

A New Cestode *Circumoncobothrium dnyaneshwarinae* from *Clarias batrachus* in Mula Dam Reservoir, India

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ABSTRACT- The present paper deals with a new species of genus *Circumoncobothrium* Shinde (1968) differs from all known species of genus in many characters, in having the scolex large oval, rostellum also oval transversely placed, rostellar hooks are 64(60-70) in number, short neck, mature proglottids are five times broader than long and lateral margins are concave, testes are small oval 75(70-80) in number in a single field or either lateral sides of ovary, cirrus pouch is small in size transversely placed, cirrus is thin coiled, obliquely placed, ovary bilobed slightly dumb-bell shaped, ovarian lobes with 5 acini, vitellaria are granular 3 rows on each lateral side, gravid segments are three times broader than longer, eggs are oval with thin shelled.

Key-Words: New Cestode, *Circumoncobothrium*, *Clarias batrachus*

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INTRODUCTION

The study area is an earth fill and gravity dam on Mula River near Rahuri in Ahmednagar district of the state of Maharashtra in India. The height of the dam above lowest foundation is 48.17 m (158.0 ft) while the length is 2,856m (9,370 ft). The volume content is 7,594 km³ (1,822 cu mi) and gross storage capacity is 736,320.00 km³ (176,652 cu mi) water capacity is 26 TMC.

Clarias batrachus is a common freshwater cat fish of Mula dam reservoir. They have a high nutritive food value and are consumed palatably by majority of the fish eating people in the state. However these edible fishes are known to harbor a number of parasites which causes deterioration of their health and affect their market value by the parasitisation. The present study is carried out to investigate the Cestode parasites infection in *Clarias batrachus*.

The genus, *Circumoncobothrium* is erected by Shinde G.B., 1968 from the intestine of freshwater fish as-

C. ophiocephali from *Ophiocephalus leucopunctatus* as a type species *C. ophiocephali* [1] described one new species of the genus as *C. shindei* from a fresh water fish, *Mastacembellus armatus*.

In 1977, Shinde and Jadhav [2] added a new sp. *C. khami* from *Ophiocephalus striatus*. Later on [3,4] added two new species, under the genus viz. *C. aurangabadensis* and *C. raoii* from *Mastacembellus armatus*. Jadhav and Shinde [5] described *C. gachuai* from *Ophiocephalus gachua*. Jadhav et al. [6] described *C. yamaguti* from *M. armatus* later on Shinde et al. [7] added *C. alii* from *M. armatus*. Patil et al. [8] described *C. vadgaonensis* from *Mastacembellus armatus*. Later on seven species were added to this genus.

The present communication dealt with the description, of one new species, as *C. dnyaneshwarinae* from *Clarias batrachus*.

MATERIALS AND METHODS

For the taxonomical study of Cestode parasites, the fishes were collected through different areas of Mula dam Reservoir, Ahmednagar District, Maharashtra, each annual cycle. The alimentary canal of the fishes were removed and cut open in normal saline water in petri-dish. The alimentary canals observe under binocular microscope (recorded infected and non infected hosts) the collected worms were washed in distilled water to render them free from intestinal contents. The Cestode was preserved in 4% formalin. Borax carmine and Haematoxylin stain were used for staining of parasites. The worms were passed through

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various alcoholic grades i.e. 30%, 50%, 70%, 90% and 100% cleared in xylen and mounted in DPX. All the drawing was made with the aid of camera Lucida. All measurements are in millimeters, unless otherwise indicated.

Out of Two hundred Eighty eight intestines, one hundred thirty two intestines were infected in freshwater fish, *Clarias batrachus* [9] from Mula dam reservoir, Dist. Ahmednagar (M.S.) India during July 2013 –June 2015.

RESULTS AND DISCUSSION

Out of these ten specimens were processed for taxonomical studies. The worms were considerably long, thin, and white in colour, with Scolex, numerous immature and mature segments. The cestodes were flattened, preserved in 4% formalin, were stained with Harris haematoxylin, passed through various alcoholic grades, cleared in xylol, mounted in D. P. X and whole mount slides were prepared for further anatomical studies. All measurements were given in millimeters.

The scolex is large in size, slightly oval in shape, distinctly marked off from the strobila, broad middle, measures 1.674(1.749–2.177) in length and 0.825(0.673–0.977) in breadth. It bears two bothria, which are large in size, start from the rostellum and extend up to the posterior margin of the scolex.

The scolex bears the rostellum its anterior end, which is medium in size, oval shape, transversely elongated, having constriction at the middle and measures 0.145 (0.128–0.163) in length and 0.160(0.144–0.194) in width. The rostellar hooks are 64 (60–70) in number, which are long, stout, rod shaped pointed at upper end, longer hooks present in the centre of the quadrant and later on decreases in length on both the sides. The hooks measures 0.051(0.038–0.065) in length and 0.005(0.003–0.007) in width and Neck is short.

The mature proglottids are broader than long, nearly four to five times broader than long with straight, irregular, slightly concave lateral margins and measure 0.333 (0.270–0.397) in length and 1.148(1.077–1.522) in breadth. The testes are small in size, oval in shape, 75 (70–80) in number, arranged in a single field or either lateral sides of ovary. In left lateral side (33) and right lateral side (42) testes present. Measure 0.0310(0.022–0.039) in length and 0.022(0.013–0.032) in width.

The cirrus pouch is small in size, oval in shape transversely placed, preovarian in position, situated just anterior to the middle of the segment and measures 0.111(0.095–0.126) in length and 0.053(0.026–0.074) in breadth. The cirrus is thin, coiled, obliquely placed, contained within the cirrus pouch and measures 0.065(0.056–0.075) in length and 0.013(0.009–0.017) in width. The vas deferens is short, thin, extends obliquely and measures 0.068(0.044–0.093) in length and 0.004(0.003–0.007) in breadth.

The ovary is medium in size, distinctly Bilobed slightly dumb- bell shaped in appearance, transversely placed, in the middle of the segments and measure 0.169 (0.124–0.214) in length and 0.657 (0.390–0.928) in breadth. The isthmus is connecting the two ovarian lobes, straight, even in width, transversely placed, consisting 5 acini and measure 0.115 (0.095–0.136) in length and 0.035 (0.034–0.038) in breadth. The vagina is thin, short, arises from the genital pore, slightly curved, runs posterior, reaches and opens into the ootype and measure 0.066 (0.053–0.076) in length 0.006 (0.003–0.012) in width. The ootype is medium in size, rounded in shape, and measure 0.035 (0.026–0.0476) in length and 0.030 (0.030–0.033) in breadth. The genital pore is small in size, oval in shape, preovarian, and measures. Longitudinal excretory canals are not distinct.

The vitellaria are granular, small in size, round in shape, in 3 rows, on each lateral side, extending from the anterior to the posterior margin of segments.

Gravid segment are three times broader then longer measure 0.602 in length and 2.203 in breadth. With uterus which is sac like oval structure measuring 0.998in length and 0.227 in breadth. The eggs are oval to elongated, thin-shelled measuring 0.043 in length and in width.

The genus *Circumoncobothrium* is erected by [10] as a type species *C. ophiocephalii* from *Ophiocephalus leucopunctatus*. After this following species are added to this genus:

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|--------------------------------|------------------------------|
| 1. <i>C. ophiocephalii</i> | Shinde [10] |
| 2. <i>C. aurangabadnesis</i> | Jadhav and Shinde [2] |
| 3. <i>C. raoii</i> | Shinde and Jadhav [4] |
| 4. <i>C. shindei</i> | Shinde and Chinholikar [1] |
| 5. <i>C. bagariusi</i> | Chinholikar and Shinde [11] |
| 6. <i>C. khami</i> | Shinde and Jadhav [2] |
| 7. <i>C. gachau</i> | Jadhav and Shinde [5] |
| 8. <i>C. yamaguti</i> | Jadhav, et al. [6] |
| 9. <i>C. alii</i> | Shinde et al. [7] |
| 10. <i>C. vadgaonensis</i> | Patil et al. [8] |
| 11. <i>C. baimaii</i> | Wongswad and Jadhav [12] |
| 12. <i>C. punctatusi</i> | Kalse and Shinde et al. [13] |
| 13. <i>C. mastacembelusaei</i> | Shinde et al. [14] |
| 14. <i>C. armatusi</i> | Pawar et al. [15] |
| 15. <i>C. vitellariensis</i> | Supugade et al. [16] |
| 16. <i>C. yogeshwari</i> | Jawalikar et al. [17] |
| 17. <i>C. naidui</i> | Kalse et al. [18] |

The worm under discussion is having the scolex large, slightly oval shaped, narrow anteriorly, broad posterior, having two bothria, rostellum medium oval; the rostellar hooks 64(60–70) in number, arranged in a single circle, stout, slightly curved, mature proglottides medium in size, slightly concave lateral margins, three to four times broader than long; testes 70–80 (75) in number, small to medium, oval, arranged in a single field; ovary large, distinctly Bilobed, dumb-bell shape transversely placed in

the middle of the segment, with 5 acini. Vitellaria granular small, round in 3 rows on each side. Gravid segments three times broader than long. The Eggs are oval.

The present Cestode differ from *Circumoncobothrium ophiocephali* [10], which is having the scolex distinct, hooks 80 in number, rod shaped; testes 90-100 in number, on two lateral fields, round in shaped; ovary single, conical mass to irregular shaped band, thinner in the middle and expanded in lateral ends; lobes with 2-3 acini and Vitellaria follicular, in 3-4 rows on each side.

The present worm differs from *C. aurangabadensis* [3], which is having the scolex broad in the middle, narrow at the ends; the rostellar hooks 42 in number, rod shaped; testes 130-140 in number, round in shape; ovary bilobed, each lobe 3-4 acini near the posterior margin of the segment and vitellaria granular near the lateral margin.

The present tapeworm differs from *C. raoii* [4] this is having the scolex broad in the middle, narrow at both the ends; rostellar hooks 46 in number, rod shape; testes 210-215 in number, rounded in shape, in two fields; ovary bilobed situated at almost near the posterior margin of the segment and vitellaria granular at the lateral sides of the segments.

The present worm differs from *C. shindei* [1] this is having the rostellar hooks 49 in number, rod shaped; ovary dumb-bell shaped, lobes rounded, compact, in the centre of the segments and vitellaria granular, Testes 260-275 in numbers, vitellaria granular.

The worm under discussion differs from *C. bagariusi* [11] this is having the rostellar hooks 55 in number, rod shaped; testes 275-285 (276) in number, in two fields; ovarian lobes each with 5-6 globular acini; in the middle one third of the segment and vitellaria follicular, with irregular shape, in 4-5 rows on each side.

The present worm differs from *C. khami* [2], which is having the scolex cylindrical, with even width, apical disc separate by a notch, rostellar hooks 48 in number, lancet shaped, tastes 190-200 in number, rounded ovary bilobed, each lobe compact, situated near the posterior end and in the center of the segments and vitelline follicles round, in a single layer, near the lateral margins.

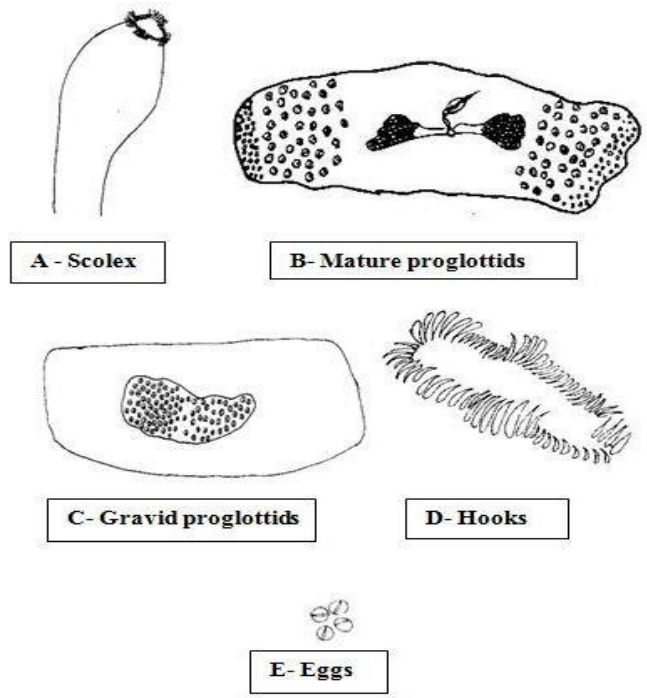


Fig 1: *Circumoncobothrium dnyaneshwarinae* n. sp.

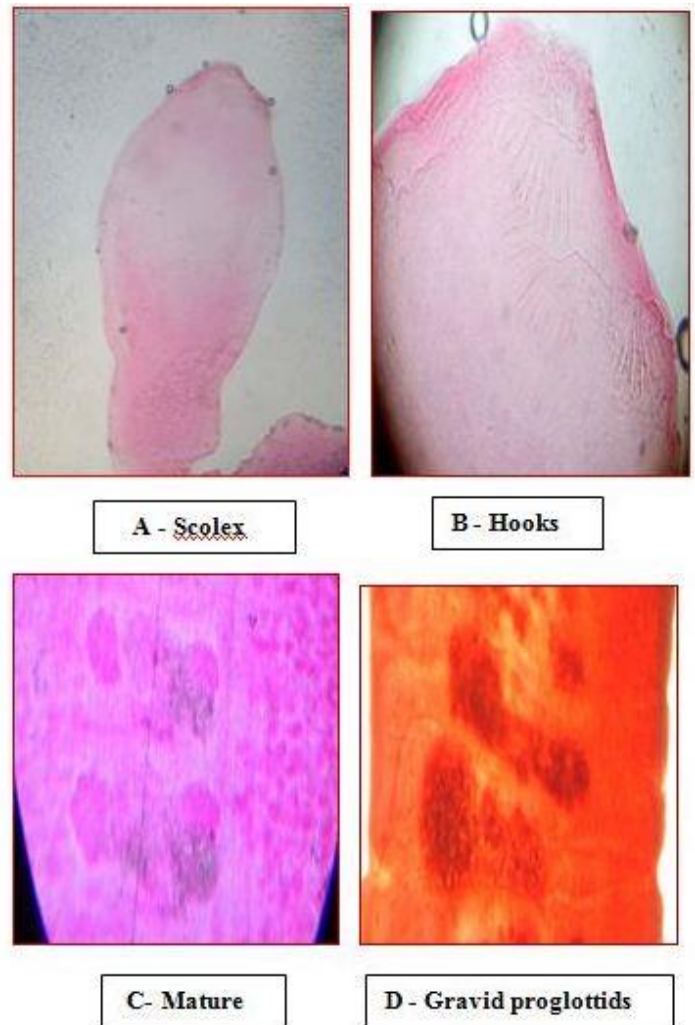


Fig 2: *Circumoncobothrium dnyaneshwarinae* n. sp.

The present tapeworm, differ from *C. gachuai* [5], which is having scolex pear shaped in appearance, rostellar hooks 48 in number, testes 375–400 in number, rounded, densely placed in two fields; ovarian lobes each with 5–6 short blunt acini and vitellaria follicular, corticular in position, in 1-2 rows on each side.

The worm under discussion differs from *C. yamaguti* [6] this is having the scolex distinct, rostellar hooks 56 in number, straight, stout, in a single circle testes 130-150 in number, round; ovary centrally placed near the posterior margin and vitellaria granular, corticular, along the lateral margin.

The present cestode differs from *C. alii* [7], which is having the rostellar hooks 34 in number, testes rounded, 230-240 in number; ovary compact, centrally placed; lobes long, oval and vitellaria granular.

The present worm differs from *C. vadgaonensis* [8] this is having scolex triangular, rostellar hooks 56 in number, testes 490-510 in number, evenly distributed; ovary distinctly bilobed, in posterior half of the segment; vitellaria follicular, in two rows on each side.

The present worm differ from *C. baimaii* [12], which is having scolex pear shape, rostellar hooks 48 in number, testes 88-100 in number, ovary compact, vitellaria granular at the lateral side.

The worm under discussion differs from *C. punctatusi* [13], which is having scolex rectangular in shape, rostellar hooks 40-50 (48) in numbers, arranged in single circle stout, tapering at both ends. Testes 140-150 in numbers.

The worm under discussion differs from *C. mastacembelusaei* [14], which is having scolex pear shaped; rostellar hooks 38 in number; neck is absent; testes are 130–140 in numbers, unevenly distributed in lateral field, ovary distinctly bilobed, compact, unequal lobes.

The present worm differs from *C. armatusi* [15], which is having scolex large and triangular; rostellar hooks 23 in number, slightly curve, stout, large hooks in center.

The worm under discussion differs from *C. vitellariensis* [16], which is having scolex triangular, broader at base, narrow at the apex, rostellar hooks 48 in numbers, pointed at the apex; neck is absent. Testes 250–260 in number, Oval pre-ovarian. Ovary bilobed transversely placed near posterior margin of the proglottids. Vitellaria follicular, rounded, 3-4 rows on each lateral side.

The present worm differs from *C. yogeshwari* [17], which is having scolex large triangular in shape, long, broad at the base, tapering at apex, with two bothridia; rostellum armed, rostellar hooks 53, arranged in single circle, neck very short, mature segment broader than long, testes 95–98, medium oval ovary bilobed, lobes compact, vitellaria follicular small, rounded from anterior to posterior margin of the segment in two row on each side of segment.

The present worm differs from *C. naidui* [19], which is having scolex cylindrical, rostellum oval, armed; rostellar hooks 40 in numbers arranged in four quadrants; bothria two; neck absent; mature segment broader than long; testes

rounded, 200-210 in number, ovary medium, a single mass, with many rounded acini, vitellaria small, granular from anterior to posterior margin of segment; gravid segment broader than long. Some additional and differentiating characters are given in the comparative chart at the end. These distinct characters are more than enough to erect a new species from this genus and hence the name *Circumoncobothrium dnyaneshwarinae* n.sp. This species name proposed on the bases of the God name Dnyaneshwar mauli.

TAXONOMIC SUMMARY

Genus	<i>Circumoncobothrium</i> [19]
Species	<i>Circumoncobothrium dnyaneshwarinae</i> n. sp.
Type host	<i>Clarias batrachus</i> [9]
Habitat	Intestine
Type locality	Mula dam reservoir
Date of collection	July 2013-June 2015
Etymology	As the Cestode species reported from Mula dam reservoir

CONCLUSIONS

The present taxonomical study revealed that freshwater fish, *Clarias batrachus* is infected by the new species of Cestode parasite of genus *Circumoncobothrium*. After taxonomical Study of Seventeen specimens, the new species of Cestode parasite *Circumoncobothrium dnyaneshwarinae* is identified. The parasites affect the productivity of fish, also decreasing growth rate, reducing the quality of flesh and making the host more susceptible to more pathogens.

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