

# Structure and Life History of Ascaris

## BSc. Part I Zoology (Subsidiary)

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### Introduction:

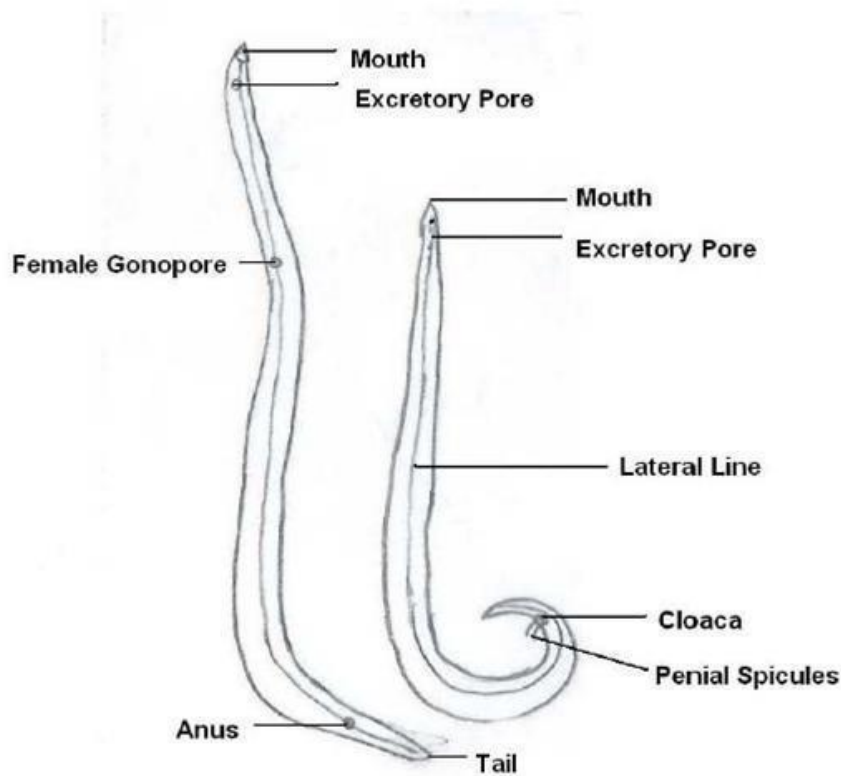
*Ascaris lumbricoides* is an intestinal round worm. It is the largest intestinal nematode to infect humans. The adult worm lives in small intestine and grow to a length of more than 30 cm. Human is only the natural host and reservoir of infection.

The round worm infection occurs worldwide. The number of infected persons is estimated to be more than 2 billion. The main epidemic region with prevalence rate of approx. 10-90% includes countries in South East Asia, Africa and Latin America.

### Morphology:

#### Adult:

The round worm resembles the earthworm. It is elongated tapering at both ends, anterior being thinner than posterior. Freshly excreted worm is yellowish pink in color, which gradually changes to white.



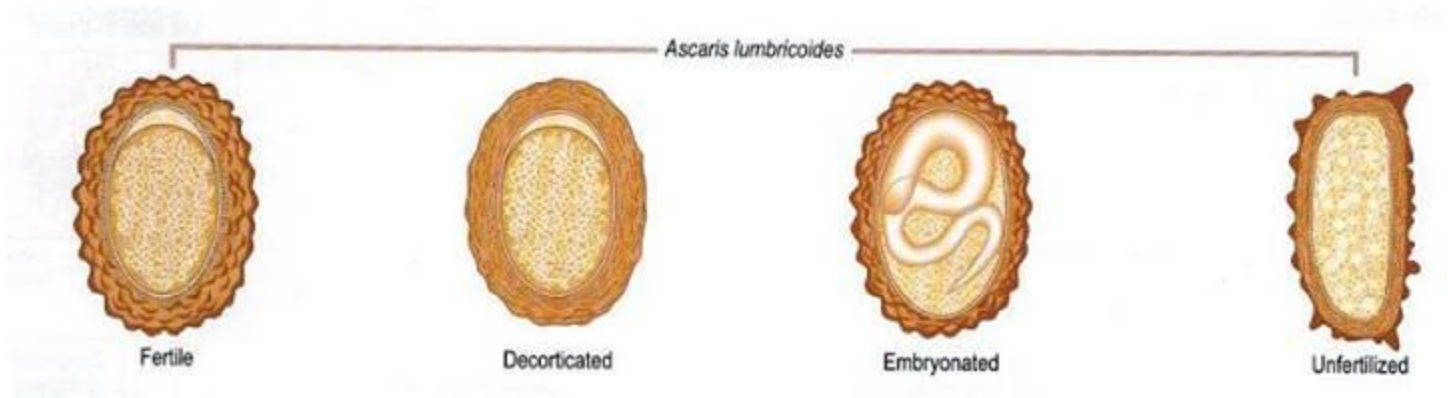
The worm is sexually dimorphic.

- Adult male: 15-30 cm in length, 3-4 mm in diameter, tail curved
- Adult female; 20-40 cm length, 2-6mm diameter, tail straight

### Egg:

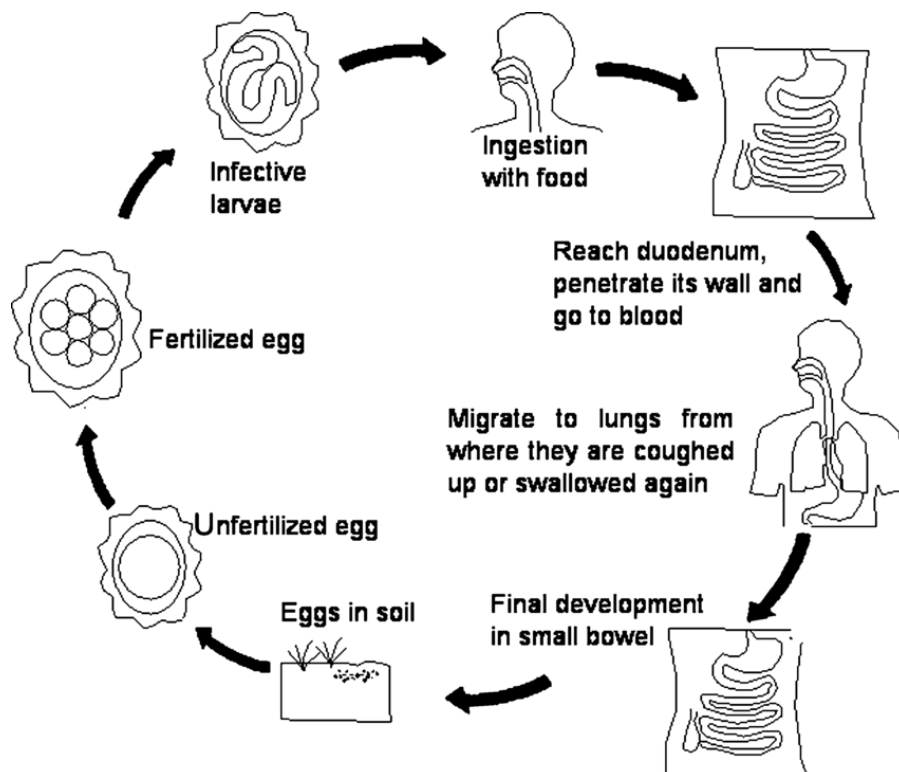
*Ascaris* egg is round or oval, 60\*40  $\mu\text{m}$  size, thick brown shell and have rough surface. It is the infective form of parasite.

- Unfertilized egg; large, more elongated (38-55\*78-105)  $\mu\text{m}$
- Fertilized egg; ovoid (35-50\*50-70) $\mu\text{m}$ , golden brown color



### Life cycle:

The life cycle of *Ascaris* completes in a single human host. Adult worm lives in small intestine.



## **Stage I: Eggs in faeces**

- Sexually mature female produces as many as 200,000 eggs per day, which are shed along with faeces in unembryonated form. They are non-infective.

## **Stage II: Development in soil**

- Embryonation occurs in soil as optimum temperature of 20-25C with sufficient moisture and O<sub>2</sub>
- Infective larva develops within egg in about 3-6 weeks.

## **Stage III: Human infection and liberation of larvae**

- Human get infection with ingestion of embryonated egg contaminated food and water
- Within embryonated state inside egg, first stage larvae develops into second stage larvae. This second stage larvae is known as Rhabditiform larvae
- Second stage larva is stimulated to hatch out by the presence of alkaline pH in small intestine and solubilization of its outer layer by bile.

## **Stage IV: Migration of larvae through lungs**

- Hatched out larvae penetrates the intestinal wall and carried to liver through portal circulation
- It then travels via blood to heart and to lungs by pulmonary circulation within 4-7 days of infection.
- The larvae in lungs molds twice, enlarge and breaks into alveoli.

## **Stage V: Re-entry to stomach and small intestine**

- From alveoli, the Larvae then pass up through bronchi and into trachea and then swallowed.
- The larvae passes down the oesophagus to the stomach and reached into small intestine once again.
- Small intestine is the normal habitat of *Ascaris* and it colonises here.
- Within intestine parasite molds twice and mature into adult worm.
- Sexual maturation occurs with 6-10 weeks and the mature female discharges its eggs in intestinal lumen and excreted along with faeces, continuing the life cycle.
- The life span of parasite is 12-18 months