

# FASCIOLA HEPATICA

*Dr. RAMBABU ( ASSOCIATE PROF.)*

*DEPTT. OF ZOOLOGY*

*Dr. B.R. AMBEDKAR GOVT. DEGREE COLLEGE MAINPURI*

1. Fasciola hepatica commonly called the liver fluke or liver fluke of cattle.
2. Fasciola hepatica is a world wide distributed found chiefly in sheep and goats.
3. Due to leaf like flattened shape and its habit to live in the liver of the host.
4. Two spaces are known from the Indian sub continent. These are Fasciola hepatica and Fasciola gigantica.
5. The deases caused by the fluke is called "Liver root" or Fascioliasis.

## LIFE CYCLE

1. The life cycle of Fasciola hepatica is completed in two hosts ( diegenetic life cycle)
2. The Primary or definite host is sheep while the secondary or intermediate host is a snail of the genius limnaea.
3. Its Life cycle includes a number of larval stages which propagate by a sexual multiplication.

**(I) COPULATION AND FERTILIZATION:** Although fasciola is a hermaphrodite animal but cross fertilization occurs. The two fluke copulate inside the bile duct of host's body. The cirrus of one is inserted into the opening of the laurer's Cannel of the other organism. The eggs are fertilize inside the oviduct. The fertilized eggs are deposited with yolk cell. A single fluke make produce about 30000 to 35000 per year.

**(II) EGGS:** The fully formed fertilized eggs are light brown oval structure measuring about  $130 \times 150 \mu$  in size. Such eggs are called operculate.

**(III) SEGMENTATION AND EARLY DEVELOPMENT:** Starts even when the eggs are inside the uterus.

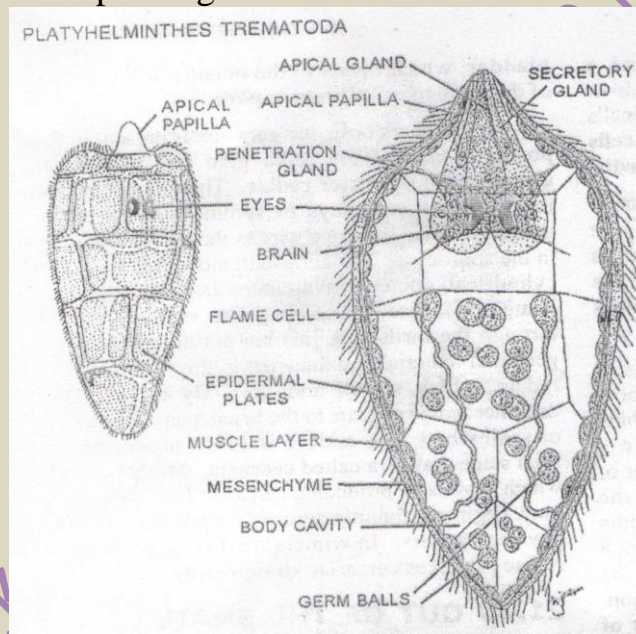
- i) The first cleavage is complete but unequal and produces. A small granular propagatory cell, large somatic cell.
- ii) The somatic cell after division form larval body structure.
- iii) The propagatory cell form the germs cell.
- iv) With 9 to 15 days the embryonic development is completed and a ciliated miracidium larva is formed.

**(IV) HATCHING:** In contact with water the operculum of egg capsule opens and ciliated miracidium hatches out it swims in water activity.

### **(1) MIRACIDIUM LARVA**

The first larval form emerging from the egg capsule is called a miracidium it swim actively in search of secondary host the snail of genus limnaea.

- i) Oval or conical shape broad anterior and narrow posterior and about 0.07 mm long.
- ii) Body wall consist two cellular layers outer layer is covered with 21 closely fitted hexagonal epidermal plates.
- iii) Below the epidermal plates is a thin layer of sub epidermal musculature. Consisting a pair of protonephridia and a group of germ cell. A pair of Eye spot a large larval brain and a simple nervous system. A large apical gland and a pair of cephalic glands.



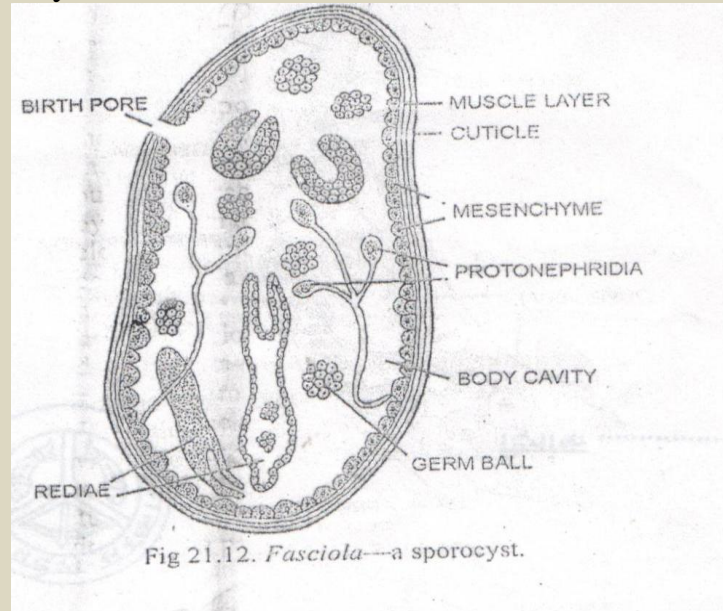
### **(2) INFECTION OF THE SECONDARY HOST**

Miracidium does not feed and swims actively in water in search of its secondary host limnaea. In case it fails to reach the host it dies with in 24 hours. If it finds the snail throws of ciliated epidermis penetrate deeper two reach pulmonary chamber. Here it change into second larva stage the sporocyst.

### **(3) SPORO CYST LARVA**

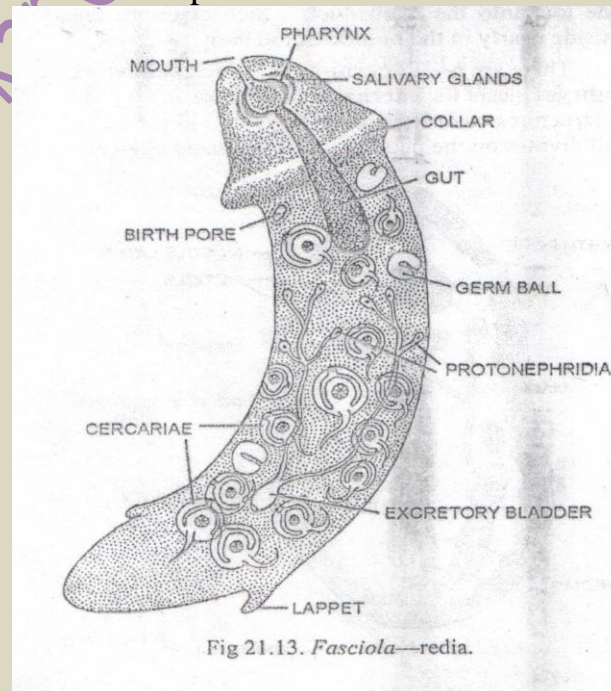
- i. Miracidium loose its apical gland penetration gland brain and eye spot and change into a sac like sporocyst larva.
- ii. It is an elongated covered with thin cuticle occupied by the protonephridia and germ cells.
- iii. The germ cell under go repeated division to produce redia larva. But may also produce daughter sporocyst.

- iv. A single sporocyst content 5-8 redia larva.



#### **(4) REDIA LARVA**

- i. It is an elongated and cylindrical sac with a thin cuticle.
- ii. Anterior and consist a small mouth a suctorial pharynx small gut and pharyngeal glands.
- iii. The lappets are present at the posterior end.
- iv. The body is filled with loose parenchyma in which germ cell and flame cells are found.
- v. The germs ball present inside redia give rise to generation of daughter redia in summer month and produce cercaria larva in autumn.



### (5) CERCARIA LARVA

- i. A fully formed cercaria larva possess a flattened heart shaped body with a long contractile tail.
- ii. The body surface is covered with cuticle, anterior ends bear mouth, muscular pharynx, oesophagus and bifid intestine.
- iii. Oral and ventral sucker presents numerous germ cell, flame cell and excretory ducts are found in the internal cavity. The Secretion of cytogenous glands forms the cyst. When it converted into metacercaria larva.
- iv. When mature the cercaria leave the redia through birth pore and swims in water for some time and finally settles down on the blade of some aquatic weed it sheds of the tail.

### (6) METACERCARIA LARVA

- i. It is some what rounded with thick outer covering of cuticle in the form of cysts.
- ii. The cytogenous cells disappear. Flame cells increase in number.

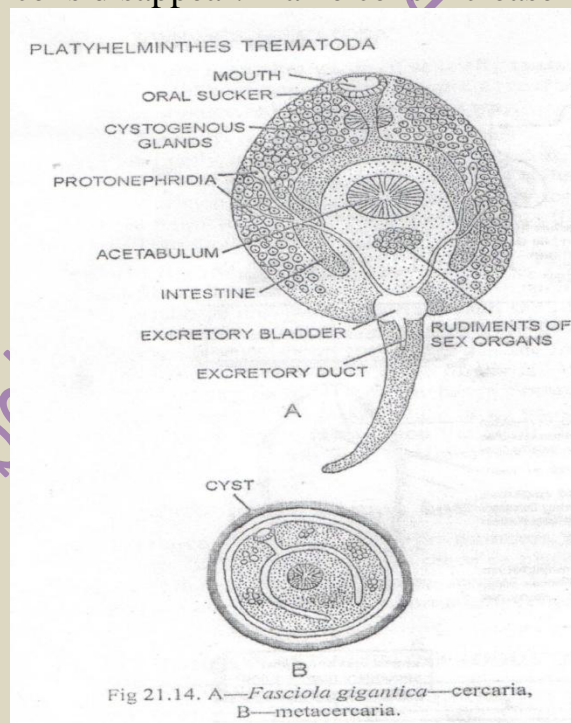


Fig 21.14. A—*Fasciola gigantica*—cercaria, B—metacercaria.

### (7) INFECTION OF THE FINAL HOST

The metacercaria enters the final host the sheep when it grazes on the aquatic weeds and reaches the intestine. In the intestine cyst is dissolved by the action of digestive enzymes and young fluke comes out. It reaches the liver through the hepatic portal system and start its existence in the bile passage.

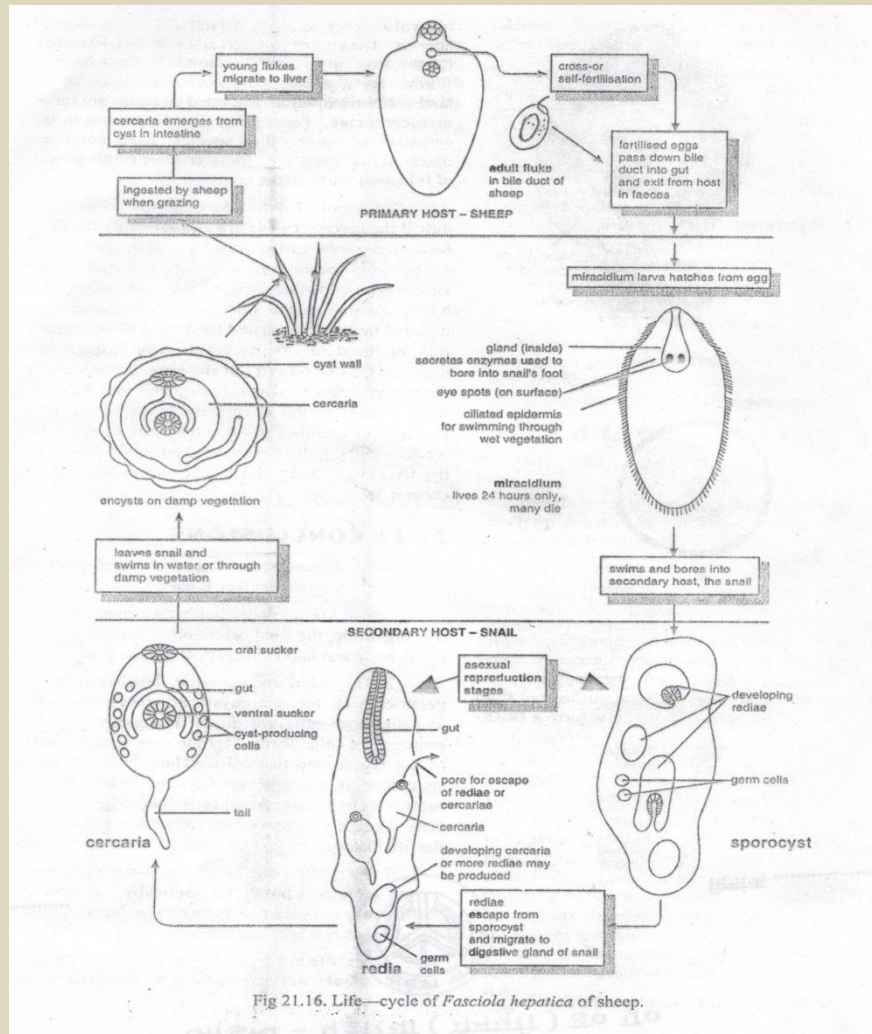


Fig 21.16. Life—cycle of *Fasciola hepatica* of sheep.

### QUESTION:

1. Describe the various larval forms of fasciola and explain their significance?
2. What is digenetic life cycle? Explain it with reference to the life history of fasciola.
3. Describe the life cycle of fasciola hepatica?

### MULTIPLE CHOICE QUESTION:

1. Planorbis and limnea are the intermediate host of –  
 A. Fasciola    B. Schistosoma    C. Trichnella    D. Echinococcus
2. Miracidium is one of the stages in the development of-  
 A. Taenia solium    B. Ascaris lumbricoids    C. Planaria  
 D. Fasciola hepatica
3. The cause of liver root in sheep is-  
 A. Dugesia    B. Taenia    C. Fasciola    D. Schistosoma
4. Fasciola hepatica is a parasite that lives in the-  
 A. Intestine of sheep    B. Liver of sheep    C. Spleen of sheep  
 D. Pancreas of sheep.