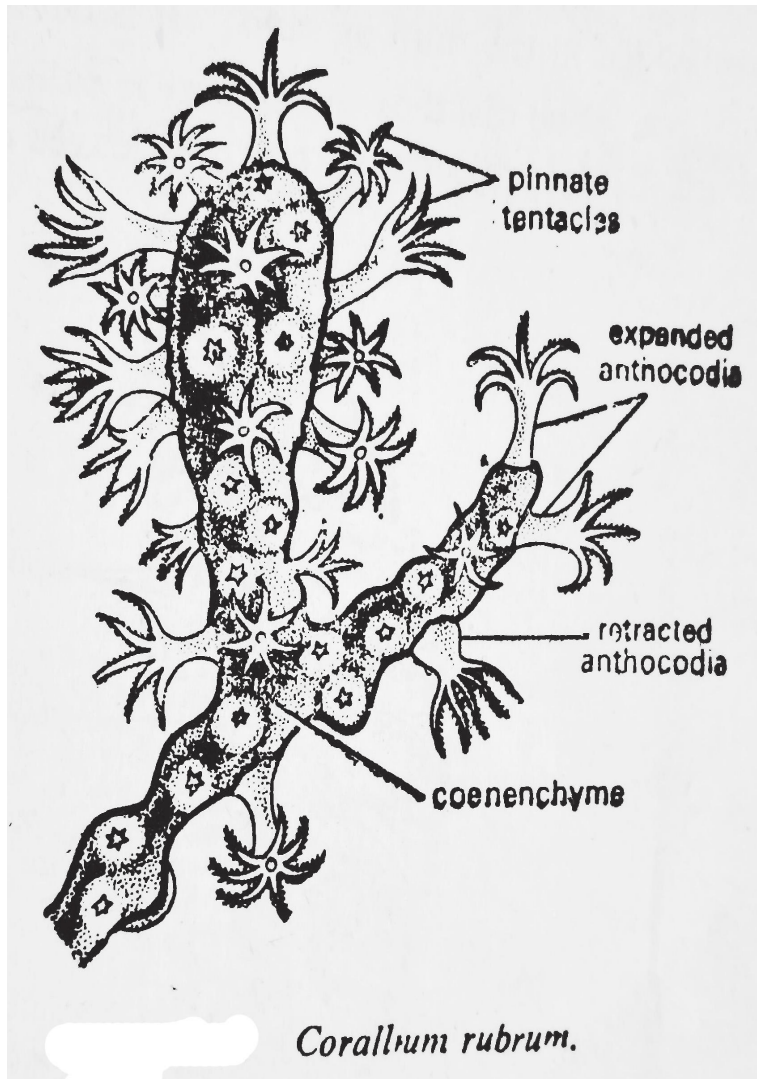
1. Obelia is commonly called as sea-fur.
2. It is attached to the substratum with a horizontal thread like root known as hydrorhiza.
3. A vertical branch arises from the hydrorhiza called hydrocaulus.
4. The hydrocaulus bears zooids or polyps on either side. Each polyp consists of a stem and a head called hydranth.
5. The entire colony is covered with a tough yellow chitin called perisarc.
6. The Obelia is a trimorphic colony consisting of polyps or hydranths (nutritive zooids), Gonangia or blastostyles (budding zooids) and medusae (sexual zooids).
7. Polyp is the nutritive zooid. Blastostyle is the club-shaped reproductive zooid. Medusa is the free-swimming reproductive zooid.
8. It reproduces by asexual as well as sexual methods. Life history of Obelia exhibits alternation of generation.

Identification

Alternate branches of polyps and blastostyles



Corallium



Corallium

Classification

Phylum: Coelenterata (Presence of coelenteron, tissue grade of organisation, diploblastic, nematocysts present with radial symmetry)

Class: Anthozoa (Only polyp stage is present)
Order: Madrepora (Solitary or colonial hard corals)

Order: Madrepora (Solitary or colonial hard corals)

Habit and Habitat

It is a marine form and lives in colonies. Certain crustaceans live in close association with the coral

Characters

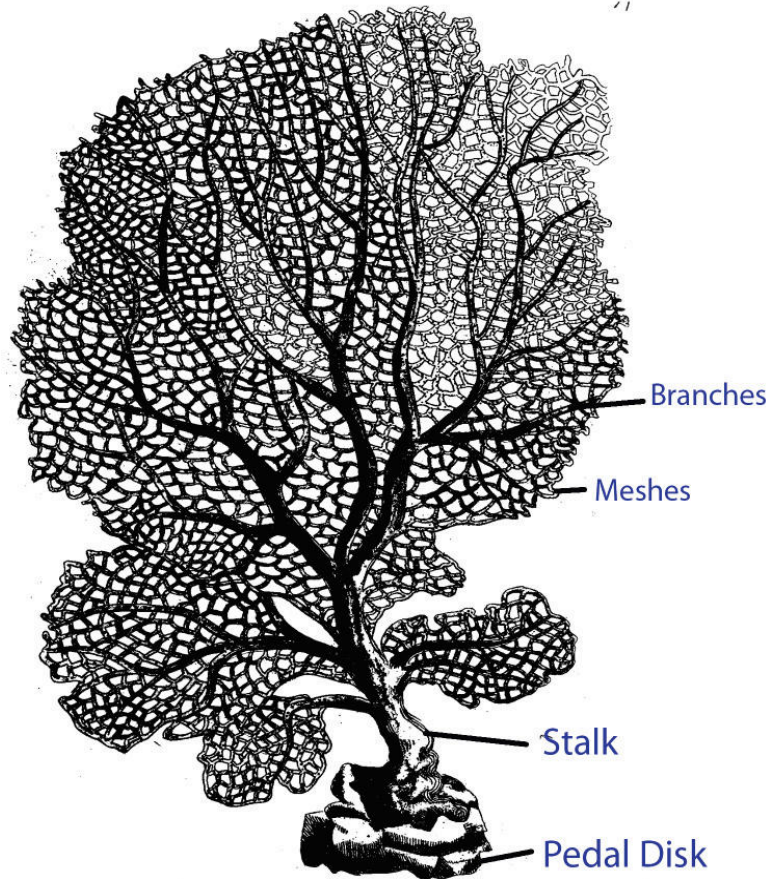
1. Its common name is Stag Horn-Coral. It is also called Acropora. It is a colonial coral. Colony is highly branched, partly porous or reticulate and grows up to 30 cm. in height
2. The branches bear numerous small polyps in elevated cups separated by perforations.
3. Polyps appear flower-like. It is of commercial utility and is used as precious beads in jewellery
4. Corallite is made up of calcium carbonate and is secreted by the basal disc of polyp.
5. Colony increases in size by growth and budding of polyps.
6. The skeleton of Madrepora is very hard and plays an important role in coral reef formation. Skeleton is formed by calcareous spicules, which appear as extremely hard spines.

Identification

Rigid colonies that may branch in all directions, giving a bushy shape. Colour: often dark red, sometimes and rarely pink or even white.



GORGONIA



Gorgonia

Gornonia

Classification

Phylum: Coelentrata (Tissue grade organization, diploplastic and acoelomate)

Class: Anthozoa (Only polypoid generation, sedentary, solitary or colonial)

Order: Gorgonacea (Horny corals, short polyps not touching base)

Habit and Habitat

It inhabits shallow tropical seas near Malaya, West Indies and Indo-Pacific Ocean.



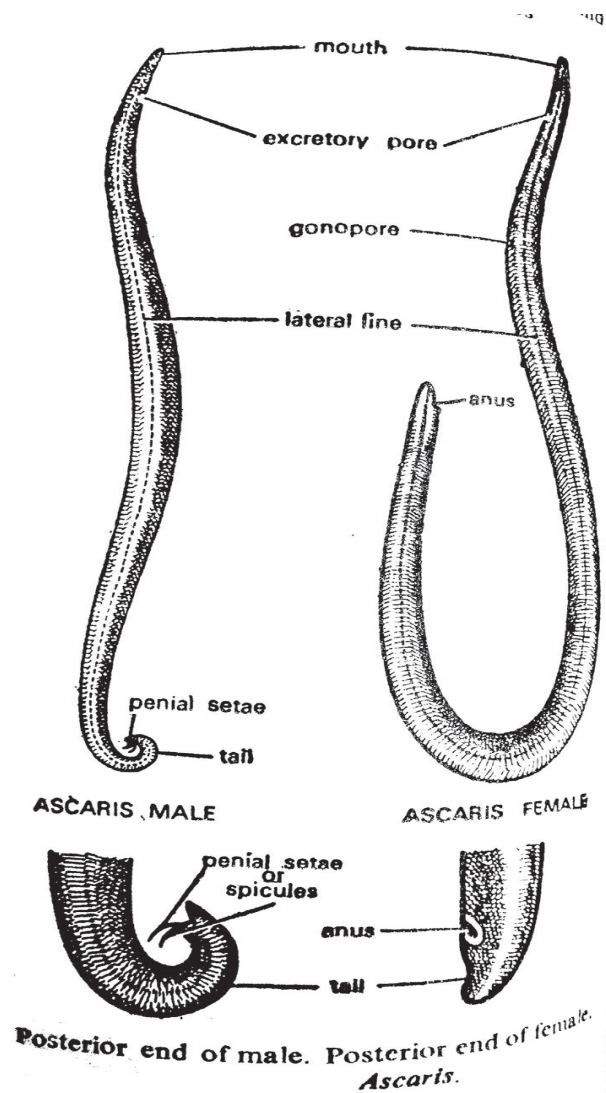
Characters

1. It forms branching colonies of yellow and red colour growing up to 50 cm in height.
2. Body consists of plant-like branching stems and a short main trunk attached to the substratum by a pedal disc.
3. Numerous small anthocodia (retractile polyps) are present in rows on either side of stems of branches. The branches are interconnected with each other and form a network, which looks like a fan.
4. Skeleton consists of an axial rod present throughout the body. It is made up of gorgonin (flexible horn like ectodermal material).
5. It contains numerous spicules in the mesoglea. Dried skeletons are horny and proteinous and are used for decoration.
6. Sexes are separate.

Identifying Character

Fan shaped body.

ASCARIS LUMBRICOIDUS



Ascaris lumbricoides

Classification

Phylum – Aschelminthes – (unsegmented, triploblastic, bilaterally symmetrical, pseudocoelomate)

Class – Nematoda (Gr. nema=thread, eidos=form)-this included thread like forms or round worms.

Order- Ascarioidea- mouth surrounded by three lips.

Habit and Habitat

Ascaris lumbricoides is endoparasite of intestine of pigs and man.



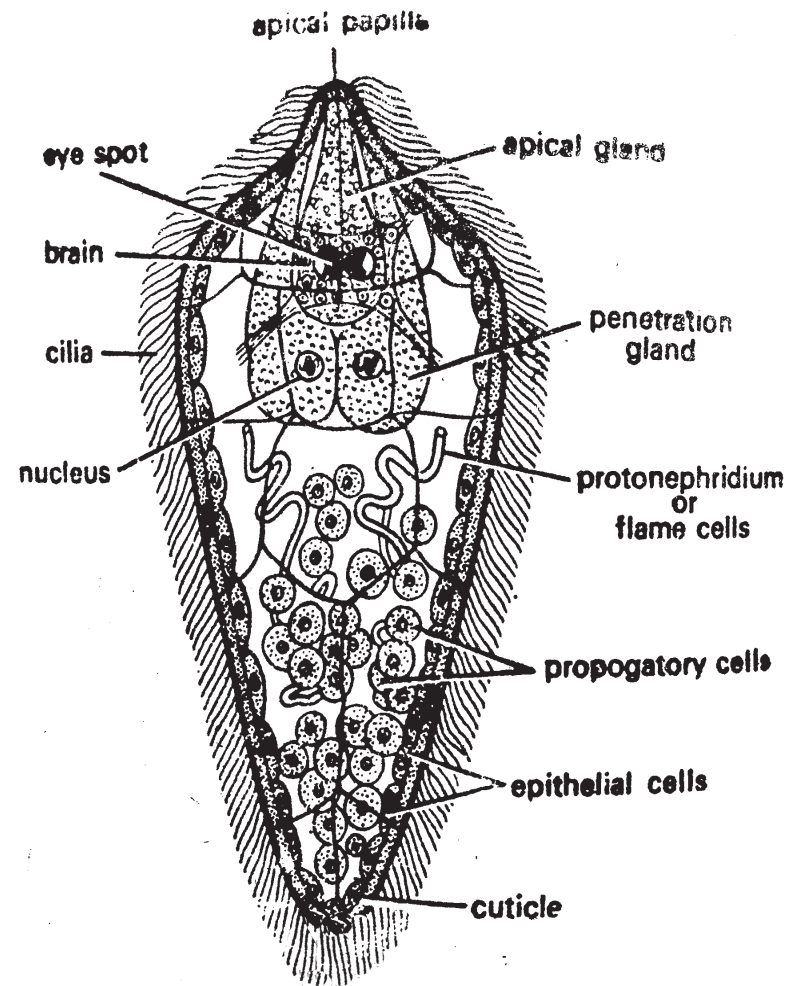
Characters

1. It is commonly called 'round worm'. The animal causes ascariasis in man.
2. Animal is elongated cylindrical tapering at the end. The animal is pseudocoelomate. Body colour is yellowish white. Body is covered with cuticle.
3. The animal is unisexual with sexual dimorphism.
4. Female is straight and longer 20-40cm in length and 4-5mm in diameter - male is curved at the posterior end and smaller 15-30cm in length and 2-4mm in diameter.
5. Mouth is at the anterior end surrounded by three lips. Lips have amphids and sensory papillae.
6. In female the genital opening is midventral at a distance 1/3rd from the anterior end.
7. Respiratory and circulatory systems are absent
8. Life cycle is monogenetic, completed in man.
9. Infection occurs by ingestion of contaminated food and water, development is direct.

Identification

Unsegmented, cylindrical body, posterior end is curved in male, female has pointed tail.

MIRACIDIUM

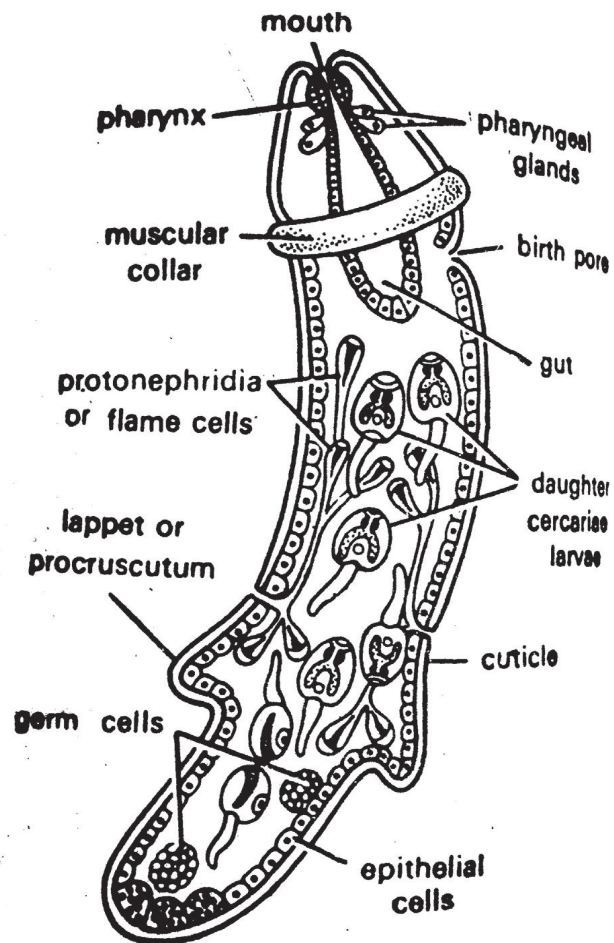


Miracidium Larva of Fasciola hepatica

1. Fertilized eggs (Zygote 4-15 days)
2. It is free swimming, microscopic, dorso ventrally flattened and conical in shape covered with ciliated epidermal plates
4. Epidermal plates 21 in number and arranged in 5 rows
5. Body wall contains
 - a. Muscle layer
 - b. Glandular epithelium
 - c. fluid filled mesenchyme cells
6. Anterior end is produced into a conical papilla, which is mobile and non ciliated.
7. Internal structures include penetration glands which secrete secretions, brain, two eye spots, two flame cells, rudimentary gut and germ cells are seen.
8. Miracidium is multicellular organism.
9. Miracidium larva swims in search of intermediate host (a molluscan), if it gets a suitable host it change into next larval stage namely sporocyst.
10. If Miracidium larva doesn't comes in contact with intermediate host the larva dies after 24 hrs.



Redia larva



Redia larva of *Fasciola hepatica*.

Redia

1. Redia Larva develops when the germ cells of the sporocyst of *Fasciola*. Each redia is an elongated and cylindrical structure about 1.3 mm to 1.6 mm long. It comes out by the rupture of sporocyst

2. It is covered with a thin cuticle.

3. At the anterior end a small mouth, a muscular suckorial pharynx with unicellular pharyngeal glands and small gut.

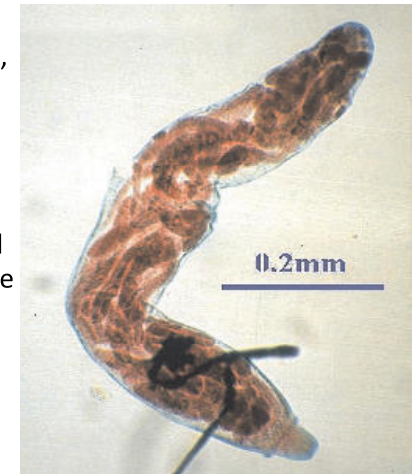
4. The body is filled with loose parenchyma, in which germ cells called germ balls and highly branched flame cells are present.

5. Flame cells open to exterior through a pair of excretory pore.

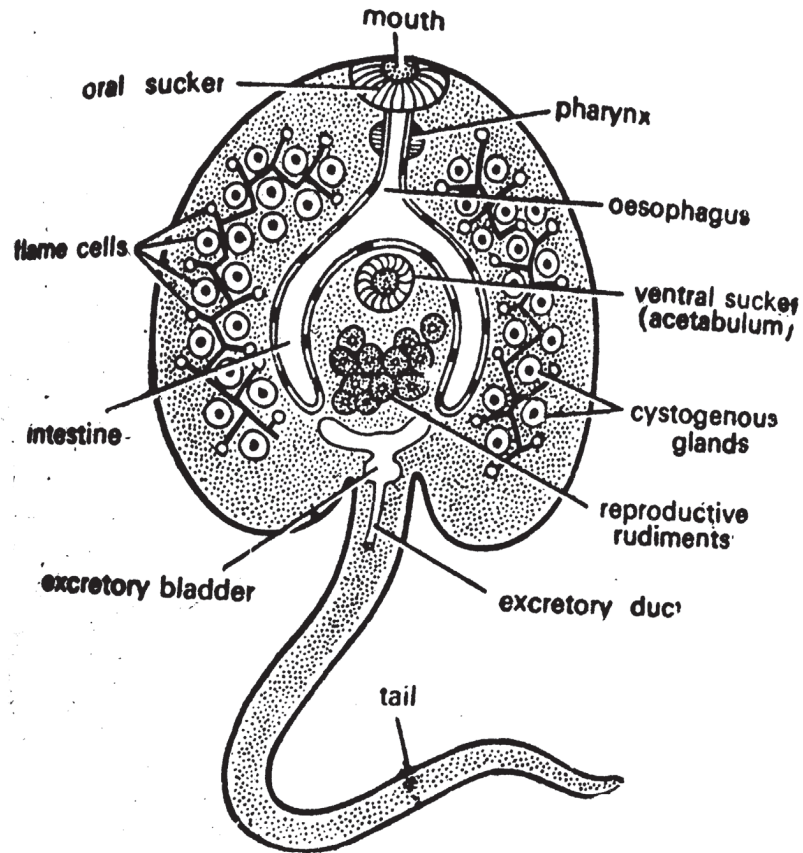
6. Slightly posterior to the pharynx, the anterior end is surrounded by a muscular band like collar

7. The germ balls present inside redia give rise to generation of daughter rediae in summer months and produce cercaria Larvae in autumn.

8. Daughter redia and cercaria come out from mother redia through birth pore



Cercaria larva



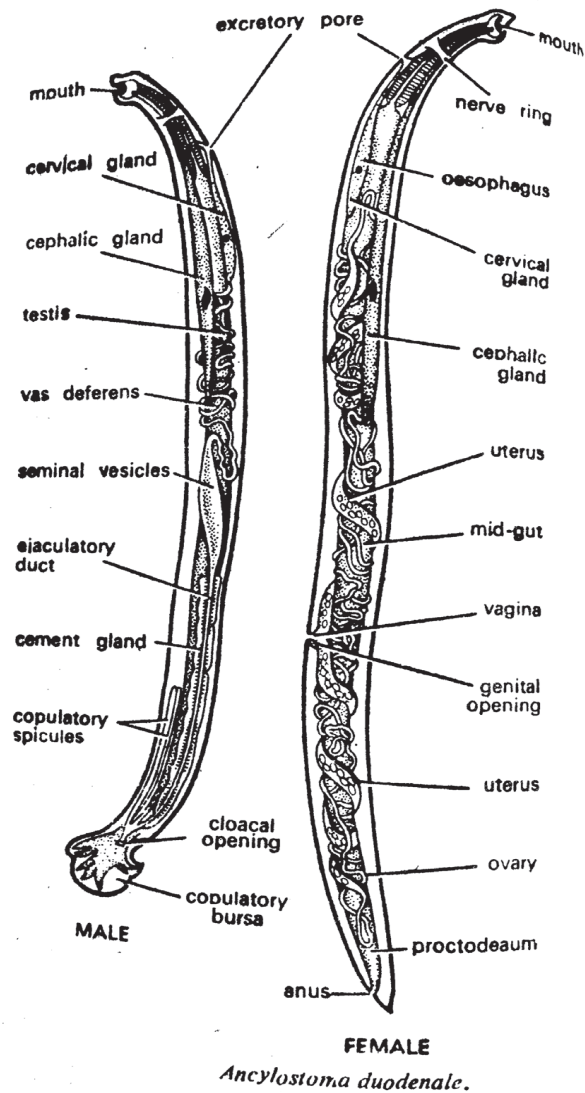
Cercaria larva of Fasciola hepatica.

Cercaria Larva of Fasciola hepatica

1. A cercaria (plural cercariae) is the larval form of the Trematode parasite *Fasciola hepatica*. Each redia produces 14-20 cercaria larvae.
2. After leaving the body of redia they enter in the digestive glands of snails.
3. Body of cercaria is and it is free swimming.
4. Body wall consists of cuticles, muscles and mesenchyme.
5. It has higher grade of organization and close resemblance with the adult fluke.
6. It has two suckers
 - (i) anterior oral sucker surrounding the mouth and
 - (ii) ventral sucker situated in the middle of the body.
7. Body and tail are covered with backwardly directed spines.
8. Digestive system comprises mouth, oral sucker, muscular pharynx, oesophagus and inverted U shaped (forked)
9. Flame cells are present as excretory organ and opens into a pair of excretory tubules which unite in front of tail to form an excretory vesicle or bladder.
10. Body space is filled with parenchyma form the cyst of the next larva.
11. Rudimentary reproductive organs (Genital rudiments) are also present.
12. Cercaria larva has a very active life. After 2 or 3 days of active life it loses its tail and transforms into metacercaria.



Ancylostoma duodenale



Ancylostoma duodenale

Classification

Phylum --- Aschelminthes - Unsegmented or superficially segmented, Pseudo-coelomate

Class --- Nematoda - cilia absent, alimentary canal straight

Order --- Strongloidea - female with ovijectors, male with a copulatory bursa, pharynx without bulb.

Habit and habitat

It is found as endoparasite in the intestine of man.

characters

1. *Ancylostoma duodenale* is commonly called as hook worm.

2. Mature worm is cylindrical in shape, narrow. Males measures 8-11 mm in length where as female measures 10-13 mm in length.

3. Anterior end in both sexes is bent dorsally and is provided with large and cup shaped buccal capsule for attachment with mucous membrane of the intestine. This buccal Capsule contains a pair of chitinous plates and a median dental process or teeth.

4. Digestive system consists of mouth, pharynx, intestine, rectum and anus in female cloaca in males.

5. Female has pointed tail end while Male is provided with a copulatory bursa which is broader than long and supported by fleshy rays.

6. Fertilization is internal and occurs in the intestine of host.

7. Fertilized eggs are passed out with the faeces.

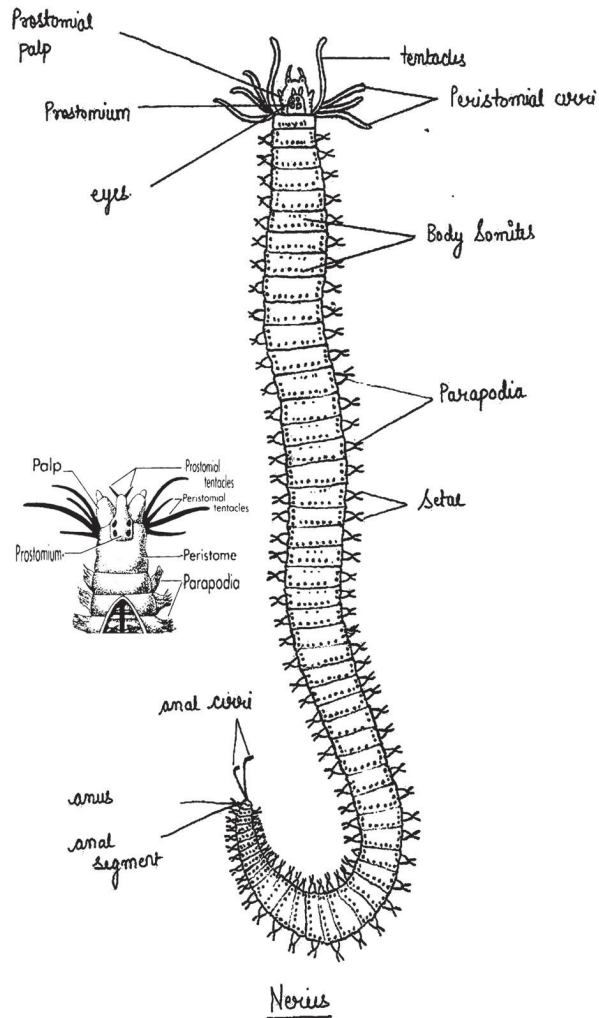
8. Mode of infection is penetration of skin of host by the infective larval

Identification

It contains teeth in buccal capsule, bursa in males.



Nereis



Nereis

Classification

Phylum: Annelida (L. annelus=ring, edios=form) metameric segmentation, bilateral symmetry, eucoelom-schizocoelom

Class: Polychaeta (Poly=many, chaeta=setae) – numerous setae are present, clitellum is absent, development indirect through trochophore larva.

Order: Errantia – Swarming animals, locomotion by parapodia.

Habit and Habitat

It is a marine organism. It is found buried in sand

Characters

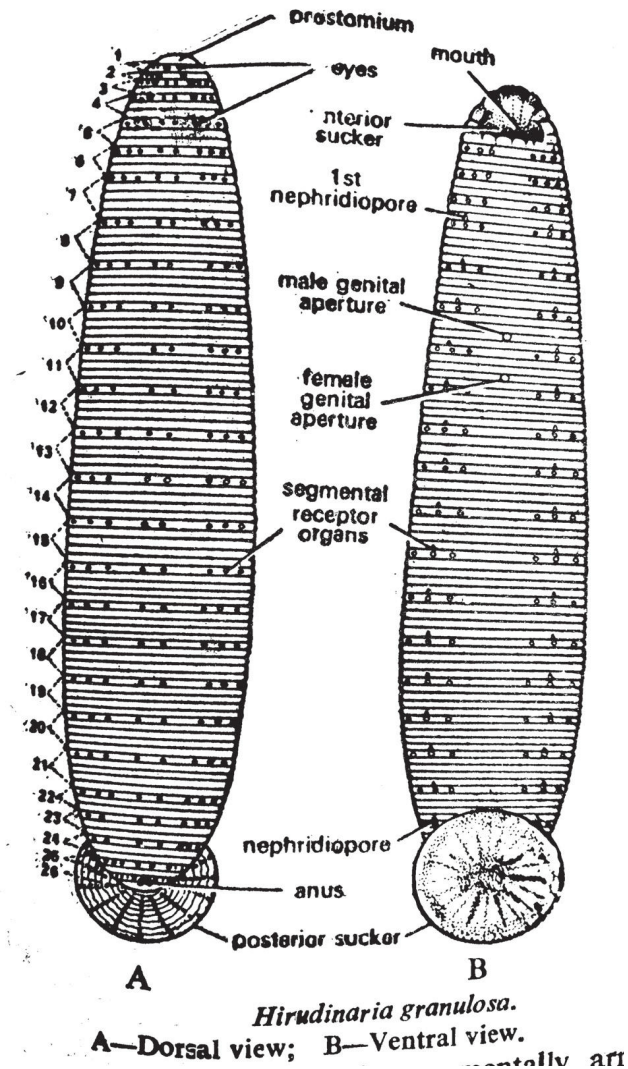
1. Nereis is commonly called rag worm. It is carnivorous and filter feeder
2. The body is long, slender, elongated, dorso-ventrally flattened segmented and is divisible into head, trunk and pygidium.
3. Head consists of two parts, the prostomium and peristomium. Prostomium bears a pair of tentacles, two pairs of eyes and a pair of short two jointed palps. Peristomium bears four tentacles and a slit-like mouth.
4. Trunk is made up of several segments, each bearing a pair of lateral parapodia which are locomotory organs. Parapodia contains numerous Setae.
5. Pygidium or anal segment is without parapodia but bears a pair of appendages known as anal cirri.
6. Respiration happens via blood capillary network of parapodia.
7. Sexes separate. Fertilization is external. Development is indirect with Trochophore larva.
8. The sexual phase of Nereis is known as Heteronereis. It has anterior atoke or non sexual region and posterior epitoke or sexual region.

Identification

Body narrow, integument smooth, prostomium with a pair of antennae, first pair of Parapodia with 3 lobes remaining parapodia with 4 lobes.



Hirudinaria



Hirudinaria

Classification

Phylum – Annelida (L-Annelus=ring, edios=form). metameric segmentation, bilateral symmetry, eucoelom-schizocoelom

Class – Hirudinea – includes parasitic leeches development is direct.

Order- Gnathobdellida - (Gnathos=jaws)- jaws are present

Habit and Habitat

Leech is ectoparasite of fish, cattles and man. It is sanguivorous (blood-sucking). It is found in freshwater ponds, lakes, swamps and slow running streams.



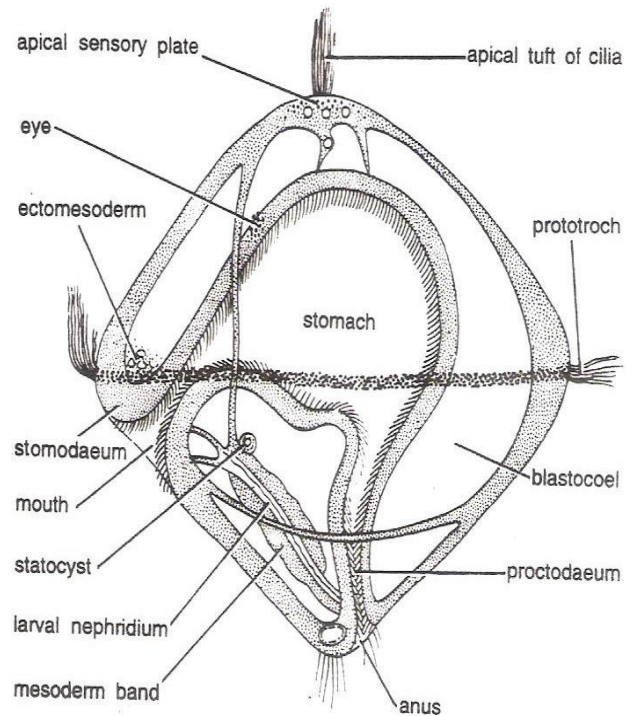
Characters

1. *Hirudinaria granulosa* is commonly called Indian cattle leech.
2. Body is soft, elongated, with green dorsal surface and orange yellow ventral surface
3. Body of leech is divided into 33 segments. The segments are further divided into annuli or rings.
4. It has two suckers. Anterior sucker is oval and bears mouth. The posterior sucker is circular. suckers help in locomotion
5. Five pairs of eyes are present on the dorsal side.
6. No special respiratory organs. Respiration happens via skin.
7. Alimentary canal is a straight tube extending from mouth to anus.
8. Excretory system consists of segmentally arranged seventeen pairs of nephridia.
9. Hermaphrodite. Male genital aperture is situated on 10th segment and female genital aperture on 11th segment.
10. Sexual reproduction is common. Development is direct through cocoon.

Identification

Jaws are present, body is divided into 33 segments

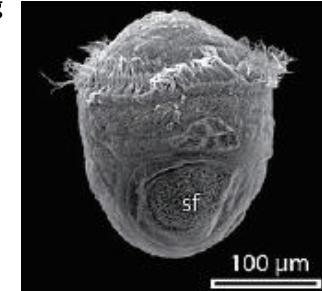
Trochophore Larva



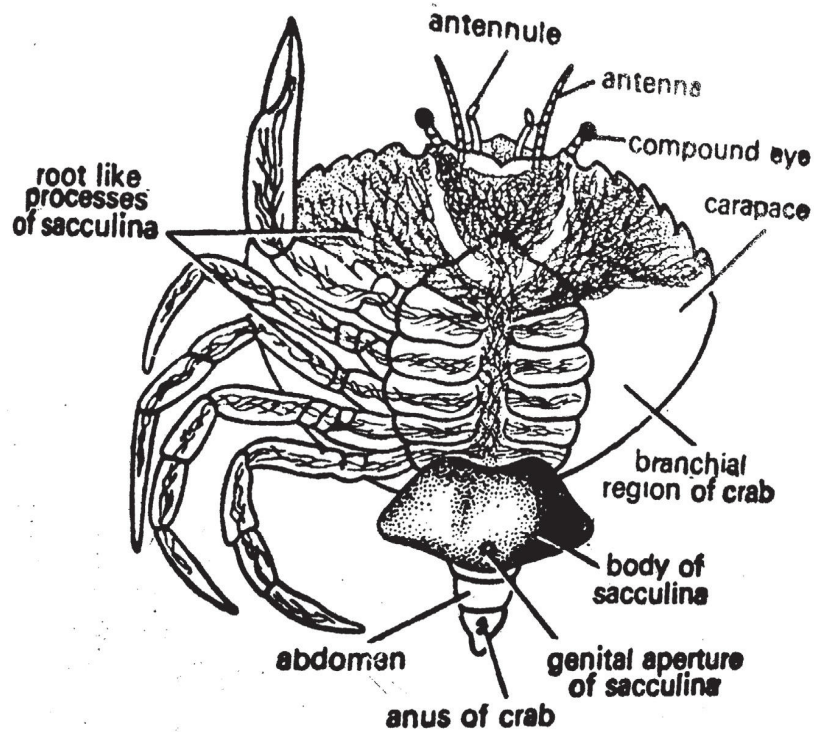
Trochophore Larva

Characters

1. Trochophore is a small, translucent, free-swimming larva characteristic of marine annelids and most groups of mollusks. It has a broad anterior end and a narrow posterior end and possess a ring of cilia
2. It has a mouth, a curved gut, ectodermal oesophagus, an endodermal stomach and an ectodermal anal opening.
3. It exhibits bilateral symmetry
4. Eyes lie below anterior apical sensory plate.
5. Above the mouth there is a strong locomotor ciliary ring called Prototroch. The Prototroch encircles the body around the middle.
5. The gut is enclosed by a spacious blastocoel. The blastocoel has mesenchyme cells, and a pair of larval nephridia. There is a statocyst near the nephridia.
6. Trochophore larva feeds on plankton and other microscopic organisms.
7. It swims with the help of ciliary ring or Prototroch.
8. The larva setae are lost and develop into adult animals adult



Sacculina



***Sacculina* on crab's abdomen.**

Sacculina

Classification

Phylum: Arthropoda (Animal bearing jointed appendages,)

Class: Crustacea (Aquatic arthropods with two pairs of antennae)

Order: Rhizocephala (Adult degenerate, parasitic)

Habit and habitat:

Sacculina is a parasite and lives in marine environment.

Characters

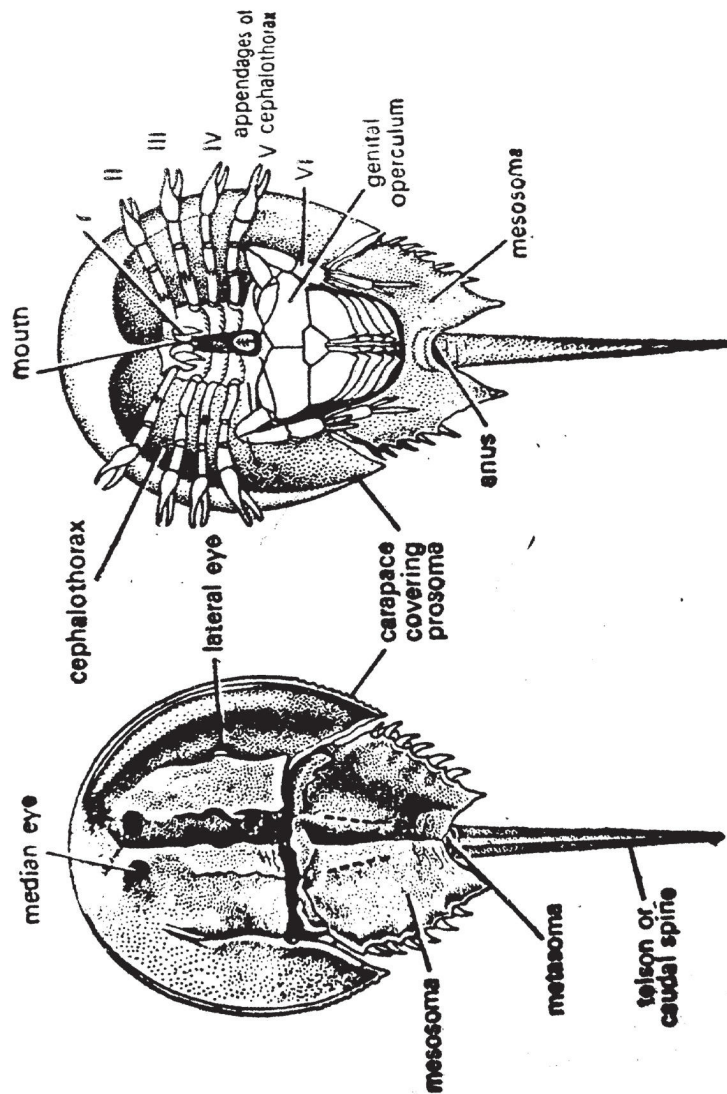
1. Sacculina is commonly known as root-headed barnacle.
2. It lives as a parasite on crab's abdomen.
3. The body is made up of two parts- a thin sac and a peduncle. The sac appears like a fleshy tumour attached to the abdomen by a peduncle. The peduncle consists of numerous root-like filaments which protrude body of the host to derive nutrition.
4. Appendages, segmentation, alimentary canal and anus are absent.
5. Hermaphrodite, i. e. sexes united.
6. Larva is cirripede-nauplius.
7. The female Sacculina, attached to male crab, causes hormonal imbalance in the crab that makes it infertile. This Phenomenon is called parasitic castration

Identification

Sac like structure at the posterior region of crabs. Filaments penetrate into host.



Limulus



Limulus

Classification

Phylum: Arthropoda ((Animal bearing jointed appendages)

Class: Merostomata (Marine aquatic chelicerates, Abdomen with 5 or 6 pair of appendages)

Order: Xiphosura (horse-shoe shaped carapace)

Habit and Habitat

Limulus is marine form and found in shallow waters. It feeds on molluscs, annelid worms and other benthic invertebrates.

Characters

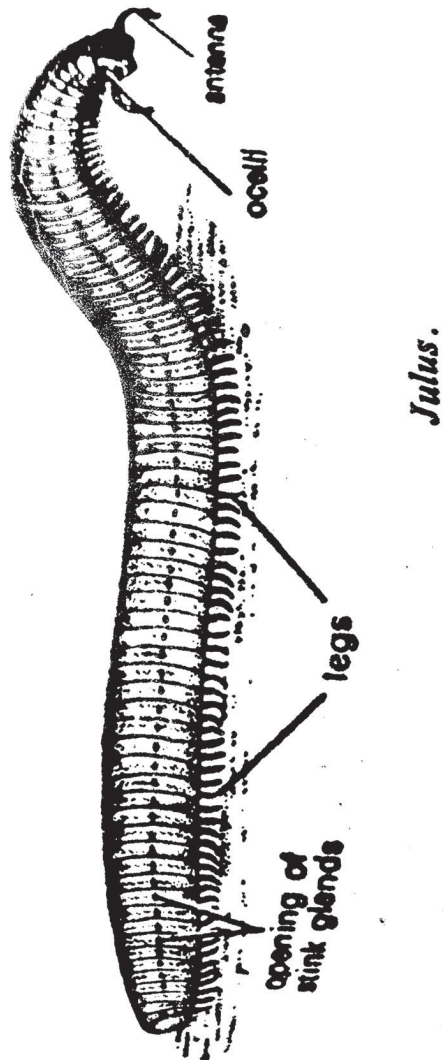
1. Limulus is commonly known as king crab.
2. It is bilaterally symmetrical, triploblastic metamerically segmented animal with jointed appendages.
3. Body is divided into anterior prosoma, posterior opisthosoma and a spine like tail or telson.
4. Prosoma is covered by a horse-shoe shaped carapace. It bears a pair of simple eyes and a pair of compound eyes. It bears 6 pair of appendages surrounding the mouth.
5. Opisthosoma is hexagonal and movably articulated with prosoma. It bears six pairs of appendages
6. The telson is used to flip itself over if stuck upside down and to steer in the water.
7. Excretion takes place through coxal glands.
8. Sexes are separate. Fertilization is external.

Identification

Horse shoe shaped carapase. Long sword like telson



Julus



Julus

Classification

Phylum: Arthropoda (Animal bearing jointed appendages)

Class: Myriapoda (Body worm-like and elongated with numerous segments)

Order : Diplopoda (have two pairs of legs per body segment)

Habit and Habitat

It lives in dark and damp places under stones, wood or decaying leaves. Terrestrial Nocturnal, Herbivorous organism

Characters

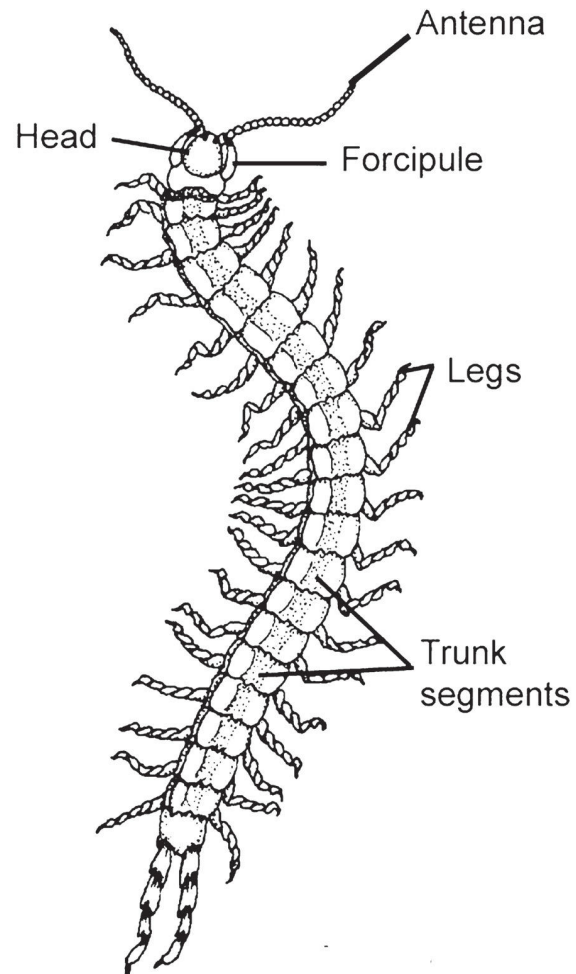
1. Julus is commonly called millipede or wire worm.
2. Body is elongated, cylindrical and consists of a large number of segments.
3. Body is divided into head, thorax and abdomen.
4. Head contains a pair of large mandibles, eyes and a pair of antennae having seven joints.
5. Thoracic segments each having a pair of legs, while abdominal segments bear two pairs of legs each.
6. Microscopic holes called ozopores (Stink glands) present along the sides of the body, secreting noxious substance as a defence mechanism.
7. Sexes are separate. Fertilization is internal.

Identification

Long and slender Segmented body and two pairs of legs per body segment.



Scolopendra



Scolopendra

Classification

Phylum: Arthropoda (Animal bearing jointed appendages)

Class: Myriapoda ((Body worm-like and elongated with numerous segments)

Order : Chilopoda (Body dorso-ventrally flattened, First pair of legs modified into poison claws)

Habit and habitat:

Scolopendra commonly occurs under stones, in rotten logs and in houses in damp places.



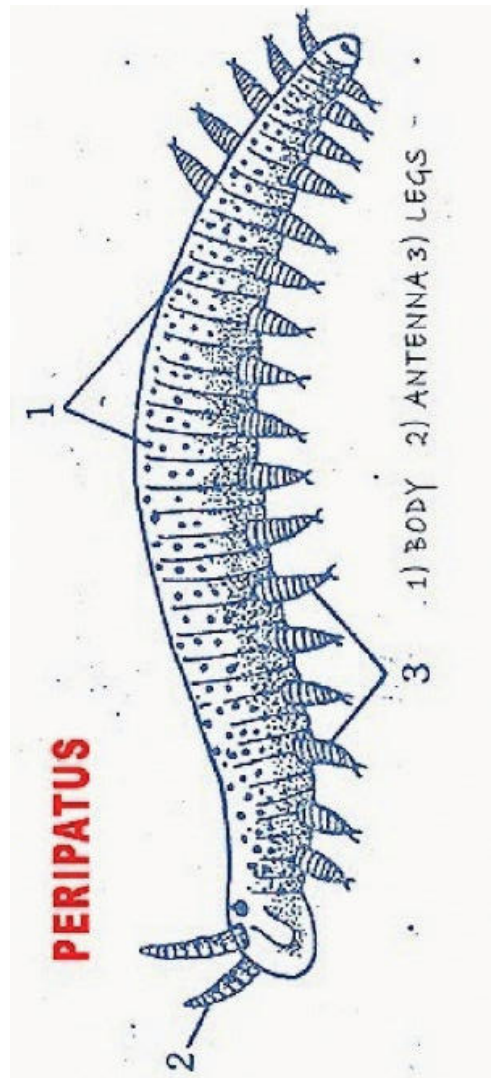
Characters

1. Scolopendra is commonly known as centipede.
2. Body is elongated and dorsoventrally flattened with numerous segments.
3. Body is divided into small head and a long trunk. Head bears a pair of antennae, eyes, a pair of mandibles and two pairs of maxillae.
4. Trunk has 22 identical segments each has a pair of walking legs.
5. First pair of trunk appendages or maxillipedes bears a sharp claw through which opens the poison gland
6. Sexes are separate.
7. It is nocturnal and mostly carnivorous.
8. Scolopendra is harmful to mankind because of their venomous bite.

Identification

Trunk has 22 identical segments, Poisonous claws.

Peripatus



Peripatus

Classification

Phylum: Onychophora (Legs are unjointed but possess claws)

Class: Udeonychophora (Their feet possess a pair of claws and a pad)

Habit and Habitat

It is a carnivores, predaceous and nocturnal arthropod found commonly in crevices of rocks, under stones and wood in damp tropical regions.



Characters

1. Body cylindrical, and without true segmentation and exoskeleton.
2. Skin velvety and is with wrinkles), which bear spiny papillae.
3. Distinct head is absent but anterior end bears a pair of segmented antennae, a pair of jaws, a pair of eyes and a pair of oral papillae having slime gland at their base.
4. Along the body, on lateral sides, are present about 14 pairs of un-segmented and stumpy appendages for movement.
5. Excretion through nephridia. Sexes are separate and they are viviparous.
6. It is called living fossil and acts as connecting link between Annelida and Arthropoda and exhibits following affinities:

Annelidan affinities:

Presence of paired nephridia, Presence of straight alimentary canal, Presence of un-segmented stumpy appendages.

Arthropod affinities:

Presence of tracheal system, Presence of chitinous cuticle, Presence of jaws

Taxonomic Position of Peripatus:

Peripatus is of special interest because it exhibits both annelidan and arthropodan characters. Therefore, peripatus is regarded to be an intermediate stage or connecting link between Annelida and Arthropoda.

Chiton

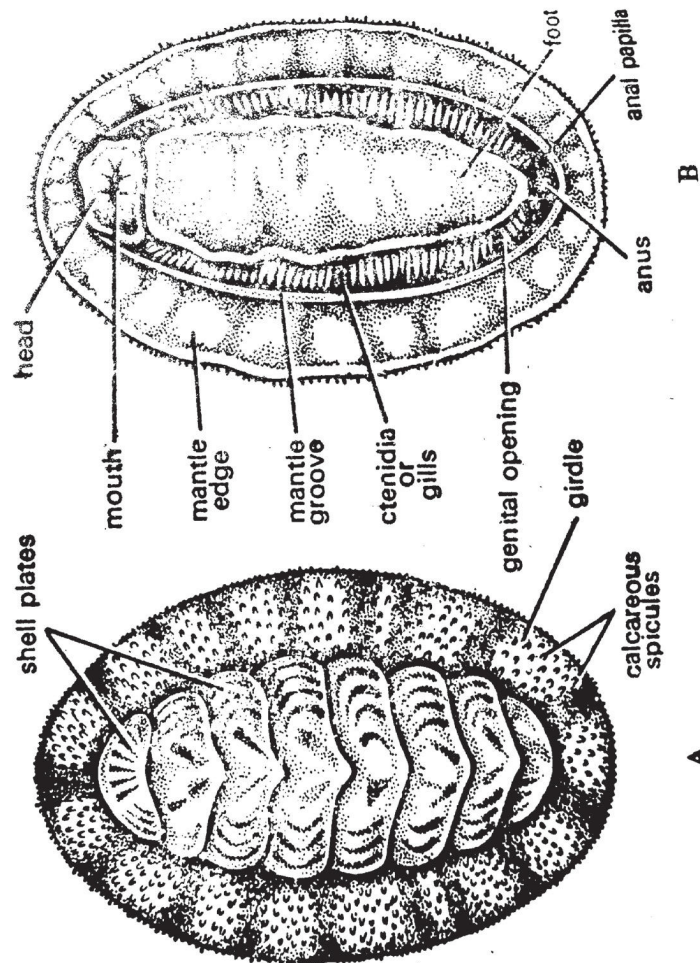


Fig. 15-2. *Chiton*.
A—Dorsal view; B—Ventral view.

Chiton

Classification

Phylum: Mollusca – Body soft, unsegmented, triploblastic and bilaterally symmetrical.

Class: Amphineura – Reduced head lacks eyes and tentacles,

Order: Polyplacophora – Mantle secretes shell with many plates, foot is flattened.

Habit and Habitat

Sluggish animal found attached to rocks, empty shells and corals, nocturnal, herbivorous. Marine Living



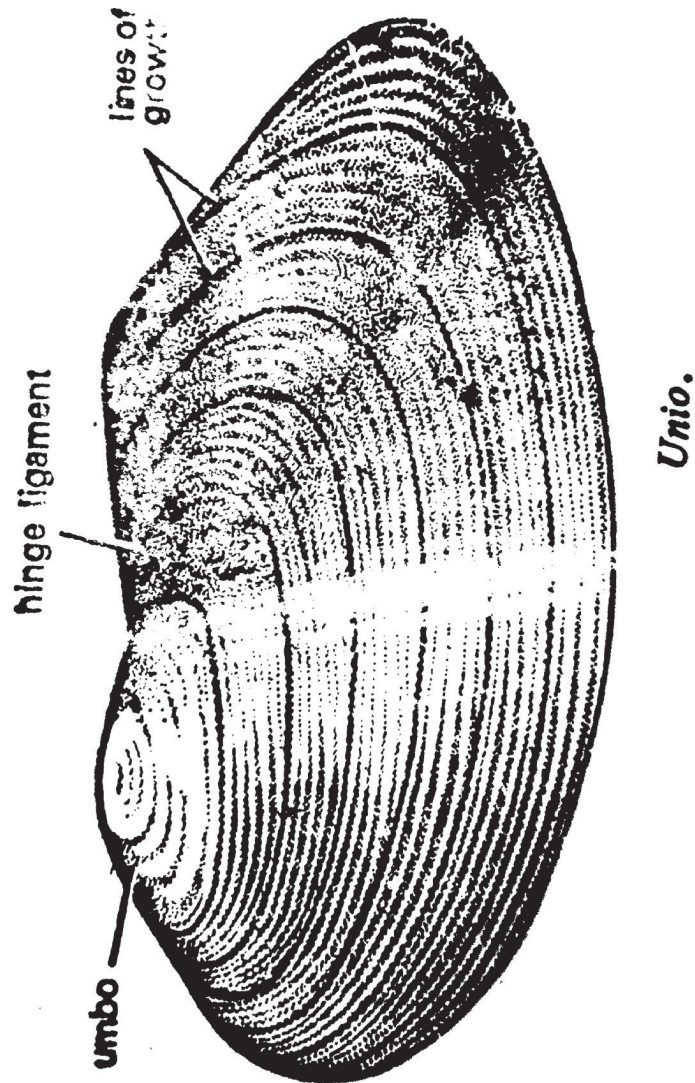
Characters

1. It is commonly called "Sea myca" or "Coat of mail shell". Chitons are eaten as food and their shells are used for decoration
2. Body is dorsoventrally compressed.
3. Shell with 8 overlapping plates is present dorsally.
4. Foot is ventral and flat helps in creeping.
5. Mantle covers visceral mass.
6. Head is not distinct and lacks eyes and tentacles.
7. Mouth and anus at the opposite ends.
8. Numerous pairs of bipectinate ctenidia lie on either side of the body in mantle groove.
9. Sexes are separate. Gonod is single, gonoducts are paired.
10. Development indirect through trochophore larva.

Identification

Dorso-ventrally compressed body. Shell is calcareous is composed of 8 overlapping plates.

Unio



Unio

Classification

Phylum: Mollusca (Body soft, unsegmented, triploblastic and bilaterally symmetrical.)

Class: Pelecypoda (Head, Tentacles, Eyes, Jaws, radula are absent)

Order: Eulamellibranchia (Gills are basket like, foot large)

Habit and Habitat

Unio lamellidensis found at bottom in ponds, lakes, streams and rivers buried in sand or mud.

Characters

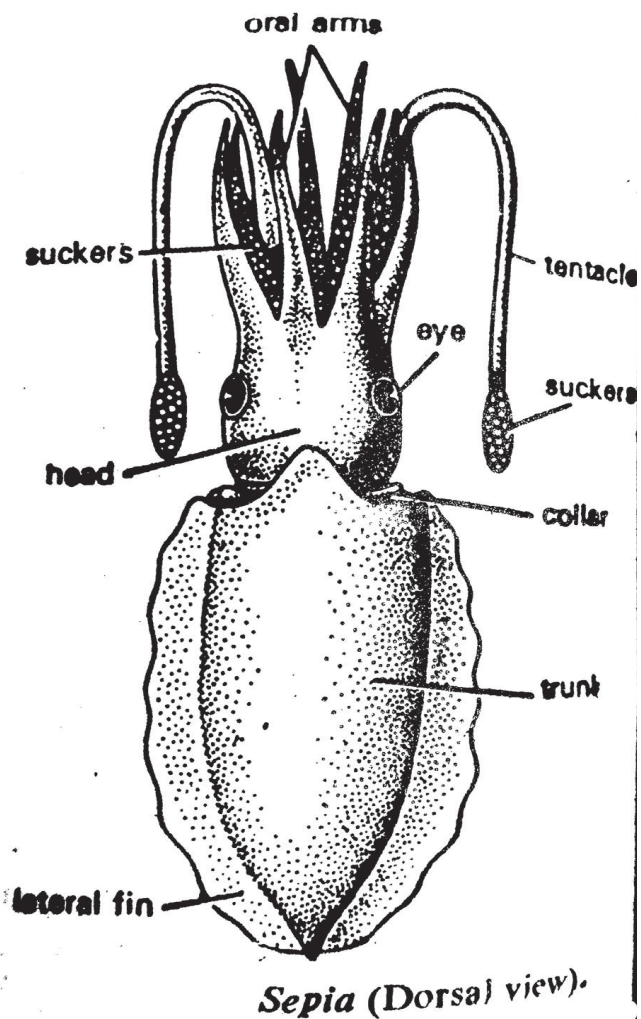
1. *Unio* is commonly called as fresh water mussel. Body is soft, bilaterally symmetrical and flattened enclosed in a calcareous shell.
2. Soft-bodied animal is completely enclosed within a calcareous shell which represents its exoskeleton.
3. Shell consists of two equal valves covering right and left side of body
4. Food consists of microscopic organisms, both animals and plants, which are fed upon by filter-feeding mechanism
5. Foot is well developed, large, muscular and used for burrowing. Muscles well developed, responsible for closing and opening of valves.
6. Inhalent and exhalent siphons are present.
7. Two bipectinate gills present.
8. Sexes are separate i.e. *Unio* is dioecious
9. Indirect development through glochidium larva.

Identification

Two equal shells are present. Wedge shaped muscular foot.



Sepia



Sepia

Classification

Phylum: Mollusca (Body soft, unsegmented, triploblastic and bilaterally symmetrical.)

Class: Cephalopoda (Marine, foot modified into tentacles)

Order : Decapoda (Ten arms are present)

Habit and Habitat

Sepia is a marine animal that resides shallow to mid water and is often associated with coral reefs. It is carnivorous, feeds on crustaceans, small fishes



Characters

1. It is commonly called cuttle fish. It is a misnomer because it is not a fish.
2. Body is soft, unsegmented and bilaterally symmetrical. It is divisible into a large head, a small neck or collar and trunk. Shell is internal.
3. The head is well developed, bears a pair of eyes and 10 oral arms which are a modification of foot. 8 oral arms are smaller while two are longer and are called tentacles.
4. Collar is constricted and connects the head with the trunk.
5. The trunk extends into flaps called lateral fins on either side that help the animal in swimming. Trunk has mantle cavity which includes viscera
6. Sepia has a life expectancy of 1-2 years.
8. The Sexes are separate and reproduction is sexual. Development is direct.
9. Ornament makers use cuttle bones as moulds for casting small objects.

Identification

Foot is modified into 10 arms of which 2 are bigger

Octopus

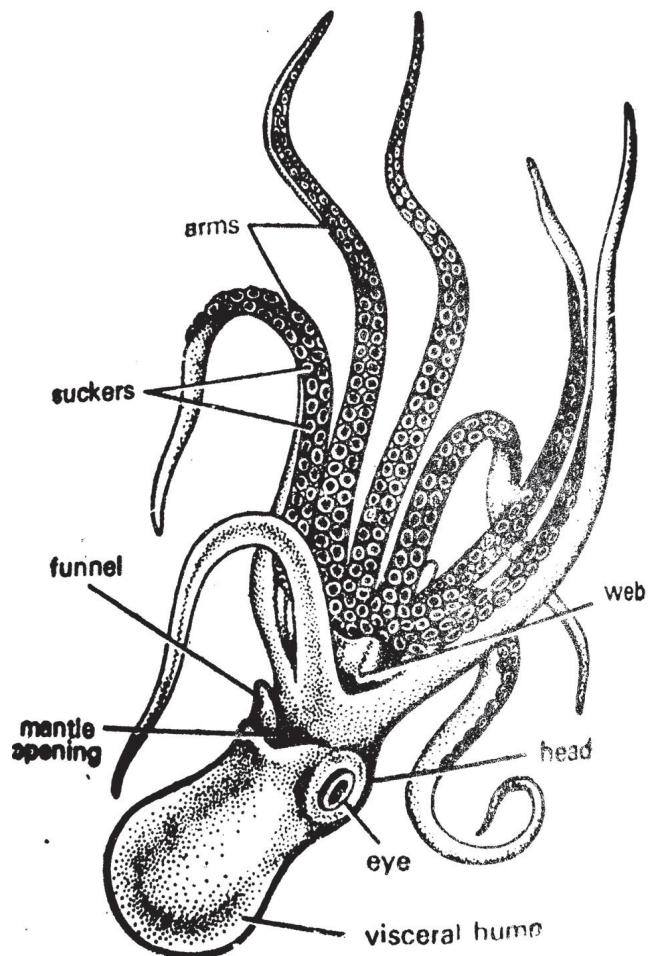


Fig. 15*29 Octopus

Octopus

Classification

Phylum: Mollusca ((Body soft, unsegmented, triploblastic and bilaterally symmetrical.)

Class: Cephalopoda
(Marine, foot modified into tentacles)

Order : Octopoda
(Eight equal arms)

Habit and Habitat

Octopus is a nocturnal marine creature inhabits many diverse regions of the ocean, including coral reefs, pelagic waters and the ocean floor. It feed upon crabs, bivalves and fishes etc.



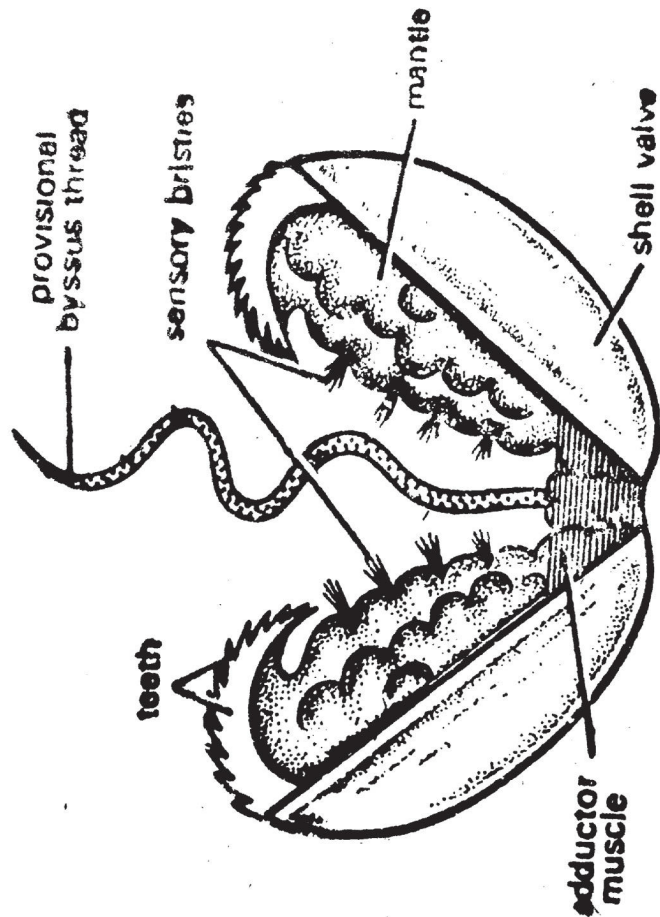
Characters

1. An Octopus is commonly called devil fish.
2. The body is unsegmented, symmetrical and soft bodied animals.
3. The head bears a pair of eyes. The mouth is surrounded by eight elongated equal arms usually bearing suckers.
4. Shell is internal.
5. It moves around by crawling or swimming.
6. For defence it ejects ink from the ink-gland into the surrounding water, producing a smoky cloud.
7. In males one of the arms, called hectocotylized arm, bears a spoon shaped organ at its end. The arm is used in mating
8. Sexes are separate. Development is direct.

Identification

Eight arms with tubular suckers . Internal Shell.

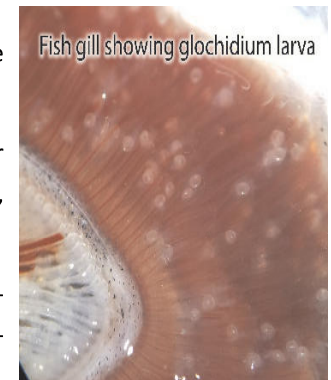
Glochidium



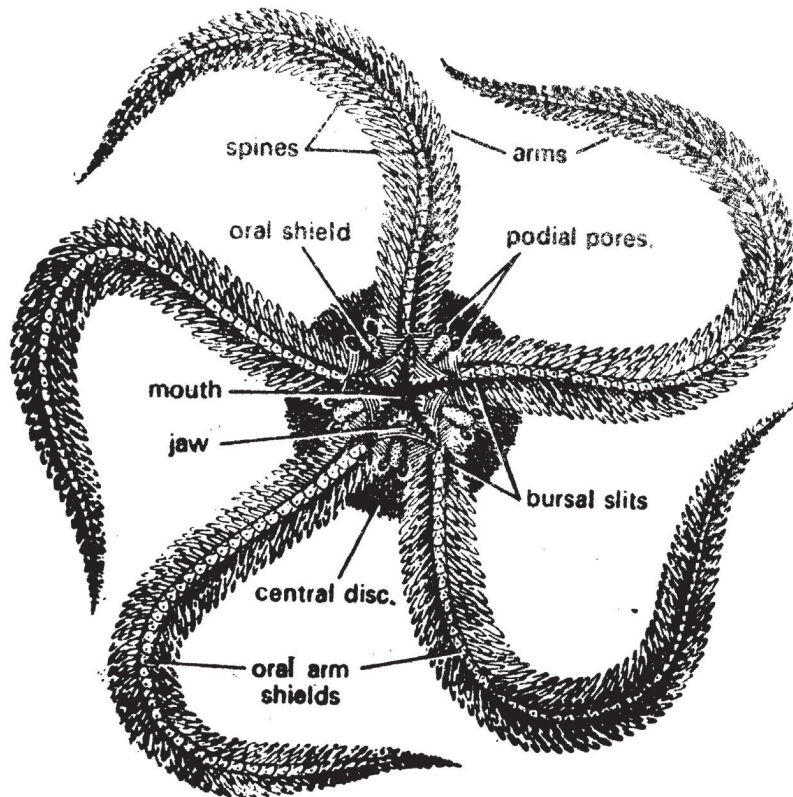
Glochidium larva.

Glochidium

1. Glochidium larva is found in the development of pelecypoda or bivalvia.
2. It is a minute larva measuring 0.1 to 0.4 mm, comprises a bivalve shell and false mantle lining the shell.
3. Shell consists of two triangular valves which are convex externally and concave internally. The valves are attached to each other on dorsal side.
4. Ventral end of each valve is like curved hook bearing spines.
5. Mantle lobes are small bearing brush-like sensory organs.
6. The closure of the valves is effected by the large adductor muscle present between them.
7. Byssus gland is situated above the adductor muscle which gives rise to a long sticky thread, called provisional byssus.
8. Glochidium larva leads a parasitic life by attaching to a fish for about 10 weeks before metamorphosis into adult.



Ophiothrix



Ophiothrix (Oral view)

Ophiothrix

Classification

Phylum: Echinodermata (Animals bearing spines on skin)

Class: Ophiuroidea (long, slender, smooth or spiny arms)

Order : Ophiurae (Five small brittle arms)

Habit and habitat:

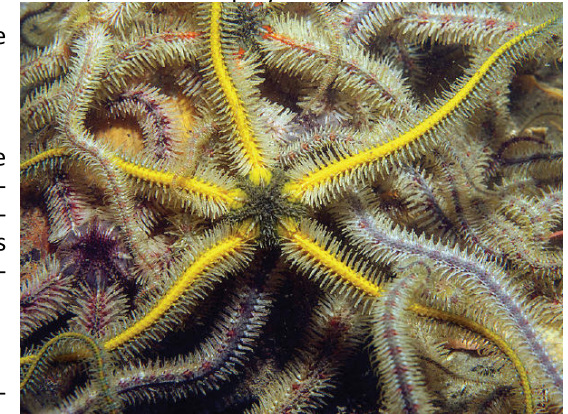
It is cosmopolitan but more abundant in shallow tropical waters. It feeds on decaying matter and microbes found on soft muddy bottoms

characters

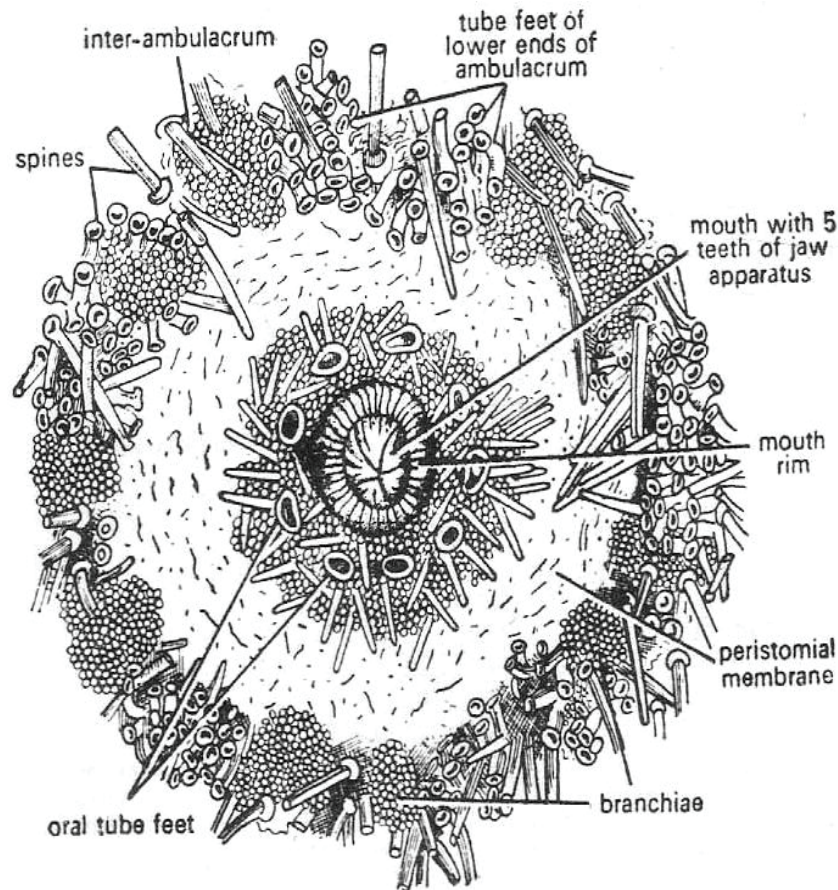
1. Ophiothrix is a commonly known as spiny brittle star. These are usually of a green colour.
2. It has a small rounded central disc and five slender jointed arms arising from the lower surface to the disc.
3. Animal has a distinct oral and an aboral surface.
4. The arms are covered on all sides by the plates or shields with spines.
5. The oral surface also bears five oral shields and podial-pores.
6. The tube feet without suckers are present on the lower plates of arms.
7. Ophiothrix possesses a great power of regenerating its lost arm
8. Sexes are separate. Development is indirect with Ophiopleutius larva. Regeneration of lost arms is seen.

Identification

Five brittle arms with no Ambulacral grooves, pedicellariae and dermal papillae.



Echinus



Echinus

Classification

Phylum: Echinodermata (Animals bearing spines on skin)

Class: Echinoidea (Body spherical, disc-like, oval with spines)

Order: Camarodonta (have imperforate tubercles, umbulacral grooves have pores at regular intervals.)

Habit and habitat

It is omnivorous feeding on worms and algae. Echinus is marine, found in the sea in the rocky places. Some species are edible

Characters

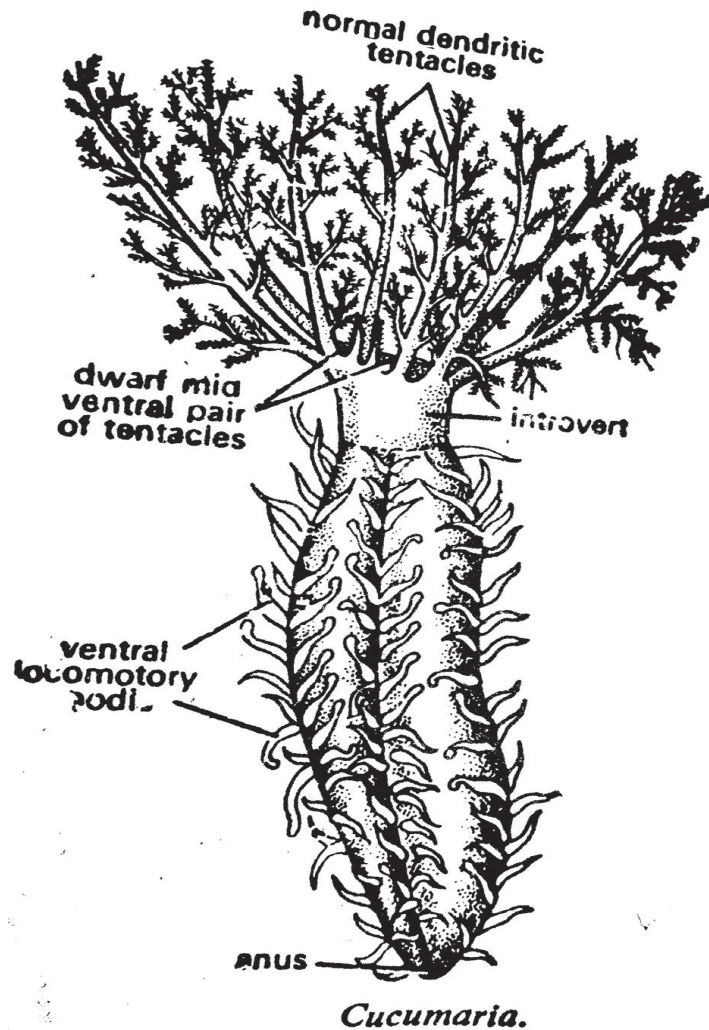
1. Echinus is commonly called sea-urchin
2. It has a globe-shaped body enclosed within a shell or corona and having very long movable spines. The surface of Shell is divided into five ambulacral regions. In each ambulacral region, there are two rows of tube feet.
3. Pedicellariae are present and are having three jaws instead of two
4. Mouth is present on oral surface and is surrounded by peristome. The chewing apparatus or Aristotle's lantern projects from the mouth. Anus is surrounded by a periproct and is present in the centre of the aboral surface.
5. Water-vascular system is well developed.
6. Sexes are separate. Development is indirect and involves free swimming echinopluteus larva.

Identification

Round box like shell, Pedicellaria have three jaws.



Cucumaria



Cucumaria

Classification

Phylum: Echinodermata (Animals bearing spines on skin)

Class: Holothuroidea (Body is elongated, arms and spines are absent)

Order: Dendrochirotida (Tentacles are irregular, Numerous tube feet)

Habit and Habitat

Its a marine. Usually 20 cm in length. They live under rocks and crevices at a depth of less than 30 meters. sea cucumbers are deposit feeders

Characters

1. It is commonly known as "sea cucumber"
2. Body elongated, cylindrical, five sided, swollen in the middle and narrow at two ends.
3. The mouth and anus (cloaca) are situated at opposite ends.
4. Body surface is traversed by five longitudinal ridges -the ambulacral ridges each of which is bordered by double rows of tube feets.
5. The spines, pedicellariae, branchiae or plates are all absent but small calcareous particles are found embedded in the body wall.
6. Mouth is surrounded with a small ring-like peristome and a collar-like introvert. The introvert bears long, highly branched and dendritic tentacles.
7. Madreporite is internal and so also the respiratory organs, which are in the form of 3 well developed respiratory tree.
8. Sexes are separate and development through auricularia larva. These organisms possess remarkable power of autotomy and regeneration.

Identification

Leathery skin, Tentacles are numerous. Absence of spines.



Antedon



Antedon

Classification

Phylum: Echinodermata (Animals bearing spines on skin)

Class Crinoidea (Sedentary, Arms with Pinnules, Tube feet without suckers)

Order Articulata (Calyx pentamerous)

Habit and Habitat

It is cosmopolitan marine animal that occurs in shallow as well as deep waters. They are attached to rocks and feed on microscopic living organisms.



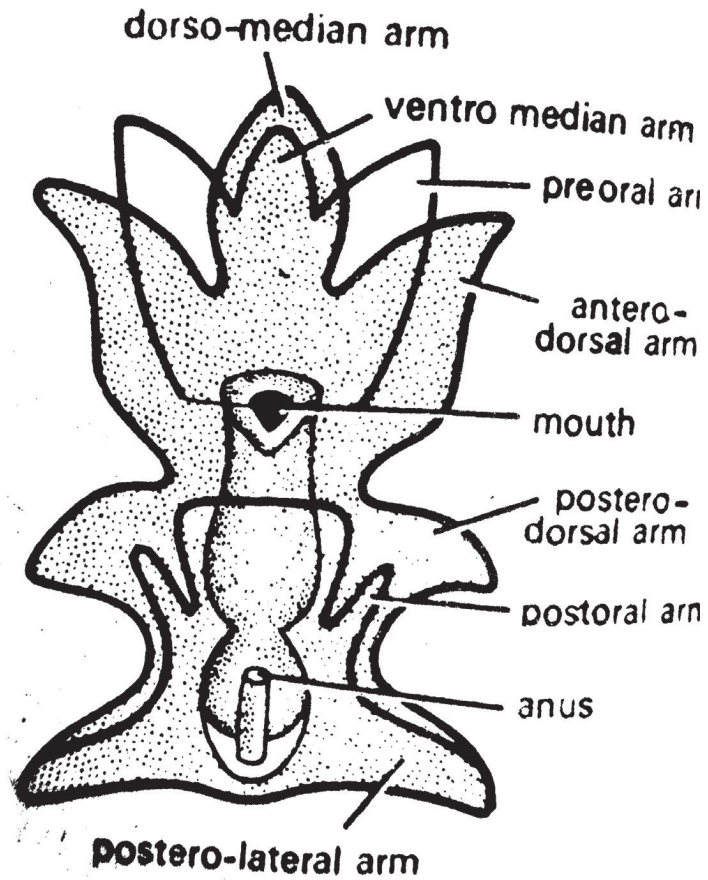
Characters

1. Antedon is commonly known as feather star or sea lily.
2. Body consists of a central disc or calyx and a series of five radiating arms.
3. It has a central leathery disc covered with bony plates with oral and aboral surfaces.
4. Each arm is divided at its base into two, so that there are ten long slender flexible arms, bearing lateral pinnules.
5. Tube feet without suckers present along the edges of ambulacral grooves.
6. Sexes are separate.
7. It has an amazing power of regeneration.
8. Development includes a pentacrinoid larva.

Identification

Five Arms with central ambulacral groove and opposing pinnules.

Bipinnaria larva



Bipinnaria larva.

Bipinnaria larva

Characters

1. In asteroids like starfish, the egg develops into Bipinnaria larva.

2. The larva is formed within few weeks. Although a free-swimming larva is hatched within 24 hours, but it takes few days to develop into bipinnaria larva.

3. A newly hatched larva assumes angular form by the time coelomic chambers are separated.

4. Outgrowths from the principal parts of the elongated larval body form arms.

5. Arms are located at posterolateral, postoral, posterodorsal, anterodorsal, preoral, and dorsomedian positions.

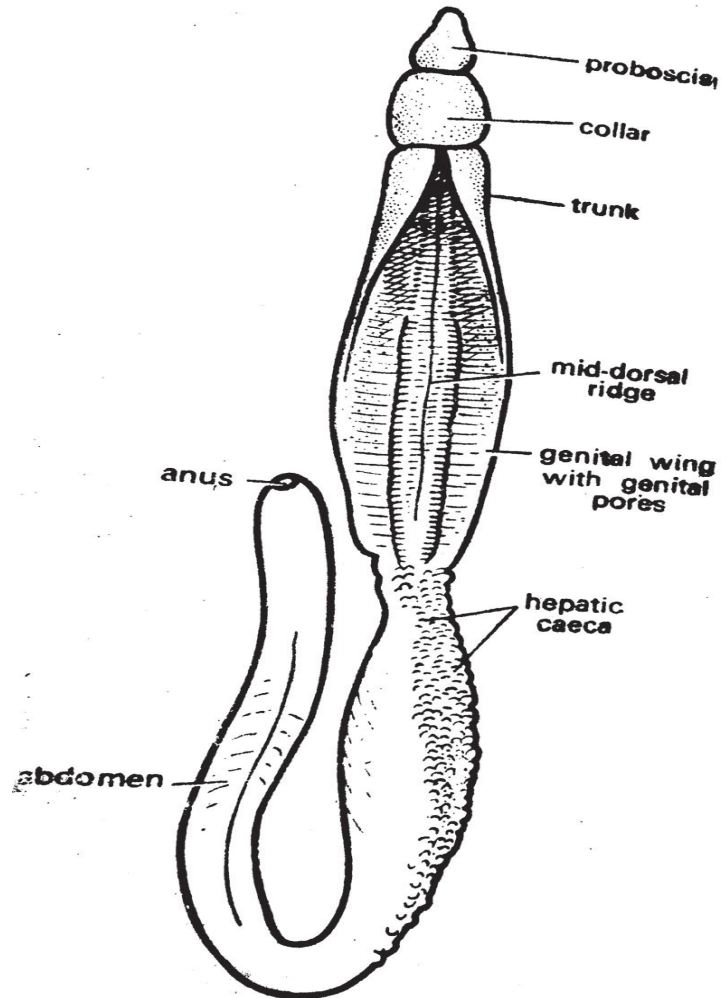
6. Presence of preoral and postoral ciliary bands.

7. Preoral ciliated band surrounds the preoral lobe.

8. Postoral ciliated band is present between the mouth and the anus



Balanoglossus



Balanoglossus.

Balanoglossus

Classification

Phylum: Hemichordata (Marine worm like organisms having related to both echinoderms and chordates, Buccal diverticulum)

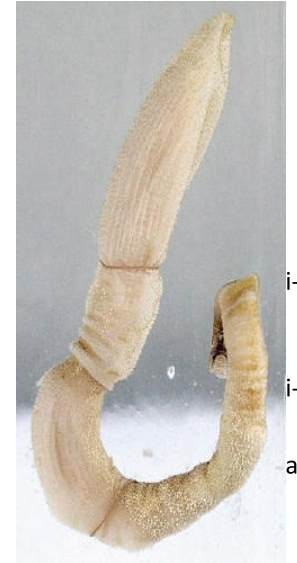
Class: Enteropneusta (solitary worm like, body divided into Proboscis, collar and trunk).

Habitat and habit

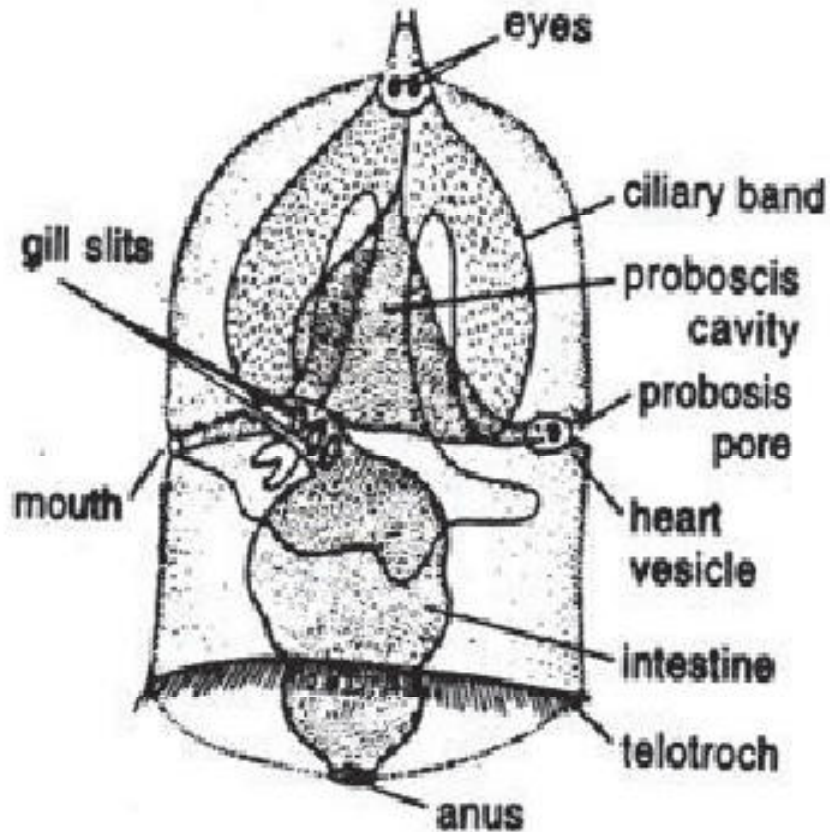
Marine burrowing, worm-like feeding on detritus. They grow 3cm to 1 meter.

Characters

1. Body is soft and cylindrical having ciliated surface. Body Length varies from 10-50 cm long.
2. Body is divided into short conical proboscis, collar and long trunk
3. Cavity of proboscis opens to exterior by proboscis pore. Proboscis has thick muscular walls Superficially ringed trunk (devoid of segmentation)
4. Trunk divided into anterior branchio-genital region, a middle hepatic region and a posterior abdominal region
5. The branchio-genital region has a pair of genital wings formed by internal gonads and a branchial groove having numerous paired gill-slits arranged in 2 rows
6. Straight alimentary canal. Anus is present on posterior end of body
7. Sexes separate, Fertilization external. Development includes free-swimming pelagic Tornaria larva
8. Balanoglossus has affinities with echinodermata and chordata. Hence Hyman has placed them in the invertebrates as an independent phylum



Tornaria larva



Tornaria larva

Characters

1. Tornaria is the larval form of Balanoglossu. It was first described by J.MULLER in 1850

2. Tornaria grows upto 1 to 3 mm in size. Tornaria larva is usually oval in shape and is excessively transparent.

3. It is glossy in appearance with an oval body having ventral mouth near the equatorial plane of the body, a posterior terminal anus.

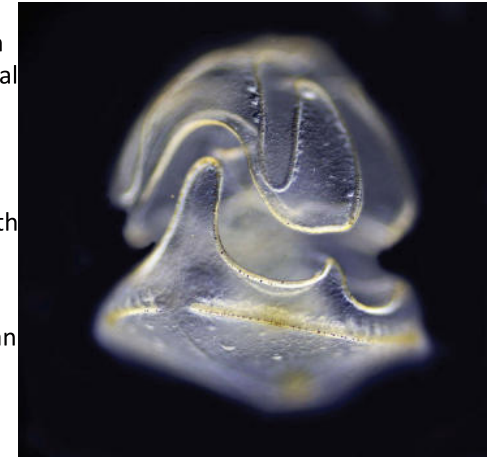
4. The gut is differentiated into an oesophagus, stomach and intestine.

5. The cilia form two bands on the body surface. The anterior ciliary band or circumoral band and posterior band or Telotroch band. Anterior band helps in food collection. Posterior band is around the anus and it helps in locomotion.

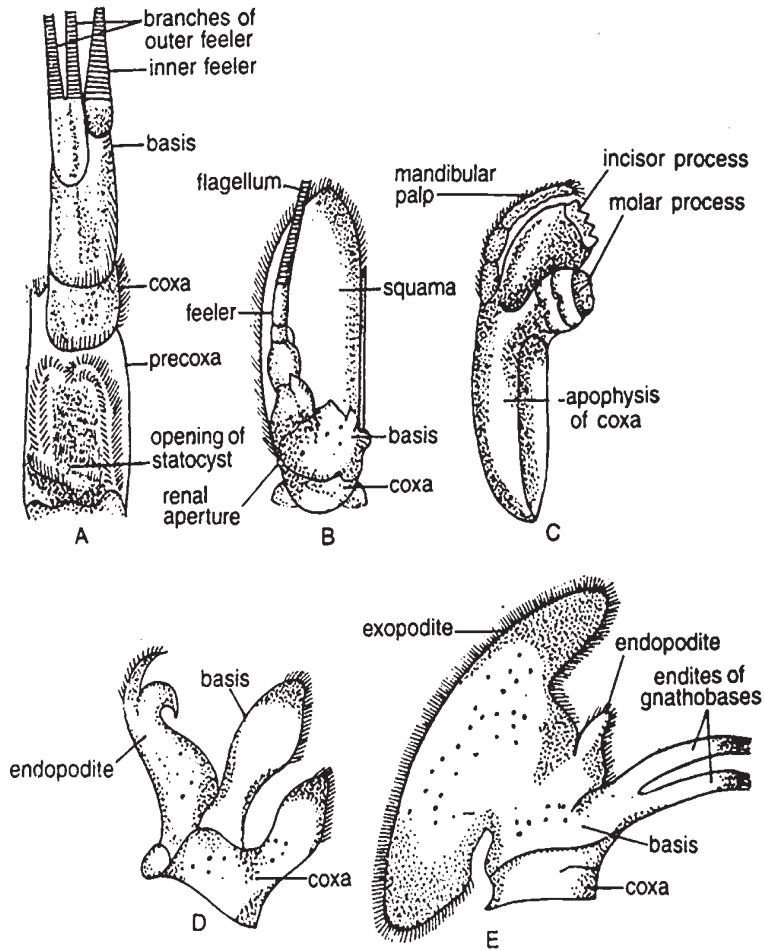
6. The apical plate bears a pair of eye spots or ocelli and a tuft of sensory cilia called apical tuft or ciliary organ.

7. The collar and trunk coeloms appear in the older larva.

8. The tornaria larva swims freely, leads a planktonic life feeding on minute organisms. After swimming for some time the tornaria larva sinks to the bottom and metamorphoses into an adult.

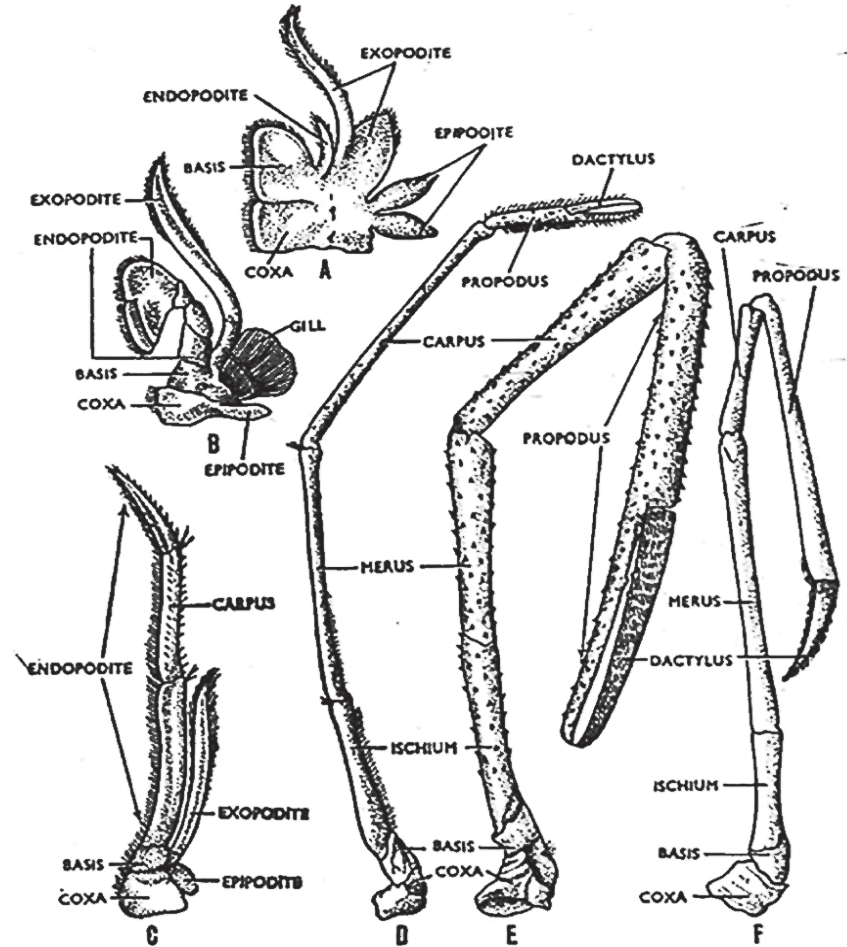


CEPHALIC APPENDAGES OF PRAWN



Cephalic appendages (five pairs). A. Antennule. B. Antenna. C. Mandible. D. Maxilla E. Maxilla

THORASIC APPENDAGES OF PRAWN



Thoracic Appendages of the right side; A=first maxilliped, B=second maxilliped, C=third maxilliped, D=first walking leg (small chela), E=second walking leg (large chela), F=a non-chelate walking leg. Third, fourth and fifth walking legs are similar to F.

ABDOMINAL APPENDAGES OF PRAWN

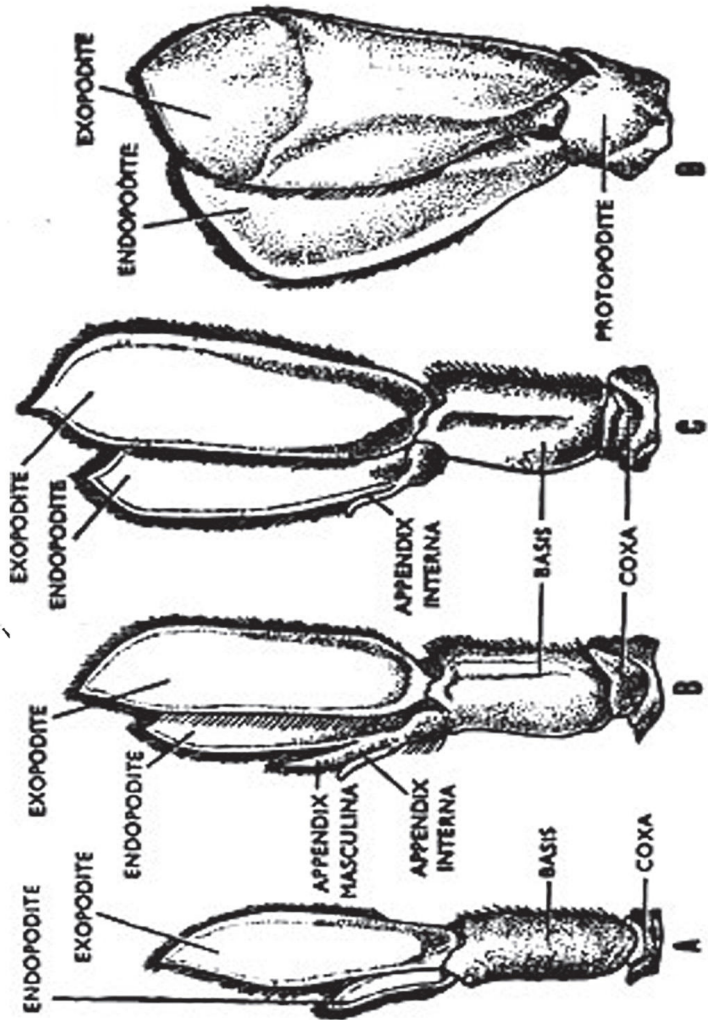


Fig. 89. Abdominal appendages of a male prawn (right side, ventral view); A=first pleopod, B=second pleopod, C=third pleopod, D=uropod. Fourth and fifth pleopods are similar to C.

NERVOUS SYSTEM OF PRAWN

