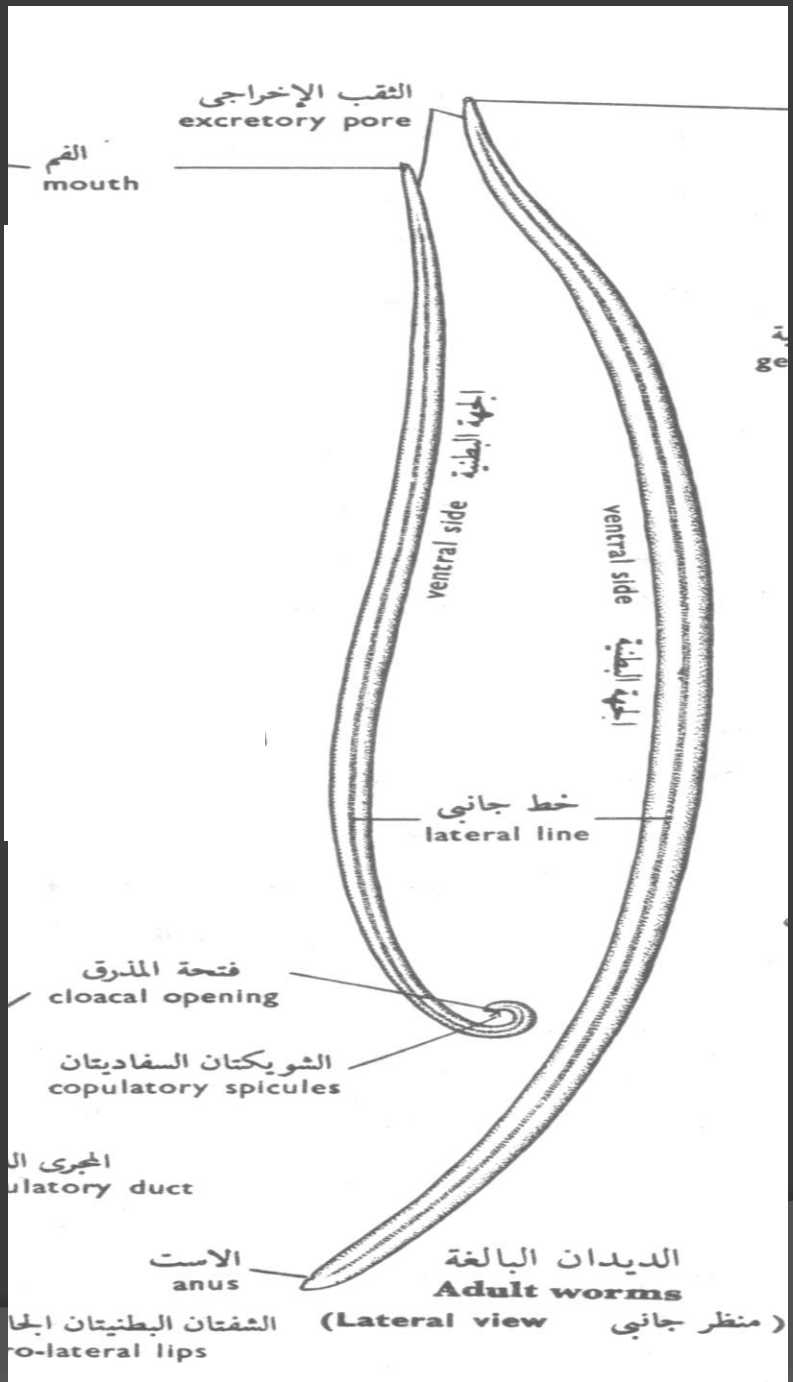
Phylum: Nematoda:
NEMATODES (Round Worms) :
INTESTINAL HELMINTHS:
Intestinal nematodes of importance to man are *Ascaris lumbricoides* (roundworm), *Trichinella spiralis* (trichinosis),
Trichuris trichiura (whipworm),
Enterobius vermicularis (pinworm),
Strongyloides stercoralis (Cochin-china diarrhea),
Ancylostoma duodenale and *Necator americanes* (hookworms) .

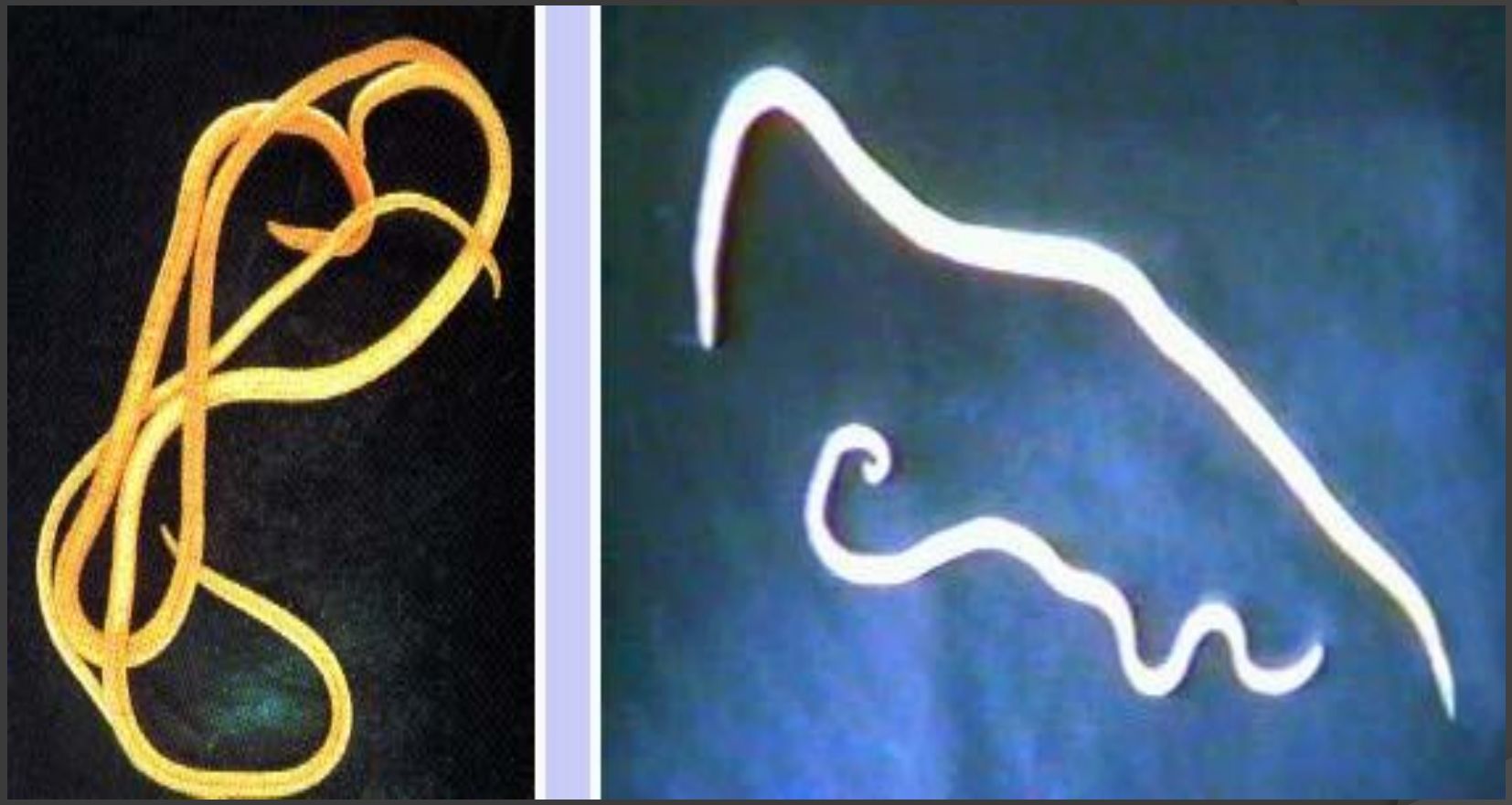
Ascaris lumbricoides (Large intestinal roundworm):

Ascaris lumbricoides, common saying “round worm of man”, is the largest of the intestinal nematodes parasitizing humans, cattle, equines, dogs, cats. **It is the most common worm found in human**. It is worldwide in distribution and most prevalent through out the tropics, sub-tropics and more prevalent in the countryside than in big cities.

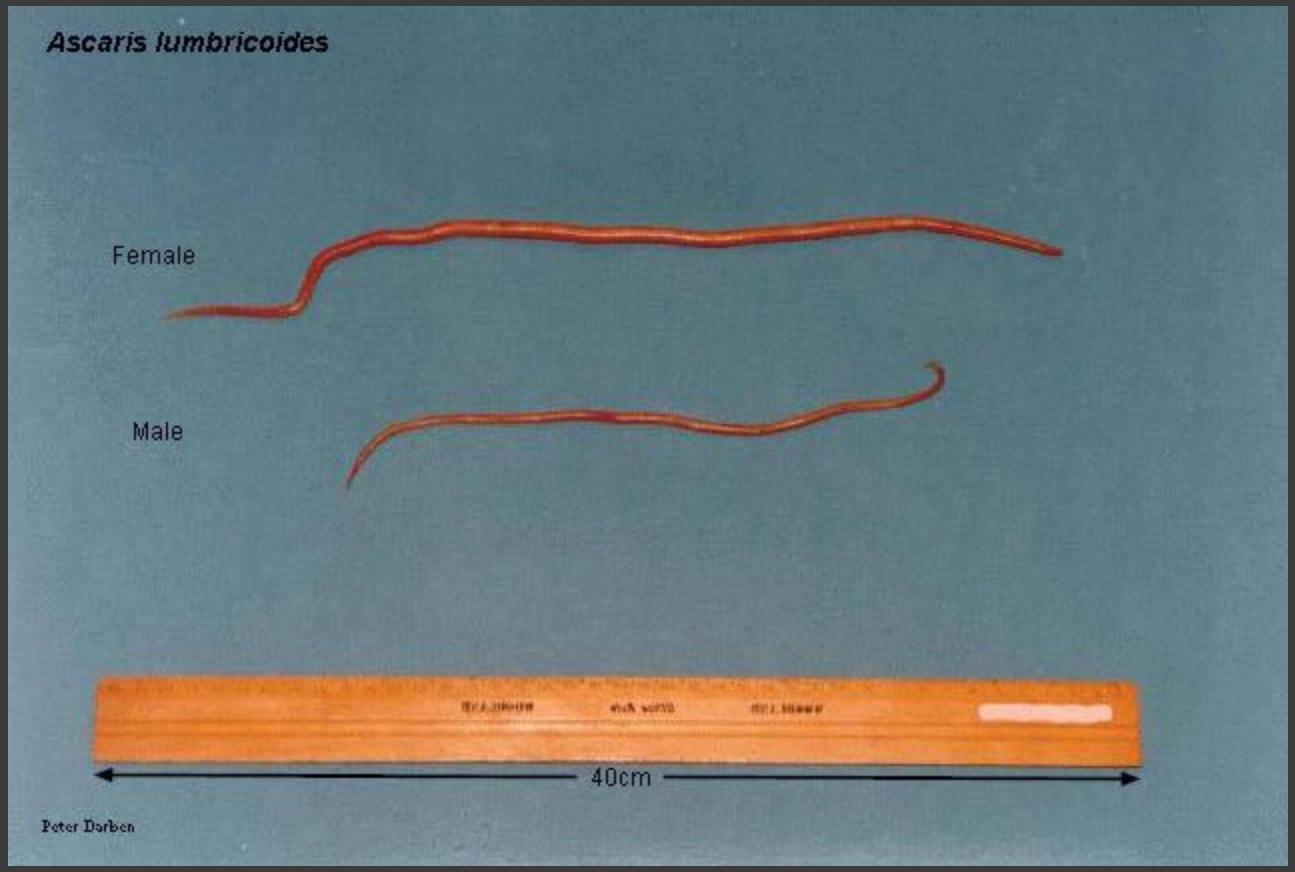
- Adult: The adults are cylindrical in shape, creamy-white or pinkish in color. The female averages 20-35cm in length, the largest 49cm. The male is smaller, averaging 15-31cm in length and distinctly more slender than the female. The typical curled tail with a pair of copulatory spines.

On the tip of the head there are three lips. They have a complete digestive tract. Reproductive organs are tubular. male has a single reproductive tubule. The female has two reproductive tubules and the vulva is ventrally located at the posterior part of the anterior 1/3 of the body.


الثقب الإخراجي
excretory pore
الفم
mouth
الجهة البطنية
ventral side
ventral side
الجهة البطنية
خط جانبي
lateral line
فتحة المذرق
cloacal opening
الشويكتان السفاديتان
copulatory spicules
الاست
anus
الديدان البالغة
Adult worms
(Lateral view
منظر جانبي)

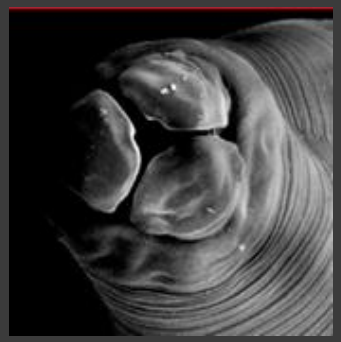


This worm is a female, as evidenced by the size and genital girdle (the dark circular groove at bottom area of image).


Ascaris lumbricoides
Female
Male
40cm
Peter Darben

The lips of Ascaris lumbricoides

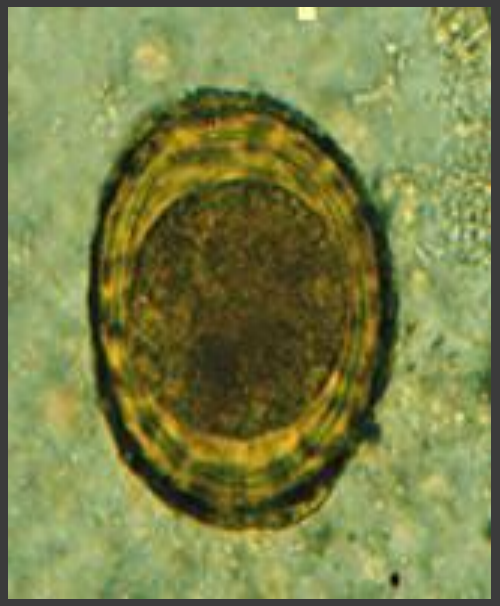
The three lips are seen at the anterior end. The margin of each lip is lined with minute teeth which are not visible at this magnification.



Eggs:

1. Fertilized eggs: broad oval in shape, brown in color, an average size 60×45 μm. The shell is thicker and consists of, chitinous layer, fertilizing membrane and albuminous coat stained brown by bile. The content is a fertilized ovum.

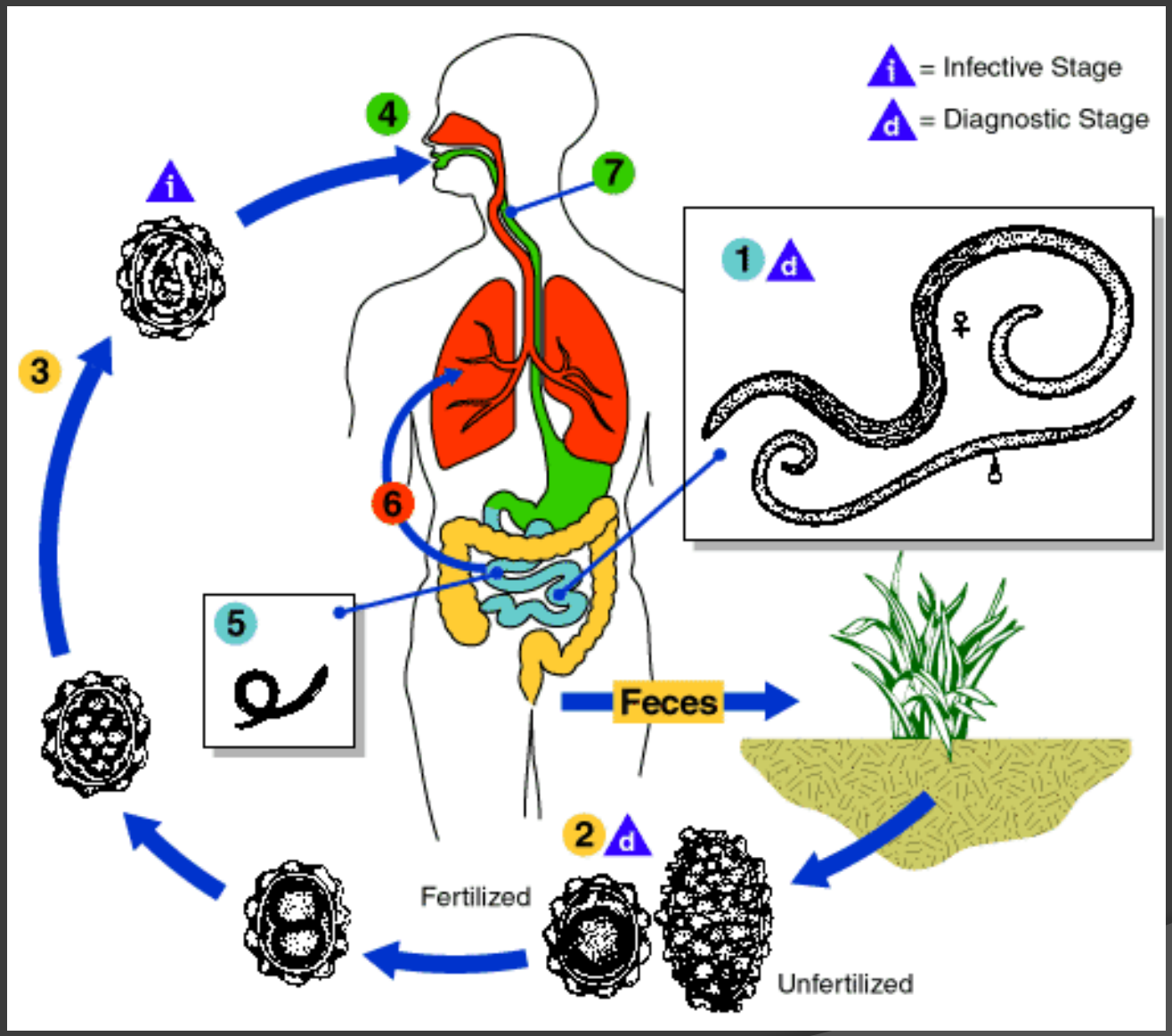
Fertilized *Ascaris* Egg



A fertilized *Ascaris* egg, still at the unicellular stage, as they are when passed in stool.

Unfertilized egg

The chitinous layer and albuminous coat are thinner than those of the fertilized eggs without fertilizing membrane. The content is made of many granules various in size.


i = Infective Stage
d = Diagnostic Stage
1 d
2 d
3
4
5
6
7
Feces
Fertilized
Unfertilized

Ascaris Life Cycle

Adult worms (1) live in the lumen of the small intestine. A female may produce approximately 200,000 eggs per day, which are passed with the feces (2) . Unfertilized eggs may be ingested but are not infective. Fertile eggs embryonate and become infective after 18 days to several weeks (3), depending on the environmental conditions (optimum: moist, warm, shaded soil). After infective eggs are swallowed (4). the larvae hatch (5) , invade the intestinal mucosa, and are carried via the portal, then systemic circulation to the lungs (6). The larvae mature further in the lungs (10 to 14 days), penetrate the alveolar walls, ascend the bronchial tree to the throat, and are swallowed (7). Upon reaching the small intestine, they develop into adult worms (1) . Between 2 and 3 months are required from ingestion of the infective eggs to oviposition by the adult female. Adult worms can live 1 to 2 years.

1. **Site of inhabitation**: small intestine
2. **Infective stage**: embryonated eggs
3. **Route of infection**: by mouth
4. No intermediate and reservoir hosts
5. **Life span of the adult**: about 1-2 years

There are two phases in ascariasis:

1. **The blood-lung migration phase of the larvae**: During the migration through the lungs, the larvae may cause pneumonia. The symptoms of the pneumonia are low fever, cough, blood-tinged sputum, asthma. Large numbers of worms may give rise to allergic symptoms. **Eosionophilia** is generally present.

2. **The intestinal phase of the adults**. The presence of a few adult worms in the lumen of the small intestine usually produces no symptoms, but may give rise to abdominal pains or intermittent colic, especially in children. A heavy worm burden can result in malnutrition. More serious manifestations have been observed. Wandering adults may block the appendical lumen or the common bile duct and even perforate the intestinal wall.

- Thus complications of ascariasis, such as intestinal obstruction, appendicitis, biliary ascariasis, perforation of the intestine, cholecystitis, pancreatitis and peritonitis, etc., may occur, in which biliary ascariasis is the most common complication.

The symptoms and signs are for reference only. The confirmative diagnosis depends on the recovery and identification of the worm or its egg.

1. *Ascaris* pneumonitis: examination of sputum for *Ascaris* larvae is sometimes successful.

2. Intestinal ascariasis: feces are examined for the *Ascaris* eggs.

(1) direct fecal film: it is simple and effective. The eggs are easily found using this way due to a large number of the female oviposition, approximately 240,000 eggs per worm per day. So **this method is the first choice**.
(2) brine-floatation method:
(3) recovery of adult worms: when adults or adolescents are found in feces or vomit and tissues and organs from the human infected with ascarids.

Epidemiology

World wide distribution, especially in the countryside.

Factors favoring the spread of the transmission:

1. Simple life cycle.
2. Enormous egg production (240,000 eggs/ day/ female).
3. These eggs are highly resistant to ordinary disinfectants(due to the ascroside, a group of glycolipids containing sugar sacarylose in some nematodes). The eggs may remain viable for several years.
4. Social customs and living habits.
5. Disposal of feces is unsuitable.

Prevention and Treatment

1. Treatment of ascariasis: **Mebendazole, Albendazole** and **Levamizole** are effective.
2. Sanitary disposal of feces.
3. Hygienic habits such as cleaning of hands before meals.
4. Health education.