General Characters and Classification of Annelida

Introduction

- Name of phylum Annelida was first coined by Lamarck (1801) for the higher segmented worms (Gr., annulus - little ring + eidos - form).
- Annelids are elongated, bilaterally symmetrical and highly organized animals, in which the organs have grouped in to definite systems.
- Appearance of metamerism represents their greatest advancement, so that they are called segmented worms in order to distinguish them from flatworms (Platyhelminthes) and roundworms (Nematodes) which are not segmented.
- Their paired appendages, when present, are never jointed.
- Their coelom, nephridia and cephalization are better developed than those of the un-segmented worms.
- They are the first animals to have a closed vascular system.
- Nervous system is fundamentally similar to that of Arthropoda and embryology is not much different from that of mollusca.

General Characters of Annelids

• Mostly aquatic, some terrestrial.
• Burrowing or tubicolous.
• Some commensal and parasitic.
• Body elongated, bilaterally symmetrical, triploblastic, truly coelomate and matamerically segmented into similar metamers.
• Epidermis of a single layer of columnar epithelial cells, covered externally by a thin cuticle. • Body wall dermo-muscular.
• Outer muscle fibres circular, longitudinal.
• Locomotory organs are segmentally repeated chitinous bristles, called setae or chaetae, embedded in skin. May be borne by lateral fleshy appendages or parapodia.
• Coelom, true, schizocoelous. Mostly well developed except in leeches.
• Usually divided into compartments by transverse septa.
• Coelomic fluid with cells or corpuscles.
• Digestive system straight and complete.
• Digestion entirely extracellular.
• Blood vascular system is closed.
• Respiratory pigmants either haemoglobin or erythrocruorin dissolved in blood plasma.
• Respiration by moist skin or gills of parapodia and head.
• Excretory system consisting of metamerically disposed coiled tubes, called nephridia.
• Nervous system with a pair of cerebral ganglia (brain) and a double ventral nerve cord bearing ganglia and lateral nerves in each segment.
• Sensory organs include tactile organs, taste buds, statocysts, photoreceptor cells and sometimes eyes with lenses in some.
• Hermaphroditic or sexes separate, cleavage pattern spiral and determinate.
• Larva, when present, is a trochophore.
• Regeneration is common.

Classification of Annelida

Modern classification of phylum Annelida was proposed by Fauchold (1977) and Parker (1980). About 8,700 known species of annelid are divided into four main classes. primarily on the basis of the presence or absence of parapodia, setae, metamers, and other morphological features.

A. Class – Polychaeta (Gr., poly- many + chaite- hair)

- These are commonly called as bristle worms. They are the most diverse group of Annelida.
- Chiefly marine, some in fresh water.
- Segmentation internal and external.
- Head distinct with eyes, palps and tentacles.
- Setae numerous, on lateral parapodia. The setae exist as bundles.
- Clitellum absent.
- Sexes separate.
- Gonads are absent or temporary in some species. Most of the segments bear gonads in many species of this class.
- The gametes are shed into the coelom and are spawned through metanephridia.
- Fertilization is external and development includes trochophore larva.

  Examples: Nereis, Arenicols, Chaetopterus

Polychaetes are divided into two subclasses, Erranitia and Sedentaria (Fauvel, 1959). However, according to Dab (1963), this subdivision is artificial and not a natural one.

1. Subclass – Erranitia
• Free-swimming, crawling, burrowing or tube-dwelling and predatory polychaetes.
• Segments numerous and similar, except for head and anal region.
• Prostomium distinct with sensory structures.
• Parapodia with acicula and compound setae.
• Pharynx protrusible, enlarged and usually with jaws and teeth.
Examples: Aphrodite (sea mouse), Polynoe , Phyllodoce, Tomopteris, Syllis, Nereis, Glycera, Eunice, Diopatra, Histriobdella.

2. Subclass - Sedentaria
• Sedentary polychaetes living in burrows or tubes.
• Body made of two or more regions, with dissimilar segments and parapodia.
• Prostomium small.
• No acicula and compound setae.
• Pharynx without jaws and teeth.
Examples: Chaetopterus (Fig.3), Arenicola , Owenia, Sabella, Sabellaria, Terebella Amphitrite (Fig.6), Pomatoceros, Spirorbis, Serpula.

2. Class - Oligochaeta (Gr., oligos- few + chaite- hair)
• Mostly terrestrial, some in fresh water and marine forms
• Segmentation internal and external.
• Head distinct, without sensory organs.
Appendages are absent in the animals belonging to this class.
• Setae few, embedded in skin.
• Parapodia absent.
• Clitellum develops at sexual maturity. This clitellum will be a glandular clitellum helpful in cocoon formation
• Hermaphroditic
• Testes anterior to ovaries.
• Fertilization external (in cocoon); development direct, no larval stages.
Examples: Pheretima, Lumbricus, Tubifex

1. Order - Plesiopora plesiothecata
• Mostly aquatic.
• Male gonopores on segment immediately following that which contains testes.
• Spermathecae in the testes-containing segments, or nearby.
Examples: Aelosoma, Nais, Dero, Chaetogaster, Tubifex (Fig.7).

2. Order - Plesiopora prosothecata
• Spermathecae far anteriorly to the segment containing testes.
Examples: Enchvtraeus.

3. Order - Prosopora
• Mostly aquatic.
• Male gonopores on the same segment containing testes, or on segment containing the second pair of testes.
Example: Branchiobdella (parasitic).

4. Order - Opisthopora
• Mostly terrestrial earthworms.
• Male gonopores some distance behind the testes-containing segments.
Examples: Lumbricus (Fig.8), Eisenia, Pheretima, Megascolex, Allolobophora, Dendrobaena.

3. Class – Hirudinea (L., hirudo- leech)

• Freshwater, marine or terrestrial (moist land).
• Generally ectoparasitc, blood-sucking and carnivorous predators too.
• Body with fixed number of segments (33). Each of these segments is externally sub-divided into annuli.
• Each segment subdivided externally into annuli.
• Segmentation external without internal septa.
• Appendages,Parapodia and setae absent.
• Both anterior and posterior ends of body with suckers.These suckers are helpful in locomotion

• Coelom much reduced due to its filling by botryoidal tissue, and forms haemocoelomic sinuses.
• Hermaphroditic with one male and one female gonopore. copulating hermaphrodites with a penis.
• Fertilization internal.
• Development in cocoons, direct without larval stages. (inside the cocoons)
Examples: Hirudinaria, Hirudo

1. Order - Acanthobdellida
• Primitive without anterior suckers, proboscis and jaws.
• Setae present in 5 anterior segments.
• Coelom with compartments.
Example: A single Russian genus and species (Acanthobdella) parasitic on salmon.

2. Order - Rhynchobdellida
• Only aquatic leeches, ectoparasitic.
• A protrusible proboscis with no jaws.
• Coelom without compartments.
• Bloodvasculare system separated from coelomic sinuses.
• Blood colourless.

3. Order - Gnathobdellida
• Aquatic or terrestrial.
• Ectoparasitic blood-sucking leeches.
• Pharynx non-eversible with 3 pairs of jaws.
Examples: Hirudo, Hirudinaria, Haemadipsa.

4. Order - Pharyngobdellida
• Terrestrial and aquatic.
• Some predaceous.
• Pharynx non-protrusible.
• No teeth but one or two style may be present.
Examples: Erpobdella, Dina.

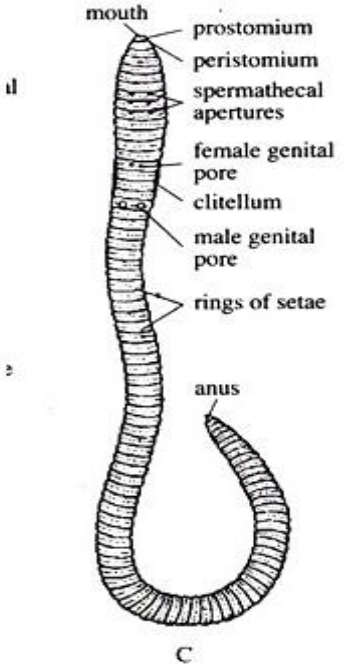
4. Class - Archiannellida (Gr., arch- First)
• About one dozen genera of small, marine worms of unknown affinities.
• Segmentation chiefly internal.
• No parapodia and setae.
• Sexes usually separate.
• Usually trochophore larva.
Example: Polygordius, Dinophilus, protodrilus.

Earthworm: General characters, Distribution, External morphology, Structure and Arrangement of Setae

Classification

Kingdom – Animalia
Phylum- Annelida
Class Oligochaeta
Order - Opisthopora
Family - Megascolccidae
Genus -- Pheretima
Species -- postuma

Distribution



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- More than 3000 species of earthworms are distributed worldwide and many more are yet to be discovered.
- 18 families of class Oligochaeta have several general of earthworms.
- In India out of these 18 families, the earthworms of 7 families are found.
- Among these, Megascolidae is largest genera.
- The members of this genus Pheretima, Perionyx, Eutyphaeus and Polypheretima are distributed in north India and other members like Drawida, megascolex etc. are distributed in south India.
- Drawida grandis is the longest earthworm in India.

Habit and habitat

- *Pheretima posthuma* is a fossorial animal that lives in moist soil burrows.
- It makes its burrows only in loamy and sandy soil.
- This burrowing habit provides its protection and also helps in respiration indirectly.
- Generally, it lives in the upper layers of damp soil which is rich in dead and decaying matter.

- In summer, when the top soil is dry, earthworms burrow deep into the soil.
- The earthworm burrows are lined by slimy secretion of its body.

External morphological features

Size

- A fully grown, mature worm measures bout 3-5 mm in width and 150 mm in length.

Shape

- *Pheretima posthuma* is long, elongated, cylindrical and narrow in shape. Its body shape is well suited for burrowing habit.
- It is bisymmetric animal. Its anterior end is slightly pointed whereas the posterior end is blunt.
- A little behind the anterior end it is thickest.

Color

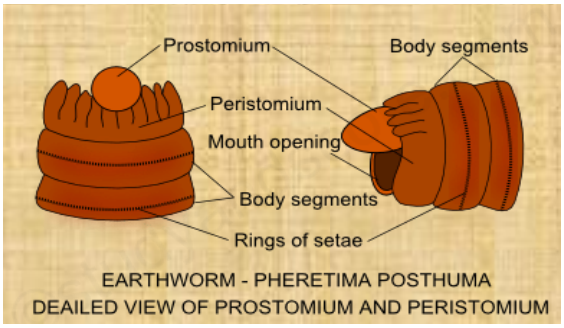
- The dorsal surface of the body is dark brown in colour due to the presence of the pigment called Porphyrin.
- This pigment protects the animal from harmful UV rays.
- The dorsal surface also carries a dark colour median line which is due to the presence of dorsal blood vessel which is seen through the integument.

Body segmentation

- The body of Pheretima posthuma is soft and naked.
- It is divided Prostomium, Trunk and Pygidium.
- Prostomium is fleshy lobe which overhangs mouth.
- Trunk has 100-120 similar segments called as metameres or somites
- Pygidium bears anus.
- The segments are separated externally by inter-segmental grooves and internally by corresponding intersegmental septa.
- The external segmentation corresponds with the internal segmentation.
- New segments are formed from the germinal zone located in front of the pygidium.
- Hence the old segments are at the anterior and the new segments are formed at the posterior end.
- The first segment of the body is Peristomium which is the oldest segment of the body, while the Preanal segment is the youngest segment of the body.

Head

- Earthworm does not have distinct head and also sense organs like eyes, cirri, tentacles are absent.
- The first segment of the body at the anterior end is called buccal segment or peristomium. Peristomium bears terminal, crescentic mouth.
- The mouth is bordered by anterior edge of peristomium and overhung by prostomium.



Clitellum

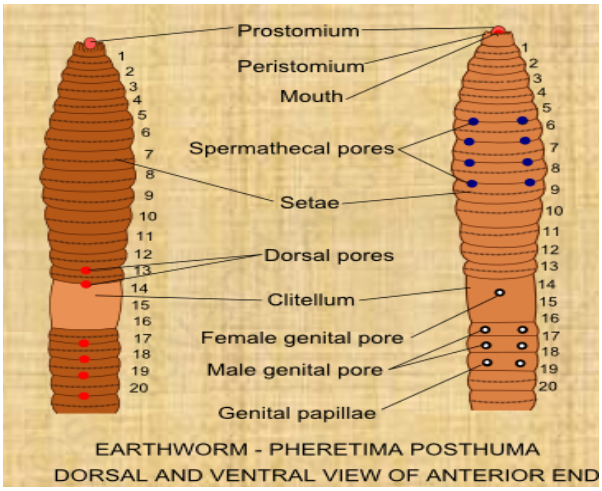
- In mature earthworms, a prominent circular band around the segments 14-16 is called cingulum or clitellum.
- Based on the location of the clitellum, the body of the earthworm is distinguished into three regions namely pre-clitellar, clitellar and post-clitellar regions.

Genital papillae

- These are two pairs of conspicuous rounded elevations, one pair each in the 17th and 19th segments on the ventral surface.
- Each papilla bears shallow cup-like depression at its top which acts as sucker during copulation.

External openings

- Mouth is situated at the anterior side of the first segment. It is surrounded by peristomium and overhung by prostomium.
- Along the mid dorsal line, in the intersegmental grooves a series of minute openings called dorsal pores are present.
- Coelomic fluid flows out through these pores and keeps the skin slippery and moist. The first pore lies in the groove between segments 12-13.
- Anus is the terminal opening present in the posterior terminus of pygidium
- The openings of integumentary nephridia are called nephridiopores. These are minute apertures present on the body wall behind first two segments. They are scattered irregularly all over the surface of the body.
- On the ventral surface of 14th segment, a single median aperture called female genital aperture is present.



- On the ventral surface of 18th segment there is a pair of male genital apertures.
- Four pairs of small elliptical openings called spermathecal apertures are situated ventro-laterally, in the intersegmental grooves of 5-6, 6-7, 8-9 segments. One pair is present in each intersegmental groove.

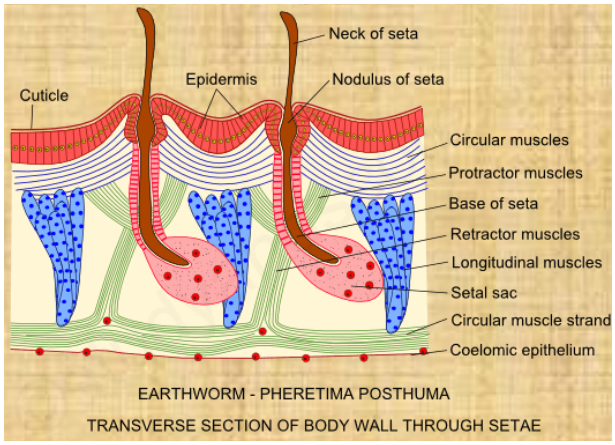
Structure and arrangement of setae

- About middle of each segment there is a ring of tiny curved bristles called as setae.
- Setae are also known as chaetae.

- They are formed of a horny nitrogenous organic substance known as chitin.
- On each body segment there are about 80 -120 setae.
- They are absent on the peristomium, pygidium and clitellum.

Structure of setae

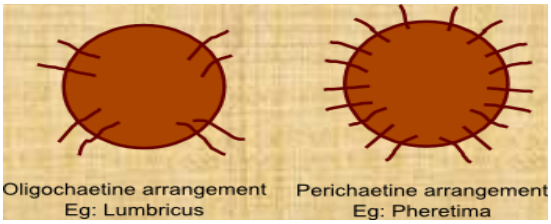
- Each seta is an 'S' shaped and faint yellowish in color.
- It has a pointed distal end, a blunt proximal end and a central swelling called nodulus.
- About 1/3 of the setae projects above the body wall which is called the neck and the part embedded in the setal sac is the base.
- The setal sac is formed by the invagination of the epidermis of the body wall.
- Each seta is formed in the setal sac. One pair of protractor muscles and a retractor muscle are associated with each setal sac.



- The protrusion and retraction of the setae are effected by protractor and retractor muscles respectively. Setae grip the soil to help the earthworm move about and sense the environment.
- Setae are absent in the peristomium and pygidium. Setae are dropped in the mature worm from the region of the clitellum.

Arrangement of setae

- The arrangement of the setae is one factor that helps in the identification of earthworms.



- Across the middle line of each segment, a ring of setae is arranged in the body wall around the segment. Such arrangement is called perichaetine arrangement.
  Eg: Pheretima posthuma
- Eight setae are arranged closely or widely or in pairs. This kind of arrangement is called as oligochaetine arrangement.
  Eg: Lumbricus

s

Phylum Porifera: General characteristics and Classification

BSc. Part I Zoology (Hons) Paper I

Introduction

Porifera animals are also called as Sponges. Sponges have managed to conceal their true animal nature for several centuries. They are sessile, profusely branched, have no clear way of capturing or eliminating food. They also show very little response to external stimuli. Some of the sponges are even green in color due to presence of symbiotic algae and hence were regarded as plants by many early researchers. Later they were proved as animals after the discovery of their feeding system and life cycle.

It was **Robert Grant** who coined the term Porifera which in Latin means pore bearing animals (L. Porus=pore; ferre=to bear). **Huxley and Sollas** first proposed the separation of sponges from eumetazoans. It is believed that sponges might have evolved from the colonial choanoflagellate protozoans. Sponges represent an evolutionary blind offshoot.

General Characters of Phylum Porifera

1. They are distributed between **Arctic** to **Temperate** regions.
2. Sponges are **sessile** and mostly **marine**. Some live in **fresh water**

3. They are solitary or colonial in nature found attached to stones or molluscan shells or wooden pieces in the waters.
4. Their body is vase-like, tubular, cushion-like or cylindrical in shape. They exist in various colours like bright red, yellow, orange, pink or violet or even white and black. Some sponges have symbiont algae and thus appear green in colour.
5. Majority of sponges are **asymmetrical** and some are **radially** symmetrical
6. They exhibit **cellular grade of organisation.** They exhibit functional division of labour. There is no relation between two cells. No organs are present in sponges.
7. **Body wal**l consists of two epitheloid layers (epitheloid resembles epithelium but lacks basal lamina and cell junctions): an outer pinacoderm and an inner choanoderm.
    - **Pinacoderm** covers the outer surface of the body and also lines some of the internal cavities of aquiferous system. Flattened cells of pinacoderm are called as pinacocytes. Pinacoderm also has porocytes each of which encloses an ostium. Porocytes extend up to spongocoel.
    - **Choanoderm** is composed of choanocytes. They have a collar of microvilli around the flagellum. Water is pulled through the ostia by the beating of the choanocytic flagella.
8. Between the pinacoderm and choanoderm is a gelatinous mesohyl. Mesohyl has various types of amoebocytes like,
    - **Sclerocytes** which produce spicules
    - **Spongocytes** which produce spongin fibres.
    - **Myocytes** are the contractile cells found around osculum.
    - **Archaeocytes** are totipotent cells capable of giving rise to any other cell type.
9. The central cavity is called as **spongocoel or atrium**. It opens outside through an osculum.
10. The water **circulatory system of sponges** is called as canal system or aquiferous system. It helps in food acquisition, respiratory gas exchange and excretion. In an ascoid sponge, water enters the spongocoel through ostia and exits through osculum.
11. **Aquiferous system** and high totipotent nature of the cells are the two characteristic features of sponges
12. **Mesohylar endoskeleton** consists of inorganic (calcareous) spicules or proteinaceous (spongin) fibres or both. Spicules are designated according to the number of axes (Eg: Monaxon, triaxon, tertaxon) or according to the number of rays (Eg: monactinal, hexactinal, teractinal)
13. Sponges are **suspension feeders or filter feeders**. Digestion is intracellular. Choanocytes engulf food particles suspended in water, partly digests and passes on to an archaeocyte for final digestion.
14. Disposal of **excretory wastes** primarily ammonia and respiratory gas exchange occur by simple diffusion. Most cells of fresh water sponges contain contractile vacuole for Osmoregulation.
15. **Nerve cells** and **sensory cells** are absent. If nervous system is present it is of primitive type in some species with bipolar or multipolar cells formed into a network. Sponges are capable of responding to a variety of environmental stimuli by the closure of osculum.
16. Asexual reproduction takes place by **fragmentation, budding** and the **formation of gemmules** and **reduction bodies**.
17. Sponges are capable of regenerating viable adults from fragments. Fresh water sponges and a few marine sponges produce small gemmules, which remain dormant during winter.
18. Sponge cells have remarkable **power of regeneration**. Even if a sponge is divided into minute pieces, the cells aggregate to form functional sponge.
19. Most sponges are hermaphrodite but exhibit **protandry** or **protogyny**. Spermatozoa arise primarily from choanocytes. Eggs arise from archaeocytes or **differential** choanocytes.
20. **Fertilization** is cross or internal. Spermatozoa are taken into the aquiferous system of neighbouring individuals. Choanocytes transfer them to the eggs in mesophyl.
21. Cleavage is holoblastic. Development is indirect and includes,
    - **Coeloblastula larva** (holoblastula with flagellated cells) or
    - **Amphiblastula larva** (Coeloblastula with flagellated & non-flagellated cells) or
    - **Parenchymella/parenchymula larva** (Solid blastula with outer layer of flagellated cells) or
    - **Trichimella larva** (solid blastula with flagellated cells around the equator)

Classification of Phylum Porifera

There are about 5,000 living species of sponges included in this phylum Porifera. All the species of this phylum are grouped into three classes depending mainly on the nature of the skeleton. They are both marine and fresh water forms. They live up to a depth of 8,500 m in the sea. They generally flourish in the warm waters. In the matter of size they are highly variable. Their size may vary from few centimeters to several meters.

Class I: Calcarea (L. Calcarius=limy)

- The sponges of this class are small.
- They all are exclusively marine forms living in shallow waters.
- Their skeleton is made up of calcareous spicules.
- Body many be cylindrical or vase like
- They may either live in colonies or solitarily
- Body organization may be asconoid, syconoid or leuconoid type.
- Development includes coeloblastula or amphiblastula larva

Ex: *Clathrina, Leucosolenia, Scypha*

Class II: Hexactanellida (Gr. Hex=six; Actin=ray)

- This class includes glass sponges.
- The sponges of this class are of moderate size.
- They all are exclusively marine forms living in deep waters.
- Their skeleton is made up of six-rayed siliceous spicules.
- Body may be cup, urn or vase like
- They may either live in colonies or solitarily.
- Development includes trichemella larva

Ex: *Euplectella, Hyalonema*

Class III: Desmospongiae (Gr. Demas=frame; Spongos=sponges)

- The sponges of this class are large sized.
- They include marine water or brackish water or fresh water forms
- Their skeleton is made up of siliceous spicules or sponging fibers or both or none.
- Body is vase or cup or cushion shaped
- They may either live solitarily or in colonies
- Body organization is leuconoid type
- Development includes parenchymula larva

Ex: *Cliona, Spongia, Spongilla, Chalina*

Wuchereria Bancrofti: Habitat, Structure and Life History

BSc. Part I Zoology (Hons) Paper I

Introduction:

Wuchereria bancrofti is a human parasitic worm (Filariworm) that is the major cause of lymphatic filariasis. It is one of the three parasitic worms, together with Brugia malayi and B. timori, that infect the lymphatic system to cause lymphatic filariasis. These filarial worms are spread by a variety of mosquito vector species. W. bancrofti is the most prevalent of the three and affects over 120 million people, primarily in Central Africa and the Nile delta, South and Central America, the tropical regions of Asia including southern China, and the Pacific islands.[1] If left untreated, the infection can develop into a chronic disease called Lymphatic filariasis.[2] In rare conditions, it also causes tropical eosinophilia, an asthmatic disease.

Habit and Habitat of Wuchereria Bancrofti:

Wuchereria bancrofti is a dreadful endoparasite of man; adults harboring the lymphatic vessels and lymph nodes.

Its life history is digenetic, as it involves a secondary host, the bloodsucking insects, i.e., the female mosquitoes of the genus Culex, Aedes or Anopheles; the secondary host for W. bancrofti in India and China is Culex pipiens, in Pacific Islands (except Fiji and New Caledonia) is Anopheles punctatus and in Polynesian Islands is Aedes polynesiensis.

Wuchereria bancrofti is viviparous or to say ovo-viviparous; its larvae are referred to as microfilariae which/harbour the blood of human beings.

Geographic Distribution of Wuchereria Bancrofti:

Wuchereria bancrofti is largely confined to the tropical and sub-tropical countries of the world.

However, it occurs in India, West Indies, Puerto Rico, Southern China, Japan, Pacific Islands, West and Central Africa and South America. In India, the parasite is chiefly distributed along the sea coast and along the banks of big rivers (except Indus); it has also been reported from Rajasthan. Punjab, Delhi and from various vicinities of Uttar Pradesh.

Structure of Wuchereria Bancrofti:

The adult worms are long, hair-like, transparent and often creamy-white in colour.

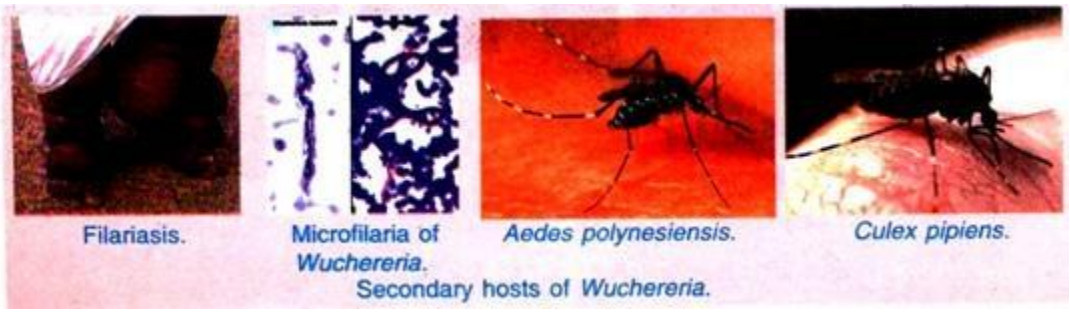
They are filiform in shape having tapering ends; the head end terminating in a slightly rounded swelling. Sexes are separate and sexual dimorphism is distinct. The male worm measures 2.5 to 4 cm in length and 0.1 mm in diameter having a ventrally curved tail-end containing a number of genital papillae and two spicules of unequal copulatory spicules.

The female worm measures 8 to 10 cm in length and 0.2 to 0.3 mm in diameter having a narrow and abruptly pointed tail. The female genital pore or vulva is located ventrally in the pharyngeal region and is characteristically provided with a pyriform ovijector.

The male and female worms remain coiled together; females are usually more in number than the males. Its mouth is simple without lips, pharynx is divisible into an anterior muscular and a posterior glandular parts, the oesophageal bulb is not found and the intestine is like those of other nematodes.

The microfilariae are very active and can move both with and against the blood stream. They have colourless and transparent bodies with blunt anterior ends and rather pointed tails. A microfilaria measures about 290 pm in length and 6 to 7 pm in diameter.

The body of a microfilaria is covered in a hyaline sheath followed by cuticula being lined by flattened subcuticular cells or epidermis and an inner column of cytoplasm containing nuclei. However, various structures from anterior end downwards are future mouth or oral stylet, nerve ring band, nephridiopore, renette cells and a dark coloured inner mass and four cells of future anus.



The microfilariae do not undergo further development in the human body unless they are taken up by their suitable secondary host (mosquito). If these microfilariae are not sucked up by the mosquito, they die in course of time. Their life span in human body is probably 70 days.

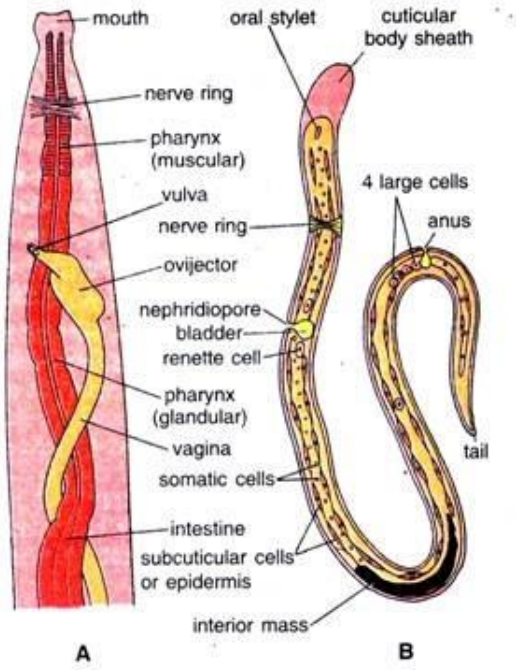


Fig. 48.1. *Wuchereria bancrofti.* A—Anterior part of female; B—Microfilaria.

Periodicity of Microfilariae:

The microfilariae of oriental countries like India and China exhibit nocturnal periodicity, as they appear in peripheral circulation periodically at night only generally between 10 pm and 4 am, but disappear inside during the rest of the day. It is believed that during daytime they retire inside the deeper blood vessels.

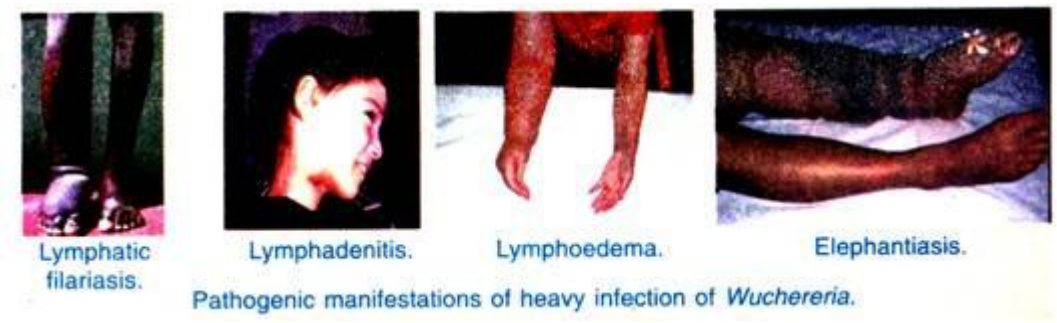
In fact, the nocturnal periodicity of microfilariae is said to be related with the nocturnal feeding habit of their secondary host, Culex pipiens.

Life History of Wuchereria Bancrofti:

We know that Wucheria bancrofti is digenetic, i.e., its life history is completed in two hosts; man is the main host, while female mosquito, usually Culex pipiens, is the secondary host.

Mature male and female worms copulate in the lymph glands of man where they usually live. Since female worm is viviparous or ovoviviparous, it delivers numerous larvae called microfilariae. The microfilariae are born in very immature stage.

However, microfilariae find their way into the blood stream where they can live for a considerable time without undergoing any developmental changes. As referred to, due to their nocturnal periodicity they are sucked up by the secondary host when it comes to take its blood-meal from the human body.



Pathogenic manifestations of heavy infection of *Wuchereria*.

The microfilariae, after reaching in the body of the secondary host, undergo further development to become infective to man. In fact, immediately after their entry in the stomach of mosquito, the sheaths around their bodies are shed off and then they penetrate the gut wall within an hour or two and migrate to the thoracic muscles.

Here they become short and thick like sausages within 2 days having short spiky tails and measure 124 to 250 µm in length and 10 to 17 pm in diameter, they also possess rudimentary digestive tract. These are first stage larvae. Within next 3 to 7 days they grow rapidly and moult once or twice to become the second stage larvae; they measure 225 to 330 µm in length and 15 to 30 pm in diameter.

Finally, by 10th or 11th day they become fully grown and are referred to as third stage larvae; they measure about 1500 to 2000 pm in length and 18 to 23 µm in diameter. This stage is infective to man. These larvae are inactive and come to lie in the labium of the mosquito.

When the mosquito bites the warm and moist skin of man, the larvae creep out of the labium to the human skin, then they penetrate into the skin and finally come to settle down in the lymphatic's. Here, they grow and become fully adult and sexually mature within a period of 5 to 18 months.

These sexually mature worms start reproduction to repeat the life history again. The life span of adult worms is very long, probably ranging from 5 to 10 years.

Diagnosis and Disease of Wuchereria Bancrofti:

The infection of Wuchereria bancrofti is diagnosed by the presence of microfilariae in stained blood smear and by the biopsy of lymph nodes. The disease caused by the infection of W. bancrofti is, in general, referred to as wuchereriasis or filariasis.

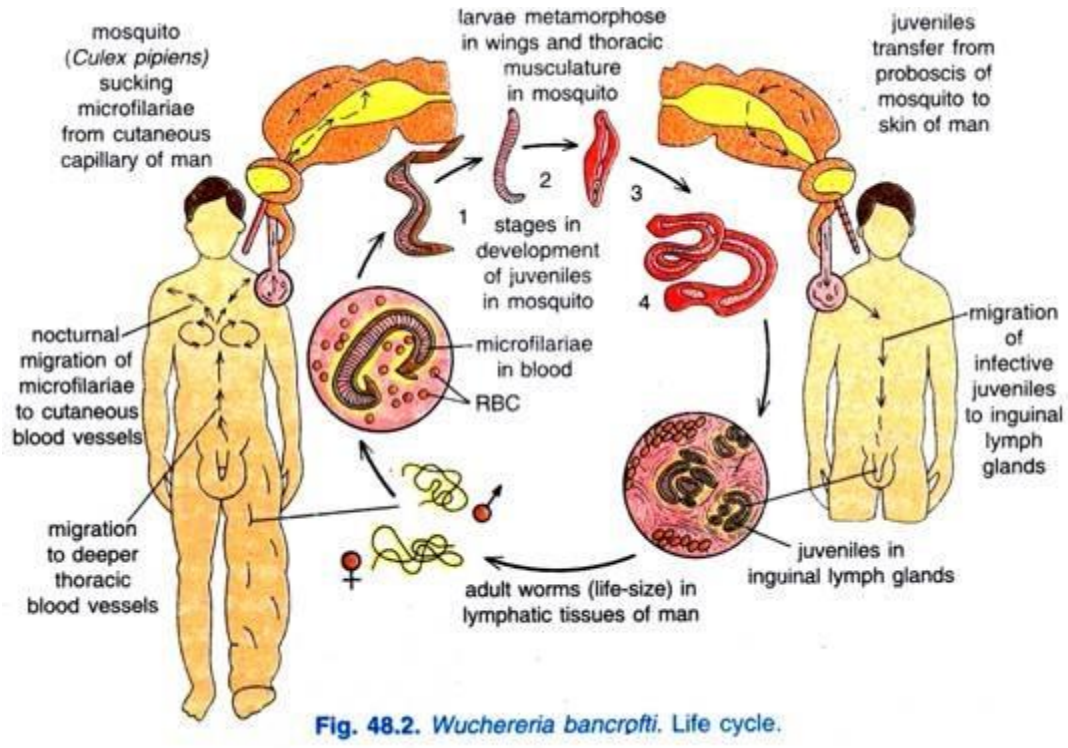


Fig. 48.2. *Wuchereria bancrofti.* Life cycle.

Pathogenicity of Wuchereria Bancrofti:

In fact, the pathogenic effects seen during filariasis are caused by living or dead adult worms.

A light infection does not produce serious effects; it causes filarial fever, headache and mental depression, etc. But, during heavy infection a large number of pathological effects are observed; in this condition they block the lymphatic vessels and glands causing lymphatic obstruction so that lymph cannot get back to the circulatory system.

Hence, there occurs accumulation of lymph in the affected organs due to which they swell fantastically, a condition called lymphoedema. When they infect lymph nodes then they cause lymphadenitis, in lymph vessels they cause lymphangitis and after infecting epididymis and related areas they cause hydrocele.

However, the affected organs sometimes become enormously enlarged, producing a tumour-like ugly look, this condition is called elephantiasis; the elephantiasis of feet, hands, scrotum, etc., are of common occurrence in the areas where W. bancrofti is prevalent.

Treatment and Prevention of Disease Caused by Wuchereria Bancrofti:

So far, no satisfactory treatment has been reported. However, heterazan and compounds of antimony and arsenic are used to reduce or eradicate microfilariae from the circulatory system. The only way of prevention is to protect our bodies from mosquito bite.