

## REDESCRIPTION OF THE CESTODE *Senga parva* (FERNANDO AND FERTADO, 1964) IN *Channa micropeltes* (CUVIER, 1831) AT TASIK KENYIR, MALAYSIA

TRAN THI YEN NHI<sup>1</sup> AND FAIZAH SHAHAROM-HARRISON<sup>2</sup>

Institute of Tropical Aquaculture, Universiti Malaysia Terengganu, 21030 Kuala Terengganu, Malaysia

Tel: 609-6683835, Fax: 609-6683390, E-mail address: <sup>1</sup>kimhue12588@yahoo.com.vn, <sup>2</sup>faizah@umt.edu.my

**ABSTRACT.** A total of thirty snakehead fishes *Channa micropeltes* (Cuvier, 1831) were collected at Tasik Kenyir, Malaysia. Muscle, liver, intestine and kidney tissues were removed from each fish and the intestine was opened to reveal cestodes. The cestodes were identified on the basis of their morphological characteristics. After staining, drawing by using Camera Lucida, measurement by using advanced microscope and using Scanning Electron Microscope (SEM), the results showed that the cestode was *Senga parva* (Fernando and Fertado, 1964). It differed from other species of genus *Senga*, parasitising fish genus *Channa*, by the size of the strobila, scolex, apical disc, hooks, number of hooks, testes and some other characteristics.

**Keywords:** cestodes, tapeworms, *Senga parva*, *Channa micropeltes*, Tasik Kenyir

### INTRODUCTION

The genus *Senga* was established by Dollfus (1934) with its type species *S. bensardi* from *Betta splendens*, the Siamese fighting fish, in an aquarium at Vincennes, France. After that, many

researchers found and described some new *Senga* species. It indicated that genus *Senga* was very abundant and diversified. Fernando and Furtado (1964) recorded *Senga malayana* from *Channa striatus*, *S. parva* and *S. filiformis* from *Channa micropeltes* at Malacca. Besides, Furtado and Chaulan (1971) reported *S. pahangensis* from *Channa micropeltes* at Tesak Bera. Deshmukh and Shinde (1980) described new species *S. khami* from freshwater fish *Ophiocephalus marulius* from Kham river at Aurangabad, India. Later, Jadhav and Shinde (1980) described a new species *S. godavari* from *Mastacembelus armatus*, at Nanded, India. Then they added the species *S. aurangabadensis* from *M. armatus* at Aurangabad, India.

Kadam *et al.* (1981) described a new species *S. paithanensis* from intestine of *M. armatus*. Later, Majid and Shinde (1984) added *S. raoii* and *S. jagannathe* from host *Channa punctatus*. Two new species were described by Jadhav *et al.*, (1991) as *S. maharashtrii* and *S. gachuae* from the intestine of *M. armatus*. Cestode *S. chauhani* also was reported by Monzee (1992) from fish host *Channa punctatus* from Jamshedpur. Then, species

*S. mohekare* from the host *M. armatus* was reported at Parli, India (Tat and Jadhav, 1997). One more species, *S. armatusae* from *M. armatus* at Pune, India, was found by Hiware (1999). Patil and Jadhav (2003) described new species *S. tappi* from *M. armatus* at Shirpur, Dhule. Later, in the review article by Jadhav *et al.* (2005), the genus *Senga* from freshwater fish in India was mentioned. Pande *et al.* (2006) described two species *S. ayodhensis* from *Amphinuous cuchia* and *S. baught* from *Rita-rita*. Bhure *et al.* (2007) reported species *S. jadhavae* from *M. armatus*. Later, Nilima (2008) described species *S. nathsagarensis* from the freshwater fish *M. armatus*. Recently, Pardeshi and Hiware (2011) also found a new Pseudophyllidean *S. rupchandensis* from *Channa striatus* at Jalna, India.

Until recently, there have not been many studies about cestodes in *Channa micropeltes* (Cuvier, 1831) at Tasik Kenyir, Malaysia. The aim of this study was to identify the cestodes in this fish host and to add to information on cestode in Malaysia.

## MATERIALS AND METHODS

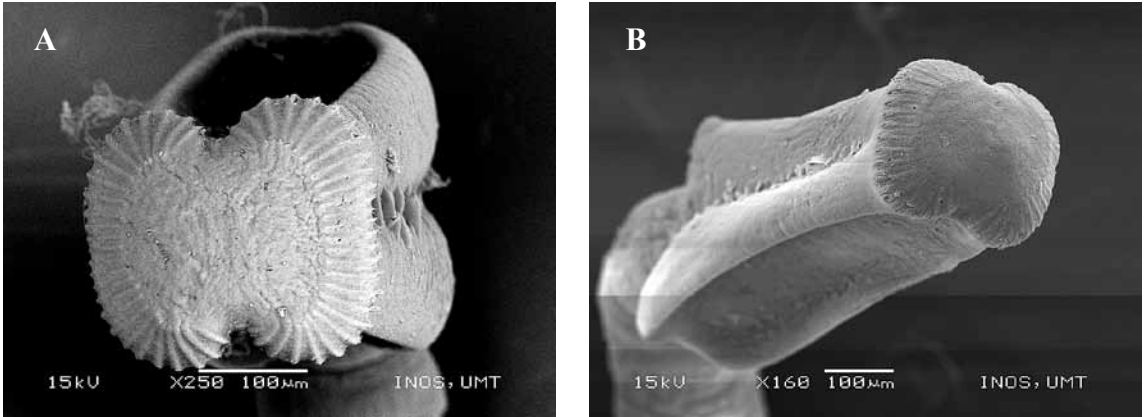
Fish were collected at Tasik Kenyir. Upon capture, the fish were killed by pithing on the head before measurement of the total length, standard length and weight. The intestine was removed from each fish and placed in a plastic Petri dish with saline solution. The intestine was cut open to reveal the cestodes.

Cestodes were removed from the intestine, washed in distilled water and fixed in 70% alcohol. Then, they were stained with acetic carmine, destained in 1% acid alcohol, dehydrated through a series of ascending alcohol of 75%, 80%, 85%, 90%, 95% and absolute alcohol, cleaned in clove oil before mounting in Canada Balsam. Drawings were made by using Camera Lucida and all the measurements are taken in millimetres by using advanced microscope. Cestodes were also scanned under scanning electron microscope (SEM).

## RESULTS

The worms are considered small, long and creamish in colour. They measured 9.6–15.7 mm in length and 0.34–1.08 mm in breadth. The scolex is cylindrical or pear-shaped and measured 0.74–1.11 mm in length and 0.17–0.26 mm in breadth. The scolex bore two shallow bothria, which is typical of the genus *Senga*, overlapping one another (Figures 1 and 2). The bothrium was a flat or elongated sac-like structure. It measured 0.54–0.8 mm in length and 0.077–0.095 mm in breadth.

Scolex is rectangular with an armed apical disc whose margins carry a row of hooks, divided in two rows of semicircular hooks. The disc measures 0.065–0.151 mm between the notches and 0.10–0.23 mm along the lateral axis. The two notches which markedly define the apical disc into two lobules were situated on the mid-dorsal and mid-ventral sides of the disc.



**Figure 1.** Scolex with apical hooks (A and B) under scanning electron microscope (SEM)

There were 38–44 large and 4 rudimentary hooks which were of different sizes and forms. The large hooks increased in size away from the notches, and attained maximum length at the third or fourth hook from the notch. They measured 0.06–0.088 mm in maximum length. From their maximum lengths, the large hooks gradually decreased in size towards the centre of the lateral depressions. The hooks had a maximum diameter of 0.03–0.052 mm, and were of variable shapes. The rudimentary hooks were narrow at the base, swollen distally and pointed at the apex. They measured 0.03–0.05 mm in maximum length. Neck was absent.

Strobila was long, 8.86–14.6 mm, with secondary segmentation. The proglottids varied in number from 74 to 120. The mature and gravid proglottids were indistinct. They varied in shape from the usual rectangular (broader than long) to almost square in the terminal portion. The proglottids varied considerably in size.

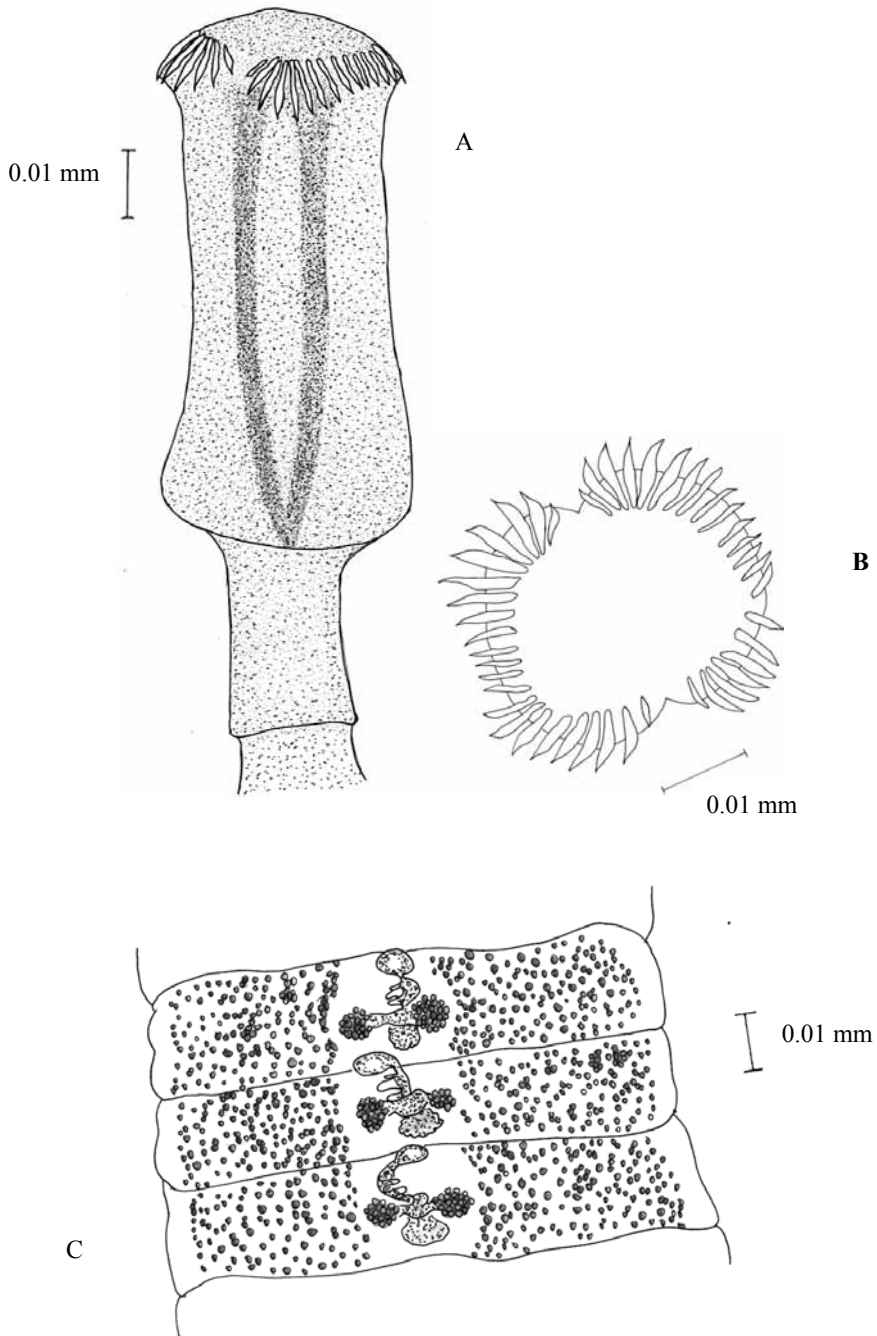
They measured 0.13–0.22 mm in length and 0.39–0.48 mm in breadth.

Cirrus pouch were sac-like oval in shape. Genital pore were rounded in shape. The testes were oval-to-round in shape, small in size, 150–200 in numbers, scattered all over the segment and measured 0.018–0.03 mm in diameter. Ootype were small, oval in shape, compact and measured 0.08–0.27 mm in diameter. The ovary of each was ‘V’ shaped, median and posterior. Ovary was globular and separated from the ootype. Eggs were oval, thin-shelled, non-operculate and measured 0.009–0.025 mm in diameter.

In conclusion, from all of the characteristics above, the cestode in this study were close to *Senga parva* (Furnando and Furtado, 1964).

## DISCUSSION

In *Channa micropeltes*, parasite in the present study differed from the species *S.*



**Figure 2.** Illustration of scolex (A), apical disc (B) and mature segments (C) by using Camera Lucida

*malayana* (Fernando and Fertado, 1964) in Malacca which had scolex (tubular, cylindrical or circular), hooks (42–55 or 60) in number, vitellaria (follicular or lobate). Another species, *S. filiformis* (Fernando and Fertado, 1964) had rectangular scolex, hooks (55–56) in number, testes (350–370 or 120–150) in number. The cestode in this study is also different when compared to the species *S. pahanensis* (Furtado and Chaulan, 1971) from *C. micropeltis* in Tasek, Bera which had scolex (tubular, cylindrical or triangular), neck absent or present, testes testicular (not lobed or lobed) and vitellaria (follicular or lobulated).

*S. bensardi* (Dollfus, 1934) from *Betta splendens* in France had scolex tubular or cylinder-to-triangular, 50 hooks, testes (350–370 to 160–175 in number), vitellaria (follicular or granular). Compared to cestodes from other fish species, cestodes in this study differed from the species *S. aurangabadensis* (Jadhav *et al.*, 1980) from *M. armatus* in India which had scolex tubular, cylindrical or oval, hooks (50–52 in number), testes (350–370 or 240–260 in number). The species *S. godavarii* in the same study had scolex (tubular, cylindrical or pear shaped), hooks (42–55 in number), testes (350–370 or 230 in number) and vitellaria follicular with 3–4 rows. The species *S. paithanensis* (Kadam *et al.*, 1981) from *M. armatus* in India, which had scolex (tubular, cylindrical or triangular), hooks (54 in number), neck (absent or present) and testes (350–370 or 130–135 in number). On the other hand, *S. gachuae* (Jadhav *et al.*, 1991) from the host

*Channa gachua* in India which had scolex (tubular, cylindrical or pear-shaped), hooks (42–55 or 22–25 in number), testes (350–370 or 60–70 in number). *S. maharashtrii* from *M. armatus* in the same study had scolex (tubular, cylindrical or oval), testes (350–370 or 80–90 in number) and tellaria follicular with single or 4–5 rows. In addition, it differed from the species *S. chauhani* (Monzee, 1992) from *Channa punctatus* in India which had scolex (tubular, cylindrical or oval), hooks (42–55 or 40–44 in number), neck (absent or present); testes (350–370 or 200–210 in number) and vitellaria follicular with 4–5 rows.

The species *S. armatusae* (Hiware, 1999) from *M. armatus* in India which in the presence of hooks (42–55 or 32–40 in number), had mature proglottids four times broader than long, testes scattered, (350–370 or 230–240 in number) and vitellaria two rows. *S. tappi* (Patil *et al.*, 2003) from *M. armatus* in India had scolex (tubular, cylindrical or triangular), testes (350–370 or 285–295) in number. The species *S. ayodhensis* (Pande *et al.*, 2006) from *Amphinuus cuchia* in India had scolex (tubular, cylindrical or conical), hooks (42–55 or 29) in number, testes numerous. *S. baught* in the same study from Ritarita in India had scolex (tubular, cylindrical or pear shaped), hooks (42–55 or 28) in number, neck (absent or present), and testes (350–370 or 40–50) in number. *S. jadhavae* (Bhure *et al.*, 2007) from *M. armatus* had scolex (tubular, cylindrical or triangular), hooks 50–54 in number, and testes oval

**Table 1.** Comparative chart showing the account of different species of *Senga Dollifus* (1934)

Species/Characters	Scolex	Hooks	Neck	Mature segment	Testes	Cirrus pouch	Ovary	Vagina	Vitellaria
<i>S. parva</i> in this study	Cylindrical or pear shaped	42-48	Absent	Wider than long	150-200	Oval	Globular	Short tube	Granular
<i>S. parva</i> (Fernando and Fertado, 1964)	Pear shaped	42-44	Absent	Broader than long	150-180	Oval	Globular	Short tube	Granular
<i>S. pahanensis</i> (Furtado et al.,1971)	Triangular	52	Present	Broader than long	Testicular lobed situated laterally in the medulla	Oval	Bilobed	Short tube	Lobulated
<i>S. bensadi</i> (Dollfus, 1934)	Triangular	50 in numbers	Absent	Wider than long	160-175 in numbers	Oval	Compact, not bilobed	Posterior to cirrus pouch	Granular
<i>S. malayana</i> (Fernando and Fertado, 1964)	Rectangular	56	Absent	Broader than long	120-150	Oval	Bilobed	Short tube	Lobate, discontinuou in two groups
<i>S. aurangabadnensis</i> (Jadhav et al., 1980)	Oval	50-52	Absent	Two times broader than long	240-260	Medullary.	Post equatorial, bilobed	Short tube	Follicular, cortical
<i>S. paithanensis</i> (Kadam et al., 1981)	Triangular prominent large	54	Present	Broader than long	130-155	Oval and curved, anterior to isthmus	Bilobed, with long, blunt acini	Thin tube	Follicular 2,3 rows
<i>S. chauhani</i> (Monzee, 1992)	Oval, large	40-44	Short	Broader than long	Oval, 200-210 in numbers	Oval	Bilobed	Thin tube	Follicular 4,5 rows

<i>S. nathsagarensis</i> (Niiima, 2008)	Long or elongated	30-32	Long	Longer than broader	200-250	Oval	Bilobed, dumbbell shaped	Thin tube	Follicular with 2-3 rows.
<i>S. rupchandensis</i> (Pardeshi et al., 2011)	Tubular, cylindrical	42-55, 2 semi-circular	Absent	Broader than long	350-370, oval, rounded in shape	Oval	Bilobed	Short tube	Follicular, oval with single rows
<i>S. ayodhenensis</i> (Pande et al., 2006)	Conical	29	Absent	Broader than long	Numerous rounded in shape	Central	Post equatorial, bilobed	Thin tube, coiled	Small, follicular
<i>S. baught</i> (Pande et al., 2006)	Pear shape	28	Present	Broader than long	40-50	Oval	Compact, oval unilobed	Thin tube, coiled	Follicular
<i>S. khami</i> (Deshmukh et al., 1980)	Rectangular	55-57	Present	Broader than long	155	Elongated	Bilobed	Short tube	Follicular
<i>S. jadhavae</i> (Bhure et al., 2007)	Triangular	50-54	Absent	2 times broader than long	240-260	Oval	Compact, oval, large, unilobed	Thin tube	Follicular
<i>S. armatusae</i> (Hiware, 1999)	Triangular	32-40	Absent	4 times broader than long	Small, rounded in shape, 230-240 in numbers	Oval	Post equatorial, bilobed	Thin tube	Follicular, double rows

**Table 2.** Comparison of measurements of species within the genus *Senga* Dollfus, 1934

	<i>S. parva</i> in this study	<i>S. parva</i> (Fernando and Fertado, 1964)	<i>S. filiformis</i> (Fernando and Fertado, 1964)	<i>S. malayana</i> (Fernando and Fertado, 1964)
<b>Whole specimens</b> L x B	9.6-15.7 x 0.34-1.08	5.17 x 0.362-0.832	15-16 x 0.192	9.7-73.8 x 0.7-3.1
<b>Scolex</b> L x B	0.74-1.11 x 0.17-0.26	0.46-0.53	0.64-0.3	0.68-1.8 x 0.24-0.35
<b>Apical disc</b> DV:L x Lat:L	0.065-0.151 x 0.10-0.23	0.1-0.12 x 0.12-0.3	0.15 x 0.2	0.15 x 0.23-0.32
<b>Hooks</b>				
Number (large + rudimentary)	38-44 + 4	38-40 + 4	51-52 + 4	56 + 4
L (large)	0.06-0.088	0.03-0.075	0.048-0.064	0.045-0.06
L (rudimentary)	0.03-0.05	0.015	0.03-0.032	0.018-0.024
Diameter	0.03-0.052	0.01-0.015	0.005-0.015	0.006-0.009
<b>Bothrium</b> (L x B)	0.54-0.82 x 0.077-0.095	0.462-0.465 x 0.15 (3:4 to > 1)	0.48 x ? (3:4)	0.49-0.91 x 0.2-0.225 (3:4)
<b>Segmentation</b>	Distinct and indistinct	Distinct and indistinct	Distinct	Distinct and indistinct
<b>Shape</b> (L:B)	B>L to L=B	B>L to L=B	B>L to B=L to L>B	B=L to B>L
<b>Number of Proglottids</b>	74-120	80-100	>70	100-500
<b>L x B</b>	0.13-0.22 x 0.39-0.48	0.03-0.075 x 0.09-0.4	-	-
<b>Vitellaria</b>				
Cells	Separate	Separate	Separate	Lobulate
Diameter	0.08-0.27	?	0.005	0.06
Spread	continuous	continuous	continuous	Discontinuous, in 2 groups
<b>Testes</b> (diameter)	0.018-0.03	-	0.016	0.045
<b>Eggs</b> (L x B)	0.009-0.025	-	-	0.03-0.045 x 0.021-0.024

All measurements are in millimetres. B: breadth, L: length, DV: dorsal-ventral, Lat: lateral



(350–370 or 120–150) in number. *S. nathsagarensis* (Nilima, 2008) from host *M. armatus* which had hooks (42–55 or 30–32) in number, testes (350–370 or 200–250) in number and vitellaria follicular in single or 2–3 rows. Hence, the cestodes in this study differed from all these species (Table 1 and Table 2).

## CONCLUSION

Cestode *Senga parva* from *Channa micropeltes* at Tasik Kenyir was described. It differed from others species of genus *Senga*, parasitising fish genus *Channa*, by the size of strobila, scolex, apical disc, hooks, number of hooks, number of testes and some other characteristics.

## REFERENCES

- Bhure D.B., Padwal N.D. and Jadhav B.V. (2007). A new tapeworm, *Senga jadhavae* n.sp. (Cestoda: Pseudophyllidae) from *Mastacembelus armatus*, Aurangabad (M.S.) India. *Proc. Zool. Soc. of India*. Vol. 6, No.2: 45-52.
- Deshmukh R.A. and Shinde G.B. (1980). On *Senga khami* (Cestoda: Ptychobothriidae) from the freshwater fish. *Indian Jour. of Zoology* 8: 1-2.
- Dollfus R.P.H. (1934). Sur un cestode Pseudophyllidae parasite de poisson d'ornement. *Boll. Soc. Zool. France*. 59:476-490.
- Fernando C.H. and Furtado J.I. (1964). Helminth parasites of some Malayan freshwater fishes. *Bulletin of the National Museum, State of Singapore*, 32:45-71.
- Furtado J.E. and Chauhan L. (1971). Two new helminth species from the fish, *Channa micropeltes*, Cuvier (Ophicephalae) of Malaysia. *Folia Parasit, Praba* 18(4): 365.
- Hiware C.J. (1999). On a new tapeworm *Senga armatusae* n.v. sp. from freshwater fish, *Mastacembelus armatus* at Pune (M.S.). *Rivista Di Parasit. XVI (LX)*, 1: 9-12.
- Jadhav B.V. and Shinde G.B. (1980). On a new species, *Senga aurangabadensis* from *Mastacembelus armatus*. *Biosearch* (4): 25-27.
- Jadhav B.V., Bhure D.B. and Padwal Nitin (2005). A survey of cestode parasites of freshwater fishes from Pune and Ahmednagar District (M.S.) India. *Proc. Recent Trends in Parasitology 30th* pp. 48-51.
- Jadhav B.V., Ghavane A.B. and Jadhav A.P. (1991). Two new Pseudophyllidean cestode from *Mastacembelus armatus* at Daryapur (M.S.) India. *Rivista Di Parasit. VIII(1)*: 19-22.
- Kadam S.S., Jadhav B.V. and Shinde G.B. (1981). On a new cestode *Senga paithanensis* n.sp. (Cestoda: Ptychobothriidae) from *Mastacembelus armatus*. *Biosearch*, 5(1): 95-96.
- Majid M.A. and Shinde G.B. (1984). Two new species of the genus *Senga* Dollfus, 1934 (Cestoda: Pseudophyllidae) from freshwater fishes at Jagannathpuri, Orrisa. *Indian Journal of Parasitol.* 1:169-172.
- Monzee H. (1992). On a new cestode *Senga chauhani* n.sp. from fish host, *Channa punctatus* from Jamshepur. *National Journal of Helminthology. XXXIV(1)*: 123-127.
- Nilima M. (2008). A new species of the genus *Senga nathsagarensis* from freshwater fish, *Mastacembelus armatus*. *National Journal of Life Sciences*, 5(3): 81-84.
- Pande P.N., Mamta T. and Neetu M. (2006). On two new species of genus *Senga* Dollfus, 1934 (family: Ptychobothriidae Luhe, 1902) from the intestine of freshwater fishes. *Indian Journal of Helminthology. Vol. 24*.
- Pardeshi P. R. and C.J. Hiware (2011). A new Pseudophyllidean *Senga rupchandensis* n.sp. from *Channa striatus*. (Bloch, 1793) at Jalna District (M.S.), India. *Recent Research in Science and Technology 2011*, 3(12): 17-22.
- Patil, D.N. and Jadhav, B.V. (2003). On a new species the genus *Senga* Dollfus, 1934 (Cestoda: Ptychobothriidae Luhe, 1902) as *Senga tappi* n.sp. from *M. armatus* from the Shripur dist. Dhule (M.S.). *J. Com. Tox. Phy.* 1: 68-72.
- Tat M.B. and Jadhav B.V. (1997). *Senga mohekare* n.sp. (cestoda: Ptychobothriidae) from *Mastacembelus armatus* at Pune (M.S.). *Riv. Di Parasit. XVII (LVIII)*, 2: 203-296.

**ACKNOWLEDGEMENTS.** Authors are thankful to the staff and laboratory of Institute of Tropical Aquaculture (AKUATROP), Universiti Malaysia Terengganu (UMT), Malaysia for their assistance in sampling and laboratory studies.

