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Original Research Article

A *Pseudophyllidean cestode* Parasite *Circumoncobothrium Nathii* Sp.Nov. from Fresh Water Fish *Channa Marulius* (Hamilton 1822) from Godavari Basin (M.S) India

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ABSTRACT

The present communication deals with the description of a new species of genus *Circumoncobothrium nathii* Sp. Nov., from fresh water fish *Channa marulius* from Godavari basin provided new data on their morphology. The worm differ from the known species of the genus in the shape and size of the scolex, number of hooks and arrangement of rostellum, shape of segment, number of testes, position of cirrus pouch and arrangement of vitellaria.

Keyword: *Circumoncobothrium nathii* Sp. Nov.; *Channa marulius* (Hamilton 1822); Godavari basin

INTRODUCTION

The genus *Circumoncobothrium* was erected by Shinde G.B., 1968 [1] from the intestine of fresh water fish *Ophiocephalus leuco punctatus* as a type species *C. ophiocephali* Jadhav and Shinde, 1976 added three new species of this genus viz., *C. aurangabadensis* and *C. raoii* from *Mastacembelusarmatus and C. gachuai* from *Ophiocephalusgachua.* Chincholikar and Shinde, 1976 described two new species of this genus *C. shindei* [2] from fresh water fish *Mastacembelus armatus* and *C. bagariusi* [3] from *Bagarius*species. Shinde, 1977 reported *C. khami* [2] from *Ophiocephalus striatus*. Jadhav et.al, 1990 described *C. yamaguti* [4], from *Mastacembelus armatus* Shinde et.al. 1994 reported *C. alii* [5] from *Mastacembelus armatus.* Patil et al, 1998 added *C. vadgaonensis* [6] as a new species to this genus from *Mastacembelus armatus*. Wongasawad and Jadhav, 1998 added *C. baimaii* [*7*] from

Mastacembelus armatus. C.punctatusi [8]is added by Kalse and Shinde, 1999 from *Ophiocephalus punctatus.* Shindeet. al., 2002 described *C. mastacembalusae* [9] as a new species from *Mastacembelus armatus.* Pawaret al., 2002 reported *C. armatusae* (*minor*) [10] from *Mastacembelus armatus* to this genus. Tat and Jadhav, 2004 reported *C. manjari* [11] from *Ophiocephalus gachua*. Supugadeet. al., 2005 added *C.vitellariensis* [12] from *Mastacembelus armatus*. Kharade et al., 2007 added *C. cirrihinae* [13] from *Cirrihinamrigala*. Shelke et al., 2007 added *C.mehdii* [14] from *Mastacembelus armatus*. Pardeshi et al., 2007 added *C. ambajogaiensis* [15] from *Mastacembelus armatus*. Jawalikar et al., 2008 added *C. yogesh wari* from *Mastacembelus armatus*. Borde S.N. and SushilJawale, 2008 added *C. purnae* [16] from *Mastacembelus armatus*. Kalse et al., 2009 added *C. naidui* [17] from *Mastacembelus armatus*. Shah, 2010 added *C. paithenensis* [18] from *Mastacembelus armatus*. Menkudale and Jawale, 2010 added *C. thapari* [19] from *Ophiocephalus stratus*. Pardeshi and Hiware, 2011 added *C. jadhavae* from *Mastacembelus armatus*. Lastly Dhole and Kadam, 2011 added *C. clariase* from *Clarias batrachus*.The present study deals with taxonomy of parasite *Circumncobothrium nathii* Sp.nov.

MATERIALS AND METHODS

The present specimens were recovered from the intestine of the freshly killed fresh water fish *Channamarulius* (Hamilton 1822)from Godavari Basin during the period of June 2009-May 2011. Each fish was dissected and examined in all parts like fins, gills, scales, and visceral organs under a microscope. Fishes were opened up dorso-ventrally and the internal organs examined. The entire digestive system was removed and placed in a Petri dish with physiological saline. Infection of each group of parasites was treated as follows: collected parasites were first relaxed and then fixed in hot 4% formalin and stain using Harris haematoxyline. Stained parasites were washed in distilled water, dehydrated in ascending grades of alcohol, cleared in xylene, mounted in D.P.X. Drawings were made using a camera Lucida. Identification was carried out by using Systema Helminthum Vol. II, (Yamaguti, 1956) [28].

RESULT

Nine cestode parasites were collected from the intestine of fresh water fish *Channa marulius* (Hamilton 1822) from paithan, Dist-Aurangabad (Godavari basin) in the month of February 2011.

The worm were flattened, preserved in 4% formalin, stained with Harris haematoxylin, passed through various alcoholic grades, cleared in xylene, mounted in D.P.X. Whole mount slides were prepared for further anatomical studies. Drawing was made with the aid of Camera Lucida. All measurements are given in millimeters.

All the cestodes are long, consisting of scolex, immature, mature and gravid proglottids.

The scolex is large well developed, cylindrical in shape measures 3.21(3.1-3.3) in length and 1.12(0.9-1.3) in breadth. The scolex broad anteriorly and narrow posteriorly. Rostellum arranged with rostellar hooks arranged in two rows. Hooks 63 in numbers. It measures 20.9(19.35-22.5) and 1.93(1.61-2.2) in breadth. Neck is absent.

Mature segment is small rectangular two times broader than long measures 1.28(1.25-1.3) in length and 3.3(3.30-3.39) in breadth. Testes are small oval to rounded 70 in number, arranged in two half in the segment at each side of the ovary, measures 0.049(0.033-0.066) in length and 0.99(0.066-0.13) in breadth.

The cirrus pouch is oval, anterior to ovary and measures 0.16(0.13-0.19) and 0.49(0.033-0.66) in breadth. The cirrus is thin tube and measures 0.18(0.16-0.19) in length and 0.49 in breadth.

Ovary is irregularly bilobeddumbellshapd with isthmus and measures 1.07(1.02-1.12) in length and 0.09(0.066-0.13) in breadth. The vagina is thin tube, starts from genital pore, posterior to cirrus pouch and measures 0.33 in length and breadth.

The vitellaria are follicular arranged in three to four rows at each lateral margin of thesegment. Excretory canal present runs at each side of the segment.

DISSCUSION

The genus *circumoncobothrium* was established by Shinde in 1968 as a type of species C.ophiocephali from *Ophiocephaluseuo punctatus*. The present worm comes closer to all the known species of the genus*Circumoncobothrium*Shinde, 1968 in general topography of organs. But differs due tosome characters from following species.

- The present cestode differs from *C. ophiocephali* Shinde, 1968 [24] in having distinct scolex, rostellar hooks 80 in numbers, testes 70-80 in numbers, ovary compact, single conical mass, vitellaria follicular and reported from *Ophiocephalusleucopunctatus*, in India.
- The present worm differs from *C. aurangabadensis* Jadhav and Shinde,1976 [2] in having the scolex broad in the middle and narrow at both the ends, hooks 42 in numbers, presence of neck and testes 135-145 in numbers, ovary bilobed, vitellaria granular reported from *M. armatus* in India.
- The present tapeworm differs from *C. raoii* Jadhav and Shinde,1976[2]in having scolex broad in the middle and narrow at both the ends, hooks 46 in numbers, arranged in single circle, neck present,testes 210-215 in numbers reported from *Mastacembelusarmatus* in India.
- The present parasite differs from *C. gachuai* Jadhav and Shinde,1976[20]in having the scolex pear shaped, hooks 46 in numbers, neck present, mature proglottidssquarish, testes 375-400 in numbers, vitellaria follicular, arranged in two rows and reported from *Ophiocephalusgachua*, in India.
- The present tapeworm differs from *C. shindei* Chincholikar and Shinde, 1976 [3]in having the scolex narrow anteriorly and broad posteriorly, hooks 49 in numbers, testes 260-275 in numbers, reported from *Mastacembelusarmatus* in India.
- The present worm differs from *C. bagariusi* Chincholikar and Shinde,1976[3]in having the scolex narrow anteriorly and broad posteriorly, hooks 55 in numbers, neck absent, testes 275-285 in numbers, arranged in two lateral fields, vitellaria follicular and reported from *Bagarius sp*., in India.
- The present parasite differs from *C. khami* Shinde, 1977[1] in having the hooks 48 in numbers, neck absent, testes 190-200 in numbers, evenly distributed, vitellaria follicular and reported from *Ophiocephalus sp.*, in India.
- The present cestode differs from *C. yamaguti* Jadhav et.al, 1990 [4] in having the scolex distinct, narrow anteriorly and broad posteriorly and hooks 56 in number, testes 130-150 in numbers, neck absent, reported from *Mastacembelus armatus* in India.
- The present worm differs from *C. alii* Shinde et.al, 1994 [5]in having scolex triangular, hooks 34 in numbers, testes 230-240 in numbers vitellaria granular, reported from *Mastacembelus armatus* in India.
- The present tapeworm differs from *C. vadgaonensis* Patil et.al. 1998 [6] in having the scolex triangular, hooks 56 in numbers, testes 490-510 in numbers reported from *Mastacembelus armatus* in India.
- The present cestode differs from *C. baimaii* Wongsawad and Jadhav, 1998

[7]in having the scolex pear shaped, hooks 48 in numbers, testes 88-100 in numbers, ovary compact vitellaria granular, and reported from *Mastacembelus armatus* In Chang Mai.

- The present worm differs from *C.punctatusi* Kalse and Shinde,1999 [8] in having scolex rectangular, mature proglottidssquarish, testes 140-150 in numbers, vitellaria follicular, arranged in 3-6 rows and reported from *Ophiocephaluspunctatus*, in India.
- The present worm differs from *C. armatusae* Shinde et. al., 1999 [8] in having scolex triangular, hooks 23 in numbers, neck present, testes 90-100 in numbers, ovary compact, reported from *Mastacembelusarmatus* in India.
- The present parasite differs from *C. mastacembelusae*Shinde et. al., 2002 [9] in having scolex pear shaped, hooks 38 in numbers, neck absent, testes 130-140 in numbers, ovary bilobed reported from *Mastacembelusarmatus*in India
- The present cestode differs from *C.armatusae* Pawar et.al, 2002 [10] having scolex triangular, hooks 58, neck absent, testes 190-200 in numbers, vitellaria follicular reported from *Mastacembalusarmatus* in India.
- The present form differs from *C. manjari* Tat and Jadhav,2004 [11] in having the scolex triangular, hooks 48 in numbers, in single circle, testes 128-145 in numbers, and reported from *Ophiocephalusgachua,* in India.
- The present parasite differs from *C. vitellariensis* Supugade et. al., 2005 [12] in having scolex large, triangular, hook 48 in numbers, testes 250-260 in numbers and ovary bilobed, from *Mastacembelus armatus* in India.
- The present parasite differs from *C. cirrhinae* Kharade et al., 2007 [13] in having scolex large, cylindrical, barrel shaped,hooks 56, testes 300-305, medium, oval, ovary dumbbell shaped,vitellaria granular, and reported from *Cirrihinamrigila* in India.
- The present parasite differs from *C. mehdii* Shelke et al. 2007 [14] in having scolex triangular, mature segment medium, squarish, testes 280-290 medium, ovary large, distinctly bilobed, reported from *Mastacembelusarmatus* in India.
- The present cestode differs from *C. ambajogaiensis* Pardeshi et al., 2007 [23] in havingscolex triangular, neck absent, mature segment ten time broader than long, testes 250-300 in numbers, ovary bilobed, dumbbell shaped, reported from *Mastacembelusarmatus* in India.
- The present worm differs from *C.yogeshwari* Jawalikar et al., 2008 [17] in having scolex triangular, hooks 53 in number, testes 95-98 in numbers, reported from *Mastacembelusarmatus* in India.
- The present worm differs from *C. purnae* Borde S.N. and Sushil Jawale, 2008 [16] in having scolex triangular. Hooks 52 in numbers, neck absent, mature segment squarish, slightly broader than long, testes 230-235 in numbers, ovary bilobed and reported from *M. armatus* in India.
- The present parasite differs from *C. naidui*Kalse et al., 2009 [21]in having scolex cylindrical, hooks 40 in numbers, neck absent, testes 200-210 in numbers, medium rounded, ovary oval, single mass, compact, transversely elongated with acini.
- The present cestode differs from *C.paithenensis* Shah, 2010 [18] in having scolex triangular, hooks 58 in number, ovary bilobedand reported from *Mastacembelusarmatus* in India.
- The present form differs from *C. thapari*Menkudale and Jawale 2010 [22] in having hooks 52 in numbers, neck absent,

testes 95 in numbers, medium, oval, ovary medium, lobed,

- The present parasite differs from *C.jadhavae*Pardeshi and Hiware, 2011[15]in having scolex triangular, dome shaped, hook 35-45 in numbers, testes 95-105 oval to round, ovary bilobed, reported from Mastacembelusarmatus in India.
- The present worm differs from *C.clariasi* K.N Kadam and Jaywant Dhole 2011[27], having scolex triangular, hooks 48 in numbers, testes oval in shape 249-259 in numbers, Reported from *Clariasbatrachus* in India.
- The present worm differs from *C. maruliusae* Fartade A.M et.al 2013 [26] having scolex triangular, tetses 60-65 in number, ovary bilobed reported from *Channamarulius* in India.

The above noted characters are valid enough to erect a new species hence the name ***C.nathii*Sp.Nov.**is proposed after the locality of the host in Nathsagar Dam at Paithan Dist.-Aurangabad.

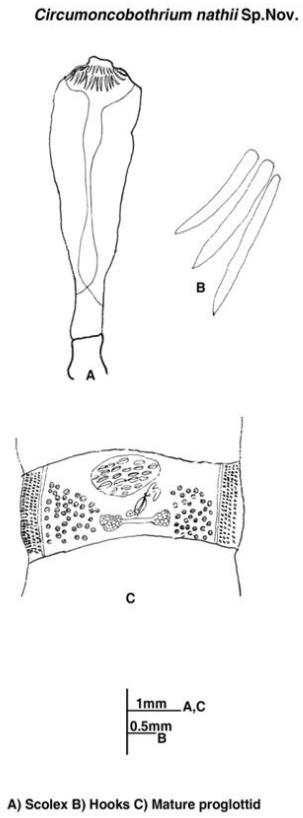

Fig.1. Circumoncobothrium Nathii Sp.Nov.

Key to the species of the genus *Circumoncobothrium.* Shinde, 1968 [24]

Neck present	-	1
Neck absent	-	2
1) Vitellaria granular	-	3
Vitellaria follicular	-	4
2) Mature segment squarish	-	5
Mature segment broader than long	-	6
3) Scolex triangular	-	*C. alli*, Shindeet. al. 1994
Scolex pear shaped	-	*C. baimaii*, Wongaswadet. al. 1988
Scolex narrow anteriorly broad Posteriorly	-	*C. Shindeii*, Shinde G. B. et. al.1977
Scolex broad in the middle narrow at both end	-	7
Scolex cylindrical	-	*C. cirrihinae,* Kharadeet. al. 2007
4) Mature proglottids squarish	-	8
Mature proglottids	-	9

broader than long

5) Testes 150-200 in numbers	-	*C. khami*, Shinde, G. B et. al 1968
Testes above 200 in numbers	-	*C. purnae*, Borde S. N, SushilJawale 2008
6) Hooks below 30	-	*C. ambajogainsis*, Pardeshi P.R. 2011
Hooks in between 30-40	-	*C. mastacembelusae*, Shinde, G. B.2002
Hooks in between 40-50	-	10
Hooks above 50 in number	-	11
7) Testes below 200 in number	-	*C. aurangabadensis*, Jadhav. B.V et.al 1976
Testes above 200 in number	-	*C. raoii*, Shinde. G. B et.al. 1976
8) Scolex rectangular in shape	-	*C. punctatusi*, Kalse A. T 2009
Scolex pear shaped	-	*C. gachuai*Jadhav B. V et.al 1980
Scolex triangular	-	*C. mehdii*, Shelke V. P. et.al 2007
9) Hooks 20-30 in numbers	-	*C. armatusae*, Shinde G. B. et.al 1999
Hooks 30-50 in numbers	-	12
Hooks 50-60 in numbers	-	13
Hooks 60-70 in numbers	-	14
Hooks 80 in numbers	-	*C. ophiocephali*, Shinde, G. B. et.al 1968
10) Scolex triangular	-	*C. vitellariansis*, Supugade, 2005
Scolex cylindrical	-	*C. naidui*, Kalseet. al. 2009
11) Testes in between 90-100	-	*C. thapari*, Menkudale, 2010
Testes in between 100-150	-	*C. yamaguti*, Jadhav. B. V 1990
Testes in between 150-200	-	*C. armatusae*, Pawar 2002
Testes above 200 in numbers	-	*C. bagariusi*, Chincholikar, 1997
12) Testes in between 90-110	-	*C. jadhavae*, Pardeshi, P.R 2011
Testes in between 125-150	-	*C. Manjari*, Tat, M. B. 2004
Testes in between 250-260	-	*C. clariasi*, K. N. Kadam 2011
13) Testes in between 70-80	-	*C. paithenesis*, Shah 2010
Testes in between 90-100	-	*C. yogeshwari*, Jawalikar 2008.
Testes in between 490-510	-	*C. vadgaonensis*, Patil S.R. 1998
14) Scolex triangular	-	*C.marulisae* Fartade A.M 2013
Scolex cylindrical	-	***C. nathii* Sp.Nov.**

CONFLICT OF INTEREST STATEMENT

None Declared

REFERENCES

1. Shinde GB. On a new species of *Circumoncobothrium* shinde, 1968 (Cestoda: *Pseudophyllidea carus*, 1863) from fresh water fish, M.S.Ibid., XVI: 1977, p 129-133.
2. Jadhav BV, Shinde GB. New species of genus *Circumoncobothrium* Shinde (Cestoda: Pseudophyllidea, Carus, 1863) from a freshwater fish at Aurangabad, India. J Indian Bio Asso 1968; 2: 163 – 166.
3. Chincholikar LN, Shinde GB. On a newspecies of *Circumoncobothrium* shinde, 1968 (Cestoda:Pseudophyllidea, Carus, 1863) from a freshwater fish in India. Marath Univ J Sci 1977; 16 (9): 183-185.

4. Jadhav BV. On new pseudophyllidae cestodes from *Mastacembelus armatus* of Daryapur (M.S.) India. Rivista di Parasitol 1976; 7: 19-22.
5. Shinde GB, Sarwade DV, Jadhav BV, Mahagan MA. On a new species of the genus *Circumoncobothrium* Shinde, 1968 (Cestoda:Pseudophyllidae) Carus, 1863 from *Mastacembelus armatus* (Cuv. and Val.) from freshwater fish at Aurangabad (M.S.) India. Rivista Di Parasitologia 1994; 11 (55): 167-169.
6. Patil SR, Shinde GB, Jadhav BV. A new species of the genus *Circumoncobothrium* Shinde, 1968 (Cestoda: Pseudophyllidae) Carus, 1863 from *Mastacembelusar matus*at Vadgaon (M.S.) India J Para Dis 1998; 22 (2): 148-151.
7. Wongsawad C, Jadhav BV. *Circumoncobothriumbaimaii*n.sp. (Cestoda: Pseudophyllidae) from fresh water fish, Maesa streamChiang Mai, Thailand. Rivista Di Parasitologia 1998; 15(3): 291-294.
8. Shinde GB, Kalse AT. Two new species of genus *Circumoncobothrium* Shinde, 1968 (Cestoda: Pseudophylidea Carus, 1863) from a freshwater fish at Khandesh (M.S.). Rivita Di Parasitol 1999; 15(3): 195-198.
9. Shinde GB, Pawar SB, Chauhan SP. Anew species *Circumonco bothrium mastacem bellusae*n.sp. (Cestoda: Pseudophyllidae) from *Mastacembelus armatus*at Paithan, India. Riv Di Parasit 2002; 20(3): 195-198.
10. Pawar SB. A new species *Circumonco bothriumar matusae*n.sp. (Cestoda: Pseudophyllidae) from *Mastacembelus armatus*at Paithan, India. Riv Di Parasit 2002; 20(3): 219-222.
11. Tat MB, Jadhav BV. A new species of thegenus *Circumoncobothrium s*hinde, 1968 (Cestoda:Pseudophyllidea) Carus, 1863 from *Ophiocephalusgachua*at Dhanegaon District, Beed. Nat Jour Life Sci 2004; 1 (1): 129-132.
12. Supugade. *Circumoncobothrium vitella - riensis*n.sp. Ptycobothriidae (Luhe, 1920) from *Mastacembelus armatus* (M.S.), India. Trajectory 2005; 13 (1): 43-49.
13. Kharade SV, Yasmin M, Shinde G B. Anew cestode *Circumoncobthrium cirrhinae*n. sp. Cotilodaptycobothridae from cirrhina-mrigala. Nat J Life Sci 2007;4(3)103-106.
14. Shelke VP. A new ptychobothridae tapeworm from *Mastacembellus armatus*at Aurangabad (M.S.). Nat J Life Sci 2007; 4(3): 72-74.
15. Pardeshi PR, Hiware CJ. A new tapeworm *Circumoncobothrium jadhavae*n.sp. from *Mastacembelus armatus* (Lecepede) 1800, at Aurangabad M.S. India Recent Res Sci Technol 2011; 3(3): 20-25.
16. Borde SN, Jawale S. A new species of Ptychobothridae from a fresh water fish in Marathwadaregion (M.S.). National J Life Sci 2008; 5 (3):121-124.
17. Jawalikar JD, Pawar SB, Shinde GB. Anew cestode *Circumoncobothrium yogeshwari n. sp.*(Cotyloda: Ptychobothridae) from *Mastacembelus armatus.*Uttar Prad J Zoology 2008; 28(3): 399 – 401.
18. Shah SAY. Taxonomic observations of *Circumoncobothrium paithenensis n.*sp from freshwater fish *Mastacembelus armatus.* Int J Syst Biol 2010; 2 (2): 21-24.
19. Jadhav BV, Shinde GB. On a new species of the genus *Circumoncobothrium s*hinde, 1968 (Cestode; Pseudophyllieda, Carus, 1963) from *Mastacembelus armatus*at Aurangabad. Bioreasearch 1980; 4: 25-27.
20. Shinde GB, Jadhav BV. New species of genus *Circumoncobothrium* shinde, 1968 (Cestoda:Pseudophyllidea) from a freshwater fish from Maharashtra. Marath Univ J Sci (Nat Sci) 1976; 15(Sci. 8): 269-272.
21. Kalse AT, Surawanshi RB, Patil JR. On a new species of *Circumoncobothrium s*hinde, 1968 (Cestoda: Pseudophyllidea) from a fresh water fish at Chalisgaon M.S. India. Proc Zool Soc India 2009; 8 (1): 28– 34.

22. Menkudale DV, Ugale BJ, Jawale CJ. Cestoda A New Cestode C*ircumoncobothrium thapari* (an.sp. *Pseudophylideacarus*, 1863) from *Ophiocephalus stratus* (M.S.). India J Ecobiotechnol 2010; 2(6): 01-03.
23. Pardeshi KSA, Kalse T, Andhare VN. Anew pseudo phyllidean worm fresh water fishes of Beed (M.S.). Nat J Life Sci 2007; 4(3): 107-110.
24. Shinde GB. On *Circumoncobothriumo phiocephali*n. gen. n.sp.from freshwater fish, *Ophiocephalusleuco punctatus*in India. Rivista Di Parasitol 1968; 19 (20): 111-114.
25. Shinde GB, Chincholikar LN. On a newspecies of *Circumoncobothrium s*hinde, 1968 (Cestoda: Pseudophyllidea, Carus, 1863) from a freshwater fish in India. Marath Univ J Sci (Nat Sci) 1977; 16(Sci. 9): 177 -180.
26. Fartade AM. A New species of *circumoncobothrium maruliusae* Sp. Nov. from freshwater fish *Channa marulius* (Hamilton 1822) from Godavari Basin (M.S), India. World J Fish Marine Sci 2013; 5(1): 09-13.
27. Kadam KN. New species of the genus circumoncobothrium (shinde, 1968) (cestode : Pseudophyllidea, Carus, 1863) from fresh water fish, Osmanabad, India. Recent research in science and technology 2011; 3(8): 14-18.
28. Yamaguti S. Systema Helminthum Vol-II. The cestode of vertebrates. New York: Interscience publication; 1958, p 979.

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