

Life cycle of Fasciola hepatica

B.Sc First year Honours (Zoology) Paper - 1

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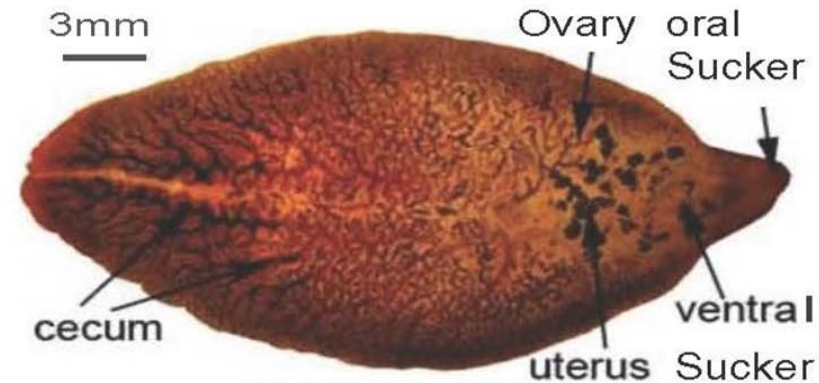
Fasciola Hepatica

- **Common name :** The sheep liver fluke.
- **Habitat:** Bile duct of liver.
- **Route of infection :** Sheep eat aquatic plants with encysted metacercariae.
- **Definitive host:** Usual host sheep, various mammals **including humans.**
- **Intermediate host:** Fresh water snails.
- **Infective stage:** Encysted metacercariae on vegetations.
- **Diagnostic stage:** Eggs in stool specimen.
- **Disease:** Fascioliasis.

Fasciola hepatica adult

Morphological characteristics

- Length 30mm and a width of 13 mm
- It is leaf shaped.
- Has conical projection.
- Oral and ventral sucker.
- Branched caecum.
- Coiled uterus.



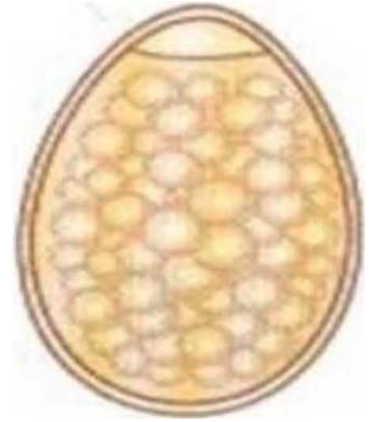
Life cycle

- The parasite browses on liver tissue for a period of up to 5-6 Weeks and eventually finds its way to the bile duct where it matures into an adult and begins to produce eggs.
- Up to **25,000 eggs per day per fluke** can be produced , and in a light infection, up to 500,000 eggs per day can be deposited onto pasture by a single sheep.

large operculated eggs in the faeces.

Ellipsoid shape

130-150 μm long and 60-90 μm wide



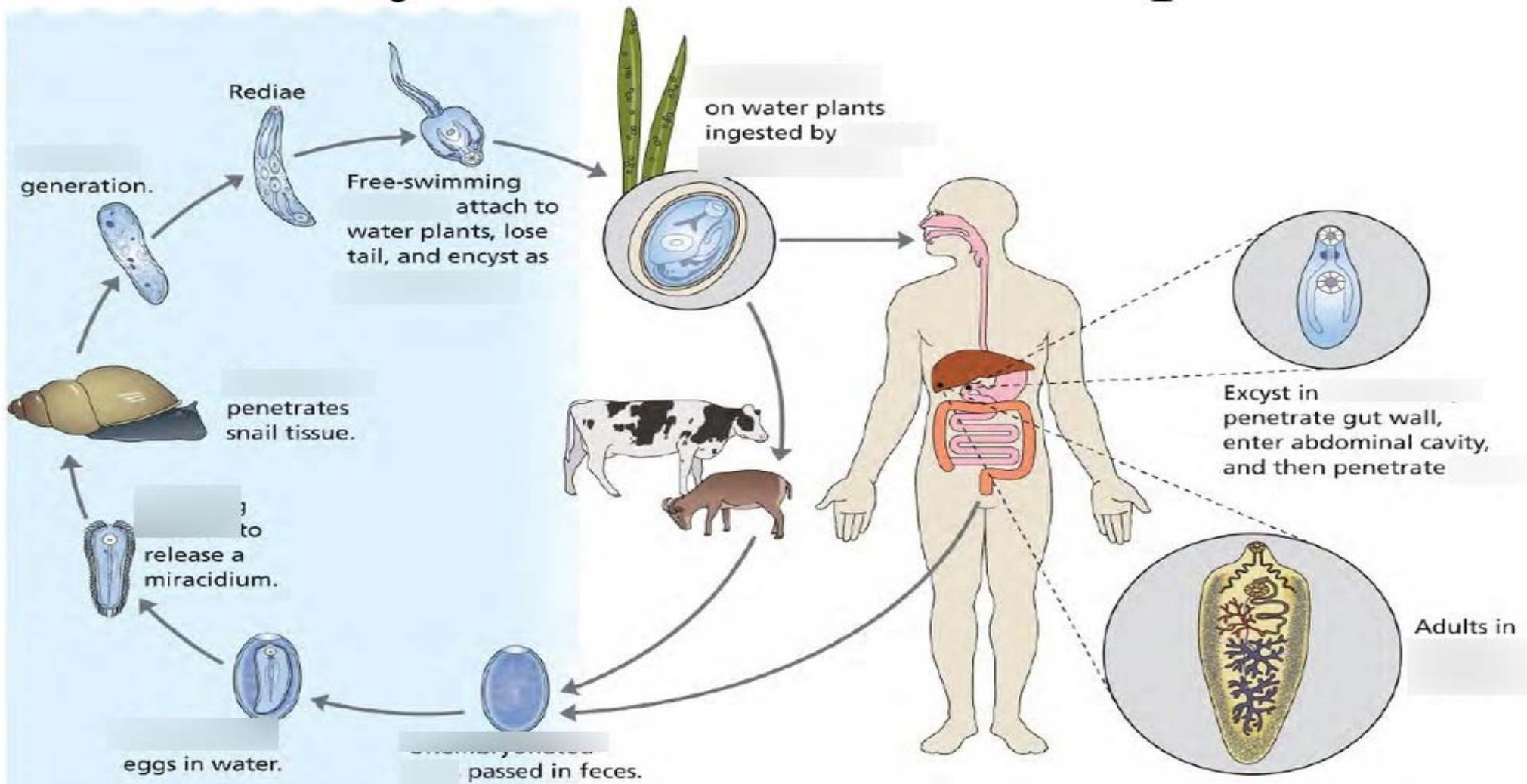
Egg capsule with emerging miracidium
Fasciola hepatica.

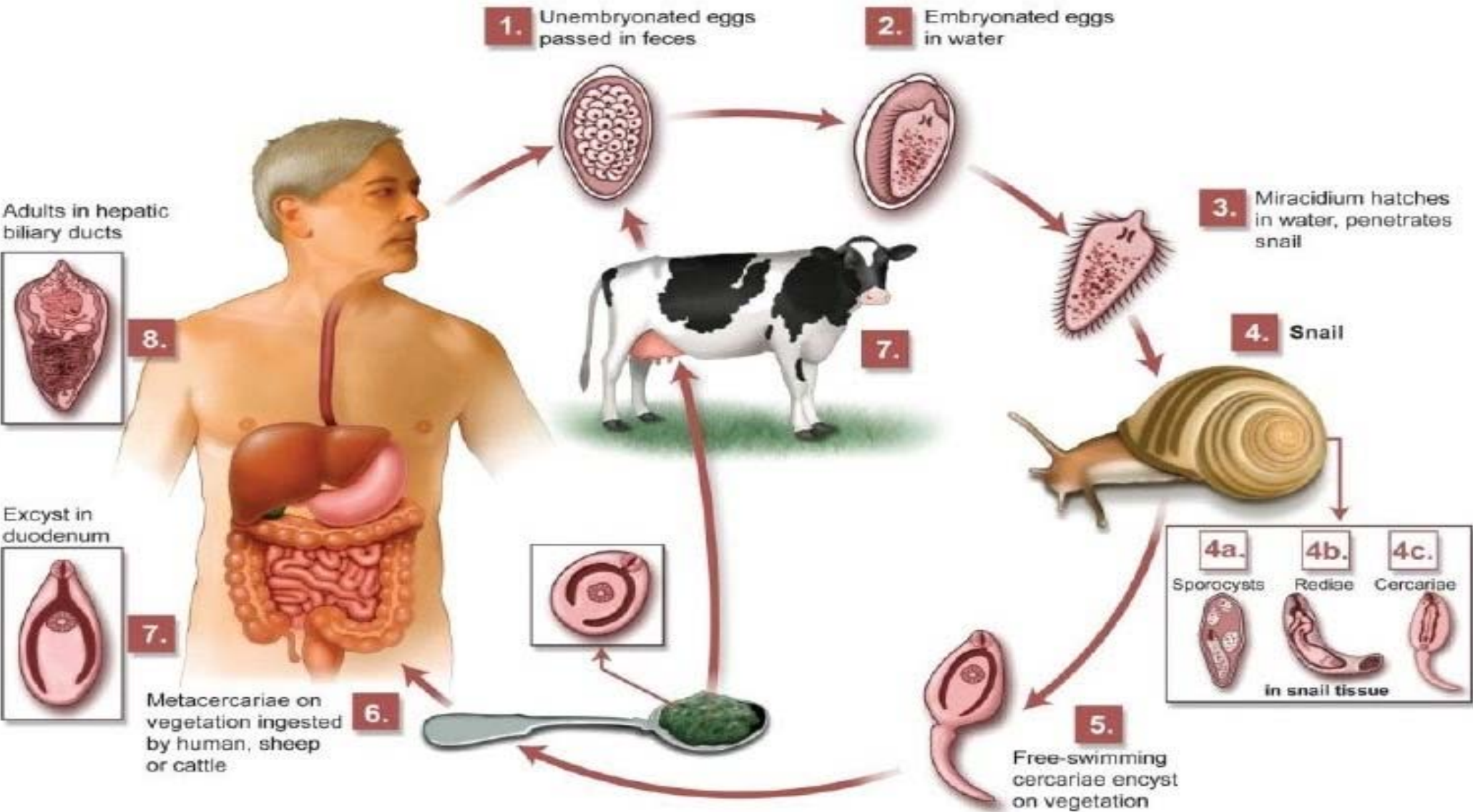


Life cycle aquatic

- **Definitive Hosts -- Cattle, Sheep, Goats & Camelids**
- **Ova develop & hatch in water**
- **Miracidia penetrate snail host**
- **Snail 1st Intermediate Host**
- **Pond / Puddle snails (Sporocysts and Redia)**
- **Cercaria**
- **2nd Intermediate Host (= Environment)**
- **Aquatic or Semi-aquatic Vegetation (metacercaria) (survive 6-10 months)**
- **Young & Adult Flukes**
- **Young flukes migrate from intestine via peritoneal cavity to the liver**
- **Young flukes migrate throughout liver parenchyma**
- **Adult worms live in the bile ducts**
- **Entire Life Cycle: 3-6 months**
- **Longevity: up to 11 years**

Life Cycle of *Fasciola hepatica*





1. Unembryonated eggs passed in feces

2. Embryonated eggs in water

3. Miracidium hatches in water, penetrates snail

4. Snail

4a.	4b.	4c.
Sporocysts	Rediae	Cercariae
in snail tissue		

5. Free-swimming cercariae encyst on vegetation

6.

Metacercariae on vegetation ingested by human, sheep or cattle

7.

Excyst in duodenum

Adults in hepatic biliary ducts

8.

Pathology and clinical symptoms.

- Most of **the damage results** from worms migrating through the **liver parenchyma feeding on liver cells and blood**.
- Worm in the bile ducts cause **inflammation and edema**.
- The triad of **fever, hepatomegaly, and eosinophilia** can be seen.
- Symptoms and signs are associated with **biliary obstruction**.

- Symptoms in Acute condition

- Due to migration of young flukes through liver.
- Severe liver damage, inflammation.
- May precipitate “Black Disease” (Close tridial infection); usually result in sudden death, especially in sheep.

- Chronic (Due to adults in bile ducts)
 - Anemia
 - Hemorrhage (Blood feeding adults)
 - Hemolysis (Proline excreted by adult worms)
 - Bile duct stenosis (fibrosis)
 - Physical irritation (Worm feeding & activity)
 - Chemical irritation (Proline excreted by adult worms)
 - Hyperproteinemia (edema)
 - Protein Loss (Blood feeding adults)
 - Protein Leak (fibrotic bile ducts show increased permeability)
 - Liver dysfunction decreased (globulin / albumin production)