

# *Circumoncobothrium godavarae* n.sp. from *channa marulius* (Hamilton, 1822) from Godavari basin ( M.S) India.

Asawari Madhukar Fartade\*, Ravikant Chati\*\*

Department of Zoology, Shri Shivaji Mahavidyalaya Barshi

**Abstract-** The present study deals with the cestode parasite from fresh water fish *channa marulius*. This taxonomic study emphasis on n.sp. *Circumoncobothrium godavarae* tapeworm. This worm is having scolex large, narrow at anterior end and broad at posteriorly, scolex is rounded and bears a prominent rostellum armed with 27 hooks. Two spatulate bothria, testes 100-120 in number, genital pore small, ovary bilobed dumbbell shaped, vitellaria follicular.

**Index Terms-** *Circumoncobothrium godavarae*, *channa marulius*, Godavari basin.

## I. INTRODUCTION

The genus *Circumoncobothrium* was erected by Shinde G.B., 1968 from the intestine of fresh water fish *Ophiocephalus leucopunctatus* as a type species *C. ophiocephali* Jadhav and Shinde, 1976 added three new species of this genus viz., *C. aurangabadensis* and *C. raoii* from *Mastacembelus armatus* and *C. gachuai* from *Ophiocephalus gachua*. Chincholikar and Shinde, 1976 described two new species of this genus *C. shindei* from fresh water fish *Mastacembelus armatus* and *C. bagariusi* from *Bagarius* species. Shinde, 1977 reported *C. khami* [ from *Ophiocephalus striatus*. Jadhav et.al, 1990 described *C. yamaguti*, from *Mastacembelus armatus* Shinde et.al. 1994 reported *C. alii* from *Mastacembelus armatus*. Patil et al, 1998 added *C. vadgaonensis* as a new species to this genus from *Mastacembelus armatus*. Wongasawad and Jadhav, 1998 added *C. baimaii* from *Mastacembelus armatus*. *C.punctatusi* is added by Kalse and Shinde, 1999 from *Ophiocephalus punctatus*. Shinde et. al., 2002 described *C. mastacembalusae* as a new species from *Mastacembelus armatus*. Pawar et. al., 2002 reported *C. armatusae* (minor) from *Mastacembelus armatus* to this genus. Tat and Jadhav, 2004 reported *C. manjari* from *Ophiocephalus gachua*. Supugade et. al., 2005 added *C.vitellariensis* from *Mastacembelus armatus*. Kharade et al., 2007 added *C. cirrhinae* from *Cirrhina mrigala*. Shelke et al., 2007 added *C.mehdii* from *Mastacembelus armatus*. Pardeshi et al., 2007 added *C. ambajogaiensis* from *Mastacembelus armatus*. Jawalikar et al., 2008 added *C. yogeshwari* from *Mastacembelus armatus*. Borde S.N. and Sushil Jawale, 2008 added *C. purnae* from *Mastacembelus armatus*. Kalse et al., 2009 added *C. naidui* from *Mastacembelus armatus*. Shah, 2010 added *C. paithenensis* from *Mastacembelus armatus*. Menkudale and Jawale, 2010 added *C. thapari* from *Ophiocephalus stratus*. Pardeshi and Hiware, 2011 added *C. jadhavae* from

*Mastacembelus armatus*. Lastly Dhole and Kadam, 2011 added *C. clariase* from *Clarias batrachus*.

## II. MATERIALS AND METHODS

The present specimens were recovered from the intestine of the freshly killed fresh water fish *Channa marulius* (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.

## III. DESCRIPTION

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 narrow at anterior end and broad at posteriorly and measures 4.5(4.4-4.6) in length and 2.6(2.5-2.8) in breadth. The anterior end of the scolex is rounded and bears a prominent rostellum armed with 27 hooks, arranged in circle and measures 0.093 (0.090-0.097) in length and 0.010 (0.008-0.012) in breadth. The scolex bears two bothria spatulate in shape large in size crossed with one another anterior long elongated up to the posterior end of the scolex and measures 7.26(6.9-7.5) in length 0.74(0.66-0.82) in breadth. Neck is absent.

Mature segment is medium in size, squarish and measures 2.0(1.9-2.0) in length 8.5(8.3-8.6) in breadth. The testes are oval in shape 100-120 in numbers unevenly distributed at each side of ovary and measures 0.22(0.19-0.26) in length and 0.05(0.03-0.076) in breadth.

The cirrus pouch is oval, anterior to ovary, medium in position and measures 0.17(0.11-0.22) in breadth. The cirrus is

thin tube and measures 0.51(0.45-0.57) in length and 0.114 in breadth.

Ovary is large bilobed dumbbell shape with long isthmus, situated in middle of the segment and measures 2.93(2.8-3.01) in length and 0.34(0.30-0.38) in breadth. The vagina is thin tube, starts from genital pore, posterior to cirrus pouch and measures 0.09(0.03-0.15) in length and 0.07(0.038-0.114) in breadth. Uterus is saccular filled with eggs. It measures 0.14(0.10-0.17) in length and 0.32(0.22-0.46) in breadth.

The vitellaria are follicular arranged in two to three rows at each lateral margin of the segment.

#### IV. DISCUSSION

The genus *Circumoncobothrium* was established by Shinde in 1968 as a type species *C. ophioccephali* from *Ophioccephalus leucopunctatus*. The present worm comes closer to all the known species of the genus *Circumoncobothrium* Shinde, 1968 in general topography of organs. But differs due to some characters from following species.

1) The present cestode differs from *C. ophioccephali* Shinde, 1968 in having distinct scolex, broad in the middle and tapering at both the ends, rostellar hooks 80 in numbers, presence of neck, ovary compact, single conical mass, vitellaria follicular and reported from *Ophioccephalus leucopunctatus*, in India.

2) The present worm differs from *C. aurangabadensis* Jadhav and Shinde, 1976 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.

3) The present tapeworm differs from *C. raoii* Jadhav and Shinde, 1976 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.

4) The present parasite differs from *C. gachuai* Jadhav and Shinde, 1976 in having the scolex pear shaped, hooks 46 in numbers, neck present, mature proglottids squarish, testes 375-400 in numbers, vitellaria follicular, arranged in two rows and reported from *Ophioccephalus gachua*, in India.

5) The present tapeworm distinguish from *C. shindei* Chincholikar and Shinde, 1976 in having the scolex narrow anteriorly and broad posteriorly, hooks 49 in numbers, neck present, testes 260-275 in numbers, evenly distributed and ovary dumb-bell shaped.

6) The present worm differs from *C. bagariusi* Chincholikar and Shinde, 1976 in having the scolex narrow anteriorly and broad posteriorly, hooks 55 in numbers, testes 275-285 in numbers, arranged in two lateral fields, vitellaria follicular and reported from *Bagarius sp.*, in India.

7) The present parasite differs from *C. khami* Shinde, 1977 in having the scolex cylindrical, hooks 48 in numbers, lancet shaped, mature proglottids squarish, testes 190-200 in numbers, evenly distributed, vitellaria follicular and reported from *Ophioccephalus sp.*, in India.

8) The present cestode differs from *C. yamaguti* Jadhav et. al, 1990 in having the scolex distinct, narrow anteriorly and broad posteriorly and testes 130-150 in numbers.

9) The present worm differs from *C. alii* Shinde et. al., 1994 in having scolex triangular, hooks 34 in numbers, neck present and testes 230-240 in numbers.

10) The present tapeworm differs from *C. vadgaonensis* Patil et.al., 1998 in having the scolex triangular, hooks 56 in numbers, neck present, testes 490-510 in numbers and vitellaria follicular.

11) The present cestode differs from *C. baimaii* Wongsawad and Jadhav, 1998 in having the scolex pear shaped, hooks 48 in numbers, neck present, testes 88-100 in numbers, ovary compact and reported from *Mastacembelus armatus* in Chang Mai.

12) The present worm differs from *C. punctatusi* Kalse and Shinde, 1999 in having scolex rectangular, hooks 40-50 in numbers, neck present, mature proglottids squarish, testes 140-150 in numbers, vitellaria follicular, arranged in 3-6 rows and reported from *Ophioccephalus punctatus*, in India.

13) The present worm differs from *C. armatusae* Shinde et. al., 1999 in having scolex triangular, hooks 58 in numbers, neck present, testes 90-100 in numbers, ovary compact and vitellaria follicular, arranged in 3-4 rows on lateral side of the segments.

14) The present parasite differs from *C. mastacembelusae* Shinde et. al., 2002 in having scolex pear shaped hooks 30 in numbers, testes 130-140 in numbers, ovary compact and vitellaria follicular, arranged in 2-3 rows on each lateral side.

15) The present cestode differs from *C. armatusae (minor)* Pawar et. al., 2002 in having scolex triangular, hooks 58 in numbers, testes 190-200 in numbers and vitellaria follicular.

16) The present form differs from *C. manjari* Tat and Jadhav, 2004 in having the scolex triangular, hooks 48 in numbers, in single circle, neck present, testes 128-145 in numbers, vitellaria follicular and reported from *Ophioccephalus gachua*, in India.

17) The present parasite differs from *C. vitellariensis* Supugade et. al., 2005 in having scolex large, triangular, hook 48 in numbers, testes 250-260 in numbers and vitellaria follicular, arranged in 3-4 rows.

18) The present parasite differs from *C. cirrhinae* Kharade et al., 2007 in having scolex large, cylindrical, barrel shaped, hooks 56, rostellar, neck short, testes 300-305, medium, oval, ovary dumbbell shaped, medium.

19) The present parasite differs from *C. mehdii* Shelke et al. 2007 in having hooks 56 arranged in single circle, neck short, squarish, mature segment medium, squarish, testes 280-290 medium, ovary large, distinctly bilobed, vitellaria follicular, 3-4 rows.

20) The present cestode differs from *C. ambajogaiensis* Pardeshi et al., 2007 in having hooks 18-20 in numbers, neck absent, mature segment ten time broader than long, testes 250-300 in numbers, ovary bilobed, dumbbell shaped, vitellaria follicular.

21) The present worm differs from *C. yogeshwari* Jawalikar et al., 2008 in having hooks 53 in numbers, neck very short, testes 95-98 in numbers, vitellaria follicular, arranged in two rows.

22) The present worm differs from *C. purnae* Borde S.N. and Sushil Jawale, 2008 in having hooks 52 in numbers, neck absent, mature segment squarish, slightly broader than long, testes 230-235 in numbers, ovary bilobed and vitellaria follicular, arranged in 3-4 rows.

23) The present parasite differs from *C. naidui* Kalse et al., 2009 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.

24) The present cestode differs from *C. paithenensis* Shah, 2010 in having scolex triangular, cylindrical, hooks 58, single circle in four quadrant, neck very short, mature segment two time broader than long, testes 70-80, oval, and vitellaria follicular in two rows.

25) The present form differs from *C. thapari* Menkudale and Jawale 2010 in having host *Ophiocephalus stratus*, hooks 52 in numbers, neck absent, testes 95 in numbers, medium, oval, ovary medium, lobed, vitellaria follicular 2-3 rows.

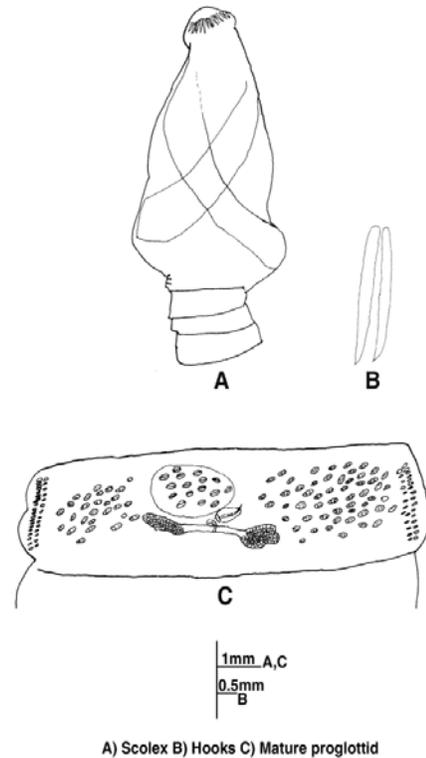
26) The present parasite differs from *C. jadhavae* Pardeshi and Hiware, 2011 in having scolex triangular, dome shaped, hook 35-45 in numbers, neck present, mature segment broader than long, testes 95-105 oval to round, ovary bilobed, vitellaria follicular, arranged in 2 rows.

27) The present worm differs from *C. clariasi* Kadam and Dhole 2011, having scolex triangular, hooks 48 in number, neck medium in size, ovary large dumbbell shaped, reported from *Clarias batrachus* in India.

The above noted characters are valid enough to erect a new species hence the name *C. godavarae* Sp. Nov. is proposed after the locality of the host in river Godavari.

FIG. - 6

*Circumoncobothrium godavarae* Sp. Nov.



**Key to the species of the genus *Circumoncobothrium* Shinde, 1968**

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	-		<i>C. alli</i> , Shinde et. al. 1994
Scolex pear shaped	-		<i>C. baimaii</i> , Wongaswad et. al. 1988
Scolex narrow anteriorly broad Posteriorly	-		<i>C. Shindeii</i> , [20] Shinde G. B. et. al. 1977
Scolex broad in the middle narrow at both end	-	7	
Scolex cylindrical	-		<i>C. cirrihinae</i> , [7] Kharade et. al. 2007
4) Mature proglottids squarish	-	8	
Mature proglottids broader than long	-	9	
5) Testes 100-150 in numbers	-		<i>C. godavarae</i> Sp. Nov.
Testes 150-200 in numbers	-		<i>C. khami</i> , [3] Shinde, G. B et. al 1968

Testes above 200 in numbers	-	<i>C. purnae</i> , [16] Borde S. N, Sushil Jawale 2008
6) Hooks below 30	-	<i>C. ambajogainis</i> , [20] Pardeshi P.R. 2011
Hooks in between 30-40	-	<i>C. mastacembelusae</i> , [12] Shinde, G. B. 2002
Hooks in between 40-50	-	10
Hooks above 50 in number	-	11
7) Testes below 200 in number	-	<i>C. aurangabadensis</i> , [2] Jadhav. B.V et.al 1976
Testes above 200 in number	-	<i>C. raoii</i> , Shinde. [20] G. B et.al. 1976
8) Scolex rectangular in shape	-	<i>C. punctatusi</i> , [17] Kalse A. T 2009
Scolex pear shaped	-	<i>C. gachuai</i> [4] Jadhav B. V et.al 1980
Scolex triangular	-	<i>C. mehdii</i> , [14] Shelke V. P. et.al 2007
9) Hooks 20-30 in numbers	-	<i>C. armatusae</i> , [10] 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	-	<i>C. ophiocephali</i> , Shinde, G. B. et.al 1968
10) Scolex triangular	-	<i>C. vitellariensis</i> , [23] Supugade, 2005
Scolex cylindrical	-	<i>C. naidui</i> , [6] Kalse et. al. 2009
11) Testes in between 90-100	-	<i>C. thapari</i> , [9] Menkudale, 2010
Testes in between 100-150	-	<i>C. yamaguti</i> , [5] Jadhav. B. V 1990
Testes in between 150-200	-	<i>C. armatusae</i> , [13] Pawar 2002
Testes above 200 in numbers	-	<i>C. bagariusi</i> , [20] Chincholikar, 1997
12) Testes in between 90-110	-	<i>C. jadhavae</i> , [15] Pardeshi, P.R 2011
Testes in between 125-150	-	<i>C. Manjari</i> , [24] Tat, M. B. 2004
Testes in between 250-260	-	<i>C. clariasi</i> , K. N. Kadam 2011
13) Testes in between 70-80	-	<i>C. paithenesis</i> , [14] Shah 2010
Testes in between 90-100	-	<i>C. yogeshwari</i> , Jawaliker 2008.
Testes in between 490-510	-	<i>C. vadgaonensis</i> , [12] Patil S.R. 1998

#### REFERENCES

- [1] Shinde, G. B.. On a new species of Circumcobotrium Shinde, 1968 (Cestoda: Pseudophyllidea carus, 1863) from fresh water fish, M.S. 1977 Ibid., XVI: 129-133.
- [2] Jadhav B. V. et.al.. New species of genus Circumcobotrium Shinde, 1968 (Cestoda: Pseudophyllidea, Carus, 1863) from a freshwater fish Aurangabad, India. 1976, Jour. of Indian Bio. Asso. 2: 163 – 166.
- [3] Chincholikar, L. N et.al. On a new species of Circumcobotrium Shinde, 1968 (Cestoda: Pseudophyllidea, Carus, 1863) from a freshwater fish in India. 1977, Marath. Univ. J. Sci., XVI (Sci. No. 9): 183-185.
- [4] Jadhav, B. V.. On new pseudophyllidae cestodes from Mastacembelus armatus of Daryapur (M.S.) India. 1990, Rivista di Parasitol. 7: 19-22.
- [5] Shinde, G. B. et.al . On a new species of the genus Circumcobotrium Shinde, 1968 (Cestoda: Pseudophyllidae) Carus, 1863 from Mastacembelusarmatus (Cuv. and Val.) from freshwater fish at Aurangabad (M.S.) India. 1994, Rivista Di Parasitologia 11 (55): 167-169.
- [6] Patil, S. R., et.al A new species of the genus Circumcobotrium Shinde, 1968 (Cestoda: Pseudophyllidae) Carus, 1863 from Mastacembelus armatus at Vadgaon, (M.S.) India. 1998, Journal of Para. Diseases. 22 (2): 148-151.
- [7] Wongsawad, C. et.al.. Circumcobotrium baimaii n.sp. (Cestoda: Pseudophyllidae) from fresh water fish, Maesa stream Chiang Mai, Thailand. 1998 Rivista Di Parasitologia. Vol. XV (LIX) No.3: 291-294
- [8] Shinde, G. B. et.al .. Two new species of genus Circumcobotrium Shinde, 1968 (Cestoda: Pseudophyllidea Carus, 1863) from a freshwater fish at Khandesh (M.S.). 1999 Rivita Di. Parasitol., XVI (LX) N.3: 195-198.
- [9] Shinde, G. Bet.al . A new species Circumcobotrium mastacembellusae n.sp. (Cestoda: Pseudophyllidae) from Mastacembelus armatus at Paithan, India. 2002 Riv. Di. Parasit., Vol. XX (LXII) No. 3: 195-198.
- [10] Pawar, S. B et.al . A new species Circumcobotrium armatusae n.sp. (Cestoda: Pseudophyllidae) from Mastacembelus armatus at Paithan, India. 2002.. Riv. Di. Parasit. Vol. XX (LXIII) No.3: 219-222.
- [11] Tat, M. B et.al . A new species of the genus Circumcobotrium Shinde, 1968 (Cestoda: Pseudophyllidea) Carus, 1863 from Ophiocephalusgachua at Dhanegaon District, Beed. 2004. Nat. Jour. of Life Sciences. 1 (1): 129-132.
- [12] Supugade., Circumcobotrium vitellariensis n.sp. Ptychobothriidae (Luhe, 1920) from Mastacembelus armatus (M.S.), India. 2005 Trajectory, Vol. 13 No. 1: 43-49.
- [13] Kharade, S. V. et.al. A new cestode Circumcobotrium cirrhinae n.sp. Cotyloda ptychobothridae from cirrhina mrigala. 2007, Nat.J.Lif. sci.4(3):103-106.
- [14] Shelke, V. P.. A new ptychobothridae tapeworm from Mastacembellus armatus at Aurangabad (M.S.) 2007, Nat.J.Lif. sci.4 (3) (72-74)
- [15] Pardeshi, P. R. et.al A new tapeworm Circumcobotrium jadhavae n.sp. from Mastacembelus armatus (Lecepede) 1800, at Aurangabad M.S. India 2011. recent research in science and technology 3(3): 20-25
- [16] Borde, S. N. et.al. A new species of Ptychobothridae from a fresh water fish in Marathwada region (M.S.). 2008, National Journal of Life Sciences. 5 (3): 121-124.
- [17] Jawaliker, J. D. et.al.. A new cestode Circumcobotrium yogeshwari n. sp. (Cotyloda: Ptychobothridae) from Mastacembelus armatus. 2008, Uttar Prad. Jou. of zoology 28 (3) : 399 – 401
- [18] Shah, Shabbir Ahmed Yasin. Taxonomic observations of Circumcobotrium paithenensis n. sp from freshwater fish Mastacembelus armatus 2010. International Journal of Systems Biology, Volume 2, Issue 2, pp-21-24
- [19] Jadhav, B. V. et.al. On a new species of the genus Circumcobotrium Shinde, 1968 (Cestode: Pseudophyllidea, Carus, 1963) from Mastacembelus armatus at Aurangabad. 1980, Bioresearch (4): 25-27.
- [20] Shinde, G. B. et.al. New species of genus Circumcobotrium Shinde, 1968 (Cestoda: Pseudophyllidea) from a freshwater fish from Maharashtra. 1976. Marath. Univ. J. Sci. (Nat. Sci.), XV (Sci. 8): 269-272.
- [21] Kalse, A. T et.al.. On a new species of Circumcobotrium Shinde, 1968 (Cestoda: Pseudophyllidea) from a fresh water fish at Chalisgaon M.S. India. 2009, Proc. Zool. Soc. of India. 8 (1): 28– 34.
- [22] Menkudale D. Vet.al. Cestoda: A New Cestode Circumcobotrium thapari (an.sp. Pseudophyllidea carus, 1863) from Ophiocephalus stratus, (M.S.), 2010. India Journal of Ecobiotechnology 2/6: 01-03,

- [23] Pardeshi, K. S. et.al.. A new pseudophyllidean worm fresh water fishes of Beed(M.S.), 2007,Nat.J.Lif. sci.4 (3) (107-110)
- [24] Shinde, G. B.. On Circumoncobothrium ophiocephalin. gen. n.sp. from freshwater fish, Ophiocephalus leucopunctatus in India, 1968,Rivista Di Parasitol. 19 (20): 111-114.
- [25] Shinde G. B. et al.. On a new species of Circumoncobothrium Shinde, 1968 (Cestoda: Pseudophyllidea, Carus, 1863) from a freshwater fish inIndia. Marath. 1977, Univ. J. Sci. (Nat. Sci.), XVI (Sci. 9): 177 -180

AUTHORS

**First Author** – Asawari Madhukar Fartade, Department of Zoology, Shri Shivaji Mahavidyalaya Barshi, alankar.fartade@gmail.com

**Second Author** – Ravikant Chati, Department of Zoology, Shri Shivaji Mahavidyalaya Barshi