

# Taxonomic evaluation of a new piscean trematode from freshwater fish *Mastacembelus armatus* of Maharashtra State, India

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## Abstract

The present investigation deals with the taxonomic evaluation of new species of the Piscean trematode of the genus *Isoparorchis* from freshwater fish *Mastacembelus armatus* of Maharashtra state provided new data on their morphology. The new species *Isoparorchis maharashtrensis* Sp. Nov. is comes closer to all the known species of the genus *Isoparorchis* in general topography of organ but differs due to shape of the body and morphology of internal organs.

**Keywords:** Piscean trematode, *Mastacembelus armatus*, Maharashtra state.

## INTRODUCTION

Southwell in 1913 erected the genus *Isoparorchis* with *I. hypselobergi* [1,5] as its type species. Later the following were species added *I. hypselobergi* (syn. *Distomum hypselobergi*) [1] (Syn: *I. Pakistani* [2]); *I. trisimilitubis* [8] syn (*Letpolecithum eurytremum* [7]) *I. tandani* [6]. *Isoparorchis hypselobergi* has been reported from Wallago attu, Tandanus tandanus; Parasilurus asotus; Prleobagrus, Pseudobagrus from Australia, Indonesia, China, Siberia and Japan [10].

## MATERIAL AND METHODS

For the taxonomical study of trematode, the fishes were collected from different places during the period of Oct. 2008 – Sept. 2010 of Maharashtra state. The hosts are easily identified by Day [4]. 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 [9]. All measurements are in millimeters, unless otherwise indicated. The identification is made with the help of "Systema Helminthum" by Yamaguti [10].

## DESCRIPTION

Description is based on thirty four specimen of this species. The present specimen is a very large, broad, dorso ventrally flattened, foliate, oval to oblong, without scaled or spines, skin

smooth, reddish in colour, it measures entire length 13.45 (13.14 – 13.77) and 5.936 (5.905 – 5.968) in width. The body is more or less transparent, without staining some organs clearly shows, darkly coloured uterus, black colour intestinal caeca very plainly, while rounded whitish testes are also shoeing very obvious, as well as ventral sucker is clearly observe. The anterior end is narrow, somewhat pointed, round and posterior is broader. There is little variation in width of parasite from the region of testes to that of ovary, through compressed specimen may show a considerable widening in the middle of third.

The oral sucker is oval to round, sub terminal it measures 0.876 (0.855 – 0.897) in length and 0.918 (0.897 - 0.939) in width. Pre pharynx is absent. Pharynx oval, elongated transversely, slightly elliptical, smaller than oral sucker, muscular continuous with oral sucker, it measures 0.479 (0.459 – 0.5) in length and 0.459(0.438 – 0.479) in width. Oesophagus is not visible. The later soon two branches elongated, bifurcate intestinal caeca, which are thrown into fairly regularly series of curves, the limbs approach to the ventral sucker, followed a wide loop partly investing testes, later on these are overlap to the ovary, uterus. The ends of caeca approach very closely to the excretory vesicle at the posterior extremity of the worm, it measures starts from anterior to posterior end of intestinal caeca 20.76 (20.45 – 21.07) in length and 0.093 (0.083 – 0.104) in width. The ventral sucker is slightly large as comparative oral sucker, situated ¼ of the body length from anterior end and almost below the cirrus pouch; it measures 1.262 (1.231 – 1.293) in length and 1.241 (1.231 – 1.252) in width.

Testes are two in number, pre ovarian, slightly elliptical, rounded, slightly elliptical in anterior hind body, they also lie either side if the ventral sucker, they are closely invested by intestinal loops, right testis measures 0.709 (0.688 – 0.730) in length and 0.688 (0.667 – 0.709) in width and left testis measures 0.698 (0.667 – 0.730) in length and 0.584 (0.563 – 0.605), distance between two testes 2.003 in length. Cirrus pouch is well developed, elongated, spoon like, obliquely placed above the ventral sucker and just below the pharynx, it measures 0.427 (0.417 – 0.438) in length and 0.323 (0.314 – 0.33) in width. Seminal vesicle small, thin-walled, tubular, winds in forebody. Pars prostatica tubular. Ejaculatory duct within sinus-sac. Cirrus thick tube presents within the cirrus pouch it measures 0.218 (0.208 – 0.229 in length and 0.323 (0.314 – 0.333)

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in width. Vas deferens long, curved start from cirrus, runs posteriorly it measures 4.194 (4.173 – 4.215) in length and 0.020 in width. The genital pore lies mid ventral line in forebody, preacetabular, it measures 0.041 in diameter. Vas efferentia arise from the inner anterior margin and pass just in front of the ventral sucker, very narrow tube which soon join to form a swollen vesicular seminal. The latter is thrown into a number of close coils and then becomes a very delicate, rather long, ejaculatory duct which travel in a sinuous, above the uterine coils and then diverse somewhat from the latter to enter the muscular genital sac. It terminates besides the uterine pore at the bottom of ductus hermaphroditicus.

The ovary is long tubular organ, transversely placed, horizontally 'U' shaped, intercaecal, winding near the posterior extremity; it is situated on near the posterior margin of the left side specimen it measures 2.045 (2.024 – 2.066) in length and 0.114 (0.041 – 0.187) in width. The later soon receive the vitelline duct and becomes sharply bent back on itself as the ootype, which is very narrow.

Uterus is extensive occupying most of the preacetabular region of the body very long, narrow, loop series of coils, wide curves passing across the worm between and slightly beyond the intestinal caeca dorsally to them, each curve being thrown into a series of smaller undulation, it measures 52.69 (45.28 – 60.10) length and 0.051 (0.041 - 0.062) in width.

Vitellaria are greatly branched, near the posterior extremity, median, slightly right side of the figure position irregularly broken network, occupy the uterus, intestinal caeca, glands markedly dendritic, each consisting of four main branches which sub divide into two to four branches and terminate in a great number of short processes.

The main excretory canals is long and sinuous, extending from the rather large excretory vesicle to a point near the middle of the length of the parasite, where it bifurcates, each limb passing forward in a series of curves near the intestinal loops. Excretory vesicle Y shaped, slightly tubular measures 1.147 (1.106 – 1.189) in length and 0.396 (0.354 – 0.438) in width.

## DISCUSSION

The genus *Isoparorchis* was established by Southwell in 1913 as a type species *I. trisimilitubis* from *Wallago attu*. The present tapeworm comes closer to all the known species of the genus *Isoparorchis* Southwell, 1913 in general topography of organs. But

differs due to some characters from following species.

The present worm differs from *I. hypselobergi* [1] having pharynx (oval Vs small), testes (globular Vs oval), cirrus pouch (elongated Vs curved) and vitellaria (branched, rounded at the extremity Vs tubular). The present worm differs from *I. trisimilitubis* [8] having pharynx (oval Vs small), intestinal caeca (bifurcate Vs sinuous), testes (globular Vs oval) and ventral sucker (elliptical Vs medium). The present worm differs from *I. tandani* [6] having pharynx (oval Vs muscular), intestinal caeca (bifurcate, posterior extremity Vs fairly regular series of curves), ventral sucker (elliptical Vs prominent) and excretory bladder ('Y' shaped tubular Vs long and sinuous).

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 worm, as a new species and named *Isoparorchis maharashtrensis* Sp. Nov. first time recorded from Maharashtra state.

## TAXONOMIC SUMMARY

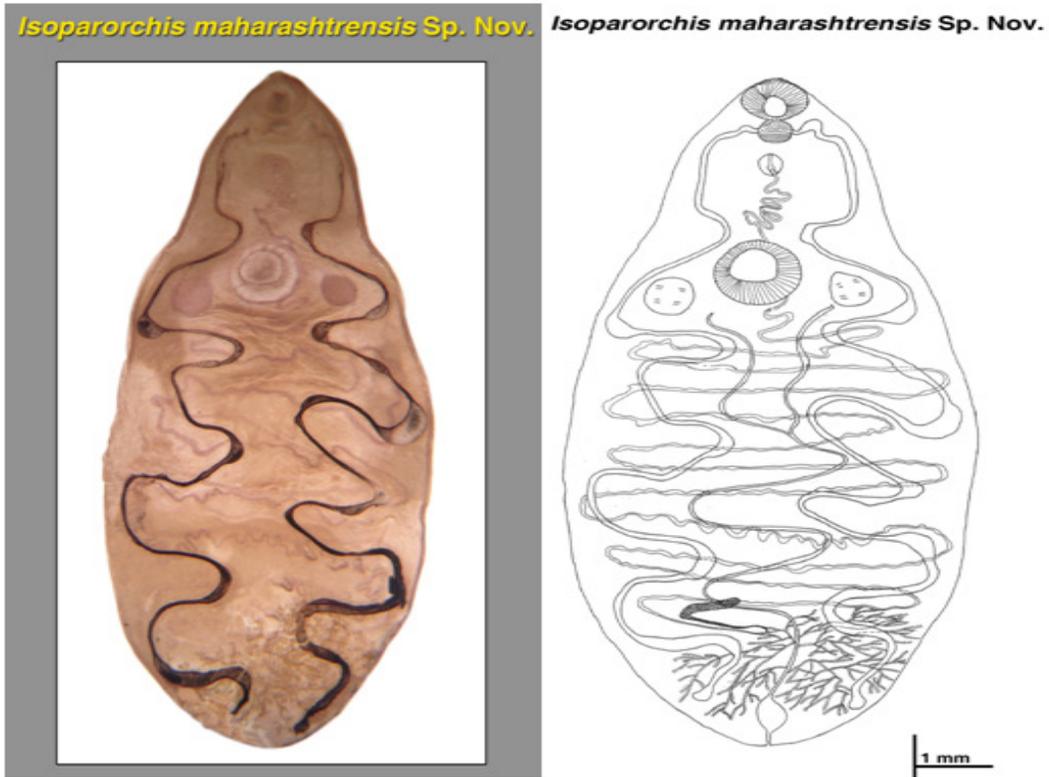
Genus	<i>Isoparorchis</i> [8]
Type Species	<i>Isoparorchis maharashtrensis</i> Sp. Nov.
Host	<i>Mastacembelus armatus</i> .
Habitat	Liver
Locality	Kolhapur, Solapur, Parbhani, Nanded, Osmanabad, Aurangabad.
Accession Number	HRL/2008-10/1-5
Holotype and Paratype	Deposited in the Helminthology Research Lab., Dept. of Zoology, Dr.B.A.M.U.Aurangabad, (M.S.) India.
Date of collection	Oct. 2008 – Sept. 2010.
Etymology	Named after Maharashtra state.

## Diagnostic key to the species of the genus *Isoparorchis* (Southwell, 1913)

Pharynx muscular	<i>I. tandani</i> [6]
Pharynx oval	<i>I. maharashtrensis</i> Sp. Nov.
Pharynx small	1
Intestinal caeca bifurcate	<i>I. hypselobergi</i> [1]
Sinuous	<i>I. trisimibulis</i> [8]

Comparative chart showing an account of old and new species of the genus *Isoparorchis* [8]

Characters	Species			
	<i>I. hypselobergi</i> [1]	<i>I. trisimilitubis</i> [8]	<i>I. tandani</i> [6]	<i>I. maharashtrensis</i> Sp. Nov.
Country	Japan	India	Australia	India
Host	<i>Wallago attu</i>	<i>Wallago attu</i>	<i>Wallago attu</i>	<i>Mastacembelus armatus</i>
Oral sucker	Sub terminal	Sub terminal	Sub terminal	Oval to round, Sub terminal
Pharynx	Small	Small	Muscular	Oval
Esophagus	short	Short	Extremely short	Short
Intestinal caeca	Bifurcate	Sinuous	Long, Fairley regular series of curves	Bifurcate, posterior extremity
Ventral sucker	Intercaecal in anterior half of the body	Intercaecal, medium	Prominent, one fifth of the body	Elliptical
Testes	Oval	Oval, preovarian	Rounded	Globular, unequal
Cirrus Pouch	Curved	Weakly developed	Apparently homologous	Elongated
Ovary	Tubular	Tubular	Long, tubular	Tubular, slightly oval at the end
Uterus	Extensive occupy	Preovarian, coiled	Long, narrow, coiled	Loop series of coils,
Vitellaria	Tubular, winding near the posterior extremity	Tubular with dendritic branches	Dendritic	Branched, rounded at the extremity
Laurer canal	Present	Present	Short, rounded	Not visible
Excretory Bladder	Y shaped	Y shaped	Long and sinuous	Y shaped, Tubular



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