

## BIO-SYSTEMATIC STUDIES ON PSEUDOPHYLLIDEAN CESTODE GENUS *POLYONCOBOTHRIUM*, DIESING, 1854 (CESTODA: PTYCHOBOTHRIIDAE, LUHE, 1902) FROM FRESHWATER FISH *MASTACEMBELUS ARMATUS* (LACEPÈDE, 1800) WITH DESCRIPTION OF A NEW SPECIES

Vikram Satwarao Deshmukh<sup>1</sup>, Sanjay Shamrao Nanware<sup>2\*</sup> And Dhanraj Balbhim Bhure<sup>3</sup>

<sup>1-3</sup>Research and Post Graduate Department of Zoology, Yeshwant Mahavidyalaya, Nanded-431602. M.S., INDIA.

E-mail: [snanware@rediffmail.com](mailto:snanware@rediffmail.com)

### ABSTRACT

The present study deals with description of a new species of Cestode genus *Polyoncobothrium*, Diesing, 1854 collected from intestine of freshwater fish, *Mastacembelus armatus* (Lacepede, 1800) at Hadgaon, Dist. Nanded M.S. India during February, 2011 to January, 2013. *Polyoncobothrium armatusae* Sp. Nov. comes closer to all known species of genus *Polyoncobothrium*, Diesing, 1854 in general topography of organs but differs due to Scolex triangular, arrow shaped, bothria sessile, neck long, mature proglottids broader than long, testes 20-25 in numbers, cirrus pouch cylindrical, ovary dumbbell shaped and vitellaria granular.

**Key Words:** Bio-Systematic, Cestode, *Mastacembelus armatus*, *Polyoncobothrium armatusae* Sp. Nov.

### INTRODUCTION

Most of the freshwater fishes constitute highly nutritive food for human being. Some of them are considered as delicacies. These edible fishes are known to harbor a number of cestode parasites which cause deterioration in their health, hence their nutritive and market value is affected. Keeping in view the increasing importance of fish as cheap source of protein rich diet, the author has undertaken present work on Bio-systematic studies of Piscean cestode parasite from *Mastacembelus armatus* (Lacepede, 1800).

Diesing, 1854 erected the genus *Polyoncobothrium* with *P. polypteri* as its type species. Subsequently, nine species viz. *P. pseudopolypteri* (Meggit, 1930); *P. indicum*

(Nama, 1979) from *Channa (Ophiocephalus) punctatus*. *P. armatii* (Malhotra, 1982, unpubl. D.Sc. Thesis, University of Garhwal) *P. allahabadense* (Gairola, 1987) from *Mystus vittatus*; *P. mastacembeli* (Maulik, 1993); *P. humadii* (Gitanjali, Yadav and Malhotra, 2003); *P. srivastavai* (Pande et. al., 2006) from intestine of *Channa punctatus* (Bloch.); *P. chauhani* (Pande et. al., 2006) from intestine of *Clarias batrachus* (Linn.) and *P. yamunica* (Sunil Kumar et. al., 2007) from *Mastacembelus armatus* have been added to the genus *Polyoncobothrium* Diesing, 1854.

The morphological studies of collected specimens revealed them to belong to genus *Polyoncobothrium* (Diesing, 1854) of family Ptychobothriidae (Luhe, 1908), order Pseudophyllidea (Carus, 1863).

## MATERIALS AND METHODS

During the course of study on helminth parasites of freshwater fishes, Forty Seven cestode parasites were collected from Thirty Five specimens of *Mastacembelus armatus* (Lecepede, 1800) out of Two Hundred Forty examined at Hadgaon (Fig.1) Dist. Nanded M.S., India during the period of February, 2011 to January, 2013. These cestodes are preserved in hot 4% formalin for 24 hrs. Subsequently, they were washed in running tap water, dehydrated through a graded series of alcohols and stained with Harris haematoxylin and Borax carmine, differentiated in acid alcohol, cleared in xylene, mounted in D.P.X. and Camera lucida sketches were made from permanent preparations. All measurements are recorded in millimeters. Identification was done by (Gerald D. Schmidt, 1934; Yamaguti, S., 1959; Wardle, R.A., Mcleod, J.A. and Radinovsky, 1974; Khalil, Jones and Bray, 1994).

## RESULTS

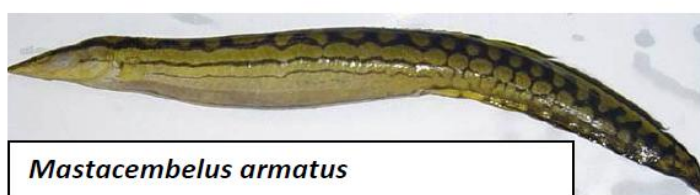
### (Based on Eight Specimens, Fig.2 &3)

All cestodes are long, consist of scolex, immature and mature proglottids. Scolex triangular, arrow shaped, narrow anteriorly and broad posteriorly and measures 3.370 (3.033-3.707) in length and 1.022 (0.539-1.505) in breadth. Scolex bears pair of bothria, which is sessile, extends from anterior end to posterior end of scolex. Bothria measures 3.033 (2.752-3.314) in length and 0.539 (0.314-0.764) in breadth.

Anterior end of scolex terminates in a rostellum, which is oval to rounded in shape and measures 0.180 (0.125-0.236) in length and 0.263 (0.208-0.319) in breadth. Rosetellum armed with 40-45 hooks, arranged in a circle, which measures 0.145(0.138-0.152) in length and 0.011(0.005-0.016) in breadth. Neck long and measures 0.955(0.842-1.067) in length and 0.786(0.674-0.898) in breadth.

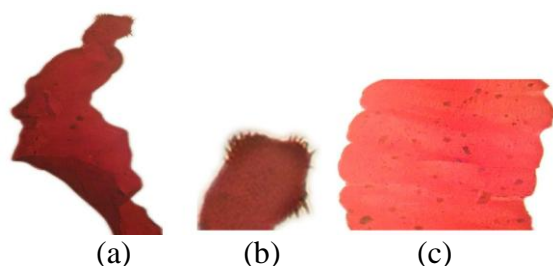
Mature proglottids two to three times broader than long and measures 0.466 (0.426-0.505) in length and 1.415 (1.348-1.483) in breadth. Testes small, oval in shape, pre-ovarian 20-25 in number, scattered in two groups and measures 0.056 (0.044-0.067) in length and 0.078 (0.067-0.089) in breadth. Cirrus pouch cylindrical in shape, pre-ovarian in position, situated in centre of segment and measures 0.157 (0.146-0.168) in length and 0.089 (0.078-0.101) 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 tube and measures 0.039 (0.033-0.044) in length and 0.016 (0.011-0.022) in breadth. Vagina and cirrus pouch opens a common pore known as genital pore, which is small in size, oval in shape and measures 0.028 (0.022 - 0.033) in length and 0.016 (0.011 - 0.022) in breadth. Vagina thin tube, slightly curved, arises from genital pore, posterior to cirrus pouch and forms receptaculum seminis and measures 0.213 (0.202-0.224) in length and 0.016(0.011-0.022) in breadth. Receptaculum seminis curved tube open into ootype and measures 0.146 (0.134 - 0.157) in length and

**Figure-1. Collection Sites and fish Host**



0.028 - (0.022 - 0.033) in breadth. Ootype oval, medium in size and measures 0.067 in diameter. From ootype ovarian lobes start. Ovary distinctly bilobed, dumbbell shaped, transversely placed at posterior margin of proglottids and each lobe measures 0.292 (0.269-0.314) in length and 0.084 (0.044-0.123) in breadth. Vitellaria granular.

**Figure-2. Macrophotoplate of *polyoncobothrium armatusae* Sp.Nov. (a) Scolex; (b) Rostellar Hooks; (c) Mature Proglottids**



## DISCUSSION

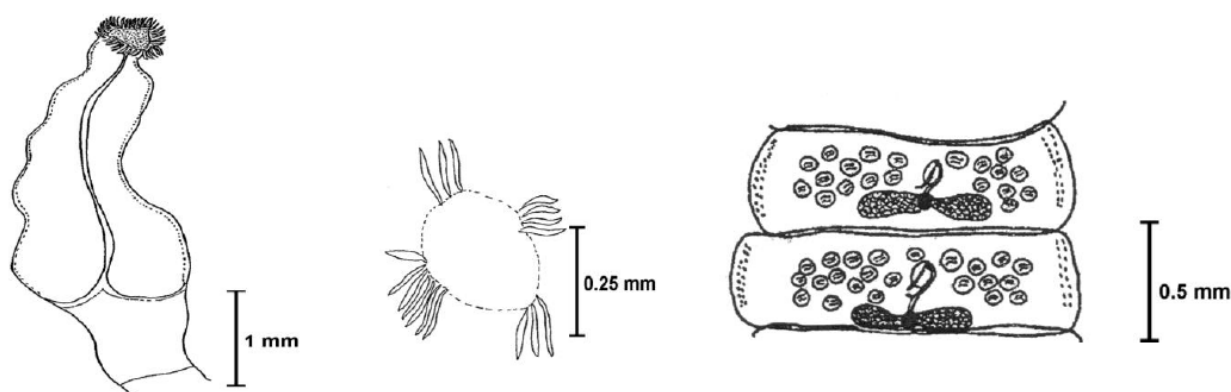
Genus *Polygoncobothrium* was erected by Diesing, 1854 with *P. polypteri* as its type species. Subsequently, nine species viz. *P. pseudopolypteri* (Meggit, 1930); *P. indicum* (Nama, 1979) from *Channa (Ophiocephalus) punctatus*. *P. armatii* (Malhotra, 1982, unpubl. D.Sc. Thesis, University of Garhwal) *P. allahabadense* (Gairola, 1987) from *Mystus vittatus*; *P. mastacembeli* (Maulik, 1993); *P. humadii* (Gitanjali, Yadav and Malhotra, 2003); *P. srivastavai* (Pande et. al., 2006) from intestine of *Channa punctatus* (Bloch.);

*P. chauhani* (Pande et. al., 2006) from intestine of *Clarias batrachus* (Linn.) and *P. yamunica* (Sunil Kumar et.al, 2007) from *Mastacembelus armatus* have been added to the genus *Polygoncobothrium* Diesing, 1854.

The present worm comes closer to all known species of the genus *Polygoncobothrium* Diesing, 1854 in general topography of organs, but differs from *P. polypteri* Diesing, (1854) in having small scolex, It differs from *P. pseudopolypteri*, Meggit, (1930) in having smaller scolex; from *P. indicum*, Nama, (1979) in having smaller scolex and collected from *Channa punctatus*. *Polygoncobothrium armatusae* Sp. Nov. differs from *P. armatii*, Malhotra, (1982) (unpubl. D.Sc. Thesis, University of Garhwal) in possessing longer worms, larger scolex, bothria, mature proglottids and eggs, longer immature and gravid proglottids and ovary. The present form differs from *P. allahabadense*, Gairola and Malhotra, (1987) in shorter body, scolex, rostellar hooks, smaller immature, mature and gravid proglottids, testes, eggs, onchosphere, narrower ovary, wider bothria and collected from *Mystus vittatus*. It differs from *P. humadii*, Gitanjali, Yadav and Malhotra, (2003) in possessing larger worms, bothria, immature, mature and gravid proglottids, ovary, testes and cirrus pouch and longer scolex. The present Cestode differs from *P. srivastavai* Pande et.al., (2006) in having scolex elongated, large, flat, armed with oval apical disc, hooks 24 in numbers, bothrium shallow, neck absent, testes 28 in numbers, scattered lateral to ovary, vitellaria follicular, eggs non operculate and

**Figure-3. Camera Lucida diagramme of *Polygoncobothrium armatusae* Sp.Nov.**

**(a) Scholex; (b) rostellar Hooks; (c) Mature Proglattids**



collected from *Channa punctatus*. It differs from *P. chauhani* Pande et.al., (2006) in having Scolex long, pear shaped, armed with oval apical disc, hooks 25-29 in numbers, bothridia fleshy, shallow, four in numbers, neck absent, testes 24 in numbers, uterus conspicuous, eggs non operculate and collected from *Clarias batrachus*. *Polyoncobothrium armatusae* Sp.Nov. differs from *P. yamunica*, Sunil Kumar et.al, (2007) in having scolex pear shaped, broader at middle and narrowing down at two ends, rostellum armed with four groups of a total of 24-48 rostellar hooks, each group comprising 6-12 hooks, neck absent, proglottids acraspedote, testes 202-218, cirrus pouch oval, ovary post equatorial, vagina anterior to cirrus pouch, vitellaria follicular.

In view of the above differences, the present parasite is regarded as a new species of the genus *Polyoncobothrium* Diesing, 1854 to Science and named *Polyoncobothrium armatusae* Sp. Nov. after the host species.

#### Taxonomic Summary:

**Genus** : *Polyoncobothrium* Diesing, 1854

**Species** : *Polyoncobothrium armatusae*

**Sp.Nov.**

**Type host** : *Mastacembelus armatus*  
(Lecepede, 1800)

**Habitat (Site)** : Intestine

**Locality** : Hadgaon, District Nanded,  
(M.S.), India.

**Prevalence** : Forty Seven mature tapeworms  
collected from Thirty Five infected  
host out of Two Hundred Forty  
examined.

**Period of collection**: February, 2011 to  
January, 2013.

**No. of Specimen**: 47

**Accession number**: PGDZ/YMN/1-05/  
February, 2011 to  
January, 2013

**Deposition** : Research and PG  
Department of Zoology,  
Yeshwant Mahavidyalaya,  
Nanded.

**Etymology** : The species *Polyoncobothrium armatusae* Sp.Nov. named after host species.

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## REFERENCES

1. **Carus, J.V. 1863.** Prodrum faunae Mediterraneae (etc.), Part I. Cestodes; 112-282, Stuttgart.
2. **Diesing, K.M. 1954.** Uckereine naturagemasse Verteilugn der Cephalocotylean. *Sitz. Ber. Akad. Wiss Wein. Math. Naturw. Klasse*, 1 (9): 171-185.
3. **Gairola, D. and Malhotra, S.K. 1987.** Cestode fauna of food fishes in River Ganges around an Indian Sub-Humid Region. IV. *Polyoncobothrium allahabadense* n.sp. from *Mystus vittatus* at Allahabad. *Japan Jr. Parasitology* 36 (02):49-52.
4. **Geetanjali, Yadav, S.N. and Malhotra, Sandeep K. 2003.** Taxometric Assessment of Organisms in Ichthyoparasitology of an Indian Sub-Humid Region I-Cestodes. *Polyonchobothrium humidii* n.sp. *Proceeding of Parasitology* 36: 13-17.
5. **Leydig, F. 1853.** Ein neuer bandwurm aus *Polypertus bichi*. *Arch. Naturg.*, 19: 219-222.
6. **Malhotra, Sandeep K. 1982.** *Ecophysiology and taxometry of Cestodes from fish, reptiles, aves and mammalian hosts of Garhwal Himalayas*. Unpubl. D.Sc. Thesis Awarded, Univ. Garhwal, pp.445.
7. **Maulik, K. 1993.** *Bioecological analysis of some Helminthes in two different ecosystems*. Unpubl. D.Phil. Thesis, Awarded, Univ. Allahabad, pp. 353.
8. **Meggitt, F.J. 1930.** Report on a collection of Cestodes mainly from Egypt IV Conclusion. *Parasitology*, 22: 338-345.
9. **Nama, H. S. 1979.** On new cestode *Polyoncobothrium indicum* n.sp from the fish *Channa (Ophiocephalus) punctatus* in Rajasthan. *Rajasthan Bioresearch* (3) 5-6.

10. **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.
11. **Kumar, Sunil, Jaiswal, Neeshma, Malhotra, Anshu, Malhotra, Sandeep K. and Capoor, V.N. 2007.** Taxometric Assessment of Organisms in Ichthyoparasitology of an Indian Sub-Humid Region III-Cestodes. *Polyonchobothrium yamunica* n.sp. from *Mastacembelus armatus* at Allahabad (U.P.). *National Journal of Life Sciences*,4(3): 19-22.
12. **Luhe, M. 1902.** Ueber die Fixierung der Helminthen an der Daimwandung ihrer wirte und die dadurch verursachten pathologisch-anatomischen Veränderungen des Wirtsdarmes. *Verhandel. Interen. Zool. Cong. Berlin.*,1901: 698-706
13. **Schmidt, Gerald D. 1934.** *Handbook of Tapeworm Identification.* CRC Press, Inc. Boca Raton, Florida. pp 1-675.
14. **Wardle, R.A., Mcleod, J.A. and Radinovsky 1974.** *Advances in the Zoology of tapeworm 1950-1970*, University of Minnesotar Press, Minneapolis 1-780.
15. **Yamaguti, S. 1959.** *Systema Helminthum. II.The Cestodes of Vertebrates.* Intescience Publishers Inc. N.Y., pp 8.

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