



## Systematic Observation Of New Piscean Ptychobothriidae Tapeworm From *Mastacembelus Armatus* At Marathwada Region (M.S.) India

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<p>CC License CC-BY-NC-SA 4.0</p>	<p style="text-align: center;"><b>Abstract</b></p> <p>Present study deals with Biosystematics of Piscean Ptychobothriidae tapeworm <i>Circumoncobothrium chavani</i> Sp. Nov. collected from intestine of freshwater catfish host <i>Mastacembelus armatus</i>. (Lacepede, 1800) from different places of Marathwada Region (M.S.) India. The worm comes closer to all known species of the genus <i>Circumoncobothrium</i> (Shinde, 1968) in general topography of organ but differs due to having length of worm, scolex triangular, rostellum disc like, Mature segments broader than long, number and shape of testes, Ovary is bilobed.</p> <p><b>Key Words:</b> - <i>Ptychobothriidae</i> tapeworm, <i>Mastacembelus armatus</i>, <i>Marathwada Region</i>.</p>
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### Introduction:

Marathwada region comprising of eight districts, viz. Ch. Sabhajinagar, Dharashiva, Beed, Hingoli, Jalna, Latur, Nanded and Parbhani. The location of Marathwada is on 70 5' – 78 5' E longitude and 17 5' – 20 5' N latitude forms the part of the vast Deccan plateau all of India and is one of the six divisions of Maharashtra State. Marathwada is a proposed state and geographical region of the Indian state of Maharashtra. The total area of Marathwada region is of 64,813 km. and is bounded by the Vidarbha region on the North, by Andhra Pradesh on the East and Southeast, by Karnataka on the South and by Western Maharashtra on the West. The entire region is situated at an average height of about 300-650 m. above Mean Sea Level gradually sloping from West to East, and is traversed by hill ranges origination from the Sahyadris in the West and the Satpudas in the North. The normal average rainfall is about 90 cm but is rather variable form year to year. It has decreased considerable in the recent years. Godavari, Purna, Karpura, Dudhana, Yelganga, Dhord, Kundlika, Sindhaphana, Manjra, Terna, Manar, Tiru all above mentioned rivers comes under Marathwada Region. A healthy and mature fish of the right weight is considered a nutrient base but when edible fish are found infected with tapeworm parasites that reduce the necessary nutrition from the host fish and secrete harmful substances. So, because of this, the market value of fish is also affected and if consumed, there is a risk of infection. Parasites play crucial roles in ecosystems around the world, making up around 40% of

animal species. As freshwater habitat faces the growing threats of climate change and habitat loss, scientists warn that parasites are equally vulnerable. Morphotaxonomic studies of tapeworm parasites are an urgent need today because of all these facts and to obtain more accurate information about the parasite.

The genus *Circumoncobothrium* is erected by Shinde in 1968 from the intestine of fresh water fish *Ophiocephalus leuconpunctatus* as a type species *C. ophiocephali*. Jadhav, (1976) added new species of this genus viz., *C. aurangabadensis* from *Mastacembelus armatus*. Most of the species belonging to genus *Circumoncobothrium* differ from each other due to relatively minor characters. Various authors have reviewed taxonomic status of the species belonging to this genus. By documenting and analyzing this parasitic relationship, we contribute to the broader knowledge of parasitology and the intricate dynamics of ecosystems in this particular geographical area. The study aims to provide a comprehensive understanding of the taxonomic characteristics *Circumoncobothrium* sp collected from *Mastacembelus armatus*.

## Material and Methods:

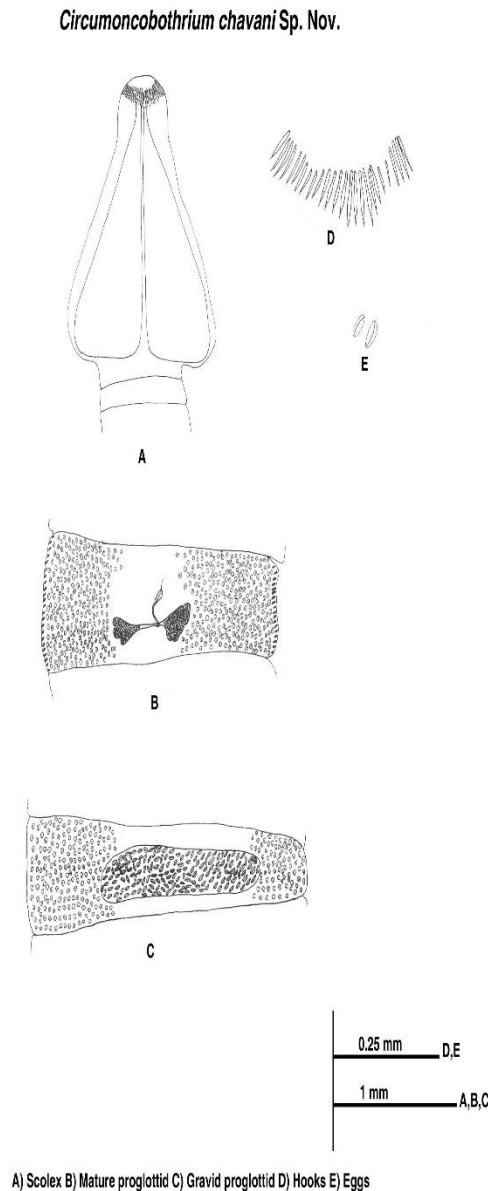
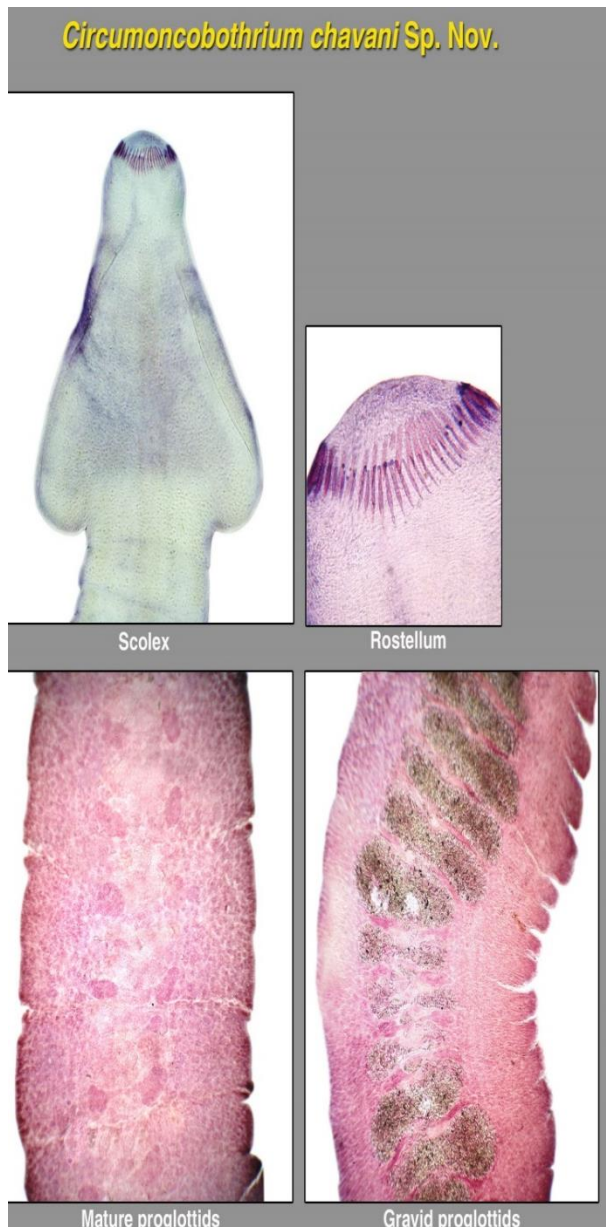
For the taxonomical study of tapeworm, the freshwater fish *Mastacembelus armatus* (Lacepede, 1800) were collected from different places Ch. Sabhajinagar, Dharashiva, Nanded, Beed districts (M.S.) India. The hosts are easily identified by Day. The viscera were brought to the laboratory immediately, repeatedly washed in cold saline, cut and observed under binocular microscope. The collected worms were washed in distilled water and fixed in hot 4 % formalin for specific identification. The flattened parasites were washed thoroughly under running tap water and subjected to Haematoxylin stain. All drawings were made with the aid of camera lucida. All measurements are in millimeters, unless otherwise indicated. The identification is made with the help of "Systema Helminthum" by Yamaguti (1959)

## Description

Twenty seven specimens of this species were collected from the intestine of freshwater fish *Mastacembelus armatus* (Lacepede, 1800). The colour of tapeworm is whitish and it is considerably long with numerous proglottids having a maximum length 67 mm and width of 1.95 mm with proglottids increasing width towards posterior side. The scolex is a typical of the genus *Circumoncobothrium*, and consists of apical disc which are present concurrent hooks.

The scolex is large in size, triangular shaped narrow and blunt anteriorly broader at the base it measures 1.929 (1.842 – 2.017) in length and 0.99 (1.745 – 1.236) in width. Pair of entire bothria which are large, oval in shape two in number narrow anteriorly and broad posteriorly large in size, occupy major region of the scolex, extend from anterior to the posterior margin of the scolex, it measures 1.232 (1.201 – 1.263) in length and 0.35 (0.192 – 0.508) in width. Scolex bears armed rostellum, disc like; it measures 0.363 (0.315 – 0.412) in length and 0.322 (0.298 – 0.344) in width. Rostellum bears a single complete circle of hooks 49 in number and it measures 0.051 (0.041 – 0.061) in length and 0.006 (0.005 – 0.007) in width. The hooks are small to medium, single pronged, straight, broad at middle, tapering at both ends. Neck is very short, it is three times broader than long and it measures 0.126 (0.122 – 0.131) length 0.701 (0.692 – 0.710) in width.

The strobila is divided into many immature, mature and gravid segments. In immature segments there is no trace of any reproductive organs and partly mature segments observe organs. Mature segments broader than long almost two and half times broader than long, with single set of reproductive organs, it measures 0.631 (0.561 – 0.701) in length and 1.976 (1.842 – 2.105) in width. Testes 442 – 474 (462) in number in two lateral sides of the ovary except central medulla, they are small in size, oval in shape equally displaced gap in between two graphs of testes, it measures 0.064 (0.061- 0.067) in length and 0.052 (0.051 – 0.054) in width. The Cirrus pouch is medium in shape obliquely placed extending more into right half of the segment at opening outside it measures 0.131 (0.122 – 0.140) in length and 0.039 (0.035 – 0.043) in width. The cirrus pouch is broader anterior towards the genital pore tapering at the narrow posteriorly. The cirrus is slightly curve at the anterior of genital opening within cirrus pouch; it measures 0.1 (0.096 – 0.105) in length and 0.008 in width and forms vas deferens. The vas deferens is short, thin, and measures 0.056 (0.052 – 0.061) in length and 0.008 in width. Vagina and cirrus pouch open at the distal end known genital pores. Genital pore is small in size oval in shape with a thick broader obliquely placed it measure 0.008 in diameter. Ovary is bilobed central in position



situated near the posterior margin of the segment in which poral lobe is long in size transfer elongated with irregular margin having 10 – 11 acini and it measures 0.219 (0.210 – 0.228) in length and 0.131 (0.122 – 0.140) in width whereas aporal lobe is small in size oval in shape transfer elongated having 6 – 7 acini and it measures 0.135 (0.122 – 0.149) in length and 0.127 (0.114 – 0.140) in width. The acini are small in size blunt in shape not pointed. Both lobes are connecting interiorly long narrow duct which is known as oviduct and it measures 0.246 (0.201 – 0.292) in length and 0.012 (0.114 – 0.40) in width. The vagina is thin, small tube, arises from the genital pore, slightly curved, runs posterior, and opens into ootype and measures 0.135 (0.122 – 0.149) in length 0.008 in width. The ootype is medium in size, oval in shape, at middle, either to the right or to the left of the middle line of the segments, it measures 0.017 in diameter. Vitellaria granular in 2 – 3 rows at the lateral side of the proglottids.

Gravid segment is longer than broad; it measures 0.442 (0.324 – 0.561) in length and 2.311 (2.263 – 2.359) in width, with uterus which tube like, filled with numerous eggs, it measuring 0.219 (0.210 – 0.228) in length and 1.328 (1.305 – 1.350) in width. The eggs are oval to elongated and non-operculated, it measuring 0.062 (0.056 – 0.069) in length and 0.013 (0.012 – 0.015) in width.

## 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* (Shinde, 1968) in having scolex distinct, rostellar hooks 80 in numbers, ovary compact and vitellaria follicular; *C. aurangabadensis* (Jadhav *et al.*, 1976) in having scolex broad in the middle and narrow at both the ends, hooks 42 and testes 135-145 in numbers; *C. raoii* (Shinde *et al.*, 1976) in having scolex broad in the middle and narrow at both the ends, testes 215 in numbers; *C. shindei* (Shinde *et al.*, 1977) in having the testes 275 in numbers and ovary dumb-bell shaped; *C. bagariusi* (Chincholikar *et al.*, 1977) in having neck absent, hooks 55 in numbers, testes 275-285 in numbers, arranged in two lateral fields and vitellaria follicular; *C. khami* (Shinde, 1977) in having the scolex cylindrical, mature proglottids squarish, testes 190-200 in numbers, evenly distributed and vitellaria follicular; *C. gachuai* (Jadhav *et al.*, 1980) having the scolex pear shaped, mature proglottids squarish, testes 375-400 in number and vitellaria follicular, arranged in two rows; *C. yamaguti* (Jadhav *et al.*, 1990) in having the scolex distinct, neck absent, hooks 56 and testes 130-150 in numbers; *C. alii* (Shinde *et al.*, 1994) having hooks 34 in numbers, testes 230-240 in numbers; *C. vadgaonensis* (Patil *et al.*, 1998) in having the, hooks 56 in numbers, testes 490-510 in numbers, vitellaria follicular; *C. baimaii* (Wongsawad *et al.*, 1998) in having the scolex pear shaped, testes 88-100 in numbers and ovary compact; *C. armatusae* (Shinde *et al.*, 1999) in having, hooks 58 in numbers, testes 90-100 in numbers, ovary compact vitellaria follicular, arranged in 3-4 rows; *C. punctatusi* (Shinde *et al.*, 1999) in having scolex rectangular, mature proglottids squarish, testes 140-150 in numbers and vitellaria follicular, arranged in 3-6 rows; *C. mastacembelusae* (Shinde *et al.*, 2002) in having scolex pear shaped, hooks 30 in numbers, testes 130-140 in numbers and vitellaria follicular; *C. armatusae (minor)* (Pawar *et al.*, 2002) in having hooks 58 in numbers, testes 190-200 in numbers and vitellaria follicular; *C. manjari* (Tat *et al.*, 2004) in having the testes 128-145 in numbers, mature segment broader than long, vitellaria follicular; *C. vitellariensis* (Supugade, 2005) in having testes 250-260 in numbers, mature segment 4 times broader than long and vitellaria s follicular, arranged in 3-4 rows; *C. cirrhinae* (Kharade *et al.*, 2007) in having scolex cylindrical, barrel snaped, hooks 56 in number, testes 300-305 in number and ovary multi lobed with 7-8 acini; *C. mehdii* (Shelke, 2007) having hooks 56 in number, mature proglottids medium, testes 284, medium, oval, Vitellaria follicular; *C. ambajogaiensis* (Pardeshi *et al.*, 2007) having testes 150-160 in number, and vitellaria are follicular in two rows; *C. yogeshwari* (Jawalikar *et al.*, 2008) testes 95 – 98 number, mature segment broader than long and vitellaria follicular; *C. purnae* (Borde *et al.*, 2008) having mature segments squarish and broader than long, testes 230-235 in number and vitellaria s follicular in 3-5 rows; *C. naidui* (Kalse *et al.*, 2009) having scolex cylindrical, hook 40 in number, neck absent, testes 200 – 210 in number and ovary oval; *C. paithenensis* (Shah, 2010) hooks 58 in number, testes 70 – 80 in number, oval and vitellaria follicular; *C. thapari* (Menkudale *et al.*, 2010) the mature proglottids medium in size, broader than long, testes 95 in number, vitellaria follicular and ovary is medium, lobed; *C. jadhavae* (Pardeshi *et al.*, 2011) having scolex is dome shape, Hooks 35-45 in number, Testes are oval to rounded 95-105 in number and vitellaria follicular in two rows; *C. clariasi* (Kadam *et al.*, 2011) having testes 254 in number, uterus 'T' shaped and vitellaria follicular in 2 - 3 rows. Some additional and differentiating characters are given in the comparative chart at the end. In view of the above differences justify the recognition of the present tapeworm, as a new species and hence the name *Circumoncobothrium chavani* proposed in honour of author's research guide Dr. R. J. Chavan.

### Taxonomic summary

Genus	<i>Circumoncobothrium</i> (Shinde, 1968)
Type Species	<i>Circumoncobothrium chavani</i> Sp. Nov.
Host	<i>Mastacembelus armatus</i> . (Lacepede, 1800)
Habitat	Intestine
Locality	Ch. Sabhajinagar, Dharashiva, Nanded, Beed (M.S.)
Accession Number	HRL/2008-10/1-5
Holotype	Deposited in the Helminthology Research Lab.,
Paratype	Dept. of Zoology, Dr. B.A.M.U. Aurangabad, (M.S.) India
Date of collection	Oct. 2008 – Sept. 2010.
Etymology	Named in honour of authors research guide



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