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## RESEARCH ARTICLE

### CHARACTERIZATION OF NEMATODE PARASITES OF SOME FRESHWATER FISHES OF MANIPUR AND ASSAM

<sup>1</sup>Huidrom Puinyabati, <sup>2</sup>Maibam Shomorendra and <sup>3</sup>Devashish Kar

<sup>1</sup>Department of Zoology, Pravabati College, Mayang Imphal-795132, Manipur, India

<sup>2</sup>Fish disease Research Lab, Department of Zoology, Thambal Marik College, Oinam- 795134, Manipur, India

<sup>3</sup>Division of Wetlands, Fishery Science and Aquaculture, Department of Life Science and Bioinformatics, Assam (Central) University, Silchar-11, Assam, India

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#### ABSTRACT

This article deals with the nematode parasites infecting in some freshwater fishes of Manipur and Assam where the knowledge of fish parasites are less explored. The present study was carried out from 2009-2011. Seven species of nematode parasites were collected during the study period viz., *Paraquimperia manipurensis* Shomorendra and Jha, 2003; *Camallanus anabantis* Pearse, 1933; *Procamallanus (Procamallanus) saccobranchi* Karve, 1952; *Goezia* sp.; *Spinitectus* sp.; *Philometra* sp.; *Cosmoxyneoides colisi* Gambhir *et al.*, 2006.

##### Key words:

Nematode parasites,

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Manipur,

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#### INTRODUCTION

Fish is an essential item of food and the main source of animal protein in daily diet of people of South-East Asia in general and Manipur and Assam in particular. Fish plays an important role in preventing protein calorie malnutrition in the world. In the recent years fish has assumed industrial recourse as fishes being the easily available and rather cheap source of animal protein. Pisciculture requires knowledge of parasites of the fishes. Hubbs (1927) seemed to be the first to point out that the fish worms can modify the specific characters of a host fish to such an extent that infected individuals appear to represent a different species. Many workers in India studied in nematode parasites namely Sood (1989), Jadhav and Khadap (2003), Shomorendra and Jha (2003), Sahay *et al.* (2004), Srivastava and Sahay (2004), Gambhir *et al.* (2006), etc. In addition to fungi and bacteria, protozoans and crustaceans, nematodes have important agents for parasitic infection. Their infections not only deteriorate the muscle quality, stunt growth but even sometimes prove damage as a result of internal injury. Infection with nematode parasite can lead to severe change in protein content and may result in host mortalities in commercial fish farming. In this regard Manipur and Assam is lagging behind as there is less exploration in the field of fish

nematode parasites. So, further investigation in this field is needed in the study area. The present study was aimed at determining the nematode parasites found in the fishes Assam and Manipur, which will further contribute to our understanding of fish nematode diversity.

#### MATERIALS AND METHODS

The present study was carried out from 2009-2011. For the present investigation two study sites have been selected, Chatla Haor of Silchar, Assam and Awangsoi Lake of Manipur. Chatla Haor (92°45'N and 24°45'E) is one of the biggest (area 1600 ha approx at FSL) seasonal floodplain wetlands located in Cachar District of Assam. It contains about 57 species of fishes belonging to major families like Notopteridae, Cyprinidae, Bagridae, Siluridae, Schilbidae, Channidae, Anabantidae, etc. (Kar, 2000). Awangsoi Lake is located in Bishnupur District, Manipur, about 24 km. from Imphal. This lake is situated between 24°39'48''N - 24°39'23''N latitude and 93°47'04''E - 93°46'90''E longitude and at an altitude of 2525 feet above the mean sea level. It has an area of about 100 ha and has a depth of 2-5 meters. It contains about 31 species of fishes belonging to 20 genera, 5 orders and 14 families. Among the fishes, species of the family Cyprinidae and Channidae are commonly found. Fishes were routinely collected from the study sites and brought to the laboratory in the polythene bags containing water of the same locality. The external body organs as well as

\*Corresponding author: Huidrom Puinyabati,

Department of Zoology, Pravabati College, Mayang Imphal-795132, Manipur, India

internal body organs were thoroughly examined for the parasites. The nematodes collected were fixed in glacial acetic acid and preserved in 70% alcohol following Bylund *et al.* (1980). The worms were cleared in lactophenol before its microscopic study and then identified following Yamaguti (1961) and Soota (1983).

## RESULTS AND DISCUSSION

During the study period seven nematode species have been collected from different fish species which are described below.

### *Paraquimperia manipurensis* Shomorendra and Jha, 2003

#### Description

Body small, filiform, with anterior end curved dorsally. Cervical alae extends up to cervical papillae. Mouth with three small lips, each with single papillae and with 3 teeth at base. Buccal capsule absent. Oesophagus divided into two, longer anterior muscular and shorter posterior glandular. Caudal alae and preanal sucker absent. Spicule equal, gubernaculum present.

**Male:** Body 4.50-6.62 mm long, 0.14-0.16 mm wide. Oesophagus divided into anterior muscular 0.91-0.96 mm long, posterior glandular 0.40-0.72 mm long. Cervical papillae 0.69 mm and nerve ring 0.39 mm both from anterior end. Excretory pore could not be observed. Tail 0.04-0.07 mm long. Spicules equal 0.08-0.115 mm long. Caudal papillae 12 pairs, 4 preanal, 1 adanal and 7 postanal. Gubernaculum 0.04-0.07 mm long.

**Female:** Body 4.00-9.19 mm long, 0.11-0.21 mm wide. Oesophagus divided into anterior muscular 1.04-1.31 mm long, posterior glandular 0.40-0.76 mm long. Nerve ring and excretory pore could not be observed. Cervical papillae 0.41-0.71 mm from the anterior end. Cervical alae extends up to cervical papillae. Tail 0.19-0.69 mm long. Vulva post equatorial 6.08 mm from the anterior end of the body. Eggs 0.089-0.112 x 0.042-0.056 mm in diameter.

#### Remarks

The present form belongs to the genus *Paraquimperia* Baylis, 1934 due to the presence of buccal teeth, presence of a gubernaculum and absence of preanal sucker.

Morphologically the present form shows close relationship with *P. tenerrima* and *P. Anguilla*, but differs from them in the number and arrangement of caudal papillae and the size of spicules.

The present form resembles with the already described species *P. manipurensis* in the presence of 12 pairs of caudal papillae, 4 preanal, 1 adanal and 7 postanal and in the presence of equal spicules. Hence the present form is referred as a synonym of *P. manipurensis*.

- Host: *Anabas testudineus* (Bloch)
- Location: Intestine
- Locality: Awangsoi Lake (Manipur)

### *Camallanus anabantis* Pearse, 1933

#### Description

Mouth slit like, buccal capsule consisting of two lateral chitinous valves, with longitudinal rib-like thickenings internally. From the point of junction of the valves, dorsally and ventrally, a trident shaped chitinous process is directed backwards. Oesophagus consisting of a short anterior muscular portion and a long posterior glandular portion.

**Male:** Body 2.11-6.47 mm long, 0.17-0.19 mm wide. Buccal capsule of two valves, each with nine longitudinal rows of teeth. Tridents 0.03-0.04 mm long. Cephalic papillae present. Oesophagus divided into two parts, anterior muscular 0.31-0.325 mm long, posterior glandular 0.41-0.47 mm long. Nerve ring not seen. Tail long 0.08-0.09 mm long, with two spines and a short precaudal ala. Spicules two, unequal but similar, smaller 0.31-0.43 mm long, larger 0.37-0.50 mm long. Caudal papillae 10-13 pairs, 4-6 preanal, 0-2 adanal, 4-5 postanal.

**Female:** Body 12.14-25.43 mm long, 0.32-0.49 mm wide. A pair of cervical papillae sometimes observable. Cephalic papillae present. Oesophagus divided into anterior muscular 0.37-0.40 mm long and posterior glandular 0.74-0.83 mm long. Tail long 0.20-0.38 mm long. Vulva pre-equatorial, 3.46-7.44 mm from anterior end of the body.

#### Remarks

The present form under reference differs remarkably from all the species of the genus *Camallanus* except *C. anabantis*. The present form has a close resemblance with *C. anabantis* morphologically as well as in the number and arrangement of caudal papillae and size of spicules, but shows some difference in the relative size of some body organs. These differences are considered as intraspecific variations and hence the present form is referred as a synonym of *C. anabantis*, Pearse, 1933.

- Host: *Anabas testudineus*
- Location: Intestine
- Locality: Awangsoi Lake (Manipur), Chatla Haor, Silchar (Assam)

### *Procamallanus (Procamallanus) saccobranchi* Karve, 1952

#### Description

Buccal capsule continuous with smooth walls of the capsule, tridents absent, oesophagus divided into an anterior muscular and a longer posterior glandular part.

**Male :** Not found.

**Female:** Body 4.39-6.58 mm long, 0.12-0.14 mm wide. Buccal capsule 0.05-0.06 x 0.04-0.45 mm. Diameter of chitinous ring 0.035-0.04 mm. Tridents absent. Oesophagus divided into anterior muscular, 0.29-0.33 mm long and posterior glandular, 0.43-0.55 mm long. Nerve ring and excretory pore not seen. Tail 0.10 mm long. Vulva post-equatorial, 2.26-3.87 mm from anterior end. Eggs rounded 0.01-0.03 x 0.01-0.03 mm.

**Remarks**

The present form belongs to the genus *Procamallanus* Baylis, 1923. Due to the morphological similarities of the present form with *Procamallanus (Procamallanus) saccobranchi* Karve, 1952, the present form is considered to be a synonym of *P. (P.) saccobranchi*.

- Host : *Clarias batrachus*, *Mystus bleekeri*,
- Location : Stomach wall, Intestine
- Locality : Awangsoi Lake, Manipur and Chatla Haor, Silchar, Assam

***Goezia* sp.****Description**

Cuticle with a series of rings provided posteriorly; lips flattened and expanded outwards, separated from body by a constriction. Oesophagus slightly constricted at middle and swollen into a bulb behind. Male not found. Female body 4.56-6.12 mm long, 0.51-0.68 mm wide. Oesophagus 0.48-0.69 mm long.

**Remarks**

The present form comes under the genus *Goezia* Zeder, 1800. Due to unavailability of male as well as mature specimens the present form cannot be identified up to species level. Hence the present form is assigned as the juvenile stage of *Goezia* sp.

- Host: *Lepidocephalus guntea*
- Location: Intestine
- Locality: Chatla Haor, Silchar (Assam)

***Spinitectus* sp.****Description**

Cuticle provided with a series of transverse rings, to the posterior edge of which are attached backwardly directed spines diminishing in size and number posteriorly. Mouth with indistinct lips. Oesophagus consisting of two parts, muscular and glandular.

**Male :** Not found.

**Female :** Body 5.12 mm long, 0.24 mm wide with about 156 spiny annulations. Oesophagus divided into two parts, anterior muscular 0.13 mm long and posterior glandular 0.26 mm long. Tail 0.08 mm long.

**Remarks**

The present form belongs to the genus *Spinitectus* Fourment, 1983 due to the presence of transverse rings of backwardly directed spines diminishing in size and number posteriorly. Due to the absence of mature specimen the present form is identified only up to the genus level. The present form is assigned the juvenile stage of *Spinitectus* sp.

- Host: *Mystus bleekeri*
- Location: Intestine

- Locality: Awangsoi Lake (Manipur)

***Philometra* sp.****Description**

Body is fusiform and yellowish white in colour. Anterior end and posterior extremities rounded. Head with two papillae. Cuticle smooth. Male not found. Female body measures 37.20-96.39 mm in length and 0.27-0.31 mm in wide. Head measures 0.09-0.11 mm in diameter. Oesophagus 0.78-2.1 mm long. Nerve ring 0.078-0.15 mm from the anterior end.

**Remarks**

The present form comes under the genus *Philometra* Costa due to the above mentioned characteristics. As male and the mature specimens are not found, the present form is identified only up to the genus level. The present form is assigned the juvenile stage of *Philometra* sp.

- Host: *Mystus bleekeri*, *Channa punctata*
- Location: Intestine
- Locality: Awangsoi Lake, Chatla Haor

***Cosmoxynemoides colisi* Gambhir et al., 2006****Description**

Body fusiform, transversely striated with lateral flanges extending upto the cervical region of the body. Cephalic end covered with smooth cuticle, separated from body by annular groove. Buccal capsule absent. Oesophagus divided into anterior tubular and a posterior bulb. Vulva post-equatorial. Tail conical, long, terminating in a sharp point.

**Male:** Not found.

**Female:** Body 2.89-3.08 mm long, 0.24-0.25 mm wide. Head 0.05-0.06 mm in diameter. Lips three each with 2 papillae. Oesophagus divided into an anterior tubular part 0.31-0.32 mm long, 0.035-0.04 mm wide, posterior bulb 0.09-0.11 mm long, 0.09-0.11 mm wide. Nerve ring and excretory pore could not be observed. Vulva post-equatorial 1.46-1.55 mm from anterior end. Tail long with a sharp point. Egg 0.16-0.17 mm long, 0.07-0.08 mm wide.

**Remarks**

The present form resembles the already described species *Cosmoxynemoides colisi* Gambhir et al., 2006 in almost all the characters viz., length and wide of the body, oesophagus, eggs and a post-equatorial vulva. Hence, based on the above mentioned similarities the present form is assigned as *C. colisi*.

- Host: *Trichogaster labiosa* (Day) and *T. fasciata* (Bloch & Schneider)
- Location: Intestine
- Locality: Awangsoi Lake (Manipur) and Chatla Haor, Silchar (Assam)

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