

Studies on Larval Digenetic Trematode Structure of Some New Species of Strigeids from Food Fishes of U.P. and Its Adjacent State

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ABSTRACT

During studies on larval trematode of freshwater fishes of U.P. and its adjacent state, the author success to collect some new species of strigeid metacercariae, belonging to genus *Tetracotyle* Faust, 1918 and *Neascus* Hughes, 1927, are characterized on the basis of shape, structure, and place and position of esophagus, intestinal caeca, holdfast organ, hold fast gland and number of genital rudiments from *Mastacembelus punctatus* (Ham.) *Colisa fasciatus* (Bl. & Schn.) and *Xenentodon cancilla* and named *Tetracotyle allahabadensis*, *Tetracotyle saiensis* and *Neascus khurramnagarensis* as a new species from different location of U.P. and its adjacent state.

Keywords: *Metacercaria*, *Neascus*, *Tetracotyle*, *Strigeids*, *Trematode*.

INTRODUCTION

Fishes provide us nutritious food value and also an important source of fish animal proteins. Almost all fishes carry infections of adult trematodes or larval metacercariae. The larval and adult trematodes infect almost all the body parts of fish viz. skin, gills, eyes and other visceral organs and cause diseases thus reducing their food value. In case of heavy infections, mortality is also caused, which in turn is a great loss to socio-economy in fish industry. They can also transfer infections to man when infected with metacercarial infestation. They are dangerous parasites, primarily of carps and siluroids, causing massive epizootics. Currently about 800 million (Approx.) people suffer from insecure

food supplies and malnutrition globally. People of all over the world faces interrelated malnutrition burden leads to under-nutrition and micronutrient deficiencies. To move forward towards the sustainable development agenda as per the United Nations in case of food, nutrition and environmental security such research fills the lacunae hence my commitment is to work on it.

MATERIALS AND METHODS

Fish specimens were collected from different water bodies of India especially north India including Eastern U.P., with the help of fishermen or purchased from the local fish markets.

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Fishes were identified by Fish Base (Froese & Pauly, 2009). Trematode metacercariae were isolated from various parts of their hosts namely *Mastacembelus punctatus* (Ham.) *Colisa fasciatus* (Bl., & Schn.) and *Xenentodon cancilla*, especially Allahabad, River Sai, Lucknow and Khurram Nagar fish market, Lucknow. Larval trematodes were

identified in live conditions under binocular microscope and observed under a phase-contrast microscope. A few specimens of each worms were fixed in formalin- alcohol- acetic acid (FAA) (2:17:1) under light pressure and stained overnight in Aceto-carmine, whole mounts were made for taxonomic study.

RESULT

Tetracotyle allahabadensis n. sp.

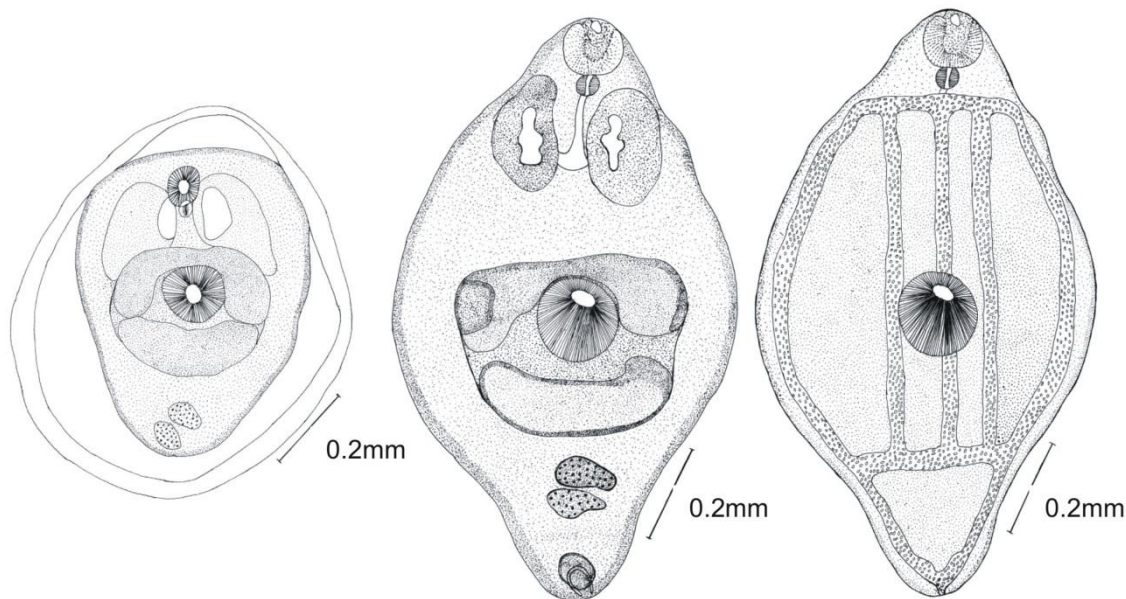


Fig. 1

Fig.2

Fig.3

Host: *Mastacembelus punctatus* (Ham.)

Location: Gut

Locality: Allahabad

No. of host examined: 15

No. of host found infected: 03

No. of metacercaria collected: 07

Cyst (Fig.1) elongate oval, 0.84 - 0.90 mm x 0.55 - 0.61 mm. Body (Fig.2) aspinose, ovoidal, 1.23 mm x 0.70 mm, fore body cup-shaped 0.90 mm x 0.70 mm, hind body somewhat cylindrical but short, 0.20 - 0.25 mm x 0.25 - 0.30 mm. Suckers well developed, circular, unequal. Oral sucker terminal, more or less circular, 0.15 - 0.12 mm. Ventral sucker circular, slightly larger than oral sucker, in middle of body, 0.17 - 0.16 mm. Pseudosuckers prominent, muscular, oval, on either side of esophagus, 0.26 - 0.32

mm x 0.16 - 0.19 mm. Prepharynx absent. Pharynx subglobular, feebly muscular, 0.03 - 0.05 mm x 0.02 - 0.04 mm. Oesophagus short. Intestinal bifurcation obscured. Genital rudiments represented by two tandem, elongate cell masses of dark staining cells, at posterior end of body. Anterior mass may be presumptive testis, 0.05 - 0.06 mm x 0.10 - 0.12 mm, while posterior mass ovary, 0.04 - 0.06 mm x 0.11 - 0.12 mm. Hold fast organ well developed, bowl-shaped, lobes protrusible and overlap each other, 0.40 - 0.48 mm x 0.15 - 0.17 mm, enclosing ventral sucker. Hold fast gland in just close to holdfast organ. Excretory bladder (Fig.3) 'V' shaped, excretory pore terminal. Main reserve excretory canals, one on each side of body run upto oral sucker and join each other by a transverse canal. A median canal runs upto the holdfast organ and joins two more canals by a posterior transverse

canal. Small and round excretory corpuscles of different sizes flow in excretory canals.

DISCUSSION

The present larva closely resembles with *T. sophorensis*, *T. indicus*, *T. xenentodoni*, *T. glossogobii*, *T. singhi* and *T. srivastavi* in shape of body, position and shape of pseudosuckers but differs from them in shape of holdfast organ and holdfast gland. It differs from *T. indicus*, *T. xenentodoni*, *T. singhi* and *T. srivastavi* in the number of genital rudiments and from *T. sophorensis* and *T. glossogobii* in position of holdfast organ and holdfast gland.

Among the species described from foreign land, it comes closer to *Tetracotyle* of *Cotyluris communis*, *Tetracotyle* of *Apatemon*

fuligulae, *Tetracotyle* of *Apatemon pellucidus*, *Tetracotyle biwaensis* and *Tetracotyle tahoensis* in ratio of suckers but differs in number of genital rudiments. It further differs from *Tetracotyle* of *Cotyluris communis*, *Tetracotyle biwaensis* and *Tetracotyle tahoensis* in shape of body and absence of intestinal bifurcation, from *Tetracotyle* of *Apatemon fuligulae* in absence of prepharynx, shape of holdfast organ and holdfast gland and from *Tetracotyle* of *Apatemon pellucidus* in the presence of pharynx and ratio of body. Therefore, the larva is regarded a new species and named *Tetracotyle allahabadensis* n. sp. after the locality where from the host was collected.

Tetracotyle saiensis n. sp.

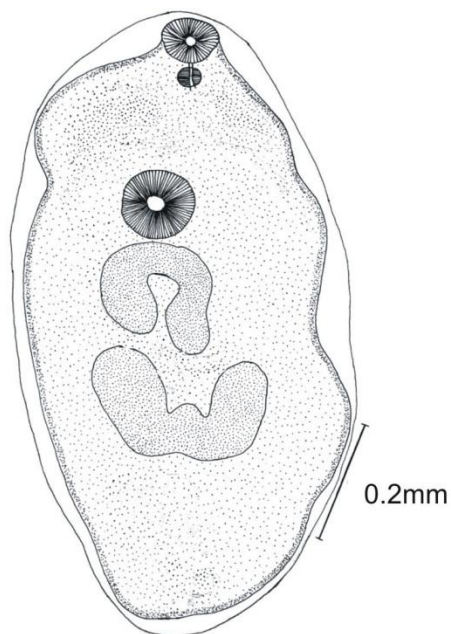


Fig.4

Host: *Colisa fasciatus* (Bl., & Schn.)

Location: Body cavity

Locality: River Sai, Lucknow

No. of host examined: 20

No. of host found infected: 01

No. of metacercaria collected: 03

Cyst (Fig.4) oval, single layered, non pigmented, transparent, 0.81 - 0.85 mm x 0.52 - 0.68 mm. Body (Fig.5) aspinose, oval, 1.0 -

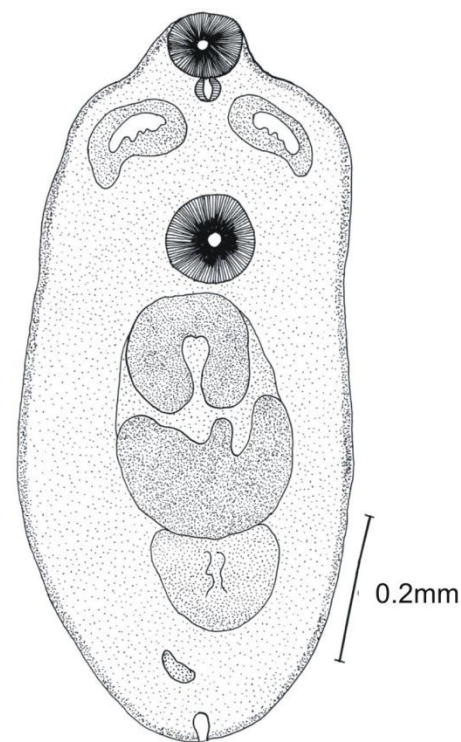


Fig.5

1.12 mm x 0.49 - 0.51 mm. Oral sucker terminal, round to oval, 0.07 - 0.09 mm x 0.08 - 0.09 mm. Prepharynx present. Pharynx oval, 0.02 - 0.03 mm x 0.03 - 0.07 mm. Intestinal caeca absent. Ventral sucker round, 0.09 - 0.11 mm x 0.08 - 0.11 mm, larger than oral sucker, pre-equatorial, circular. Pseudosuckers slightly compressed, close to pharynx. Holdfast organ 'U' shaped, bilobed, posterior to ventral

sucker, lodges a distinct cavity, 0.17 mm x 0.13 mm. Holdfast gland 'W' shaped, consists of deeply stained cell mass, which partly covers posterior border of holdfast organ. Gonad is represented by one small, dark stained, elongate-oval mass of cells, located posterior to holdfast organ, at hind region of body. Details of reserve excretory system could not be studied due to small number of specimens collected.

DISCUSSION

The present larva closely resembles with *T. sophoriensis*, *Tetracotyle metacercaria*, *T. glossogobii*, *T. lucknowensis*, *T. singhi*, *T. tandani*, *T. lymnaei*, *T. gyanpurensis*, *T. pandei*, and *T. fotedari* in number of genital rudiments and shape of body but differs from them in shape of holdfast organ and holdfast gland. It chiefly differs from *T. glossogobii*, *T. lucknowensis*, *T. singhi*, *T. lymnaei*, and *T. pandei* in position of holdfast organ and

holdfast gland, from *T. sophoriensis*, *T. tandani* and *T. gyanpurensis* in shape and position of pseudosuckers and from *T. fotedari* in ratio of suckers.

Among the species described from foreign land, it comes closer to *Tetracotyle* of *Cotyluris communis*, *Tetracotyle* of *Apatemon pellucidus*, *Tetracotyle* of *Apatemon fuligulae*, *Tetracotyle biwaensis* and *Tetracotyle tahoensis* in ratio of suckers and presence of intestinal caeca but differs in shape of holdfast organ and holdfast gland. It further differs from *Tetracotyle* of *Apatemon pellucidus* and *Tetracotyle* of *Apatemon fuligulae* in number of genital rudiments and from *Tetracotyle* of *Cotyluris communis*, *Tetracotyle biwaensis* and *Tetracotyle tahoensis* in the presence of prepharynx and ratio of body. Therefore, the larva is regarded a new species and named *Tetracotyle saiensis* n. sp. after the locality where from the host was procured.

Neascus khurramnagarensis n. sp.

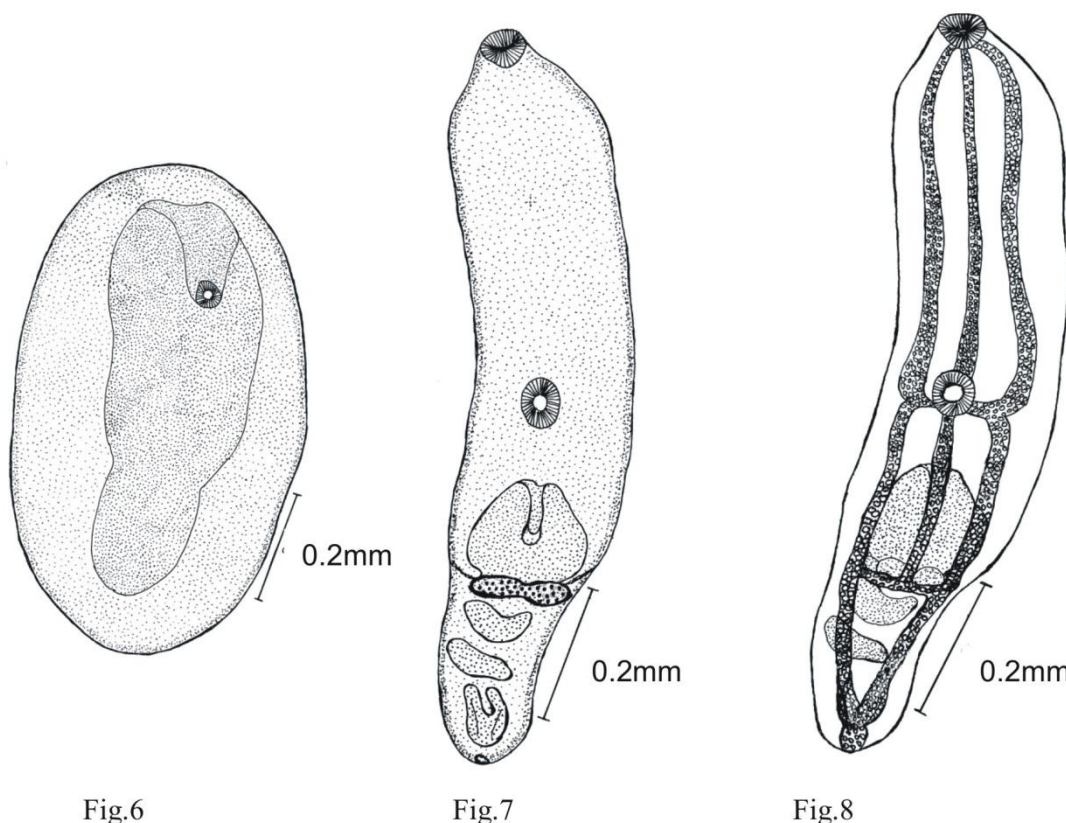


Fig.1, 4 and 6 encysted metacercaria Fig.2, 5, and 7 metacercaria Fig.3 and 8 metacercaria, showing reserve excretory system (drawn from live specimens)

Host: *Xenentodon cancilla* (Ham.)

Location: Liver

Locality: Khurram Nagar fish market, Lucknow

No. of host examined: 25

No. of host found infected: 15

No. of metacercariae collected: 79

Cyst (Fig.6) oval, thick, transparent, 1.13 - 1.33 mm x 0.90 - 1.20 mm. Body (Fig.7) aspinose, elongated, differentiated into fore and hind body, fore body 0.47 - 1.03 mm x 0.19 - 0.21 mm, body tube like, 0.19 - 0.22 mm x 0.13 - 0.19 mm. Oral sucker terminal, oval, 0.03 - 0.04 mm x 0.02 - 0.03 mm. Ventral sucker elongate-oval, equal to oral sucker, post-equatorial, 0.03 - 0.04 mm x 0.02 - 0.03 mm. Hold fast organ strongly developed, situated behind ventral sucker, at hind region of fore body, 0.12 - 0.17 mm x 0.10 - 0.16 mm. Hold fast gland bilobed. Pharynx and gut absent. Gonads represented by two dark stained cell masses; one large crescent, 0.02 - 0.07 mm x 0.06 - 0.12 mm, and the other mass, 0.01 - 0.03 mm x 0.05 - 0.09 mm. Bursa copulatrix oval and located in hind body. Excretory bladder (Fig.8) 'V' shaped and opens out by terminal excretory pore. Two main reserve excretory canals arise, one on each side of excretory bladder, run laterally, upto oral sucker and join anterior transverse canal. A median excretory canal arises from anterior transverse canal and runs posteriorly to join a posterior transverse canal, in region of ventral sucker. All canals contain excretory corpuscles of different sizes.

DISCUSSION

The present larva closely resembles with *N. vetastai*, *N. hepatica*, *N. xenentodoni*, *N. hoffmani*, *N. hanumanthai*, *N. simhai*, *N. moghei*, *N. ramalingami* and *N. vedi* in shape of body but differs from them in number of genital rudiments. It further differs from *N. hepatica* and *N. vedi* in ratio of suckers, from *N. vetastai*, *N. xenentodoni*, *N. hoffmani*, *N. hanumanthai*, *N. simhai*, *N. moghei* and *N. ramalingami* in shape of holdfast organ and holdfast gland.

Among the species described from foreign land, it comes closer to *Neascus* of *Uvulifer ambloplitis*, *Neascus* of *Crassiphiala bulboglossa*, *Neascus* of *Posthodiplostomum minimum*, *Neascus* of *Posthodiplostomum cuticola*, *Neascus grandis*, *Neascus pyriformis* and *Neascus ellipticus* in shape of body but differs in absence of pharynx and gut. It further differs from *Neascus* of *Uvulifer ambloplitis*, *Neascus* of *Crassiphiala bulboglossa*, *Neascus* of *Posthodiplostomum minimum*, *Neascus* of *Posthodiplostomum cuticola*, *Neascus grandis*, *Neascus pyriformis* and *Neascus ellipticus* in ratio of fore and hind body, shape and position of holdfast organ and holdfast glands. Therefore, the larva is regarded a new species and named *Neascus khurramnagarensis* n. sp. after the locality wherefrom the host was procured.

CONCLUSION

To studies on the significance of larval trematode, parasitized on food fishes and detailed observations on the structure, geographical distribution & pathogenicity, author successes to collect three new species of strigeid metacercariae belonging to genus *Tetracotyle* Faust, (1918) and *Neascus* Hughes, (1927) from *Mastacembelus punctalus* (Ham.) *Colisa fasciatus* (Bl., & Schn.) and *Xenentodon cancilla* and named *Tetracotyle allahabadensis*, *Tetracotyle saiensis* and *Neascus khurramnagarensis* as a new species from different location respectively. It serves as base line information on current status of fish trematodes for upcoming researcher. Author has no competing interest.

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