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# THREE NEW SPECIES OF CERCARIAE FROM THE SNAIL, *INDOPLANORBIS EXUSTUS* (DESHAYES) IN TAMIL NADU

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## INTRODUCTION

During the couase of a study of freshwater gastropods and their cercarial fauna in two districts of Tamil Nadu, viz., Thanjavur and Chingleput, a total of 53 specimens of *Indoplanorbis exustus* were examined. Of these 18, were found to be infected with three types of Furcocercous cercariae. Three localities of collection are Kadiramangalam pond and Keelapandi pond in Thanjavur district and Thiruporur pond in Chingleput district. These three cercariae could not be assigned to any of the known forms and are hence reported as new species.

Furcocercous group of cercariae consist of a wide variety of forms, all of which being characterised by the presence of a forked tail. Though a large number of Furcocercous cercariae have been described from India, only a few are known from Tamil Nadu.

In Bombay, Soparkar (1921) studied the cercarial fauna and identified the bovine schistosome, *Schistosoma spindalis* for the first time. Study by Sewell (1922) resulted in an outstanding publication on cercariae indicae, describing 62 kinds of cercariae from all over the country. Other notable contributions on Fureocercous cercariae are those of Rao (1932a, 1932b, 1933), Premvati (1953), Peter (1955), Gupta and Taneja (1969), Mathavan (1973), Mohands (1974), Murty (1975), Pandey and Agrawal (1977) and Ramachandrula and Agarwal (1986).

Cercariae were studied both in the live condition and preserved in fixatives such as Bouin's fluid, 70% alcohol and picric acid. They were also stained using intra vitum stains like neutral red and methylene blue.

## 1. **Cercaria kadiramangalamensis** sp. nov.

(Fig. 1)

### DESCRIPTION

This large cercaria is an active swimmer and is capable of considerable degree of contraction and extension. The pyriform penetrating organ is situated anteriorly. A prominent feature of this cercaria is the sword like furcalrami which are at right angle to each other. The tail is longer than the body. The cercaria has both oral and

ventral suckers. The oral sucker is circular in shape and measures 30$\mu$ across. Three pairs of penetration glands are seen around and below the ventral sucker. There is no eyespot. A small bulbous pharynx is continued as a short oesophagus which travels upto the level of acetabulam and divides into two intestinal caecae. The ventral sucker measures 22$\mu$ in diameter. The excretory system consists of a bladder from which arise tubes laterally each dividing into anterior and posterior branches. Another

Cercaria kadiramangalamensis sp. nov.

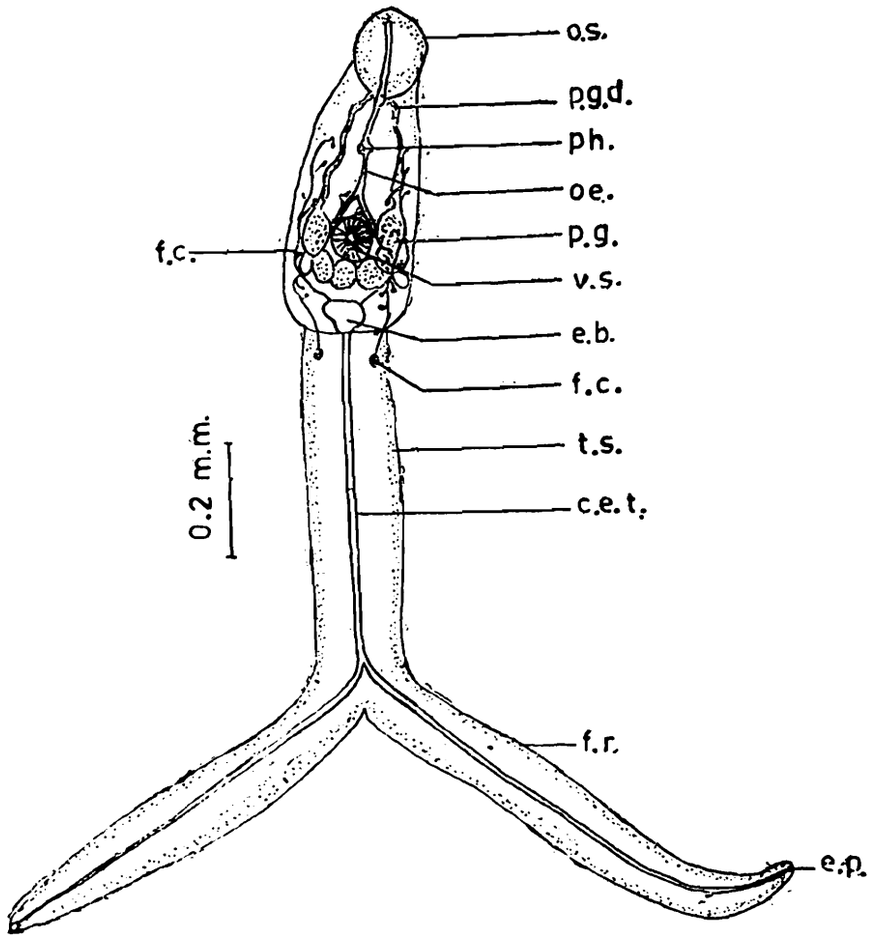


Fig 1.

tube arises posteriorly from the bladder and travels down to the tail stem and the furcae and terminate at the tip of the furcal rami. The anterior excretory canal has four pairs of flame cells while the posterior has three pairs. A single pair of flame cells could be seen at the base of the tail.

## Discussion

The comparative measurements and characters of *Cercaria kadiramangalamensis* sp. nov. along with other related cercariae are furnished in Table I. Although resembling

TABLE—I

Characters and measurements of Cercariae kadiramangalamensis with other Cercariae

| Sl. No. | Characters | *C. bombayensis* No. 9, Soparkar (1921) | *Cercariae indicae II* of Sewell, 1922 | *C. Aszidat* (Dawes, 1968) | *C. pandei* Pandey and Agrawal, 1977 | *C. kadiramangalamensis* sp. nov. |
|---|---|---|---|---|---|---|
| 1. | Body (Length × breadth) $\mu$ | 225 × 5 | 210-263 × 53-61 | 340 × 85 | 147 × 75 | 345 × 72 |
| 2. | Tail stem (Length × breadth) $\mu$ | 325 × 38 | 263 | 225 × 40 | 266 × 39 | 410 × 39 |
| 3. | Furcal rami (Length × breadth) $\mu$ | Length 300 | 263 | Length 280 | 64 × 32 | 398 × 22 |
| 4. | Oral sucker $\mu$ | – | 39 × 28 | — | 40 × 29 | 30 |
| 5. | Ventral Sucker $\mu$ | – | – | – | 18 | 22 |
| 6. | Eye spot | Faint, Circular | Absent | – | Absent | Absent |
| 7. | Penetration glands | Three pairs below the ventral sucker. | Three pairs | Two pairs in the acetabular region. | Three pairs in the acetabular region. | Three pairs below the ventral sucker. |
| 8. | Flame cells | Ten pairs | Ten pairs | Seven pairs | Six pairs | Eight pairs |
| 9. | Notch at the hind end of the body | absent | absent | present | present | present |
| 10. | Snail host | *Indoplanorbis exustus* | *Indoplanorbis exusnes* | *Lymnaea pereger* | *Indoplanorbis exustus* | *Indoplanotbis exustus* |

*Cercaria bombayensis* No. 9 of Soparkar 1921, *C. kadiramangalamensis* differs from it in many respects. The present cercaria is larger and it has a distinct pharynx in contrast to *C. bombayensis* No. 9. Out of the three pairs of penetration glands in *C. bombayensis* No. 9, one pair is anterior to the ventral sucker. While other two pairs are below it. These in the present specimen are placed below and never anterior to the ventral sucker. Soparkar (1921) describes a pair of faint circular spots representing the vestigeal eyespot which are totally absent in the present specimen. The number and disposition of the flame cells are also different in the two.

There are four pairs of flame cells in the anterior excretory canal and a single pair in the tail totalling eight pairs in the present cercaria. *C. bombayensis* No. 9 has 10 pairs of flame cells in the body and two pairs in the tail.

*Cercariae indicae* II of sewell 1922, from *I exustus* though appears similar to the present specimen differs in possession of fine cuticular spines. The branches of the the excretory tubules in the furcae terminate at the middle of each of the furcal ramus while in the present specimen they extend to the tip of the furcal ramus to open as excretory pore. The pharynx has been described as rudimentary. The tail has two pairs of flame cells vis-a-vis the one pair in the present specimen. *Cercaria Aszidat*, 1924 (Dawes, 1968) discharged by *Lymnaea pereger* is also apharyngeate, longifurcate and non-ocellate cercaria. However, it is smaller in size than the present specimen and also differs in the excretory system having seven flame cells on each side. It has only two pairs of penetration gland situated in front of the ventral sucker. Pandey and Agrawal (1977) also describe the furcocercous, longifurcate cercaria, *Carcaria pandei* from *Indoplanorbis exustus*. The distinct, prominent notch at the union of the tail and the body is not present in the specimen under report. It has also only six pairs of flame cells and the cercaria is itself smaller in size.

The present specimen is distinct from *C. bombayensis* No. 9 of Soparkar (1921), *Cercariae indicae* II of Sewell (1922), *C. Aszidat* of Dawes (1968) and *C. Pandei* of Pandey and Agrawal (1977). The erection of a new taxon is thus justified to accommodate the present largesized, Furcocercous, longifurcate, pharyngeate and non-ocellate cercaria from *Indoplanorbis cxustus*. The specific name relates to the locality of collections.

Snail host : *Indoplanorbis exustus* (Deshayes)
Locality : Kadiramangalam pond, Thanjavur District.
Incidence of emergence : 9 out of 23 snaiis (39.1%)

### 2. **Cercaria anantaramani** sp. nov.

(Fig. 2)

This cercaria is comparatively large and swims rapidly by means of the vibrator movements of the tail. It is negatively geotropic and period of active swimming

alternate with periods of rest while at rest, it floats motionless with body hanging downwards.

## DESCRIPTION

Oral sucker is prominent with a protrusible organ. It leads into a small pharynx followed by the oesophagus which bifurcated into the intestinal caecae. Just at the level of this bifurcation there is a mass of browntinted structures measuring 20-30$\mu$. Acetabulam is placed anterior to the excretory bladder and there is no evidence of any

Cercaria anantaramani sp. nov.

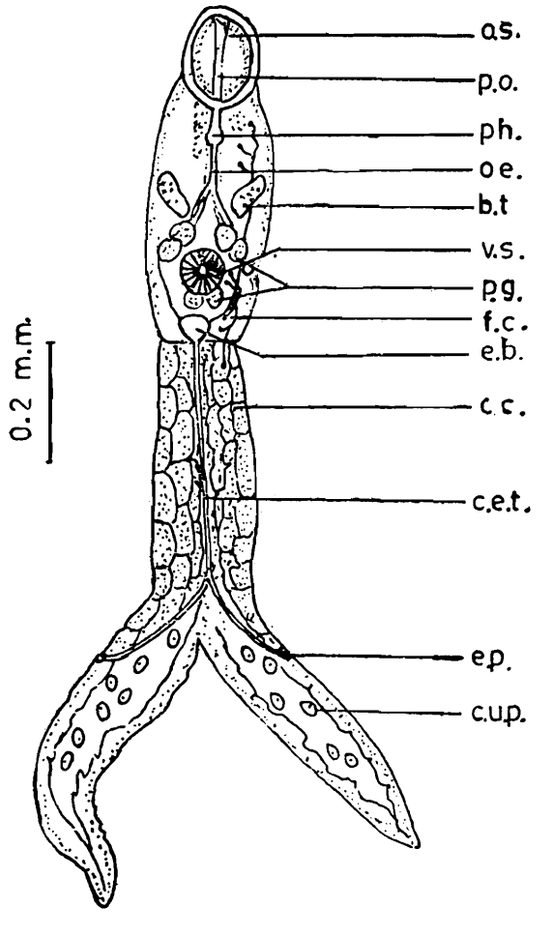


Fig. 2

eyespot or pigmentation. There are three pairs of penetration glands, one of which is below the acetabulam while the other two are anterior. The bladder is oval in shape. A total of seven pairs of flame cells are present, three pairs on each of the anterior and posterior excretory tubule and one pair at the base of the tail. Tail is continuous with the body. The tail stem is longer than the body and furcal rami are as long as the tail stem. The tail is broad with numerous caudal gland cells. The caudal excretory tubes

traverses the tail stem and divides to enter the furcalrami. There are 8 to 10 cuticular prominences or papillae-like structures on each ramus.

## Discussion

The comparative measurements and characters of *Cercaria anantaramani* sp. nov. along with other related cercariae are furnished in Table II.

TABLE—II

Characters and measurements *Cercariae Indicae II* (*Sewell, 1922*) *with Cercaria anantaramani* sp. nov.

| S. No. | Characters | *Cercariae indicae II* Sewell, 1922 | *Cercaria anantaramani* sp. nov. |
|---|---|---|---|
| 1. | Body (Length × breadth) $\mu$ | 210-263 × 53-61 | 410 × 92 |
| 2. | Tail stem (Length × breadth) $\mu$ | 263 | 420 × 87 |
| 3. | Furcal rami (Length × breadth) $\mu$ | 263 | 390 |
| 4. | Oral sucker $\mu$ | 39 × 28 | 42 |
| 5. | Ventral sucker $\mu$ | – | 38 |
| 6. | Brown tinted structure | Absent | Present |
| 7. | Penetration glands | 3 pairs | 3 pairs |
| 8. | Flame Cells | Ten pairs | Seven pairs |
| 9. | Circular caudal cells. | Present | Present |
| 10. | Cuticular papillae-like structures on furcal rami. | Absent | 8 to 11 |
| 11. | Spines on furcal rami. | Present | Absent |

Sewell (1922) has described furcocercous cercariae from *Indoplanorbis exustus* as *cercariae indicae* II. These are smaller when compared to the present specimen and lack the brown-tinted structures which are characteristic of the present specimen.

Presence of the brown-tinted mass in the body and the cuticular papillae-like structures on the furcal rami make *Cercaria anantaramani* specifically distinct. It is being named after the late Prof. M. Anantaraman in appreciation of his outstanding contributions to Indian parasitology.

Snail host : *Indoplanorbis exustus* (Deshayes)

Locality : Keelapandi Pond, Thanjavur District

Incidence of emergence : 3 out of 7 snails (43%)

### 3. **Cercaria nudis** sp, nov. (Fig. 3)

These cercariae emerge in large number in the later part of the morning and are positively phototactic. They remain suspended with the body in a twisted position and move up and down freely and remain alive nearly for an hour under the coverslip.

## DESCRIPTION

The body is cylindrical in shape and the tail contiguous. The oral sucker is elongate, oval in shape in which a spindle-shaped protrusible organ could be seen. Below the oral sukcer is a bulbous pharynx from which arises the oesophagus through small tube. Just above the middle of the body. The oesophagus divides into two intestinal caecae, which are sinuous and extend upto the posterior end of the body. No distinct ventral sucker is seen. The cuticle of the body has prominent annulations. Fine strands could faintly be seen connecting these annulation in the middle part of the

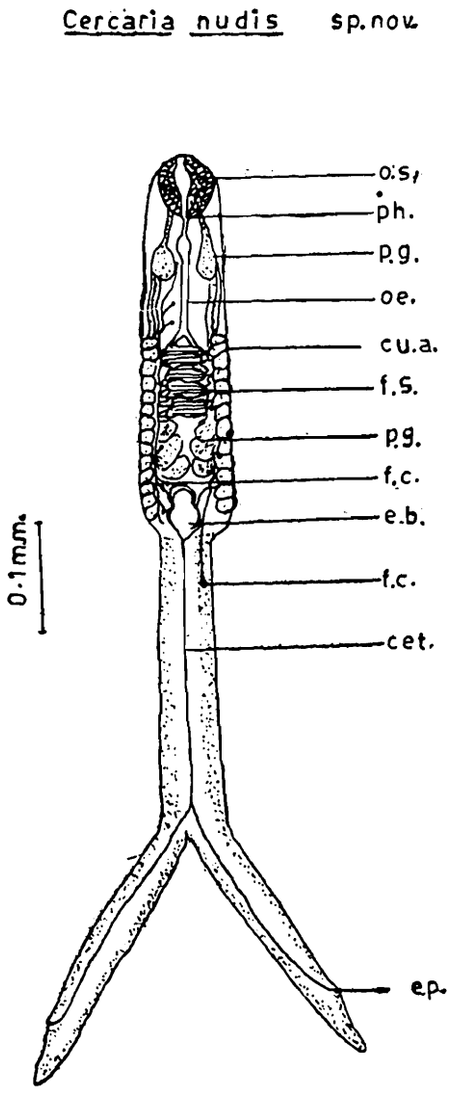


Fig. 3

body. Four pairs of penetration glands are present, three below the median line of the body and the fourth, near the oral sucker. Eyespots are not seen. The excretory bladder is hour-glass shaped, the two main collection canals arising from the anterior half of the bladder laterally. Excretory duct divides into anterior and posterior

collecting canals. The collecting canal has three pairs of flame cells while posterior has four pairs. A single pair of flame cells is seen just below the base of the tail. The caudal excretory canal divides and enters each furcal ramus and terminates as a bulbous structure.

## Discussion

The comparative measurements and characters by *Cercaria nudis* sp. nov. along with *cercariae indicae* LXV of Murty (1975) are furnished in Table III.

TABLE—III

Characters and measurements of *Cercariae indicae* LXV (Sewll, 1922) with *Cercariae nudis* sp. nov.

| S. No. | Characters | *Cercariae Indicae LXV* Sewell, 1922 | *Cercaria nudis* sp. nov. |
|---|---|---|---|
| 1. | Body (Length×breadth) $\mu$ | 137×38 | 292×27 |
| 2. | Tail (Length×breadth) $\mu$ | 207×22 | 270×15 |
| 3. | Furcal rami (Length×breadth) $\mu$ | 208×18 | 198 |
| 4. | Oval Sucker $\mu$ | 31×12 | 42 |
| 5. | Ventral Sucker | Vestigeal | absent |
| 6. | Penetration glands | 2 pairs | 4 pairs |
| 7. | Flame cells | 10 pairs | 8 pairs |
| 8. | Body annulations | Seen only in the contracted state. | Present |
| 9. | Bristles on body and tail | Present | absent |
| 10. | Snail host | *Indoplanorbis exustus* | *Indoplanorbis exustus* |

Strigeoid cercariae LXV described by Murty (1975) from Waltair, Andhra Pradesh is spinulate with circumoral spineless area and three pairs of lateral bristles over the body. The tail stem is without spines, longer than the body and has lateral bristles and cuticular annulations. The present specimen is larger and shows prominent cuticular annulations and fine strands connecting them in the middle of the body which are absent in *cercariae indicae* LXV. Besides the differences seen in the number of penetration glands and flame cells. The cuticular tailstem in the present specimen is without spines and annulations seen in *cercariae indicae* LXV.

Snail host : *Indoplanorbis exustus* (Deshayes)

Locality : Thiruporur pond, Chingleput District.

Incidence of emergence : 6 out 23 snails (25%)

SUMMARY

Three new species of Furcocercous cercariae from *Indoplanorbis exustus* from Tamil Nadu are described viz. *Cercaria kadiramangalamensis* sp. nov. *Cercaria anantaramani* sp. nov. *Cercaria anantaramani* sp. nov. and *Cercaria nudis* sp. nov. These are compared with related forms to bring out their specific distinction.

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## ABBREVIATIONS

| | | |
|---|---|---|
| b. t. | — | brown tinted structure |
| c. c. | — | caudal cells |
| c. e. t. | — | caudal excretory duct |
| cu. a. | — | cuticular annulations |
| cu. p. | — | cuticular papillae |
| e. b. | — | excretory bladder |
| e. p. | — | excretory pore |
| f. c. | — | flame cells |
| f. r. | — | furcal rami |
| f. s. | — | fine strands |
| oe. | — | oesophagus |
| o. s. | — | oral sucker |
| p. g. | — | penetration glands |
| p. g. d. | — | penetration gland duct |
| ph. | — | pharynx |
| t. s. | — | tail stem |