

STUDIES ON THE LARVAL TREMATODES OF WEST BENGAL.  
PART I. *CERCARIA ESPLANADENSIS* MUKHERJEE AND  
GHOSH, 1975, A FURCOCERCOUS CERCARIA.

*By*

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(With 3 Text-figures)

Since publication of Sewell's (1922) monographic work on the larval trematodes of India, which included a number of cercariae from West Bengal, drastic ecological transformation has occurred in the urban and rural areas. This has necessitated a reappraisal of the cercarial fauna of this area. With this end in view a project has been undertaken to assess the present position of larval trematodes in and around Calcutta which aims at intensive investigation of these forms in the study area. The present paper includes the description in detail of the cercaria which has been briefly reported by the authors in 1975. The second part of this series dealing with a new echinostome cercaria has already been published (1977).

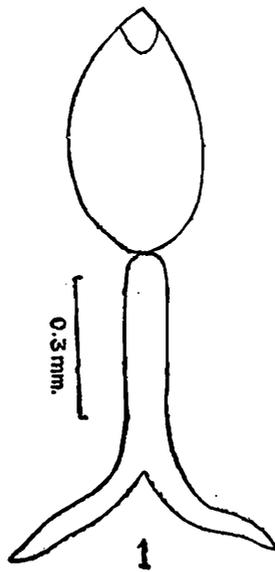
***Cercaria esplanadensis* Mukherjee and Ghosh 1975**

(Text-figs. 1—3).

Out of seven *Vivipara bengalensis* collected from Manohar Das tank situated at Esplanade, Calcutta, one snail was found to discharge distome, pharyngeate, non-ocellate and longifurcate cercariae. The white coloured cercariae remained suspended and uniformly distributed in water. They hang in water with up side down and slightly bend tail pointing upward with stretched out furcal rami. The cercariae in hanging position did not remain stationary at a place for long but slowly drifted with feeble current of water and gradually losing the height when they began to swim actively and regain height. The movement was vertically upwards. At times they sank to bottom of the container and remained there sometime before regaining their normal activity. They crawled rapidly on surface of a slide with help of oral and ventral suckers. Under laboratory conditions majority of cercariae died within 24 hours of emergence from the snail.

Spoon-shaped body of cercaria in fixed condition measures 0.369-0.414(0.405)\* in length and 0.225-0.279(0.245) in breadth. Tail measures 0.378-0.450 (0.418) in length and 0.072-0.099 (0.081) in breadth and ramus measures 0.261-0.315 (0.295) in length and 0.054-0.063 (0.61) in breadth. The muscular and well developed oral sucker measures 0.084-0.120 (0.096) in length and 0.048-0.089 (0.069) in breadth. Ventral sucker measures 0.031-0.034 (0.032) in length and 0.024-0.031 (0.028) in breadth. Pharynx measures 0.031-0.048 (0.035) in length and 0.022-0.034 (0.031) in width.

The anterior end forms a conical, protrusible and retractile snout which in turns provided with 7 to 8 rows of anteriorly directed small piercing spines. The rest of the posteriorly directed small spines are arranged in transverse rows. The body is covered with minute backwardly directed spines but the sensory hairs and papillae are absent.



Text-fig. 1. *cercaria*

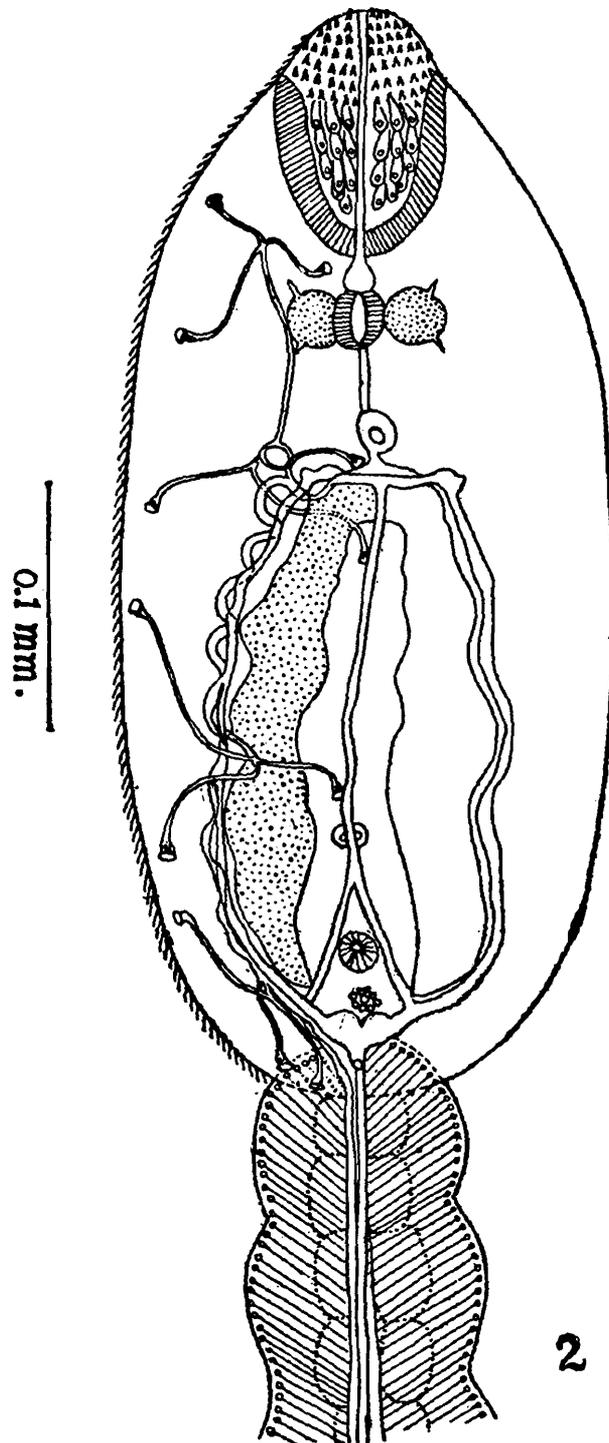
Oral sucker is furnished with uninucleated gland cells. The mouth is located terminally and leads into a muscular pharynx. The prepharynx forms a triangular non-muscular structure. The long oesophagus forms a loop before bifurcating into two caeca. Two well developed, broad, muscular and sinuous caeca extend upto the posterior part of body and terminate just anterior to excretory vesicle. Ventral sucker is small in size, less muscular than oral sucker, oval in shape and situated anterior to excretory vesicle. Holdfast organ is located anterior to ventral sucker, slightly smaller in size than ventral sucker and unarmed.

Tail is strong, muscular organ and is provided with large number of uninucleate cells arranged laterally along length of tail stem. The stout

\* All measurements are in millimeters. Average measurements are in parenthesis. Measurements are based on twenty specimens.

tail stem is without any spines, sensory hairs and papillae. Furcal rami are long, dorso-ventrally flattened and unarmed.

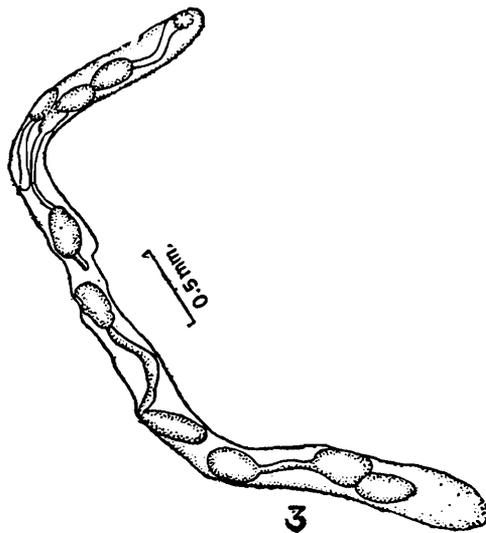
Excretory bladder is situated near posterior end of body. Main excretory ducts are four in numbers. Two median intercaecal ones after running to short distance unite with each other anterior to ventral sucker and form a median duct which runs forward upto level of oesophageal bifurcation where it joins with the transverse connection.



Text-fig. 2. *Cercaria* showing flame cells.

Lateral sinuous ducts run close to the outer wall of caeca upto oesophageal bifurcation where they join to form a transverse canal. Lateral ducts after reaching the level of oesophageal bifurcation descend again

as sinuous tubes along length of ascending ducts. Descending canals soon after leaving the ascending ducts divide into anterior and posterior collecting ducts. Anterior duct runs forward to short distance and gives off a small lateral duct which finally ends in three flame cells in the region of oesophageal bifurcation, while the other long duct of anterior collecting duct runs forward and ends in three flame cells in region of pharynx. The posterior collecting duct runs back and gives off small duct which ends in three flame cells in mid region of body. Posterior collecting duct runs further downward and gives off another small duct which ends in three flame cells in posterior part of body. Finally the posterior collecting duct enters in stem of tail by passing close to lateral side of excretory bladder. Each duct after entering into tail stem gives



Text-fig. 3. *Sporocyst*.

off three flame cells in each side. First pair of caudal flame cells is situated near base of tail and directed anteriorly. Second and third pairs of posteriorly directed caudal flame cells are situated in middle and near the end of tail stem respectively. Caudal flame cells of two sides are not located at the same level. Caudal excretory canal originates from posterior end of excretory bladder and runs through the entire length of stem and divides distally into two ducts passing through each furcal ramus of its side to open at the tip. Flame cell formula of this cercaria is  $2 [(3+3)+(3+3)+(3)]=30$ . Out of these 30 flame cells 12 pairs are located in body proper and 3 pairs in stem of tail.

Dorsally placed genital rudiments are represented by a mass of cells and situated between ventral sucker and excretory bladder. Nerve mass consists of a pair of ganglia placed on either side of pharynx and is connected by transverse band of nerve tissue. Each ganglion gives off nerve bands anteriorly and posteriorly.

Thin walled, transparent, elastic, long and cylindrical sporocysts

contain 8 to 14 cercariae in various stages of development. Birth pore is situated near one end of body and is encircled by two rows of minute anteriorly directed spines. Posterior end of body is also provided with one row of posteriorly directed spines. Sporocyst measures 1.098—4.095 (2.982) in length and 0.153—0.207 (0.189) in breadth. They are so firmly attached by the posteriorly directed spines with tissue of the digestive gland of host that it is difficult to separate them out of it.

Host : *Vivipara bengalensis*

Locality : Manohar Das tank, Esplanade, Calcutta.

*Discussion* : The present cercaria comes close to *Cercaria kumaunensis* Singh and Malaki, 1963, *Cercaria shikarii* Singh, 1966 and *Cercaria kukrailensis* Thapar, 1969 in the general arrangement of various body organs but it differs from *C. kumaunensis* in the absence of sensory hairs and papillae on the body and absence of hairs, papillae and spines on the caudal stem, absence of spines on the hold-fast organ, absence of antero-lateral ducts of the median duct, number and arrangement of the flame cells in body and caudal stem of cercaria and presence of spines around birth pore and at the posterior end of body of sporocyst. It differs from *C. shikarii* in the absence of long hairs on body and caudal stem, absence of spines on the caudal stem, size and structure of prepharynx and oesophagus, number and arrangement of penetrating glands, presence of hold-fast organ and in the morphology of the sporocyst. It differs from *C. kukrailensis* in the presence of spines on the body, absence of fin folds on the furcal rami, presence of hold-fast organ, structure of prepharynx, oesophagus and excretory system, number and arrangement of flame cells in cercaria and in the morphology of sporocyst.

*Summary* : This paper includes the description of a pharyngeate, non-ocellate and longifurcate cercaria, discharged by *Vivipara bengalensis*. Main features of this cercaria are presence of spines at anterior end, presence of small spines on the body, oesophagus forms a loop before it bifurcates into two caeca and presence of hold-fast organ. Sporocyst is provided with spines round the birth pore as well as in the posterior end of body.

#### ACKNOWLEDGEMENT

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