Environment Conservation Journal 16(1&2) 47-50, 2015
ISSN 0972-3099 (Print) 2278-5124 (Online)
Abstracted and Indexed

Studies on pseudophyllidean cestode genus *Ptychobothrium* loennberg, 1889 (cestoda: ptychobothriidae, luhe, 1902) from freshwater fish *Mastacembelus armatus* (lacepede, 1800)

Vikram Satwarao Deshmukh, Sanjay Shamrao Nanware✉ and Dhanraj Balbhim Bhure

Received: 30.09.2014 **Revised: 21.02.2015** **Accepted: 28.04.2015**

Abstract

The present study deals with description of a new species of Pseudophyllidean Cestode genus *Ptychobothrium*, Loennberg, 1889 collected from intestine of freshwater fish, *Mastacembelus armatus* (Lacepede, 1800) at Mahur, Dist. Nanded M.S. India during February, 2011 to January, 2013. *Ptychobothrium vitellaris* Sp.Nov. comes closer to all known species of genus *Ptychobothrium*, Loennberg, 1889 in general topography of organs but differs due to sessile Scolex, paired bothria, apical disk at anterior end of scolex, Neck absent, Mature Proglottids broader than long, Cirrus pouch pyriform, Testes 40-45 in numbers, Ovary bilobed and Vitellaria follicular.

Key Words: Mastacembelus armatus, Pseudophyllidean Cestode, Ptychobothrium vitellaris Sp. Nov

Introduction

Genus *Ptychobothrium* was established by Loennberg, 1889 with its type species *Ptychobothrium belones* (Dujardin,1845*).* Subsequently, Sandeep K. Malhotra, 1983 added *Ptychobothrium nayarensis* from hill stream fishes *Barilius bola (*Ham*.)* and *Schizothorax richardsonii (*Gray*)*. Wongswad *et al.*,1998 described *Ptychobothrium mystacoleucysi, Ptychobothrium rojanapaibuli* collected from *Mystacoleucus marginatus* at Maesa Stream, Chiang Mai. Wongswad *et. al.,* 1998 reported *Ptychobothrium discusae* collected from *Mystacoleucus marginatus* at Maesa Stream, Chiang Mai. The morphological studies of the collected specimens revealed them to belong to genus *Ptychobothrium*, (Loennberg, 1889) of family Ptychobothriidae (Luhe,1902), order Pseudophyllidea (Carus, 1863).

Materials and Methods

During the survey of Piscean Helminths, a total of 120 freshwater fish specimens of *Mastacembelus armatus* (Lacepede, 1800) from Mahur Dist. Nanded (M.S.) India (Fig.1). During course of study 18 fish were found infected with 21 cestode parasites during February, 2011 to January, 2013. These cestodes were preserved in 4% hot formalin stained with Harris haematoxylin and Borax carmine, dehydrated through various alcoholic grades, cleared in xylene, mounted in D.P.X. and drawings were prepared with the aid of a Camera Lucida attachment, Photomicrograph were taken by Trinocular Computerized Research Microscope. All measurements are recorded in millimeters unless otherwise stated with average values included in parentheses. Identification was done by (Schmidt, 1934; Yamaguti, 1959; Wardle *et al.*, 1974; Khalil *et al.*,1994).

Results and Discussion

(Based on Seven Specimens; Fig.2 & 3)

All cestodes observed during course of study are long, consist of scolex, immature and mature and ripe proglottids. Scolex tubular, unarmed with an apical disk and measures 1.050 (1.033-1.067) in length and 0.674 (0.505-0.842). Scolex bears pair of bothria, which is sessile, distinctly two lobed and measures 1.039 (1.011-1.067) in length and 0.533 (0.393-0.674) in breadth. Anterior end of scolex terminates in apical disc, which is oval, well marked and measures 0.056 (0.044-0.067) in length and 0.101 (0.089-0.112) in breadth. Neck absent. Mature proglottids are 5-6 times broader than long and measures 0.280 (0.224-0.337) in length and

Author's Address
Research and Post Graduate Department of Zoology, Yeshwant Mahavidyalaya, Nanded-431602
E-mail: snanware@rediffmail.com

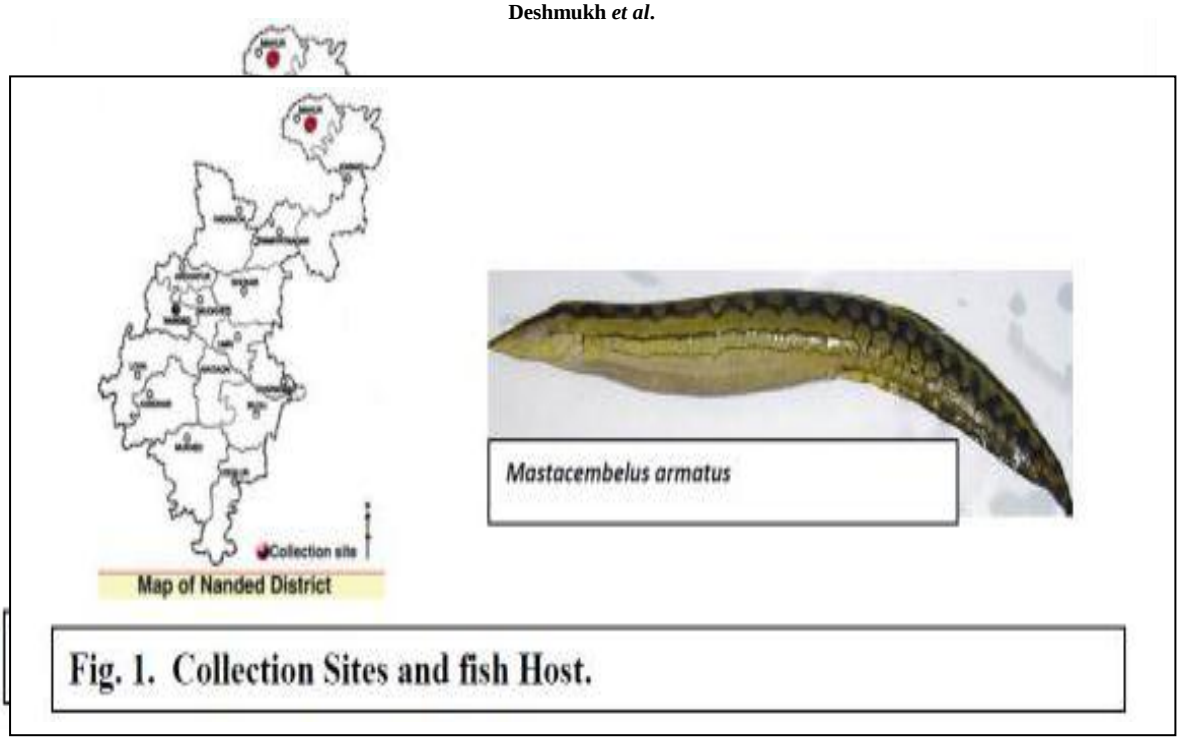
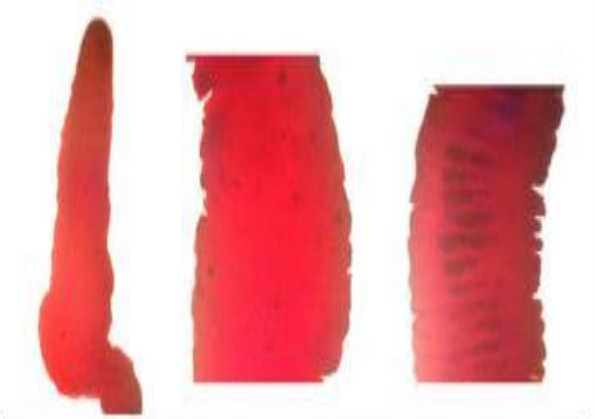


Fig. 1. Collection Sites and fish Host.

2.275 (2.191-2.359) in breadth. Testes small, oval to rounded, pre-ovarian 40-45 in number, scattered in two groups and measures 0.044 (0.033-0.056) in length and 0.056 (0.044-0.067) in breadth. Cirrus pouch pyriform, pre-ovarian and measures 0.168 (0.157-0.179) in length and 0.061 (0.056-0.067) in breadth. Cirrus thin, present within the cirrus pouch and measures 0.117 (0.112-0.123) in length and 0.016 (0.011-0.022) in breadth. Vas deferens very short, thin curved tube and measures 0.039 (0.033-0.044) in length and 0.016 (0.011-0.022) in breadth.Vagina and cirrus pouch open a common pore known as genital pore, which is small in size, oval in shape and measures 0.039 (0.033 - 0.044) in length and 0.028 (0.022 - 0.033)in breadth. Vagina thin, short tube, arises from genital pore,



Scolex Mature Proglottids Gravid Proglottids

Fig. 2. Microphotoplate of *Psychobothrium vitellaris* Sp.Nov.

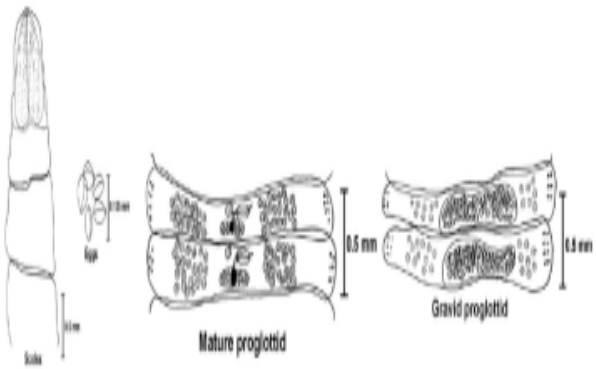


Fig. 3. Camera Lucida diagramme of *Psychobothrium vitellaris* Sp.Nov.

runs posteriorly, opens in ootype and measures 0.061 (0.056-0.067) in length and 0.016(0.011-0.022) in breadth. Ootype oval, compact, medium and measures 0.067 in diameter. From ootype ovarian lobes start. Ovary distinctly bilobed, transversely placed at posterior margin of proglottids and each lobe measures 0.185 (0.168-0.202) in length and 0.073 (0.056-0.089) in breadth. Vitellaria follicular Gravid proglottids are five to six times broader than long and measures 0.337 (0.280-0.393) in length and 2.275 (2.247-2.303) in breadth. Uterus saccular, filled with eggs and measures 00.196(0.168-0.224) in length and 1.039(1.011-1.067) in breadth. Eggs cylindrical, operculate, tapering at both ends and measures measures 0.038(0.027-0.050) in length and 0.065(0.061-0.069) in breadth Uterine pore rounded, towards anterior region of proglottids and measures 0.056 (0.044-0.067) in length and 0.078(0.067-0.089) in breadth. Loennberg, (1889) established the genus *Ptychobothrium* with its type species *Ptychobothrium belones* (Dujardin,1845*).* Subsequently, Malhotra, (1983) added *Ptychobothrium nayarensis* from hill stream fishes *Barilius bola (*Ham*.)* and *Schizothorax richardsonii (*Gray*)* in Garhwal Himalayas, India. Wongswad, 1998 described *Ptychobothrium mystacoleucysi, Ptychobothrium rojanapaibuli* collected from *Mystacoleucus marginatus* at Maesa Stream, Chiang Mai. Wongswad *et. al.,* 1998 reported *Ptychobothrium discusae* collected from *Mystacoleucus marginatus* at Maesa Stream, Chiang Mai.On comparison, the present worm *Ptychobothrium vitellaris* Sp. Nov. stands close to known species of the genus *Ptychobothrium* Loennberg, (1889) in general topography of organs, but differs from *Ptychobothrium belones* (Dujardin,1845*)* Loennberg, (1889) in absence of an apical disc. Present form differs from *P.nayarensis* Malhotra, 1983 in having heart shaped Scolex with well developed bothria, distinctly 3-4 lobed, testes 52-78 (66), ovary 'V' shaped, uterus 'S' shaped, excretory vessels 6 pairs in numbers and collected from *Barilius bola (*Ham*.)* and *Schizothorax richardsonii* (Gray) in river East and West Nayar, District Pauri, Garhwal, U.P., India. Present tapeworm differs from *Ptychobothrium mystacoleucysi,* Wongswad, (1998) in having scolex triangular, testes 25-30 in number, pre-ovarian, cirrus pouch placed in the center, vagina long tube, ovary bilobed with 10-12 acini, uterus reticulate, filled with many eggs, uterine pore rounded, placed near to the anterior margin of the segment, granular vitellaria and collected from *Mystacoleucus marginatus* at Maesa Stream, Chiang Mai. It differs from *Ptychobothrium rojanapaibuli* Wongswad,(1998)

Taxonomic Summary

Genus: *Ptychobothrium* Loennberg, 1889
Species:*Ptychobothrium vitellaris* Sp.Nov.
Typehost:*Mastacembelusarmatus (*Lacepede,1800)
Habitat (Site) : Intestine
Type locality : Mahur, District Nanded M.S., India.
Prevalence: Twenty One mature tapeworms collected from Eighteen infected host out of One Hundred Twenty examined.
Period of collection:February,2011 to January,2013.
No. of Specimen: 21
Accession number: PGDZ/YMN/1-07/ February, 2011 to January,2013
Deposition: Research and PG Department of Zoology, Yeshwant Mahavidyalaya, Nanded.
Etymology: The present species is named on account of follicular vitellaria.

Key to the species of the genus *Ptychobothrium* Loennberg, 1889
Presence of Apical Disc : 1
Absence of Apical Disc : *P.belones* (Dujardin,1845*)* Loennberg, (1889)
1. Scolex Heart shaped : 2
Scolex Triangular: *P. mystacoleucysi* Wongswad, (1998)
Scolex Tubular : 3
2. Testes below 100 in numbers : 4
Testes above 100 in numbers : *P.discusae* Wongswad *et.al.,* (1998)
3. Absence of Neck : *P. vitellaris* Sp.Nov.
Presence of Neck: *P. elongata* Deshmukh *et. al.,* 2014
4. Ovary 'V' shaped: *P.nayarensis* Sandeep K. Malhotra, (1983)
Ovary 'U' shaped: *P.rojanapaibuli* Wongswad,(1998)

in possessing heart shaped scolex, bothridia compressed, immature segments square, testes 65-70 in number, in two fields, big and rounded, post-ovarian, cirrus pouch near to the anterior margin of the segment, big, cirrus curve, uterine pore not touching to the anterior margin of the segment, ovary 'U' shaped, uterus reticulate, vitellaria granular in 3-4 strips and collected from *Mystacoleucus marginatus* at Maesa Stream, Chiang Mai. Present form *Ptychobothrium vitellaris* Sp. Nov. differs from *Ptychobothrium discusae* Wongswad *et.al.,(*1998) in having scolex heart shaped, bothridia oval with having disc, neck absent, number of segments 158-170 in number, testes 190-220 in number, post-ovarian, vas-differens coiled, gravid segments broader than long, ovary finger-like in the last gravid segment, Uterus square and conical, filled with two types of eggs, uterine pore rounded, lies near to the anterior margin of the segment and recovered from *Mystacoleucus marginatus* at Maesa Stream, Chiang Mai. The worm under discussion differs from *Ptychobothrium elongata* Deshmukh *et.al.*, (2014) described earlier, in having tubular, sessile Scolex, paired bothria, apical disk at anterior end of scolex, Neck short, Testes 50-55 in numbers, Ovary bilobed and collected from *Mystus seenghala (*Sykes 1839*)* at Dharmabad, Dist. Nanded M.S. India . From the above discussion it is clear that the species under discussion is new to science and differs from known valid species of *genus Ptychobothrium* Loennberg, (1889) in respect to major taxonomic characteristics. Considering all significant differentiating features of newer worms, authors are inclined to raise a new species *Ptychobothrium vitellaris* Sp. Nov. The present species is named on account of follicular vitellaria.

Acknowledgements

The authors express sincere thanks to Dr. N.V. Kalyankar, Principal, Yeshwant Mahavidyalaya Nanded for facilities provided. DBB & VSD are indebted to SERB, New Delhi for sanctioning the Fast Track Research Project No. SR/FT/LS-19/2010 Dt. 2nd May, 2012.

References

Carus, J.V. 1863**.** Prodromus faunae Mediterraneae (etc.), ***Part I. Cestodes***; 112-282, Stuttgart.

Deshmukh, Vikram Satwarao, Nanware, Sanjay Shamrao and Bhure Dhanraj Balbhim 2014**.** Bio-Systematic Studies on Cestode Genus *Ptychobothrium* Loennberg, 1889 (Cestoda: Ptychobothriidae, Luhe, 1902) from Freshwater Fish *Mystus Seenghala* (Sykes 1839) With Description of A New Species. ***Paper accepted in International Symposium on "Biodiversity: Status, Utilization and Impact of Challenging Climatic conditions, Babasaheb Bhimrao Ambedkar University (A Central University), Lucknow.***

Dujardin, F. 1845**.** *Histoire naturelle des helminthes ou vers intestinaux.* Xvi+654+15p.

Khalil, L.F, Jones, A. and Bray, R.A. 1994. *Keys to the cestodes parasites of vertebrates*. CAB International Pub. U.K**.** pp.1-751.

Loennberg, E.1889**.** Bidrag till kannedomen om i Sverige forekommande Cestoder. Bihang. Till K. Suvenska ***Vet. Akad. Handl.,*** 14:1-69.

Luhe, M. 1902**.**Ueber die Fixierung der Helminthen an der Daimwandung ihrer wirte und die dadurch verursachten pathologisch-anatomischen Veranderungen des Wirtsdarmes. ***Verhandel. Interen. Zool. Cong. Berlin***.,1901: 698-706

Sandeep K. Malhotra 1983**.** Cestode Fauna of Hill- Stream Fishes in Garhwal Himalayas, India. VI. *Ptychobothrium nayarensis* n.sp. from *Barilius bola* (Ham.) and *Schizothorax richardsonii* (Gray). ***The Korean Journal of Parasitology***. 21(2): 205-208

Schmidt, Gerald D. 1934**.** *Handbook of Tapeworm Identification.* CRC Press, Inc. Boca Raton, Florida. pp 1-675.

Sykes, W. H. 1839**.** An account of the fishes of the Dukben**.** *In Proceedings of learned societies. Zoological Society. Ann. Mag. Nat.Hist.* ***(N.S.)*** 4: 54-62

Wardle, R.A., Mcleod, J.A. and Radinovsky 1974**.** *Advances in the Zoology of tapeworm 1950-1970*, University of Minnesotar Press, Minneapolis 1-780.

Wongsawad C. 1998**.** A Review of the Genus *Ptychobothrium* Loennberg, 1889 with Two New Species**.** ***Rivista Di Parassitologia***, Vol. XV(LIX)-N.3 Dicembre 1998, 299-303.

Wongsawad C., Kumchoo K. and Pachanawan A. 1998. A New Tapeworm from Maesa Stream Fish of Chiang Mai, Thailand. ***Rivista Di Parassitologia,*** Vol. XV(LIX)-N.3 Dicembre 1998, 305-308

Yamaguti, S. 1959. *Systema Helminthum. II.The Cestodes of Vertebrates*. Inderscience Publishers Inc. N.Y., pp 860.