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Research Article

REPORT OF CARYOPHYLLIDEAN CESTODE FROM *MASTACEMBELUS ARMATUS* FROM MANIPUR

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ABSTRACT

The present paper reports about description and new host record of caryophyllid cestode in a freshwater spiny eel, Mastacembelus armatus. A survey was conducted during autumn months of two consecutive years 2015 and 2016, from the border town of Manipur, Moreh. Many piscine cestodes were recovered during the course of investigation and out of which one was identified as the genus Lucknowia Gupta, 196. The present specimen shows morphological features viz., digit form to lance late scolex, longitudinal furrows in scolex, medullary testes, vitelline follicle in the medullary, post -testicular vitelline absent, ovarian follicular with inverted A- shaped and situated at the posterior extremity. Detailed are described and illustrated with figures and table.

INTRODUCTION

Fishes serve as very much important and unavoidable food item and is the main source of the animal protein in daily diet of people. Some fishes like siluroids, channids, synbranchids, etc. are used as a protein sources and play an important role in treatment of malnutrition of children. However, these fishes are infected by many parasites especially helminth inhabiting the gastro- intestinal tract. Among the helminth, cestodes are very common, two subclasses viz., Cestodaria Monticelli, 1892 and Eucestoda South well, 1930 are encountered in fishes. The present paper deals with the piscine cestode belonging to subclass Cestodaria Monticelli, 1892: Caryophyllidea Ben. in Olsson, 1893: Caryophyllaeidae Leuckart, 1878.

Caryophyllideans are a small group of single- segmented, monozoic cestode parasites. In India, in fact, a little importance was given to the collection and investigation of this group. Moghe, 1925 initiated the study on this group by describing *Caryophyllaeus indicus* from *Clarias batrachus* from Nagpur. However, Woodland, 1926 indicated that *C. indicus* belong to the genus *Lyocestus* Cohn, 1908. Later in 1931 Moghe redescribed it as *L. indicus*. The caryophyllids were recovered from different parts of the world and they are common parasites of live freshwater fish belonging to the orders Siluriformes and Cypriniformes. Yet, the genus *Lucknowia* Gupta, 1961 is found to record from Indomalayan region particularly India. However, the present specimen is recovered from fish belonging to order Synbranchiformes (*Mastacembelus armatus*), a new record of the host and locality i.e.,Moreh, Manipur. The State is lagging behind in the exploration of piscian parasitic fauna. Hence, the aim of the present study is at determining the piscine cestode diversity and to add a new discovery in the world of Science of Taxonomy.

MATERIALS AND METHODS

The cestodes were dissected out and collected from the intestine of the fish host and kept in 0.7% normal saline, then fixed in AFA (Alcohol-Formaline-Acetate) and dehydrated in Glycerine Alcohol at room temperature. Stained in Bulluoy's Aceto – alum carmine followed by dehydration in alcohol grades of ascending series. Then the specimens are cleared in xylene and mounted in D.P.X. Photomicrographs were taken with Nikon Stereo-zoom microscope model no. SMZ1270 and Olympus CH20i. All measurements are given in millimetres unless otherwise stated. Other type specimens have been deposited in the Museum of Parasitology Section, Department of Life Sciences, Manipur University and few paratypes will be deposited in the Zoological Survey of India, Kolkata.

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Description

Fig. 1 &2- The worms are whitish yellow in colour with body long, narrow at the anterior extremity, 33.93- 50.55 long and 19.87- 40.87 width. The body is differentiated into three parts viz., pre- testicular, testicular and post- testicular. The pre-testicular part long, measuring 8.87- 9.90 long and consist of simple, unspecialised scolex with lanceolate shape, measuring 1.18 in length by 0.60- 0.75 in width. Neck long wider than scolex, measures 8.47- 8.77 in length by 12.75- 15.00 wide.

The testicular part is considerably long, 20.92- 36.15 in length, consisting of vitelline follicles, testes and cirrus sac. Testes medullary, 130- 270 in number approximately (precise number difficult to count because of overlapping with vitelline follicles), almost round to oval, medium in size, pre- ovarian, 0.07- 0.19 long, 0.17-0.30 wide. cirrus sac large, somewhat oval, 1.06 long, 0.39 wide. Inside the cirrus, consist of convulated ejaculatory duct. Vitelline follicles numerous, 0.04-0.06 long, 0.09- 0.16 wide, mostly cortical region, penetrate the medullary region.

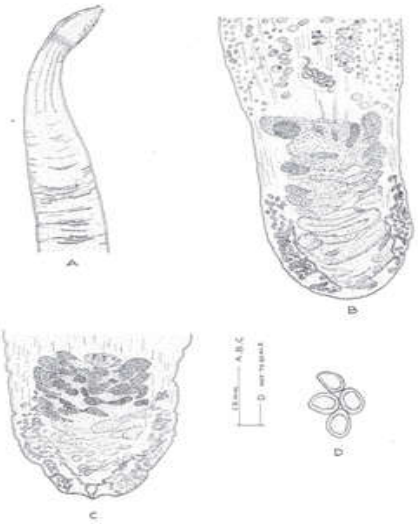

Figure 1 *Lucknowia mastacembeli* n. sp.
(**A**) Undifferentiated scolex,(**B**) Posterior end showing reproductive organs,
(**C**) Posterior end of another specimen,(**D**) Eggs.

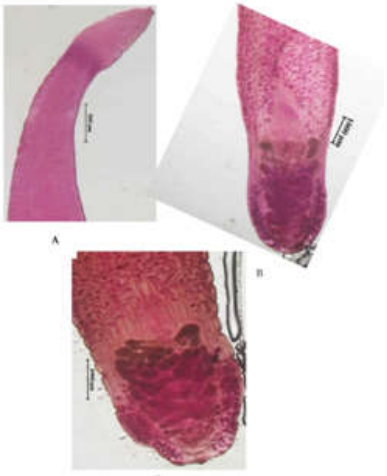

Figure 2 *Lucknowia mastacembeli* n. sp. (**A**) Anterior end with undifferentiated scolex
(**B**) Posterior end showing reproductive organs, (**C**) Posterior end of another specimen.

The post- testicular part is shortest out of the three which measures 4.12- 4.50 long, 2.81-3.75 wide, consisting of extensively coiled uterus, follicular ovary, vaginal opening and anal pore. Uterus form many loops between ovary and posterior margin of the cirrus sac, measures 20.62- 23.36 long and fully packed with eggs. Ovary follicular, close to posterior extremity, inverted- 'A' shaped with total length of 2.25- 2.62 connect with isthmus, 1.12long and faintly visible. Each ovary measures 0.07- 0.11 long, 0.05- 0.22 wide. Vaginalopening between cirrus sac and uterus, measures 0.05 long, 0.16 wide. Eggs oval, 0.03 long, 0.01- 0.03 wide.

Excretory system not clearly visible as the region is highly occupied with ovary. The excretory bladder is however present and the anal pore measures 0.09 long, 0.03 wide. Inner longitudinal musculature very well developed. Male and female genital pores separate.

RESULT

Detail structural analysis of the present caryophyllidean cestode leads to the recognition of the genus *Lucknowia* as a new species.

Taxonomic Summary

Genus : Lucknowia
Species : L. mastacembeli n. sp.
Type host : Mastacembelus armatus L.
Habitat : Intestine
Type locality : Moreh, Manipur (24.2513 0 N &; 94.3013 0 E)
Holotype : $MUPLC_6/16$
Etymology : Name based on the name of the host i.e.,'Mastacembelus'.

TABLE- I. Dishtinguishing characters of species of *Lucknowia* Gupta, 1961 (Cestoda: Caryophyllidea)

Characters	*L. fossilis* Gupta, 1961	*L. microcephala* Bovein, 1926 Ash et al. 2011	Present specimen
Body length	15-45	60	33- 50
Scolex	Digitiform	Lanceolate	Lanceolate
Testes	Medullary	Medullary	Medullary
Number of testes	167- 209	425	130- 270
Previtelline part of the body	Long, represent1/4-1/5 of the total body length	Short, represent 1/3 of the total body length	Long, represent 1/4-1/5 of the total body length
Ovary shape	Mostly inverted A shaped	H or inverted A shaped	Inverted A shaped
Posterior extent of vitelline follicle	May be present	Absent	Absent
Type host	*Heteropneustes fossilis*	*Clarias batrachus*	*Mastacembelus armatus*

Remarks

The unique characteristic of *Lucknowia* is the presence of vitelline follicles in the medulla whereas it is cortical in other genus. All the known species of the genus possess a long body with robust posterior part, lanceolate scolex, ovarian follicles situated near the posterior extremity, with anterior arms longer than posterior arms forming inverted A shape.

DISCUSSION

Gupta, 1961 erected the genus *Lucknowia* for the monozootic cestodes from the intestine of *Heteropneustus fossilis* from the river Gomti, Lucknow, with *L. fossilis* as a type species having following generic diagnosis:

Scolex unspecialised, varying little in shape and not broader than remainder of body. Cirrus sac and utero- vaginal canal open separately at the beginning of last seventh of body length. Uterine and vaginal pores common. Ovarian follicles cortical,

commisure or isthmus being medullary. Uterine coils much convoluted, compactly coiled behind ovarian isthmus and not extending anterior to cirrus sac. Uterine glands present. Receptaculum seminis absent. Vitelline cortical and extending up to posterior end of body. Terminal excretory bladder present.

Mackiewicz, 1972 doubted the presence of polar filament and absence of the receptaculum seminalis in *L. fossilis*. Afer reinvestigation he amended the generic diagnosis by including these characters too. Later Niyogi *et al*., 1982 added *L. indica*, recorded the presence of receptaculum seminalis and absence of operculum and polar elongation.

However, Hafeezullah (1993) and Mackiewicz (1994) invalidate *Lucknowia* Gupta, 1961 and transferred its type species to *Lytocestus* Cohn, 1908. This synonymy however, does not well justified because both the genera differ from each other in the shape and position of the ovary. Consequently, Ash *et al*., 2011 resurrected *Lucknowai*.

In the course of the study, four species of the genus *Lucknowia* viz., *L. fosssilis* Gupta, 1961*, L. indicus* Niyogi *et al*., 1982*, L. ovocompactum* and *L. microcephala* Bovien,1926, Ash *et al*., 2011 were encountered. The present specimen shows resemblances with *L. fossilis* Gupta, 1961and *L. micocephala* Ash *et al*., 2011 also shows some distinct variations in the morphological features.

The present specimen differs from *L. fossilis* Gupta, 1961 in the shape and length of the body, shape of ovary and posterior extent of vitelline follicles (see Table I).

The present specimen differs from *L. microcephala* Bovien, 1926, Ash *et al*., 2011in the shape and length of the body and length of the previtelline region (see table I).

CONCLUSIONS

After a detail comparison of the characters of already known species and the present one, the lattert specimen cannot be placed among the already existing species. Therefore to accommodate the present specimen there arises the need for keeping as a separate new species. Hence, a new species *Lucknowia mastacembeli* is proposed. The specific name '*mastacembeli*' is based on the generic name of the fish host i.e., '*Mastacembelus*'.

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