

Morphology of A New Xiphidiocercaria from The Snail (*Lymnaea auriculaia*) (Lamarck) in Bareilly

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Abstract

A morphological description of a new species of Xiphidiocercaria procured from the freshwater snail Lymnaea auricularia is given here for the first time. They were obtained during a parasitological investigation of thousand of snails (1262) collected during April 2018-march 2019 from several localities of district Bareilly. 43 (3.4%) infected Lymnaea species (freshwater snail) were isolated and the cercariae of snails were obtained by emerging or crushing methods. Collected cercariae were observed as alive and in fixed form. The Drawings were made with the help of Camera Lucida. Identification of cercariae species was made by using the systematic keys based on recognizable morphological characteristics and monometric measurements.

Keywords: *Lymnaea auricularia, Xiphidiocercaria, Sporocyst*

Introduction

The trematode cercaria larva is an infective and very active stage of the development process of trematode parasites of man and animals. The Xiphidiocercariae group is characterized by the presence of a well-developed stylet at the anterior end of the body, in the region of the oral sucker. Luhe (1909) proposed the classification of xiphidiocercariae and categorized them into four groups: *Cercaria microcotyle*, *C. virgulae*, *C. ornatae*, *C. armatae*.

In this study, *Lymnaea auriculaia* collected from several localities of district Bareilly were examined for trematode cercarial infection. The objectives of this study were to investigate the infection rate of trematode in *L. auriculaia* and the types of parasites found in this snail to control and prevent the risk of infection in that particular locality.

Material and Method

Snails were collected monthly from April 2018-march 2019 from the three sites of Bareilly, Shankha, Gora, and Daniya river. The collection of snails was made by the hand-picking method from the bank of the rivers. Snails were kept in polythene bags and brought to the laboratory and placed in an aquarium.

Now snails were placed separately in glass beakers containing 50 ml of de-chlorinated tap water. Snails were exposed to the sunlight or artificial light for 2-8 hrs to induce the shedding of cercariae. Each and every snail was observed under a dissecting microscope three times a day for cercarial emergence. The infected snails were examined by cercarial shedding methods. After completing the shedding of a snail, it was taken out of the beaker and the cercariae were collected.

These cercariae were studied under light cover-slip pressure in both alive and stained mounts using a single staining procedure in aceto-alum carmine and clear in xylol. Identification of cercariae was carried out by using description and keys in Wesenberg-Lund, (1931), Yamaguti (1975), Cheng (1986), and Faltynokova et.al. (2008). Live unstained specimens and stained cercariae were identified to the family level based on morphological characteristics and swimming behavior. For the identification of cercariae length of the body, tail, furcae, and the distance between the two suckers were measured.

Prevalence of infection was determined by taking the number of

snails that released cercariae, divided by the total number of snails collected from a particular site. The number of cercariae released by a snail were counted using a Sedgwick Rafter cell, counting was carried out until no cercaria was released by the infected snail.

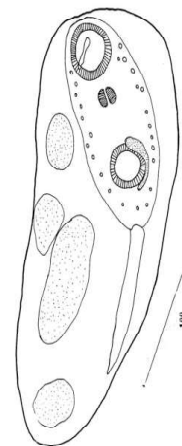
Result

During the study of larval trematode of district Bareilly, we found a new species of Xiphidiocercariae from the infected snail, *Lymnaea auricularia*. Out of 1262 snails of the genus *Lymnaea auricularia* (Lamarck), collected from the river banks. Only 43 (3.4%) snails were found infected with the cercariae. These cercariae emerged out in morning hours and continue till evening. They are active swimmers but the swimming movement is short. They perform creeping movements at the bottom of the container with the help of suckers. Before death, they perform the circular motion. It casts off its tail before death and after casting off the tail, the body moves a little bit for some time. Life span of the cercariae is very short.

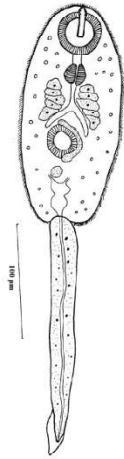
The development of cercariae takes place in sporocyst measuring 280-300 μm in length and 100-120 μm in width. The sporocysts are thick and

yellow in colour. In the body of sporocyst, there exist a few germ balls, germ cells, and usually one well-developed cercaria. Like other Xiphidiocercaria birth pores, the excretory system seems to be absent.

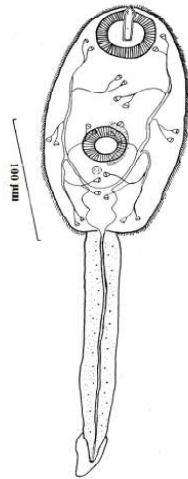
The body of the cercaria is oval in shape and smaller in size measuring 360-420 μm in length and 70-100 μm in width. The tail is slightly longer as compared to the body proper. The body proper measures 160-180 \times 70-100 μm . The size of the tail ranges from 200-240 \times 10-20 μm . The entire body excluding the tail covered with backwardly directed spines.



◦ Sporocyst of *C. pentaglandulata* n. sp.



C. pentaglandulata n. sp. Whole mount



C. pentaglandulata n. sp., Excretory system

The oral sucker is sub-terminal and larger as compared to the ventral sucker, measuring 30-40 μm in diameter. It is further strengthened with a stylet measuring 28-32 μm in length. The stylet is in the form of a lanceolate plate with a tapered anterior end and the lateral cutting edges. The lateral edges, at the tip, are thickened giving the appearance of semicircular protuberances. The length of the blade of this stylet ranges 5-11 μm and the length of the handle ranges from 18-21 μm . The ventral sucker is round to oval, well muscular, situated posterior to the equatorial plane of the body measuring 28-31 \times 25-28 μm in diameter. The mouth leads into a short pre-pharynx measuring 6-9 μm in length. The pharynx is muscular elongate-oval and measures 18-21 μm in diameter. The pharynx leads into a long narrow esophagus measuring 18-20 μm in length. The esophagus bifurcates, little anterior to the ventral sucker, into two short intestinal caeca which terminate blindly at the level of the anterior border of the ventral sucker. The penetration glands are ten in number and arranged in two groups, five on either side of the esophagus. The cystogenous glands are rounded having agranular cytoplasm. The genital rudiments are well marked and

represented by a 'C' shaped dark stained cellular mass situated in the left margin of ventral sucker and around mass located above the excretory bladder and below the ventral sucker. The anterior genital rudiment measures 40-50 μm in length and the post genital rudiment measures 10-12 \times 10-12 μm in the fixed specimen.

The excretory bladder is two-chambered. The anterior chamber is larger than the posterior. Both chambers are roughly rectangular. These are connected through a wide canal. The main collecting canal is short and arises from the anterior border of the anterior chamber on either side. It extends anteriorly and bifurcates into anterior and posterior collecting canals in the ventral sucker region. The anterior collecting canal on either side of the body runs upto the pharyngeal region and gives rise to three branches, each further giving rise to two short branches, bearing two capillaries having flame cells. Similarly, the posterior collecting canal also bears three branches each dividing into two capillaries with flame cells. The flame cells pattern can be represented by $2[(2+2+2) + (2+2+2)] = 24$.

The tail has no flame cell but a caudal excretory canal arises from the

posterior tip of the posterior excretory bladder and extends up to the tip of the tail. The tail is a spinose, comparatively large having well-developed muscles and a large number of caudal bodies irregularly distributed. At the distal end of the tail, there is a well-developed caudal fin.

Discussion

The present cercaria belongs to the 'ornatae' group of Xiphidiocercous cercaria (Luhe, 1909). It resembles closely with the *C. prima* Ssinitzin, 1905; *C. longistyleta* Macloy, 1929; *C. osmaniae* Sinha, 1964; *C. indica* LXXIV Sultana, 1980 in having five pairs of penetration glands, in the shape of the excretory bladder and the ratio of the oral sucker. But it differs from all of these in presence of spines on the body and the number and disposition of flame cells. Moreover, it also differs from *C. prima*, *C. longistyleta*, and *C. indica* LXXIV in the shape of the stylet. It is therefore described as a new species, *C. pentaglandulata* n.sp., on account of the presence of five pairs of penetration glands. This study provides preliminary information about the distribution and prevalence of trematode species based on the identification of larva.

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