

# Diagrammatic representation of general anatomy and digestive system of Earthworm

B.Sc. Part I, Practical

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## General anatomy of Earthworm

### Classification: -

**Phylum-** Annelida

**Class-** Oligochaeta

**Order-** Neo-Oligochaeta

**Genus-** Pheretima

**Habit and habitat:** These are found in the soil but absent in Sandy and humus deficient soil. they are found in Mountain, clayey and acidic soil.

**Distribution:** Cosmopolitan

### Comments: -

**Shape:** Body is elongated, cylindrical with pointed anterior and blunt posterior end. body shape is nicely adapted for burrowing life'

**Pigmentation:** it is dark brown in colour

**Segmentation:** body is divided by transverse furrows into segments or metameres

**Number of segments:** hundred to 120.

**Length:** about 150 mm

**Breadth:** 3 to 5 mm

**Clitellum:** it is a thick girdle, like a forwardly situated region, containing only three segments of the body 14 to 16. it forms a complete ring

**Setae:** Ventrally in the middle of each segment contain a ring of small covered chitinous setae which can be observed by a hand lens. setae are locomotory. The First segment last segment and the cliteiiar region are devoid of setae.

**Mouth:** it is a Crescentic opening, found in the first segment and shifted ventrally by fleshy prostomium.

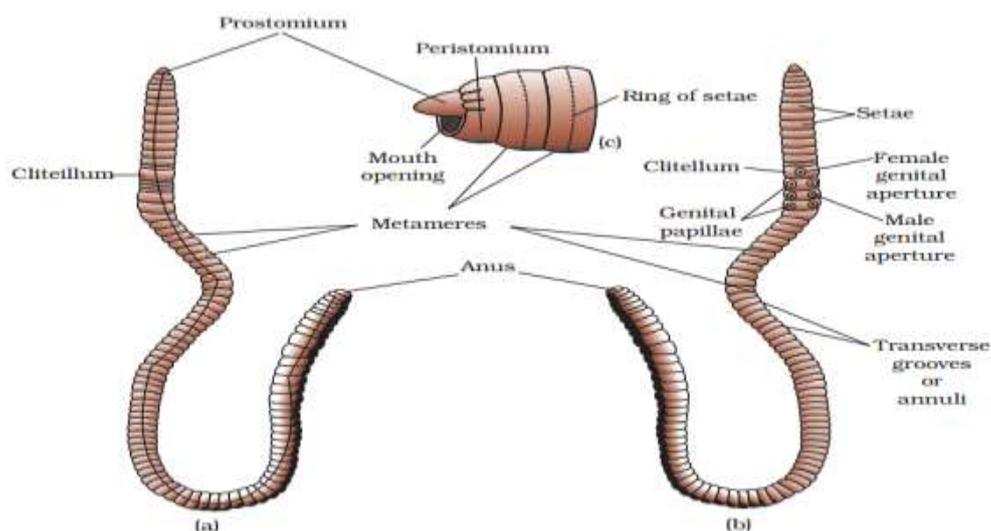
Genital ok copulatory papillae: two pairs. 1 pair each is found on the ventral surface of the 17th and 19th segments respectively.

**Female genital opening:** It lies on the ventral side of the 14th segment in the clitellar region.

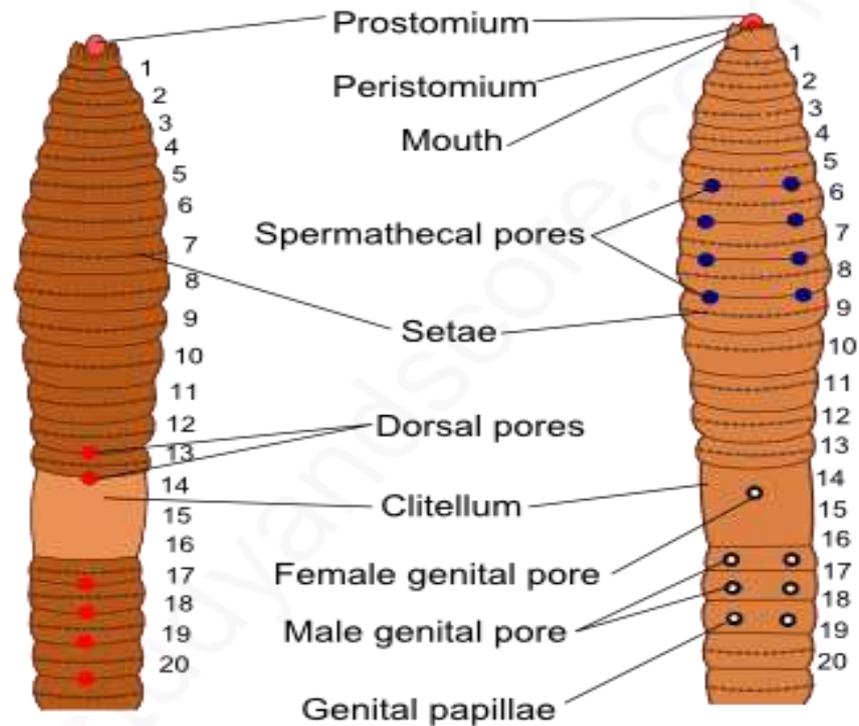
**Male genital pore:** two in number they are found on either side of the ventral surface upon raised genital papillae.

**Spermathecal pore:** board Paisa located ventral literally in the intersegmental grooves of 5/6, 6/7, 7/8, 8/9, segment. Anus lies on the last segment.

**Dorsal Blood vessel:** It is seen on dorsal surface extending from anterior to posterior end.



Body of earthworm : (a) dorsal view (b) ventral view (c) lateral view showing mouth opening



EARTHWORM - PHERETIMA POSTHUMA  
DORSAL AND VENTRAL VIEW OF ANTERIOR END

## General Anatomy

**Circulatory system:** Four pairs of so-called hearts in the segment 7, 9, 12 and 13. Just after opening the animal dorsal blood vessel is seen from anterior to posterior end. lateral oesophageal hearts are very distinct in the 12th and 13th segment. various rounded and red coloured blood glands are Found below the pharynx. Lymph glands are present below intestinal caeca associated with blood glands.

**Excretory System:** Different types of nephridia are seen: -

- I. **Integumentary nephridia:** several in each segment.
- II. **pharyngeal nephridia:** found in three bunches in 4th 5th and 6th segment.
- III. **septal nephridia:** From the 15th and 16th segments onward they are attached to intersegmental Septal.

**Nervous System:** will discuss separately...

**Reproductive system:** Hermaphrodite.

Male reproductive system: Testis two pairs. Seminal vesicle two pairs. Prostate gland one pair of lobulated and irregularly shaped found from 16-17 to 20 -21 segments. Accessory glands two pairs are present, one in 17 whereas another pair in the 19<sup>th</sup> segment.

Female reproductive system: Ovaries 2 in number. 2 short oviducts with oviducal funnel. Spermatheca 4 pairs found in 6<sup>th</sup> 7<sup>th</sup> 8<sup>th</sup> and 9<sup>th</sup> segment.

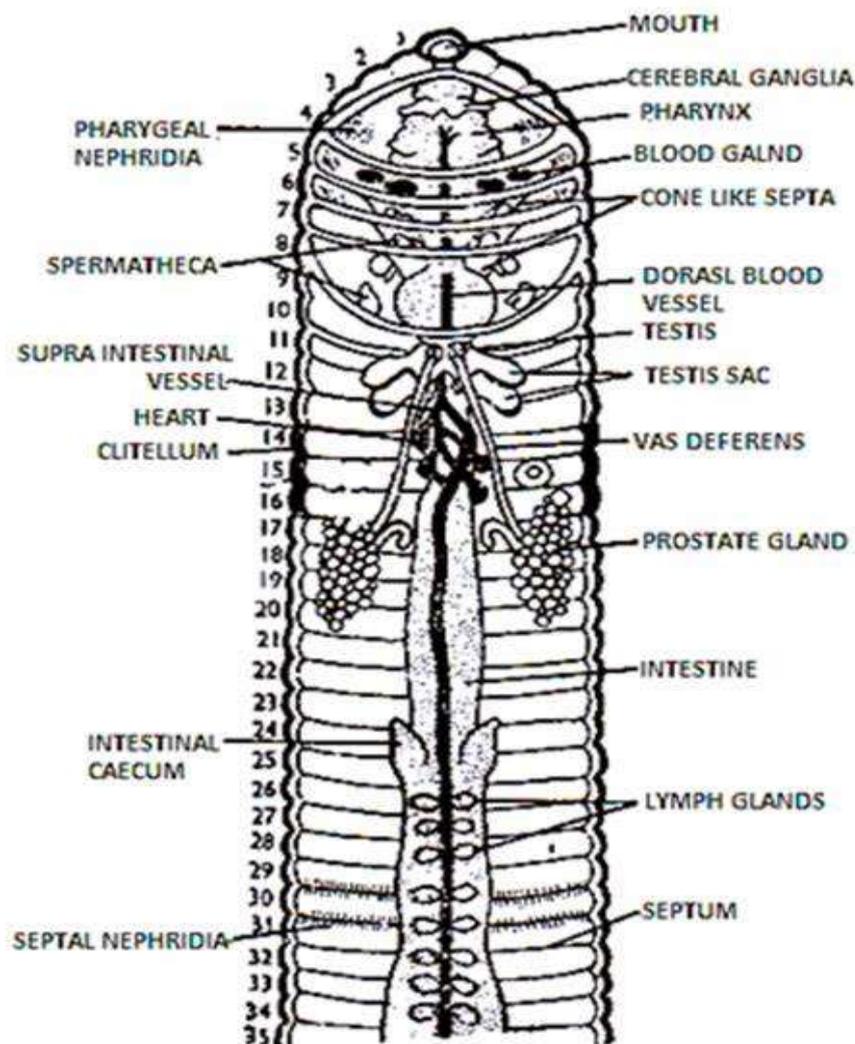
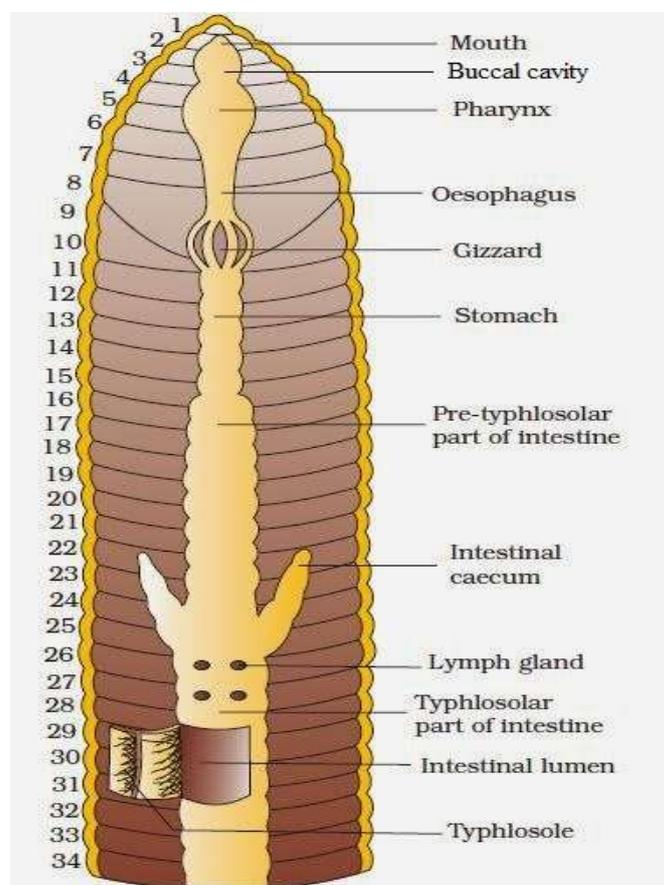


Fig. 258 EARTHWORM-CUT OPEN TO SHOW GENERAL ANATOMY

**Digestive System of Earthworm:** Digestive system of earthworm consists of alimentary canal and glands along with physiology of digestion.

**Alimentary Canal:** Alimentary canal is long and straight, extending from mouth to anus. It consists of following parts:

1. Mouth: 1<sup>st</sup> segment
2. Buccal Cavity: 2<sup>nd</sup>-3<sup>rd</sup> segment or middle of 3<sup>rd</sup> segment
3. Pharynx: 3<sup>rd</sup>-4<sup>th</sup> segment
4. Oesophagus: 5<sup>th</sup> -7<sup>th</sup> segment
5. Gizzard: 8<sup>th</sup> or 8<sup>th</sup>-9<sup>th</sup> segment
6. Stomach: 9<sup>th</sup> or 10<sup>th</sup>-14<sup>th</sup> segment
7. Intestine: 15<sup>th</sup> up to last segment except anus
8. Anus: last segment



**Fig. Alimentary canal of earthworm**

## **Mouth**

It is crescentic aperture situated in the 1<sup>st</sup> segment below the prostomium. Mouth leads into a buccal cavity.

Ingestion of food takes place through it.

## **Buccal Cavity**

It is a short, wider, thin-walled tube extending from 2<sup>nd</sup> up to 3<sup>rd</sup> or middle of 3<sup>rd</sup> segment. It consists of two kinds of muscle. They are: protractile muscle and retractile muscle.

Buccal cavity protrude out through mouth with the help of special muscle for holding the food particles during feeding.

Buccal cavity leads into spacious organ called pharynx.

## **Pharynx**

It is small, swollen, wider, thick-walled pear-shaped chamber, which extends up to 4<sup>th</sup> segment.

It is wider than buccal cavity.

It is distinguished from buccal cavity by means of constriction.

It has pharyngeal gland, located in the dorsal salivary chamber. Pharyngeal gland is composed of many chromophil cells, which produce saliva containing proteolytic enzyme; protease and mucin. Mucin makes the food soft and protease converts protein into amino acid.

## **Oesophagus**

It is narrow thin-walled tubular structure extending from 5<sup>th</sup> to 7<sup>th</sup> segment.

It has no gland.

It passes the food particles from pharynx to gizzard.

It leads into gizzard.

## **Gizzard**

It is oval, thick-walled and highly muscular organ lying in the 8<sup>th</sup> or 8<sup>th</sup>-9<sup>th</sup> segment.

It is the hardest part of alimentary canal due to the presence of inner lining of cuticle. It also possesses chitinous teeth like projection. It helps in grinding or crushing food so act as grinder during feeding.

## **Stomach**

Gizzard leads to short, narrow, thin-walled, highly vascular tubular structure called stomach, which extends from 9<sup>th</sup> or 10<sup>th</sup> to 14<sup>th</sup> segment. It is wider than oesophagus.

It has calciferous gland which helps in neutralization of food by calcification process.

Stomach leads to intestine.

The glandular cell of stomach produces proteolytic enzymes for the digestion of protein.

## **Intestine**

It is long, wide and thin-walled tube which extends from 15<sup>th</sup> to last segment except anus. Its inner lining is ciliated, vascular, folded and glandular. Its intestinal lining is folded to form villi. One of the villi becomes larger and well developed than other called typhlosole which runs mid-dorsally from 27<sup>th</sup> to last 25<sup>th</sup> segment.

Typhlosole divides the intestine into 3 regions. They are:

### **I. Pre-typhlosolar region**

It extends from 15<sup>th</sup> segment to 26<sup>th</sup> segment so it is the first part of the intestine.

It consists of villi but no typhlosole.

In 26<sup>th</sup> segment, there is a pair of short and conical lateral outgrowth called intestinal caeca which extends upward up to 23<sup>rd</sup> segment. Intestinal caeca produce amylase which helps in starch(carbohydrate) digestion.

## **II. Typhlosolar region**

It is the 2<sup>nd</sup> or middle part of the intestine which extends from 27<sup>th</sup> segment to last from 25<sup>th</sup> segment. It has both villi and typhlosole.

The typhlosole is highly vascular and glandular fold that increases the absorptive surface area of the intestine.

## **III. Post-typhlosolar region**

It is the last part of the intestine lying in the last 23<sup>rd</sup>-25<sup>th</sup> segment in front of anus. It is also called rectum. It lacks villi and typhlosole.

It contains small pellets of mud which are thrown out through the anus to form casting.

## **Anus**

It is a circular opening in the last segment called anal segment.

Undigested food materials release out through anus in the form of worm casting.

## **Digestive glands**

There are different types of digestive glands associated with alimentary canal of earthworm. 1. Pharyngeal gland, 2. Gastric gland, 3. Intestinal glands, 4. Intestinal caeca