



RRST-Zoology

New Species of the Genus *Circumoncobothrium* (Shinde, 1968) (Cestoda: *Pseudophyllidea carus*, 1863) from a Fresh Water Fish, Osmanabad, India

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Article Info	Abstract
<p>Article History</p> <p>Received : 16-01-2011 Revised : 22-03-2011 Accepted : 22-03-2011</p> <p>*Corresponding Author</p> <p>Tel : +91-9970129919 Fax : +91-9970129919</p> <p>Email: dkarmveerkadam@gmail.com <small>©ScholarJournals, SSR</small></p>	<p>The present paper deals with a new species of the genus <i>Circumoncobothrium</i> Shinde, [16], Viz <i>Circumoncobothrium clariasi</i> n. sp is recovered from freshwater fish <i>Clarias batrachus</i> (L.) at Tulajapur, Dist. Osmanabad. The present form differs from all other known species of the genus having in the shape and size of the scolex, hooks 48 in number, total number and arrangement of testes, position of cirrus pouch, ovary is dumbbell shaped, vitellaria follicular and opening of the genital pore.</p> <p>Key Words: Cestoda, <i>Circumoncobothrium clariasi</i> n.sp, <i>Clarias batrachus</i> Osmanabad</p>

Introduction

The genus *Circumoncobothrium* is erected by Shinde in 1968 [16] from the intestine of fresh waterfish *Ophiocephalus leuconpunctatus* as a type species *C. ophiocephali*. [3] added new species of this genus viz., *C. aurangabadensis* from *Mastacembelus armatus*. Shinde [19] added *C. raoii* from *Mastacembelus armatus*. Shinde and Chincholikar [20] described new species of this genus *C. shindei* from fresh water fish *Mastacembelus armatus*. Chincholikar and Shinde [2] described new species *C. bagariusi* from *Bagarius* species. Shinde [17] reported *C. khami* from *Ophiocephalus striatus*. Jadhav *et al.*, [4] added *C. gachuai* from *Ophiocephalus gachua* Jadhav *et al.*, [5] described *C. yamaguti*, from *Mastacembelus armatus* Shinde *et al.*, [21] created *C. alii* from *Mastacembelus armatus*. Patil [12] added *C. vadgaonensis* as a new species to this genus from *Mastacembelus armatus*. Wongsawad and Jadhav [25] added *C. baimaii* from *Mastacembelus armatus*. Shind and kalse in [18] added two new species of the genus viz. *C. armatusae* from *Mastacembelus armatus* and *C. punctatusi* from *Ophiocephalus punctatus*. Shinde [22] described *C. mastacembelusae* as a new species from *Mastacembelus armatus*. *C. armatusae (minor)* [13] reported from *Mastacembelus armatus* to this genus. Tat and Jadhav, 2004 reported *C. manjari* from *Ophiocephalus gachua*. Supugade [23] added *C. vitellariensis* from *Mastacembelus armatus*. Kharade [8] added *C. cirrhinae* from *Cirrhina mrigila*. Shelke, [15] added one more species *C. mehdii* from *M. armatus*. Pardeshi [11] added *C. ambajogaiensis* from *Mastacembelus armatus*. Jawalikar [6] added one more new specuies *C. yogeshwari* from *M. armatus*. Borde [1] added *C. purnae* from the host,

Mastacembelus armatus. Later on [7] added one more new species *C. naidui* from *M. armatus*. Shah [14] added *C. paithenensis* from *M. armatus*. Menkundale and Jawale [9] added one more new species *C. thapari* from *Ophiocephalus stratus*. *C. jadhavae* [10] added from *M. armatus*.

In present communication *Circumoncobothrium clariasi* n. sp. is reported from *Clarias batrachus*, a fresh water fish at Tuljapur.

Materials and Methods

The present specimens were recovered from the intestine of the freshly killed fresh water fish *Clarias batrachus* (L.) from Tuljapur, Osmanabad District during the period of July 2007 – June 2009. 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.

Description: *Circumoncobothrium clariasi* n. sp (based on seven species)

A scolex is medium, triangular, narrow and blunt anteriorly broad posteriorly, distinct and measures 0.888 - 0.947 in length and 0.180 - 0.252 in breadth. A pair of entire bothria which are large sac like, start from rostellum, extend

posteriorly, almost upto posterior margin of the scolex narrow anteriorly and broad posteriorly overlapping and measure 0.889 - 0.873 in length and 0.029 – 0.214 in breadth. Scolex bears an armed rostellum, at anterior end. Which is medium in size, oval in shape, with a single circle of hooks and measures 0.155- 0.160 in length and 0.140 – 0.150 in breadth. The rostellar hooks are small to medium, single prolonged, straight, broad at middle, tapering at both ends, 48 in number, arranged in a single circle, in four quadrants, 12 in each quadrants, the central hooks of the quadrant are longest, broadest and later on decrease in length and breadth on both the sides, the longer hooks measure 0.060 in length and 0.01 – 0.007 in breadth. The neck is medium, rectangular, longer than broad and measures 0.335 – 0.350 in length and 0.233 to 0.252 in breadth.

The mature segments are medium in size, squarish in shape, broader than long with convex lateral margin, acraspedote, with single set of reproductive organs and measures 0.259 – 0.647 in length and 2.575 – 2.725 in breadth. Testes medium oval, evenly distributed 249-259 (254) in number, filled completely in segment, except region of ovary, uterus, cirrus pouch and vagina bounded by excretory canal and measures 0.011 - 0.050 in length and 0.011 to 0.034 in breadth. Cirrus pouch is small, sac like, oval, antero posteriorly elongated, preovarian, situated in the centre of the segment, either to left or to right of the central line of the segment, opens in the middle of same and measures 0.090 – 0.102 in length and 0.022 – 0.045 in breadth. Cirrus thin, a coiled tube, contained with a cirrus pouch, measures 0.174 – 0.136 in length and 0.011 in breadth. Vas deferens short, thin, laterally directed and measures 0.090 – 0.102 in length and 0.11 in breadth. Ovary large, dumb bell shaped, distinctly bilobed, near posterior margin of segment, measures 1.271 - 1.305 in length and 0.359 – 0.404 in length and 0.056 – 0.214 in breadth. Isthmus long, a narrow tube, transversely placed, near posterior margin, connecting two ovarian lobes, measures 0.590 – 0.602 in length and 0.020 – 0.050 in breadth. Uterus large, 'T' shaped arise from ootype, runs anteriorly, enlarges transversely, near the anterior margin of the segment, filled with eggs and measures 0.370-1.039 in length and 0.022 in length and 0.011 in breadth. Genital pores small, oval, transversely elongated, just posterior to middle of the segment, preovarian, either to left or to the right of the middle line of segment and measure 0.022 in length and 0.011 in breadth. Vitellaria follicular, follicles small, round in 2-3 rows on each lateral side, from anterior to the posterior margin of the segment and measures 0.011 in diameter. Longitudinal excretory canals are thin and measures 0.011 in breadth.

Discussion

The genus *Circumoncobothrium* was established by Shinde in 1968 as a type species *C. ophiocephali* from *Ophiocephalus leucopunctatus*. The present tapeworm 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.

The present tapeworm differs from *C. ophiocephali* [16] 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 *Ophiocephalus leucopunctatus*, in India. The present tapeworm differs from *C. aurangabadensis* [3] 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. The present tapeworm differs from *C. raoii* [19] 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. The present tapeworm distinguish from *C. shindei*, [20] 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. The present tapeworm differs from *C. bagariusi* [2] 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. The present tapeworm differs from *C. khami* Shinde [17] 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 *Ophiocephalus sp.* in India. The present tapeworm differs from *C. gachuai* [4] 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 *Ophiocephalus gachua*, in India. The present tapeworm differs from *C. yamaguti* [5] in having the scolex distinct, narrow anteriorly and broad posteriorly and testes 130-150 in numbers. The present tapeworm differs from *C. alii*. [21] in having scolex triangular, hooks 34 in numbers, neck present and testes 230-240 in numbers. The present tapeworm differs from *C. vadgaonensis* [12] in having the scolex triangular, hooks 56 in numbers, neck present, testes 490-510 in numbers and vitellaria follicular. The present tapeworm differs from *C. baimaii* [25] 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. The present tapeworm differs from *C. armatusae*, [18] 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. The present tapeworm differs from *C. punctatusi* [18] 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 *Ophiocephalus punctatus*, in India. The tapeworm parasite differs from *C. mastacembelusae* [22] 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. The present tapeworm differs from *C. armatusae (minor)* [13] in having scolex triangular, hooks 58 in numbers, testes 190-200 in numbers and vitellaria follicular. The present tapeworm differs from *C. manjari* [24] in having the scolex triangular, hooks 48 in numbers, in single circle, neck present, testes 128-145 in numbers, vitellaria follicular and reported from *Ophiocephalus gachua*, in India. The present tapeworm differs from *C. vitellariensis* [23] in having scolex large, triangular, hook 48 in numbers, testes 250-260 in numbers and vitellaria follicular, arranged in 3-4 rows. The present tapeworm differ from *C. cirrhinae* [8] in having scolex cylindrical, barrel snaped, rostellar hooks 56 in number, mature

segments slightly longer than broad, testes 300-305 in number, ovary multi lobed with 7-8 acini, vitellaria granular. The present tapeworm differ from the species *C. mehdii* Shelke [15] scolex large, triangular, rostellar hooks 56, neck short, mature proglottids medium, testes 284, medium, oval, squarish, vas deferens short, thin, ovary large, distinctly bilobed, Vitellaria follicular. The present tapeworm differ from the species *C. ambajogaiensis* [11] scolex large, triangular, rostellar hooks 48 number, neck is short, mature segments two and half times broader than long, testes (150-160) in number, oval, ovary bilobed, dumbbell shaped, vitellaria are follicular, in two rows. The present tapeworm differ from the species *C. yogeshwari* [6] scolex triangular, large, hooks 53 in number, neck short, testes 95 – 98 number, mature segment broader than long, ovary indistinctly bilobed. The present tapeworm differ from the species *C. purnae* Borde [1] from *Mastacembelus armatus* in having hooks 52 in number, mature segments squarish and broader than long, testes 230-235 in number, vitellaria follicular in 3-5 rows. The present tapeworm differs from the species *C. naidui*, [7] having cylindrical, hook 40 in number, neck absent, broader than longer, testes 200 – 210 in number, ovary oval. The present tapeworm differs from the species *C. paithenensis* Shah [14] having scolex is large, almost triangular or cylindrical, long, rostellar hooks 58 in number, neck is very short Mature segments are almost two times broader than long with irregular margins, testes 70 - 80 in number medium in size, oval in shape, Vitellaria follicular, vas deference is thin ovary is distinctly Bilobed, dumb-bell shaped. The present tapeworm differs from the species *C. thapari* [9] scolex is large, triangular, rostellar hooks are 52 in number. The mature proglottids are medium in size, broader than long, The testes are 95 in number, medium in size, oval in shape, vitellaria are follicular, 2-3 rows, The vas deference is thin, short, The ovary is medium, lobed. The present tapeworm differs from the species *C. jadhavae* [10], scolex is dome shape, Hooks are 35-45 in number; Neck is present. Mature proglottids are broader than long, Testes are oval to rounded, 95-105 in number. Vitellaria are follicular in two rows, and Ovary is Bilobed.

In view of the above differences justify the recognition of the present tapeworm, as a new species and hence the name *Circumoncobothrium clariasi n. sp* is proposed, after generic name of the host.

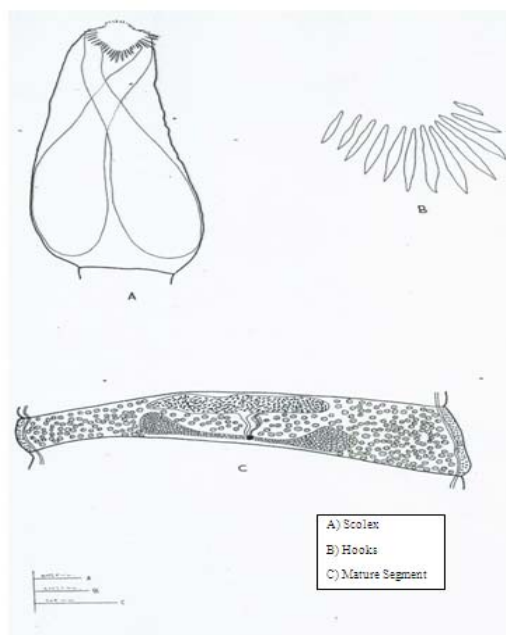
Taxonomic Summary

Genus : *Circumoncobothrium* Shinde, [16]
 Type Species : *Circumoncobothrium clariasi n. sp*
 Host : *Clarias batrachus* L.
 Habitat : Intestine
 Locality : Tulajapur, Dist. Osmanabad, M.S. India.
 Etymology : Named after the generic name of the host.

A 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. alii</i> [21] |
| Scolex pear shaped | - | <i>C. baimaii</i> [25] |
| Scolex narrow anteriorly and broad posteriorly | - | <i>C. shindei</i> [20] |
| Scolex broad in the middle and narrow at both end | - | 7 |
| Scolex cylindrical | - | 8 |
| 4) Mature proglottids squarish | - | 9 |
| Mature proglottids broader than long | - | 10 |
| 5) Testes in bet. 190 -200 number | - | <i>C. khami</i> [17] |
| Testes in bet. 230 – 235 number | - | <i>C. purnae</i> [1] |
| 6) Hooks below 30 in numbers | - | 11 |
| Hooks in between 30 -50 in numbers | - | <i>C. vitellariensis</i> [23] |
| Hooks above 50 in numbers | - | 12 |
| 6) Testes below 200 in numbers | - | <i>C. aurangabadensis</i> [3] |
| Testes above 200 in numbers | - | <i>C. raoii</i> [19] |
| 8) Testes in bet. 300 – 310 number | - | <i>C. cirrhinae</i> [8] |
| Testes in bet. 200 – 210 number | - | <i>C. naidui</i> [7] |
| 9) Scolex rectangular in shape | - | <i>C. punctatusi</i> [18] |
| Scolex pear shaped | - | <i>C. gachuai</i> [4] |
| Scolex triangular | - | <i>C. mehdii</i> [15] |
| 10) Hooks 20-30 in numbers | - | <i>C. armatusae</i> [18] |
| Hooks 30-50 in numbers | - | 13 |
| Hooks 50-60 in numbers | - | 14 |
| Hooks above 60 in numbers | - | <i>C. ophiocephali</i> [16] |
| 11) Scolex pear shaped | - | <i>C. mastacembelusaiei</i> [22] |
| Scolex triangular | - | <i>C. ambajogaiensis</i> [11] |
| 12) Testes in between 90 – 100 | - | <i>C. thapari</i> [9] |
| Testes in bet. 100-150 in numbers | - | <i>C. yamaguti</i> [5] |
| Testes in bet.150-200 in numbers | - | <i>C. armatusae (minor)</i> [13] |
| Testes above 200 in numbers | - | <i>C. bagariusi</i> [2] |
| 13) Testes in bet. 90 – 110 | - | <i>C. jadhavae</i> [10] |
| Testes in bet. 125 -150 in number | - | <i>C. mangari</i> [24] |
| Testes in bet. 250 -260 in number | - | <i>C. clariasi n.sp.</i> |
| 14) Testes in bet. 70-80 in number | - | <i>C. paithenensis</i> [14], |
| Testes in bet. 90 -100 in number | - | <i>C. yogeshwari</i> [6] |
| Testes in bet. 490 - 510 in number | - | <i>C. vadgaonensis</i> [12] |



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References

- [1] Borde, S. N. and S. Jawale. 2008. A new species of Ptychobothridae from a fresh water fish in Marathwada region (M.S.). *National Journal of Life Sciences*. 5 (3): 121-124.
- [2] Chincholikar, L. N. and G. B. Shinde. 1977. On a new species of *Circumoncobothrium* Shinde, 1968 (Cestoda: Pseudophyllidea, Carus, 1863) from a freshwater fish in India. *Marath. Univ. J. Sci.*, XVI (Sci. No. 9): 183-185.
- [3] Jadhav B. V. and G. B. Shinde. 1976. New species of genus *Circumoncobothrium* Shinde, 1968 (Cestoda: Pseudophyllidea, Carus, 1863) from a freshwater fish Aurangabad, India. *Jour. of Indian Bio. Asso.* 2: 163 – 166.
- [4] Jadhav, B. V. and G. B. Shinde. 1980. On a new species of the genus *Circumoncobothrium* Shinde, 1968 (Cestode; Pseudophyllidea, Carus, 1963) from *Mastacembelus armatus* at Aurangabad. *Bioresearch* (4): 25-27.
- [5] Jadhav, B. V. (1990). On new pseudophyllidae cestodes from *Mastacembelus armatus* of Daryapur (M.S.) India. *Rivista di Parasitol.* 7: 19-22.
- [6] Jawalikar, J. D. S. B. Pawar and G. B. Shinde. 2008. A new cestode *Circumoncobothrium yogeshwari n. sp.* (Cotyloa: Ptychobothridae) from *Mastacembelus armatus* Uttar Prad. *Jou. of zoology* 28 (3) : 399 - 401
- [7] Kalse, A. T., R. B., Surawanshi and J. R. Patil. 2009. On a new species of *Circumoncobothrium* Shinde, 1968 (Cestoda: Pseudophyllidea) from a fresh water fish at Chalisgaon M.S. India. *Proc. Zool. Soc. of India*. 8 (1): 28 – 34.
- [8] Kharade, S. V. Yasmin Mulla and G. B. Shinde. 2007. A new cestode *Circumoncobothrium cirrhinae* n.sp. Cotiloda ptychobothridae from cirrhina mrigala. *Nat.J.Lif. sci.*4 (3)103-106.
- [9] Menkudale D. V, B. J. Ugale And C. J. Jawale. 2010. Cestoda: A New Cestode *Circumoncobothrium thapari* (a n.sp. *Pseudophyllidea carus*, 1863) from *Ophiocephalus stratus*, (M.S.), India *Journal of Ecobiotechnology* 216: 01-03,
- [10] Pardeshi, P. R. and C. J. Hiware. 2011. A new tapeworm *Circumoncobothrium jadhavae* n.sp. from *Mastacembelus armatus* (Lecepede) 1800, at Aurangabad M.S. India *recent research in science and technology* 3(3): 20-25
- [11] Pardeshi, K. S. A. T. Kalse, and V. N. Andhare. 2007. A new pseudophyllidean worm fresh water fishes of Beed (M.S.), *Nat.J.Lif. sci.*4 (3) (107-110)
- [12] Patil, S. R., G. B. Shinde, and B. V. Jadhav. 1998. A new species of the genus *Circumoncobothrium* Shinde, 1968 (Cestoda: Pseudophyllidae) Carus, 1863 from *Mastacembelus armatus* at Vadgaon, (M.S.) India. *Journal of Para. Diseases*. 22 (2): 148-151.
- [13] Pawar, S. B. 2002. A new species *Circumoncobothrium armatusae* n.sp. (Cestoda: Pseudophyllidae) from *Mastacembelus armatus* at Paithan, India. *Riv. Di. Parasit.* Vol. XX (LXIII) No.3: 219-222.
- [14] Shah, Shabbir Ahmed Yasin. 2010. Taxonomic observations of *Circumoncobothrium paithanensis n.sp.*

- from freshwater fish *Mastacembelus armatus* International Journal of Systems Biology, Volume 2, Issue 2, 2010, pp-21-24
- [15] Shelke, V. P. 2007. A new ptychobothridae tapeworm from *Mastacembellus armatus* at Aurangabad (M.S.) *Nat.J.Lif. sci.4* (3) (72-74)
- [16] Shinde, G. B. 1968. On *Circumoncobothrium ophiocephali* n. gen. n.sp. from freshwater fish, *Ophiocephalus leucopunctatus* in India, *Rivista Di Parasitol.* 19 (20): 111-114.
- [17] Shinde, G. B. 1977. On a new species of *Circumoncobothrium* Shinde, 1968 (Cestoda: Pseudophyllidea carus, 1863) from fresh water fish, M.S. *Ibid.*, XVI: 129-133.
- [18] Shinde, G. B. and A. T. Kalse. 1999. Two new species of genus *Circumoncobothrium* Shinde, 1968 (Cestoda: Pseudophyllidea Carus, 1863) from a freshwater fish at Khandesh (M.S.). *Rivita Di. Parasitol.*, XVI (LX) N.3: 195-198.
- [19] Shinde, G. B. and B. V. Jadhav. 1976. New species of genus *Circumoncobothrium* Shinde, 1968 (Cestoda: Pseudophyllidea) from a freshwater fish from Maharashtra. *Marath. Univ. J. Sci. (Nat. Sci.)*, XV (Sci. 8): 269-272.
- [20] Shinde G. B. and L. N. Chincholikar. 1977. On a new species of *Circumoncobothrium* Shinde, 1968 (Cestoda: Pseudophyllidea, Carus, 1863) from a freshwater fish in India. *Marath. Univ. J. Sci. (Nat. Sci.)*, XVI (Sci. 9): 177 - 180
- [21] Shinde, G. B., Sarwade, D. V., Jadhav, B. V. and M. A. Mahagan. 1994. 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* 11 (55): 167-169.
- [22] Shinde, G. B., Pawar, S. B. and S. P. Chauhan. 2002. A new species *Circumoncobothrium mastacembellusae* n.sp. (Cestoda: Pseudophyllidae) from *Mastacembelus armatus* at Paithan, India. *Riv. Di. Parasit.*, Vol. XX (LXII) No. 3: 195-198.
- [23] Supugade, 2005. *Circumoncobothrium vitellariensis* n.sp. Ptychobothriidae (Luhe, 1920) from *Mastacembelus armatus* (M.S.), *India. Trajectory*, Vol. 13 No. 1: 43-49.
- [24] Tat, M. B. and B. V. Jadhav. 2004. A new species of the genus *Circumoncobothrium* Shinde, 1968 (Cestoda: Pseudophyllidea) Carus, 1863 from *Ophiocephalus gachua* at Dhanegaon District, Beed. *Nat. Jour. of Life Sciences.* 1 (1): 129-132.
- [25] Wongsawad, C. and B. V. Jadhav. 1998. *Circumoncobothrium baimaili* n.sp. (Cestoda: Pseudophyllidae) from fresh water fish, Maesa stream Chiang Mai, Thailand. *Rivista Di Parasitologia.* Vol. XV (LIX)No.3:291-294.