



Ascaris lumbricoides

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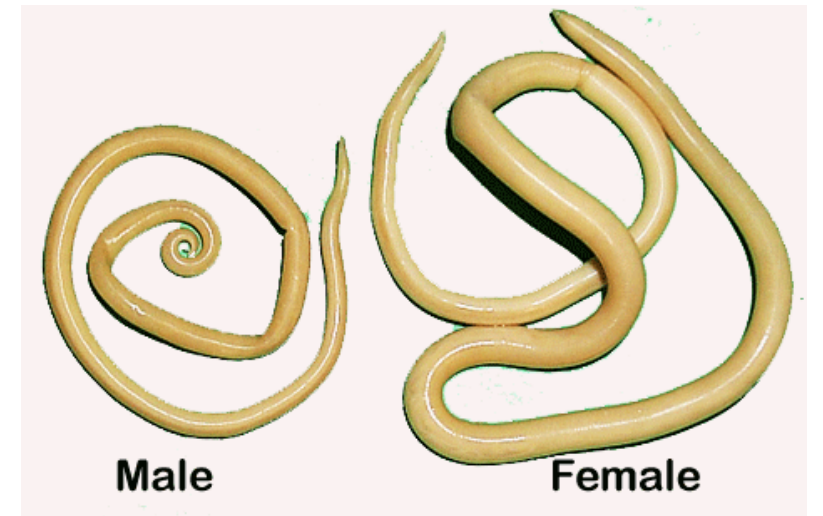
Parasitology – 5th Practical lecture

Ascaris lumbricoides

common name: Roundworm

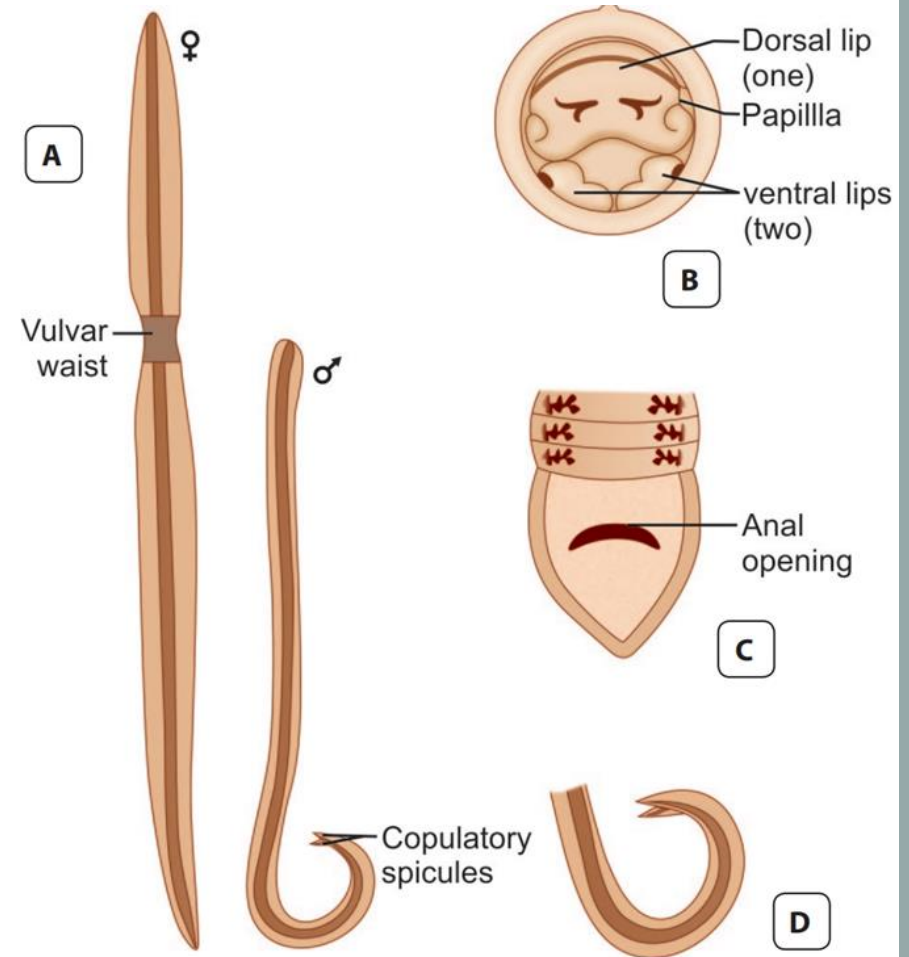


- Infections caused by the large nematode roundworm *Ascaris lumbricoides*, a soil-transmitted helminth, are called **ascariasis**.
- Over 800 million to 1 billion people are estimated to be infected worldwide.
- Adult worms live in the small intestines (85% in jejunum and 15% in ileum).
- Direct life cycle, no intermediate or reservoir hosts.
- Infective form: Embryonated eggs
- Infection occurs when the egg containing the infective rhabditiform larva is swallowed. It may also be transmitted through contaminated drinking water.



Morphology: adult form

- The adult male worm is little smaller than female. It measures 15–30 cm in length and 2–4 mm in thickness. Its posterior end is curved ventrally to form a hook and carries 2 copulatory spicules.
- The female is larger than male, measuring 20–40 cm in length and 3–6 mm in thickness. Its posterior extremity is straight and conical.
- On the tip of the head there are three lips. They have a complete digestive tract. Reproductive organs are tubular.
- The vulvar waist is believed to facilitate mating.
- A single worm lays more than 200,000 eggs per day. The eggs are passed in feces.



Morphology: eggs

- ❖ Two types of eggs are passed by the worms;
 - fertilized and unfertilized. The fertilized eggs, laid by females, inseminated by mating with a male, are embryonated and develop into the infective eggs
 - The unfertilized eggs, are laid by non-inseminated female. These are non-embryonated and cannot become infective.
- ❖ The fertilized egg passed in feces is not immediately infective. It has to undergo a period of incubation in soil before acquiring infectivity.
- ❖ The eggs are resistant to adverse conditions and can survive for several years.
- ❖ The development of the egg in soil depends on the nature of the soil and various environmental factors.
- ❖ After 10–40 days, the egg becomes the infective rhabditiform larva
- ❖ Stool samples may show both fertilized and unfertilized eggs, or either type alone.

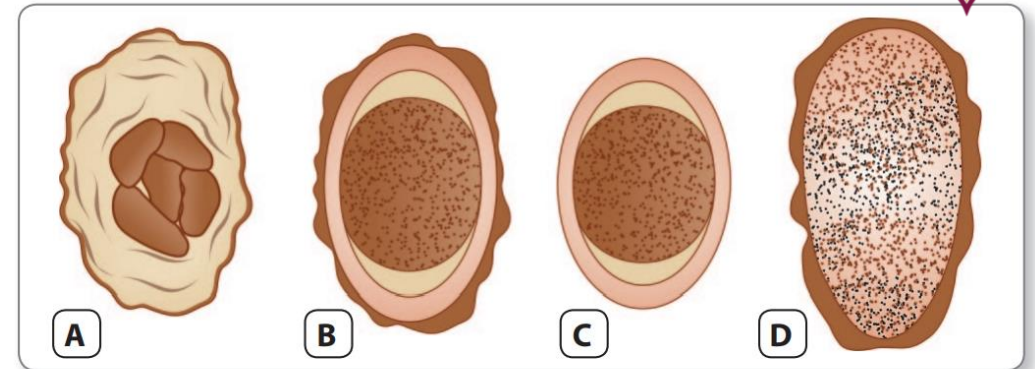


Fig. 20.3: Types of *Ascaris* eggs found in stools. **A.** Fertilized egg surface focus, showing outer mamillary coat; **B.** Fertilized egg, median focus, showing unsegmented ovum surrounded by 3 layers of coats; **C.** Decorticated fertilized egg, the mamillary coat is absent; **D.** Unfertilized egg, elongated, with atrophic ovum

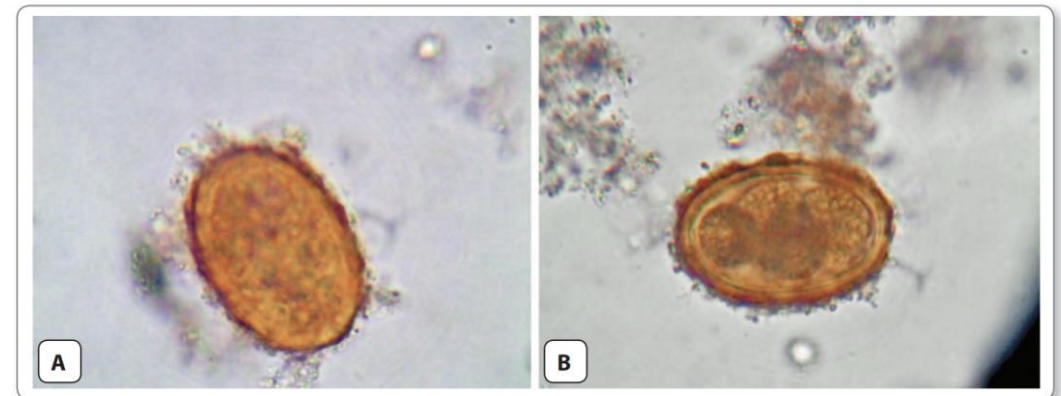
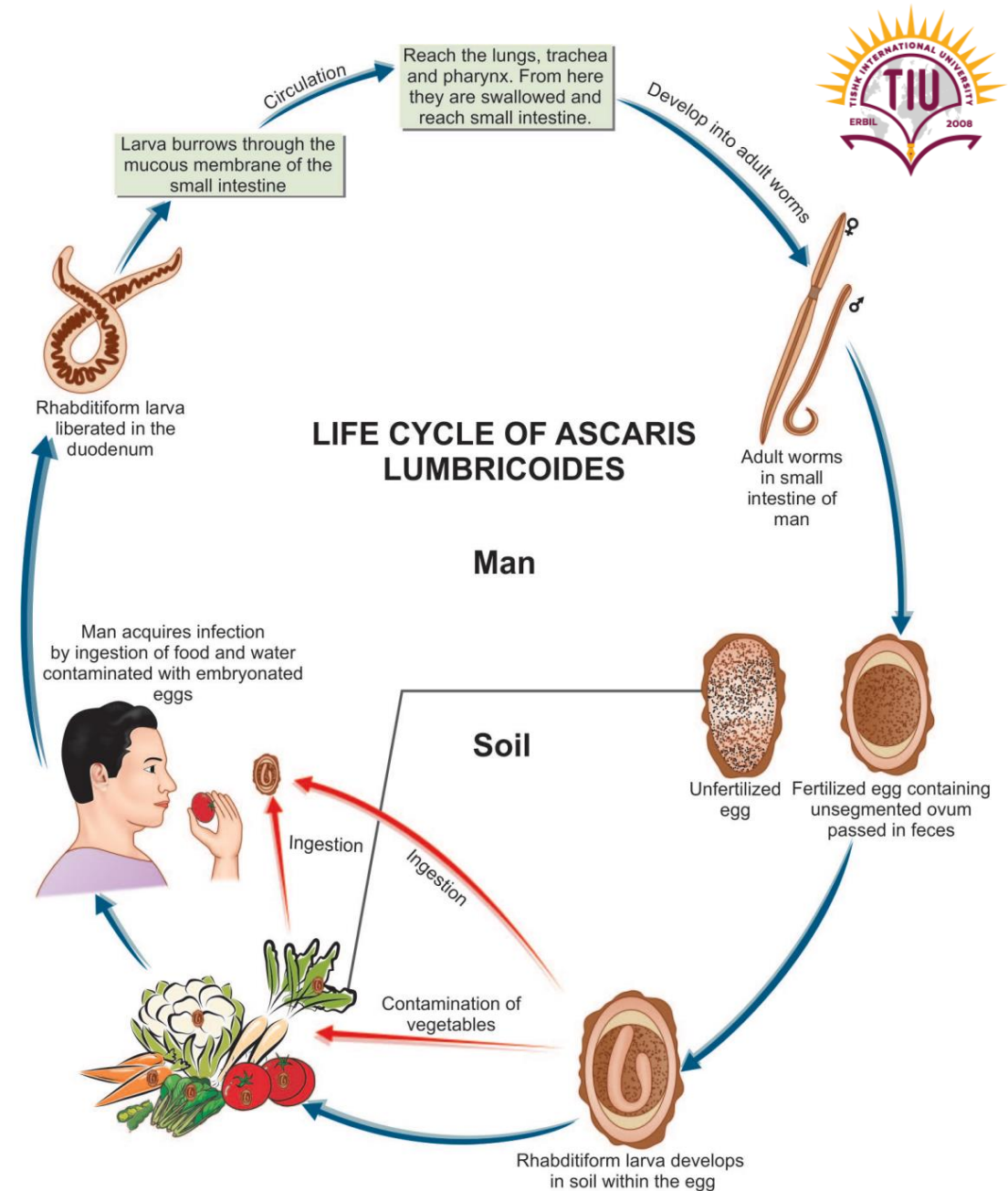


Fig. 20.4: **A.** Unfertilized egg of *Ascaris*; **B.** Fertilized egg of *Ascaris*

Lifecycle

1. When the swallowed eggs reach the duodenum, the larvae hatch out. (Infection occurs when the egg containing the infective rhabditiform larva is swallowed.)
2. They penetrate the intestinal mucosa, enter the portal vessels and are carried to the liver.
3. They then pass via the hepatic vein and in about 4 days reach the lungs.
4. After development in the lungs, in about 10–15 days, the larvae pierce the lung capillaries and reach the alveoli. They crawl up or are carried up the respiratory passage to the throat and are swallowed.
5. The larvae develop into adults in the upper part of the small intestine. They become sexually mature in about 6–12 weeks and the gravid females start laying eggs to repeat the cycle.
6. The adult worm has a lifespan of 12–20 months.



Clinical manifestation



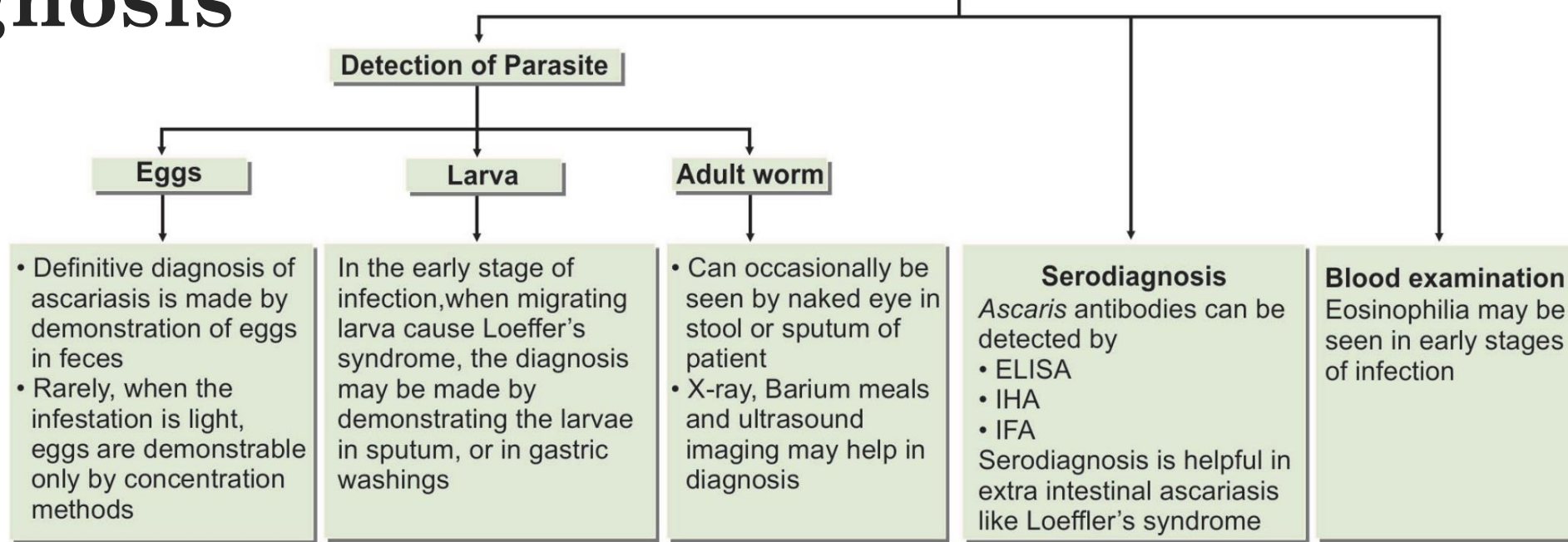
- Disease caused by *A. lumbricoides* is called as ascariasis.
- Clinical manifestations in ascariasis can be caused either by the migrating larvae or by the adult worms.

❖ Symptoms due to the Migrating Larvae:

- **Pneumonia.** This condition may present symptoms such as a **mild fever**, **coughing**, **sputum tinged with blood**, and **asthma**.
 - A significant infestation of worms can lead to **allergic reactions**. Leading to **eosinophilia**. This clinical presentation is often referred to as **Loffler's syndrome**.
- ## ❖ Symptoms due to the Adult Worm:
- Clinical manifestations due to adult worm vary from asymptomatic infection to severe and even fatal consequences.
- Asymptomatic infection
 - protein-energy malnutrition and vitamin A deficiency.
 - Ectopic ascariasis (Wanderlust): leads to acute biliary obstruction, pancreatitis and obstructive appendicitis. (Biliary ascariasis)

Diagnosis

Laboratory Diagnosis of *Ascaris lumbricoides*



- The adult worm can occasionally be detected in stool or sputum of patient by naked eye.
- General stool examination
- Sputum examination
- Blood Examination: eosinophilia in early stage of invasion
- Serological Tests
- Imaging tests

Treatment

- Several safe and effective drugs are now available for treatment of ascariasis. These include:
 - pyrantel pamoate (11 mg/kg once; maximum 1 g),
 - albendazole (400 mg once),
 - Mebendazole (100 g twice daily for 3 days or 500 mg once),
 - These medications are contraindicated in pregnancy; however, pyrantel pamoate is safe in pregnancy.

Prophylaxis

- Treatment of vegetables and other garden crops with water containing iodine 200 ppm for 15 minutes kills the eggs and larvae of *Ascaris* and other helminths.
- Avoid eating raw vegetables.
- Improvement of personal hygiene.
- Treatment of infected persons especially the children



References

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Thank you!

Any questions?