



RESEARCH ARTICLE

CHARACTERIZATION OF CESTODE PARASITES OF SOME FRESHWATER FISHES OF MANIPUR

^{1,*}Huidrom Puinyabati Devi, ²Maibam Shomorendra Singh and ³Devashish Kar

¹Department of Zoology, Pravabati College, Mayang Imphal-795132, Manipur, India

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

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

ARTICLE INFO

Article History:

Received 19th November, 2016

Received in revised form

06th December, 2016

Accepted 20th January, 2017

Published online 28th February, 2017

Key words:

Cestode parasites,
Freshwater fish, Manipur.

Copyright©2017, Huidrom Puinyabati Devi et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Huidrom Puinyabati Devi, Maibam Shomorendra Singh and Devashish Kar, 2017. "Characterization of Cestode parasites of some freshwater fishes of Manipur", *International Journal of Current Research*, 9, (02), 46044-46046.

ABSTRACT

This article deals with the cestode parasites infecting some freshwater fishes of Manipur where the knowledge of fish parasites are less explored. The present study was carried out from 2015-2016. Five species of cestode parasites were collected during the study period viz., *Lytocestus fossilis* Singh, 1975; *L. indicus* (Moghe, 1925) Woodland, 1926; *L. longicollis* Rama Devi, 1973; *Djombangia penetrans* Boviën, 1926 and *Ophiotaenia* sp. La Rue, 1911.

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 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. The pathogenecity caused by the parasites by damaging the tissues and decreasing the nutritional values can lower the productivity of the fish. Therefore pisciculture requires knowledge of parasites of the fishes. Many workers in India studied in cestode parasites namely Ramadevi (1973), Sahay (1979), Gupta and Parmer (1985), Gupta and Parmer (1990), Shomorendra *et al.* (2003), Tandon *et al.* (2005), Poonam (2007), Mangale and Kalse (2009). Cestode 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 is lagging behind as there is less exploration in the field of fish cestode parasites. So, further investigation in this field is needed in the study area.

The present study was aimed at determining the cestode parasites found in the fishes Manipur, which will further contribute to our understanding of fish cestode diversity.

MATERIALS AND METHODS

Manipur is situated on the north eastern part of India between latitudes 23^o 49' N and 25^o 44' N and longitudes 92^o 59' E and 95^o 45' E with an altitude varying from 550-2996 m above the mean sea level (MSL). For the present study, different freshwater bodies (in the form of ponds, lakes, rivers etc.) in different localities of Manipur are used for sampling. The present investigation was done from 2015 and 2016. Fishes were brought in fresh or preserved condition to the laboratory from different locality of Manipur. Small fishes were killed by pithing and somewhat larger specimens by blow on the top of the cranium. Fishes were identified following, Jayaram (2010) and Vishwanath (2002). The external body surfaces as well as the internal body organs were thoroughly examined for the parasites following Bylund *et al.* (1980). The cestodes collected were fixed and preserved in 5% formalin. To facilitate identification of the worms the cestodes were stained in alum carmine and mounted in Canada balsam. Then the worms were identified following Yamaguti (1959).

*Corresponding author: Huidrom Puinyabati Devi,

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

Table 1. List of parasites recovered, site of infection with their respective fish host

Parasites	Site of infection	Host
<i>Lytocestus fossilis</i> Singh, 1975	Intestine	<i>Mystus bleekeri</i> (Day) <i>Heteropneustes fossilis</i> (Bloch)
<i>L. indicus</i> (Moghe, 1925) Woodland, 1926	Intestine	<i>Clarias batrachus</i> (Linnaeus) <i>Heteropneustes fossilis</i> (Bloch)
<i>L. longicollis</i> Rama Devi, 1973	Intestine,	<i>Clarias batrachus</i> (Linnaeus)
<i>Djombangia penetrans</i> Bovien, 1926	Intestine	<i>Clarias batrachus</i> (Linnaeus)
<i>Ophiotaenia</i> sp. La Rue, 1911	Intestine	<i>Glossogobius giurus</i> (Ham-Buch)

RESULTS AND DISCUSSION

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

1. *Lytocestus indicus* Moghe, 1925

Observation

Body is elongated, flat, 7.75-16.24 mm long, 1.35-1.57 mm wide. Scolex stumpy, unspecialised (i.e. bothria, introvert, furrows or grooves absent), much narrower than rest of the body, 0.79-1.41 mm long, 0.50-0.99 mm wide. Neck present, 0.82-1.50 mm long. Seminal receptacle absent. Testes numerous, 245-340 in number. Male and female gonopores are separate. Uterus with thick coat of glandular cells, thrown in lateral coils, extending posteriorly beyond shell gland complex, anteriorly opening into dilated terminal part of vagina to form a short utero-vaginal canal. Utero-vaginal canal opens as female pore a little posterior to male pore. Ovary bilobed or wing like, ovarian follicles cortical, only ovarian commissure and proximal portions of ducts being medullary. Vitellaria follicular, cortical, surrounding testes in testicular zone, smaller than testes, extending from behind neck to almost level of utero-vaginal pore. Post ovarian vitellaria absent. Eggs oval in shape, 0.045-0.065 mm long, 0.02-0.03 mm wide.

Remarks

The present form resembles the already described species *L. indicus* Moghe, 1925 in almost all the characters viz., stumpy scolex, wing-like follicular ovary, absent of post ovarian set of vitelline follicles, testes larger in size than vitelline follicles, uterus with thick coat of glandular cells thrown in lateral coils and absence of seminal receptacle. Hence, on the basis of above mentioned similarities, the present form assigned as *L. indicus*. The difference in measurements from other description of *L. indicus* with the present form considered to be intra specific variations.

2. *L. fossilis* Singh, 1975

Observation

Body elongated, flat, 5.77 mm long, 0.56 mm wide, main body usually tapering into neck and scolex. Scolex stumpy, undifferentiated, anterior end bluntly rounded, narrower than neck, 0.39 mm long, 0.345 mm wide. Neck present, 1.22 mm long, 0.33 mm wide. Testes rounded or oval, numerous, about 289 in number, medullary, 0.045 mm long, 0.065 mm wide, extending from a little behind to anteriormost vitelline follicles up to the anterior half of cirrus sac. Cirrus sac ovoid, 0.37 mm long, 0.29 mm wide. Male and female gonopore are separate.

Seminal receptacle absent. Ovary bilobed, H-shaped, ovarian follicles cortical, connected by a bandshaped isthmus or commissure. Vitellaria follicular, cortical, annular (i.e. surrounding testes), 0.015 mm long, 0.07 mm wide, extending from behind neck to posterior level of cirrus sac. Uterus laterally coiled. Vagina is a narrow tube, midventral to uterus joining anteriorly with uterus to form a short utero-vaginal canal, opening as female gonopore a little behind male gonopore. No eggs.

Remarks

Lytocestus fossilis was originally described by Singh, 1975 from *Heteropneustes fossilis* in Katmandu, Nepal. The present form resembles the already described species in almost all the characters viz., stumpy scolex, H-shaped follicular ovary, cortical and annular vitellaria and absence of seminal receptacle. Hence, based on the above mentioned similarities the present form is assigned as *L. fossilis*. The difference in the relative size of some body organs of the present form with the already described *L. fossilis* is considered to be the variation within the species.

3. *L. longicollis* Rama Devi, 1973

Observation

Body elongated, 17.75-30.34 mm long, 1.63 mm wide at the middle of testes field. Scolex undifferentiated, unarmed, 1.01-1.40 mm long, 0.42-0.75 mm wide. Neck present, 1.03-15.40mm long, 0.44-0.64 mm wide. Testes numerous, 315-345 in number, medullary, spherical, 0.095-0.12 mm long, 0.08-0.09 mm wide, extending from anterior narrow end of the body to the cirrus sac posteriorly. Cirrus sac oval, lined by thin muscular wall, open as male gonopore separately from the utero-vaginal pore. Ovary bilobed, follicular, wing like and cortical near posterior extremity. Right ovarian lobe measures 0.62-1.80 mm long and a band like isthmus extending posteriorly to some distance short of posterior end of body. Mehlis's gland situated posterior to isthmus in between the two ovarian lobes, uterine coils glandular, extending from behind ovarian isthmus to the level of cirrus pore. Vagina straight or slightly convoluted, opening unitedly with the uterus as utero-vaginal pore, receptaculum seminis a conspicuous sac, oval in shape, lying anterior to ovarian isthmus. Vitellaria cortical as well as medullary, smaller than testes, 0.045-0.06 mm long, 0.06-0.09 mm wide, no post ovarian vitelline follicles. Egg oval in shape, operculate. Excretory pore terminal.

Remarks

Lytocestus longicollis was originally described by Rama Devi (1973) from the freshwater fish *Clarias batrachus* in India. It was distinguished from the other species of the genus *Lytocestus* in having a receptaculum seminis, which is absent

in the other species. The present observation shared with those of Rama Devi but have little difference from it with regard to the measurements of the various organs which are considered as intraspecific variations. Hence, the present form is assigned as a synonym of *L. longicollis*.

4. *Djombangia penetrans* Bovien, 1926

Observation

Body short, milky white when freshly recovered from host, measuring 4.89-7.03 mm long, 2.22-3.05 mm wide. Scolex globular with a terminal sucker and measures 0.65 mm long, 0.50-0.92 mm wide. Neck marked off from the body, 0.44-0.51 mm long, 0.41-0.45 mm wide. Main body or trunk is flattened and fleshy. Testes numerous, rounded, 0.05-0.09 mm in diameter, larger than vitelline follicles, extending in two lateral rows from some distance behind the neck up to the level just in front of the ovary. Cirrus sac not well defined, opening into a common atrium close to posterior extremity, just in front of the ovarian isthmus. Ovary dumb-bell shaped, bilobed, at posterior extremity, follicular, the two lobes joined to each other by an ovarian isthmus. Right ovarian lobe measures 0.22-0.34 mm long, 0.34-0.41 mm wide and left ovarian lobe measures 0.35-0.46 mm long, 0.24-0.34 mm wide. Uterus extending in median medulla to almost anterior level of testes. Seminal receptacle absent. Vitellaria spherical to ovoid, 0.045-0.07 mm long, 0.05-0.10 mm wide, smaller than testes, cortical, extending from about anterior region of testes to ovarian lobes. Post ovarian vitellaria absent. Eggs spiny, measures 0.06 mm long and 0.03-0.04 mm wide.

Remarks

The present form resembles the already described species *D. penetrans* Bovien, 1925 in almost all the characters viz. like a distinct sucker at the tip of the scolex, neck marked from the body, no post-ovarian vitelline follicles, cirrus sac not prominent and spinose eggs. Hence, on the basis of above mentioned similarities, the present form is assigned as *D. penetrans*.

5. *Ophiotaenia* sp. La Rue, 1911

Observation

Body 13.04-15.68 mm long, 0.42-0.54 mm wide. Scolex globose or somewhat tetragonal, 0.16-0.19 mm long, unarmed. No rostellum. Suckers round. Gravid proglottides longer than wide. Ventral excretory stems in lateral medulla. Testes meullary anterior to ovary. Testicular follicle measures 0.02-0.13 mm long, 0.02-0.12 mm wide. Ovary bilobed, M-shaped. Right ovarian lobe measures 0.15-0.19 mm long, 0.11-0.12 mm wide. Left ovarian lobe measures 0.15-0.16 mm long, 0.10-0.11 mm wide. Ovarian follicle 0.025-0.03 mm long, 0.025-0.45 mm wide. Vitellaria extending in marginal maedulla throughout proglottis length, some follicles intrude into the cortex through the space among the inner longitudinal muscle bundles. Vitelline follicle measures 0.015-0.025 mm long, 0.015-0.02 mm wide. Uterus extending in median field between ovary and anterior end of proglottis. Vagina opening anterior. Eggs measure 0.015-0.015 mm in diameter.

Remarks: On the basis of the above mentioned characters the present form comes under the genus *Ophiotaenia* La Rue, 1911.

Acknowledgement

The authors are thankful to the Principal, Pravabati College, Mayang Imphal for providing laboratory facilities. The Principal authors also highly acknowledge University Grant Commission, North-Eastern Regional Office for granting a minor research project to the first author.

REFERENCES

- Bovien, P. 1926. Caryophyllaeidae from Java. Medd. Dansk. Naturh. Foren. 82: 157-181.
- Bylund, G., Fagerholm, H.P., Calenius, G., Wikgreen, B.J. and Wikstrom, M. 1980. Parasites of fish in Finland – ii. Methods for studying parasite fauna in fish, Acta Acad. Aboensis, Ser.B. 40(2):1-23.
- Gupta, V. and Parmar, S. 1985. On a new cestode, *Senga indica* sp. nov. from the intestine of a freshwater fish, *Mastacembellus armatus* (Lacep.) from Lucknow. Indian J. Helminth. XXXVII(II): 96-99.
- Gupta, V. and Parmer, S. 1990. On two new Caryophyllaeids from river Gomati, Lucknow, Uttar Pradesh. *Ind. J. Helminth.*, Vol. XXXXII(1): 25-30.
- Kar, D. 2000. Ichthyodiversity of Chatla Haor, a floodplain wetland in Barak valley region of Assam, pp.3-6. In: Advances in Zoology, Environmental Degradation and Biodiversity, pp 279 (Ed) Pandey, B.N. and Singh, B.K., Daya Publishing House (New Delhi).
- Mangale, A. J. and Kalse, A.T. 2009. A new cestode *Senga panzaraensis* from *Mastacembellus armatus* at Dhule, India. *Uttar Pradesh J. Zool.*, 29(1): 105-108.
- Moghe, M.A. 1925. *Caryophyllaeus indicus* n. sp. from the catfish *Clarias batrachus* (Bl). Parasitology. 17: 132-233.
- Poonam, 2007. Studies on the helminthic endoparasitic fauna of certain vertebrates of Bokaro District. Ph.D. thesis, Vinoba Bhawe University, Hazaribagh.
- Rama Devi, P. 1973. *Lytocestus longicollis* sp. nov. (Cestoidea: Caryophyllidae) from catfish *Clarias batrachus* L. in India. *Journal of Helminthology*, 47:415-420.
- Sahay, S.N. 1979. Studies on some trematodes, nematodes and cestodes of Chotanagpur. Ph.D. thesis, Ranchi University, Ranchi.
- Shomorendra, M, Jha, A.N. and Kumar, P. 2003. A new cestode *Lytocestus bishnupurensis* n. sp. from a fresh water fish *Mystus seenghala* (Sykes). *J. Freshwater Bio.*, 15(1-4): 43-45.
- Singh, S.S. 1975. On *Lytocestus fossilis* n. sp. (Cestoidea: Lytocestidae) from *Heteropneustes fossilis* from Nepal. In Dr. B.S. Chauhan Commemorial Volume, 1975. (eds. Tiwari K.K and Srivastva C.B.) Orissa, India. Zoological Society of India. 79-82.
- Tandon, V., Chakravarty, R. and Das, B. 2005. Four new species of the genus *Lytocestus* (Caryophyllidae, Lytocestidae) from edible catfishes in Assam and Meghalaya, India. *Journal of Parasitic Diseases*, 29(2): 131-142.
- Vishwanath, W., 2002. Fishes of North East India. NATP Publication, Manipur University. pp-195.
- Woodland, W.N.F. 1926. On the genera and possible affinities of the Caryophyllaeidae; a reply to Drs. O. Fuhmann and J.G. Baer. Proc. Zool. Soc. London, 1926, pp. 49-69.
- Yamaguti, S. 1959. Systema Helminthum Vol. II. The Cestoda of Vertebrates. Inter-Science, New York. pp. 860.