

# FASCIOLA HEPATICA

(Liver Fluke)

Q → Describe structure and anatomy of Fasciola <sup>hepatica</sup>

Fasciola hepatica is commonly known as liver fluke or distomum hepaticum. Adult is a parasite in the livers and bile duct of sheep, cow etc. It causes a disease called liver-rot. It is digenetic <sup>endo-</sup> parasite of snail and vertebrates, therefore their life shows alternation of hosts.

## STRUCTURE :

It is dorsoventrally flattened, leaf like of 19mm to 38.1mm in length and about 12.7mm width. Anterior end is triangular while posterior end is tapering. The anterior end terminate into a projection, which is called apical lobe or cephalic lobe or head lobe. At the apex of head lobe is situated a small opening called mouth, which is surrounded by <sup>anterior</sup> muscular sucker, called oral or anterior sucker.

At a short distance behind the head lobe is situated another sucker known as ventral sucker or acetabulum situated on the ventral side. ventral sucker has no connection with the interior of the body.

Suckers serves for the attachment of the liver fluke to the wall of the bile passage. Just in front of the acetabulum there is a common genital pore. At the posterior end is excretory pore. During breeding season, on the dorsal surface is found the opening of Laurer's Canal.

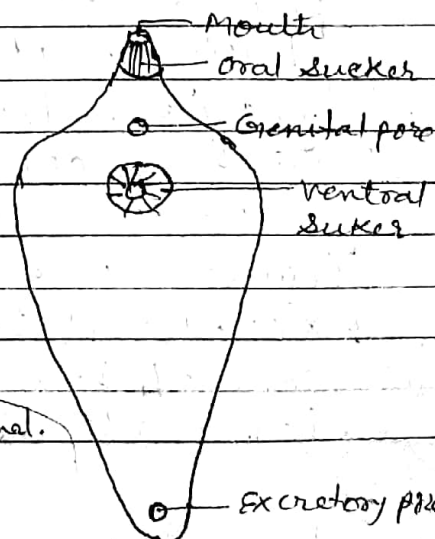


Fig. External feature of Fasciola

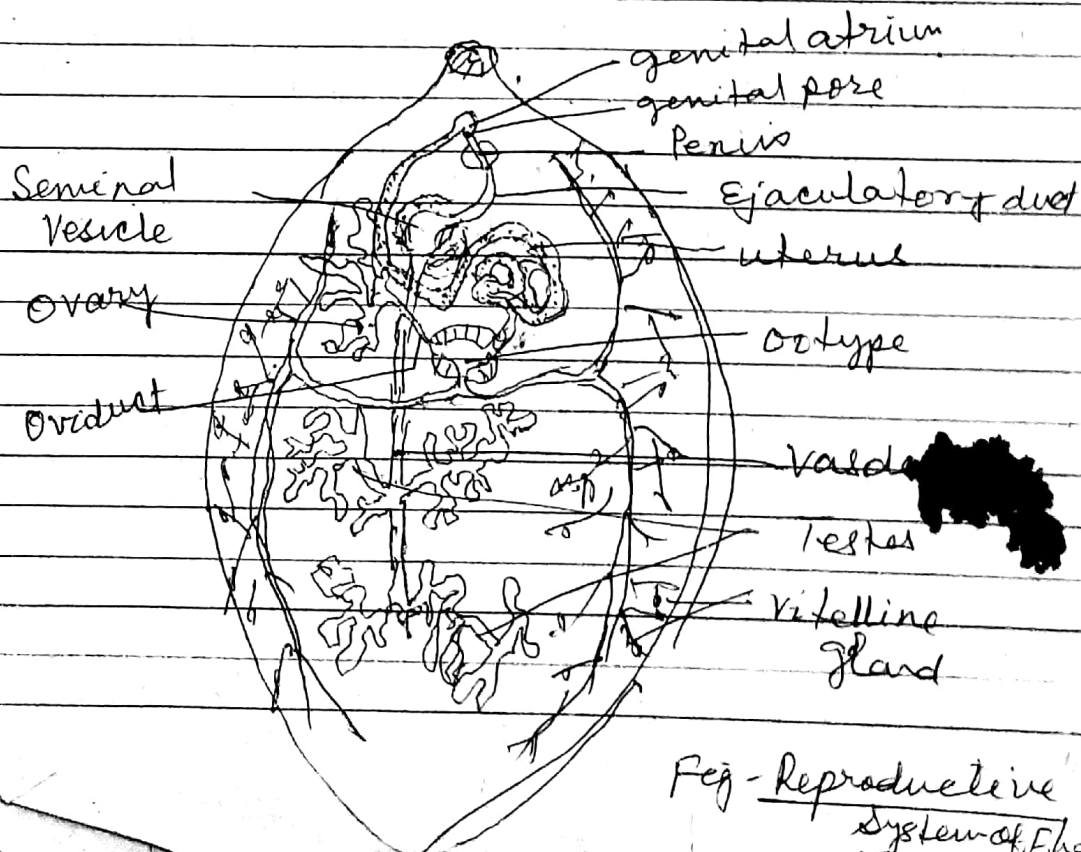
## Reproductive System:

Fasciola is hermaphrodite and so both male and female reproductive organs are found in same animal. There is only cross fertilization.

### Male Reproductive Organs: It consists of:

- (i) two testes, (ii) two vas deferentia, (iii) seminal vesicle, (iv) one ejaculatory duct and (v) cirrus and cirrus sac.

Testes: Testes are situated in the middle and posterior part of the body. These are extremely branched and lie one behind other. From each testis arise out one vas-deferent which unite to form a common sperm duct. They enlarge in front of ventral sucker to form a pear shaped seminal vesicle. From this arise thin zig-zag tube called ejaculatory duct, which runs forward through cirrus <sup>or Penis</sup> to genital chamber where it open outside through male genital aperture.





### Female Reproductive System: It consists of.

- i) One Ovary. ii) One Oviduct, (iii) Cotype
- iv) Uterus (v) Shell glands with their ducts and (vi) Laurer's canal.

The single ovary is tubular highly branched like on the right side, in front of posterior feet. The oviduct comes out from the ovary and proceeds downwards. on its course it gives out the Laurer's canal. Then it join with median vitelline duct. This point of union is swollen and is called cotype. Cotype is surrounded by Shell or Mehlis glands. From cotype comes out a wide convoluted uterus which open into genital aperture atrium by female gonopore. Numerous vitelline glands are also found in each lateral side.

Within the fertilized eggs by complete and unequal division form a large somatic cell and a small preopercular cell. By repeated division the somatic cells form the body of worm and the preopercular cells form the germ cells.

### Life Cycle:

Cross fertilization takes place by insertion of the cirrus of one fluke into the Laurer's canal of another fluke. Transference of the spermatozoa directly into the oviduct is possible. Eggs are fertilized in the oviduct and become covered by with chitinous shell formed by some of the yolk-cells. Shelled egg called capsule. Each capsule has an operculum or lid at one pole. Capsule pass on to the uterus where further development starts. There are 3,000 to 4,000 capsules in the uterus of liver fluke.

The development takes place within the capsule as they are passing along the uterus. The development is completed after the capsule have passed to the outside with the faeces.

of the hosts. The hatching of the capsule takes place from a few hours to several weeks depending upon the development going on in the interior on reaching sufficient damp conditions a free swimming larva called miracidium is hatched. The larva swims freely in water or moist vegetation and soon die if it does not reach snail.

In Snail: On finding the snail the miracidium bores to the soft organs by its papillae and reaches to pulmonary sac, where it cast off the coat of ciliated cells and grows rapidly to change into another Sporocyst larva.

The sporocyst larva absorbs nourishment from host tissue. The germ balls produced another larva called Redia, Redia larva.

The germ balls of redia larva gives rise to secondary redia in the summer months only, or the fourth type of larva, the Cercaria.

There is encystment in Cercaria takes place which change into metacercaria larva. Further development is takes place if the cyst is followed by the main host i.e. the Sheep.

If a sheep is feed on infested leaves the cyst wall is digested and a young fluke emerge, bore the gut wall and reaches the bile duct where it grows and matures, thus completing the life cycle.



### Miracidium Larva:

This is first larva formed in the life cycle of Fasciola. It is free swimming ciliated larva with broader anterior end which is provided with conical projection called apical lobe. The posterior end is narrow and slightly conical. The entire body except apical lobe is surrounded by cilia.

The ectoderm is formed by 25 hexagonal cells arranged in 5 rows (6+6+3+4+2) below which is the muscular layer. It has brain eye spots arranged like 'X', a pair of protonephridia and a group of germ cells are found.

Finding the snail (Limnea), it penetrates the host's soft body and reaches the pulmonary chamber. From here it comes to the digestive gland and throws off the cilia and change into second larva called sporocyst larva.

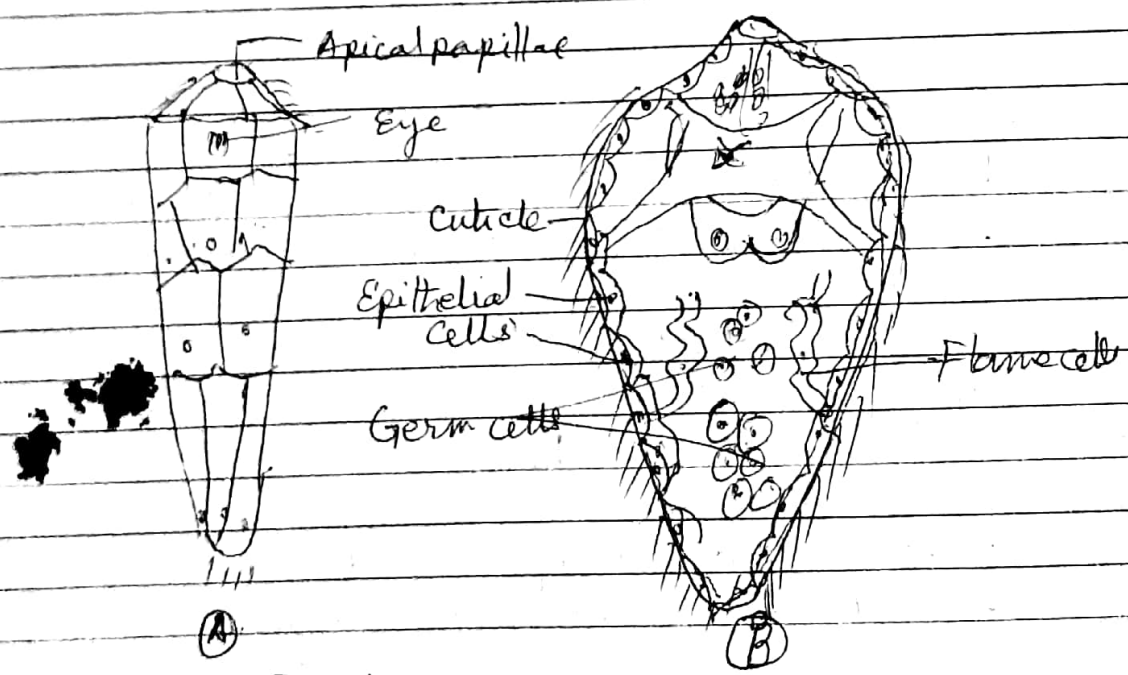


Fig A & B - Miracidium Larva.

② Sporocyst Larva.

Sporocyst larva is elongated sac like structure covered by cuticle. It contains protonephridia and germ cells which by division form redia larva or daughter sporocyst. When redia larva fully mature it comes out by rupture of sporocyst wall.

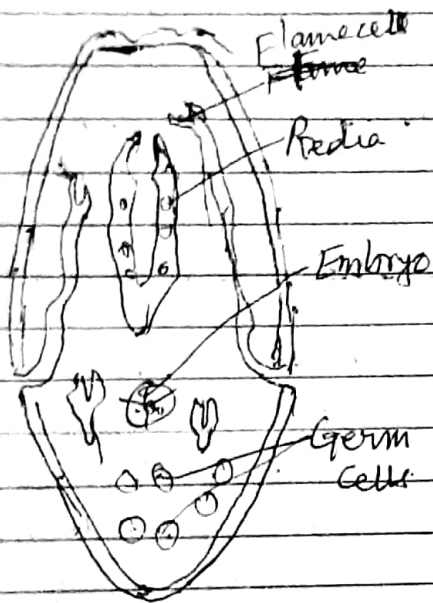


Fig. Sporocyst larva.

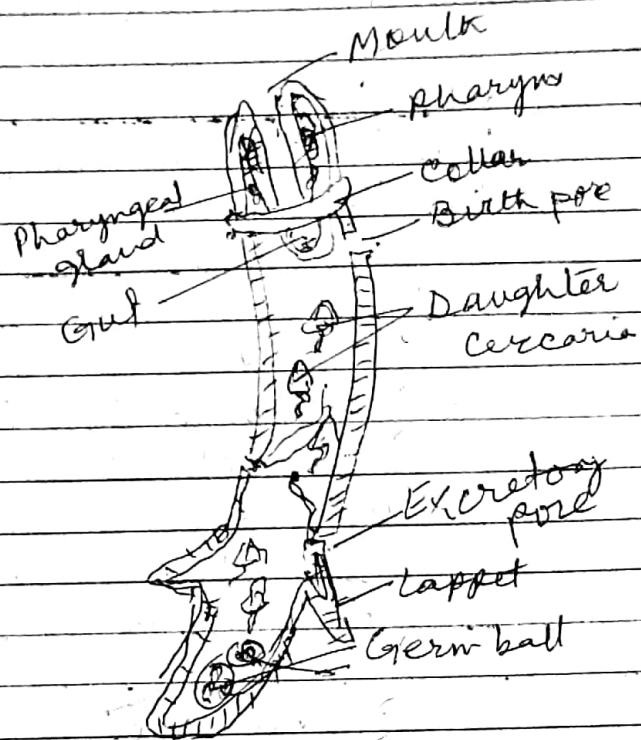


Fig. Redia larva.

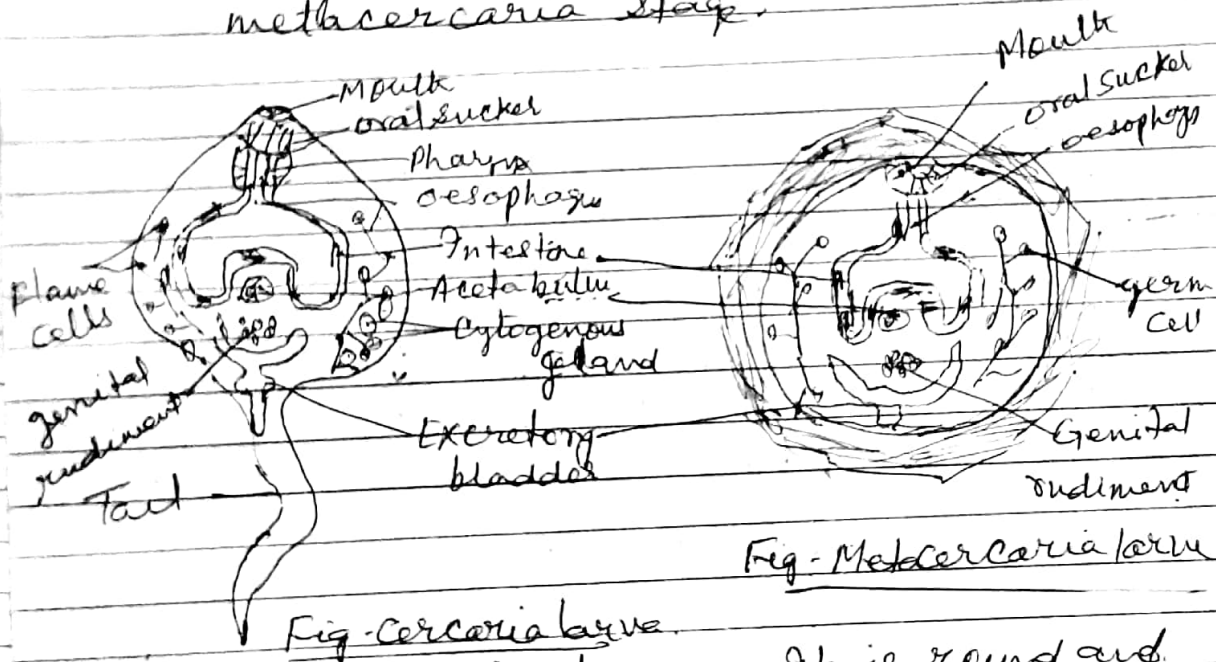
③ Redia larva. It is <sup>also</sup> elongated like sporocyst and is bounded by a thin cuticle. The mouth is at anterior end which open into muscular pharynx, which in its turn open into a small gut. Little behind the pharynx is muscular collar behind which is the birth pore. At the posterior end is two ~~pro~~ lateral projection called lappet, above each lies excretory pore. It contain group of germ cells.

by division forms cercaria larva in autumn. These come out through burk pore.

③ Cercaria Larva:

It is heart shaped with a long tail. Mouth leads into the pharynx which opens into the bifid intestine. Oral and ventral suckers are also present. The body contains flame cells, germ cells and gland cells (cystogenous gland).

When fully formed it comes out of snail body in water and finally it gets attached on some aquatic plant. Here the tail disintegrates and it is covered by a cyst secreted by gland cells. This is metacercaria stage.



⑤ Metacercaria larva: It is round and protected by cyst wall. The mouth is at the centre of the oral sucker. pharynx and bifid intestine are present. The flame cells increase in number.



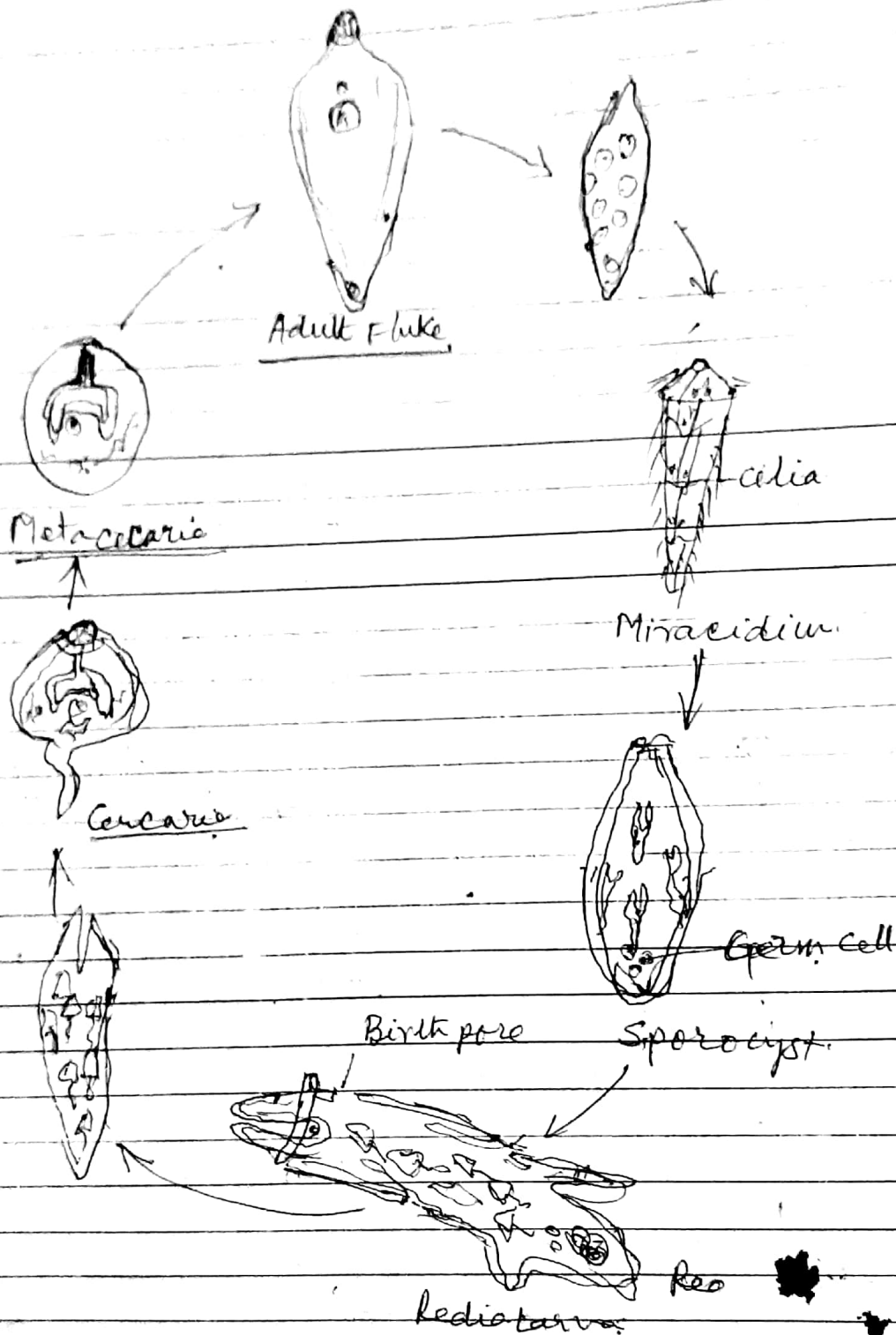


Fig - Life cycle of *Fasciola hepatica*.