Volume-4, Issue-8, August-2015 • ISSN No 2277 - 8160

Research Paper Zoology

On A New Species of the Genus *Senga*, Dollfus, 1934 (Cestoda: Ptychobothridae) From Fresh Water Fish *Mastacembelus armatus* (Lecepede, 1800) at Aurangabad District (M.S.), India.

Ashok Mote	Sant Ramdas Arts, Science and Commerce College, Ghansawangi, Dist-Jalna.
Sushil Jawale	Sant Dnyaneshwar Mahavidyalaya Soegaon
Sunita Borde	Department of Zoology, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad-431004
Rahul Khawal	Department of Zoology, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad-431004

ABSTRACT *The present communication deal with the description of a new species of genus Senga shindei Sp. Nov. These Cestodes collected from the intestine of a fresh water fish Mastacembelus armatus (Lecepede, 1800) from Godavari river at Paithan, District- Aurangabad. The present worm differs from the known species of genus Senga in the shape and size of the Scolex, number and arrangement of hooks, shape of mature segment, numbers of testes, position of cirrus pouch and arrangement of vitellaria.*

KEYWORDS : Aurangabad, *Mastacembelus armatus, Senga shindei.*

INTROIIDUCTION

The genus *Senga* was established by Dollfus, 1934 with its type species *S. besnardi* from *Betta splendens* at Vinecunes, France. *S. ophiocephalina* Tseng, 1933 as *Anchistrocephalus ophiocephalina* from *Ophiocephalus argus* at Taimen, China and identified with a form previously recorded by Southwell, 1913 as *Anchitrocephalus polyptera* (*Anchitrocephalus*) Monticelli, 1890 - Syn. *Anchistrocephalus* Luhe, 1899 from *Ophiocephalus striatus* in Bengal, India *S. pcynomera* Woodland, 1924 as *Bothriocephalus pcynomera* from *Ophiocephalus marulius* at Allahabad, India. *S. lucknowensis*. Johri, 1956 from *Mastacembelus armatus* in India. Fernando and Furtado, 1963 recorded *S. malayana* from *Channa striata*, *S. parva* and *S. filiformis* from *Channa micropeltes* at Malacca. Ramadevi and Hanumanha Rao, 1966 reported the plerocercoid of *Senga* sp. from *Panchax panchax*. Tadros, 1968 synomised the genus *Senga* with the genus *Polyonchobothrium* and proposed new combinations for the species. Furtado and Chauhan, 1971 reported *S. pahangensis* from *Channa micropeltes* at Tesak Bera. Shinde, 1972 redescribed *S. besnardi* from *Ophiocephalus gachua* in India. Ramadevi and Rao, 1973 reported another species of *S. visakhapatanamensis* India. Ramadevi (1976) described the life cycle of *S. visakhapatnamensis* from *Ophiocephalus punctatus* in a lake at Kondakaria, Andhra Pradesh, India. But they do not agree with Tadors statements. Wardle, McLeod and Radinovsky, 1974 put *Senga* as a distinct genus in the family Ptychobothridae. Deshmukh, 1980 reported *S. khami* from *Ophicephalus marulius*, a

fresh water fish from Kham river at Aurangabad. Jadhav and Shinde, 1980 reported *S. godavari* from *M. armatus* at Nanded, M.S. India. One more species *S. aurangabadensis* was added by Jadhav and Shinde, 1980 from *M. armatus* at Aurangabad M.S. India. A new addition made by Kadam et.al., 1981 as *S. paithaensis* from host *M. armatus*. Majid et. al., 1984 added *S. raoi* and *S. jagannathae* from *Channa punctatus*. Two more new species erected by Jadhav et. al., 1991 as *S. maharashtrii* and *S.gachuae* from the intestine of *M. armatus*. Monzer Hasnain, 1992 added *S. chauhani* from *Channa punctatus*. Tat and Jadhav, 1997 added *S. mohekarae* from the intestine of the *M. armatus*, at Parli, Dist. Beed, M.S. India. Patil and Jadhav added *Senga tappi* from *M. armatus* in 2003. Jadhav, 2005 made the review article of the genus *Senga* from freshwater fishes from Maharashtra state, India. Pande et. al, 2006 added two new species i.e. *S. ayodhensis* from *Amphinuous cuchia* and *S. baghui* from *Rita rita*. Bhure et.al. 2010 added one new species *S.madhavii*. Lastly Fartade et.al.

MATERIAL AND METHODS

Cestode parasites were collected from the intestine of fresh water fish *Mastacembelus armatus* at. Paithan, District- Aurangabad (M.S.) India. These Cestodes preserved in hot 4% formalin and stained with Aceto-caramine or Harris haematoxylin, passed through various alcoholic grades, cleared in xyline, mounted in D.P.X. and drawings are made with the aid of camera lucida. All measurements are given in millimeters, otherwise mentioned. The identification is made with the help of Systema Helminthum.

DESCRIPTION

Eight mature specimens were collected from the intestine of a fresh water fish *Mastacembelus armatus* (Lecepede, 1800) from Godavari river at Paithan Tq. Paithan, Dist. Aurangabad.

The worms were considerably long, thin, milky white in colour, with scolex, numerous immature and mature segments.

The scolex is large well developed, broad at base and tapering anteriorly and measures 3.24(3.20-3.28) in length and 1.82(1.71-1.94) in breadth, the anterior part of the scolex ends terminally in a prominent rostellum, armed with 45 hooks arranged in two rows. The scolex bears two bothria oval in shape and measures 2.01(1.90-2.13) in length and 0.72(0.64-0.80) in breadth. Neck is present and measures 1.67(1.64-1.71) in length and 1.12(1.10-1.14) in breadth.

Mature segment is seven time broader than long and measures 1.80(1.71-1.90) in length and 7.09(6.94-7.24) in breadth. The testes are oval to round, of medium size, 185 in numbers, spread in the segment at each lateral side and measures 0.13(0.11-0.15) in length and 0.13(0.11-0.15) in breadth.

The cirrus pouch is oval, medium size, anterior to ovary and measures 0.57 in length and 0.18(0.15-0.22) in breadth. The cirrus is thin tube and measures 0.59(0.57-0.61) in length and 0.03 in breadth.

Ovary is bilobed, each lobe separate, short, and measures 1.78(1.71-1.86) in length and 0.30(0.26-0.34) in breadth situated in the middle of the segment. The vagina is thin tube, starts from genital pore, posterior to cirrus pouch and measures 0.91(0.87-0.65) in length and 0.07 in breadth. Genital pore small, rounded and measures 0.07 in length and 0.07 in breadth. The vitellaria are granular, arranged in two-three rows at each lateral margin of the segment.

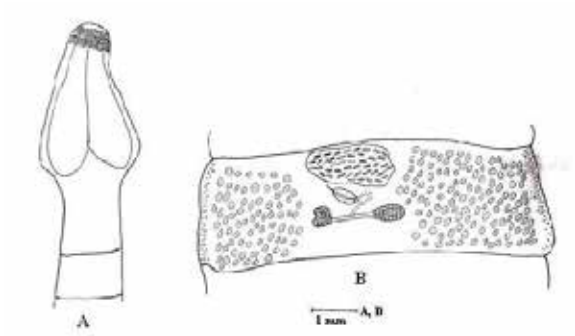

Fig. *Senga shindei* Sp. Nov
A. Scolex B. Mature segment

DISCUSSION

The genus *Senga* was established by Dollfus, 1934 with the type species *Senga besnardi* from *Betta splendens*. The present worm comes closer to all the known species of the genus *Senga* Dollfus, 1934 in general topography of organs. But differs due to some characters from following species.

1. The present worm differs from *S. besnardi* Dollfus, 1934 in the shape of scolex which is triangular, hooks 50 in numbers, testes 160-175 in numbers, ovary compact and reported from *Betta splendens* in France.
2. The present cestode differs from *S. ophiocephalina*, Teseng,1933 in having hooks 47-50 in numbers, testes 50-55 in numbers, ovary bilobed but equatorial in position, vitellaria lobate and reported from *Philocephalus argua argua* in China.
3. The present tapeworm differs from *S. pcynomera,* Woodland, 1924 in having scolex elongated, hooks 68 in numbers, mature segments are indistinct, ovary discontinuous into two groups and reported from *Philocephalus marulius* in India.
4. The present parasites differs from *S. lucknowensis,* Johri,1956 in having hooks 36-48 in numbers, ovary post equatorial, vitellaria lobulate and discontinuous in two groups.
5. The present cestode differs from *S.malayana,* Furnando and Furtado, 1964 in having scolex circular, hooks 60 in numbers, ovary slightely bilobed, post equatorial, vitellaria lobate, discontinuous in two groups and reported from *Channa striata,* in Malacca
6. The present tapeworm differs from *S.parva,* Furnando and Furtado, 1964 in having hooks 38-40 in numbers, testes 150-180 in numbers and reported from *Channa micropeltis*, in Malacca.
7. The present cestode differs from *S. pahangensis,* Furtado et. al., 1971 in having triangular scolex, hooks 52 in numbers, neck short, segmentation clear, testes laterally situated in the proglottids, vitellaria lobulated and reported from *Channa micropeltis*, in Tasek, Bera.
8. The present tapeworm differs from *S. visakhapatanamensis,* Ramadevi et. al., 1973 in having circular scolex, hooks 46-52 in numbers, testes 50-55 in number, vitellaria lobulated and reported from *Ophiocephalus punctatus,* in India.
9. The present worm differs from *S. khami,* Deshmukh and Shinde,1980 having scolex rectangular, oval, shallow bothria, hooks 55-57 in numbers, short neck, testes rounded, 155 in numbers and arranged in two fields, cirrus pouch is elongated, vitellaria follicular and reported from *Ophiocephalus marulius,* in India.
10. The present cestode differs from *S. aurangabadensis,* Jadhav et. al., 1980 in having oval scolex, hooks 50-52 in numbers; in two half rows, overlapping on each other, mature segment broader than long, testes 240-260 in numbers and vitellaria follicular.
11. The present tapeworm differs from *S. godavarii,* Shinde et. al., 1980 in having hooks 40-42 in numbers, arranged in two half rows, testes rounded, 220-230 in numbers, cirrus pouch is oval, situated in anterior half of the segment and vitellaria follicular.
12. The present worm differs from *S. paithanensis,* Kadam et. al., 1981 which shows prominent, large, triangular scolex, hooks 54 in numbers, neck present, testes oval to rounded, 130-135 in numbers, arranged in two lateral groups, vagina posterior to cirrus pouch and vitellaria follicular.
13. The present cestode differs from *S. raoi,* Majid and Shinde,1984 in having hooks 46 in numbers, testes 65-170 in numbers, vagina posterior to cirrus pouch and reported from *Channa punctatus,* in India.
14. The present cestode differs from *S.jagannathae,* Majid and Shinde,1984 in having hooks 44 in numbers, testes 240 - 250 in numbers, ovary compact, vagina anterior to cirrus pouch and reported from *Channa punctatus,* in India.
15. The present parasite differs from *S. gachuae,* Jadhav et. al.,1991in having hooks 22-25 in numbers, neck present, testes 60-70 in numbers, vitellaria follicular and reported from *Channa gachua,* in India.
16. The present cestode differs from *S. maharashtrii,* Jadhav et. al., 1991 which shows muscular scolex, hooks 45-46 in numbers, large, arranged in two half crowns, testes oval 80-90 in numbers and vitellaria follicular.
17. The present worm differs from *S.chauhani,* Monzer Hasnain,1992 in having scolex oval, hooks 40-44 in numbers and testes 200-210 in numbers, vitellaria non lobate and reported from *Channa punctatus,* in India.
18. The present cestode differs from *S. mohekarae*, Tat and Jadhav,1997 which shows elongated scolex, hooks 151 in numbers, neck short and broad, testes 300-310 in numbers and vitellaria follicular.
19. The present parasite differs fom *S. armatusae,* Hiware,1999 in having scolex triangular, hooks 32-40 in numbers, vagina anterior to cirrus pouch and vitellaria follicular.
20. The present cestode differs from *S. tappi,* Patil et. al., 2003 which is having triangular scolex, hooks 42-44 in numbers, neck is very short and squarish, testes 285-295 in numbers, small, rounded, distributed in 2 fields, vagina anterior to cirrus pouch and vitellaria follicular.
21. The present parasite differs from *S. ayodhensis,* Pande et. al., 2006 in having conical scolex, hooks 29 in numbers, testes numerous, vitellaria follicular and reported from *Amphinuous cuchia,* in India.
22. The present cestode differs from *S. baughi,* Pande et. al., 2006 in having hooks 28 in numbers, neck present, testes 40-50 in numbers, ovary compact, vitellaria follicular and reported from *Rita rita,* in India.
23. The present worm differs from *S. panzarensis*, et.al. 2008, having scolex triangular, no.of hooks 58, neck absent, testes 40-45, ovary compact, vitellaria 4-5 lateral side reported from *Mastacembelus armatus* in India.
24. The present worm differs from *S .madhavii,* Bhure et.al. 2010 having scolex triangular, hooks 40-42 in numbers, testes 200-225 in numbers, vitellaria granular reported from *Mastacembelus armatus* in India.
25. The present worm differs from *S. rupchandensis,* Pardeshi et.al. 2011, having scolex tubular, hooks 42-45 in numbers, testes 350-370 in numbers. Reported from *Channa striatus*.
26. The present worm differs from *S. nandedensis,* Asawari et.al 2014 having solex triangular, hooks 60-62. Mature segment rectangular, genital pore small and rounded, reported from *Mastacembelus armatus* in India.
27. The present worm differs from *S. madhukarii,* Asawari et.al 2015 having scolex cylindrical in shape, hooks 45, Mature segment rectangular, testes 130 in numbers reported from *Mastacembelus armatus* in India.

The above noted characters are valid enough to erect a new species hence the name S. shindei Sp.Nov. is proposed in honour of Prof. G.B. Shinde, well known scientist in Helminthology and Ex-Registrar and Ex-Professor, Department of Zoology, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad-431004.

A Key to the species of the genus S*enga* Dollfus, 1934

	Neck present	-	1
	Neck absent	-	2
1)	Scolex circular	-	*S. malayana*, Furnando and Furtado, 1964.
	Scolex rectangular	-	*S. khami*, Deshmukh and Shinde, 1980.
	Scolex triangular	-	3
	Scolex pear shaped	-	4

	Scolex oval	-	5
2)	Scolex circular	-	*S.visakhapatnamensis*, Ramadevi et.al.1973.
	Scolex conical	-	*S. ayodhensis*, Pande et.al. 2006.
	Scolex cylindrical	-	*S. madhukarii*, Fartade et. al. 2015
	Scolex tubular	-	*S. rupchandensis* Pardeshi 2011.
	Scolex elongated	-	*S. pcynomera*, Woodland 1924.
	Scolex oval	-	6
	Scolex pear shaped	-	7
	Scolex triangular	-	8
3)	Vitellaria follicular	-	9
	Vitellaria lobulate	-	*S.pahangensis*, Furtado et.al. 1971.
	Vitellaria granular	-	***S. shindei* Sp. Nov**
4)	Testes below 50	-	*S.baughi*, Pande et.al. 2006
	Testes above 50	-	*S. gachuae*, Jadhav et.al 1999
	Testes in bet^{n} 100-200	-	*S. parva*, Furnando and Furtado, 1964
	Testes in bet^{n} 200-300	-	*S.jagannathae*, M. A. Majid and G. B. Shinde, 1984.
5)	Hooks below 100	-	*S. chauhani*, Monzer Hasnain, 1992
	Hooks above 100	-	*S.mohekarae*, Tat and Jadhav, 1997
6)	Testes below 100	-	*S. maharashtrii*, Jadhav and Tat 1991
	Testes above 100	-	*S. aurangabadensis*, Jadhav et.a1980
7)	Vitellaria lobulate	-	10
	Vitellaria follicular	-	*S.godavarii*, Shinde et.al. 1980.
	Vitellaria granular	-	*S.raoi*, M. A. Majid and Shinde1984
8)	Testes below 100	-	*S. panzarensis*, Kalse. A. T 2009.
	Testes in bet^{n}100-150	-	*S. nandedensis* Fartade et al. 2014
	Tetses in bet^{n} 150-200	-	*S. besnardi*, Dollfus, 1934
	Testes in bet^{n} 200-250	-	11
9)	Hooks below 50	-	*S. tappi*, D. N. Patil 2003.
	Hooks above 50	-	*S. paithanensis*, Kadam et.al. 1981.
10)	Hooks below 50	-	*S. luknowensis*, Johri, 1956
	Hooks above 50	-	*S. ophiocephalina*, T seng, 1933
11)	Vitellaria follicular	-	*S. armatusae*, C. J. Hiware, 1991
	Vitellaria granular	-	*S. madhavii*, Bhure et.al. 2010

ACKNOWLEGMENTS

Author is very much thankful to the U.G.C. for providing the financial assistance under minor research project.

REFERENCES

1. Aswari M. Fartade and Madhukar M. Fartade(2014): A new species of genes Senga nanadedensis Sp.Nov from fresh water fishes Mastacembelus armatus in Godavari basin (M.S.) India. Volume- 1 Issue-2 (2014) ISSN: 2348 – 604X (Print); 2348 – 6058 (Online) | 2. Aswari Fartade, Madhukar Fartade and Sunita Borde (2015): A psedophyllidean Senga madhukarii Sp.Nov.from a fresh water fish Mastacembelus armatus from Godavari basin Maharashtra state India. MAY-JUNE, 2015, VOL. 3/18 | 3. B.V.Jadhav, S.B.Deshmukh and A.B.Gavhane (1991): A new tapeworm Senga gachuae n.sp. from the fish Channa gachua at Aurangabad. India. J. Inv.2001.nnd.Aqu.Biol.3 (1) 39-41. | 4. B.V.Jadhav (2005): Cestoda of the genus Senga (cestode-Pseudophyllidae) from freshwater fishes in Maharashtra India.A survey of species.Riv. Di. para.vol XXII (IXVI) N-2 93-101. | 5. Bhure, D. B., Jadhav. B.V. (2007): New tapeworms, Senga jadhvae n.sp. (Cestode: Pseudophylidae) from Mastacembelus armatus, Aurangabad (M.S) India.Proc. Zool. Soc. of India. Vol. 6, No2: 45-52. | 6. C.J. Hiware (1999): On a new tapeworm Senga armatusae n.sp. from fresh water fish, Mastacembelus armatus at pune (M.S) India.Riv. Di. Para. Vol XVI (LX) N-1. 9-12. | 7. Deshmukh, R.A. and Shinde, G.B. (1980): On a new cestode Senga khami n.sp. (cestoda- Ptychobothridae) from a fresh water fish.Indian J. of helminth. 31 (1-2):28-32. | 8. Dollfus, R.P.H. (1934): Sur un cestode Pseudophyllidae parasite de Poisson d' ornament. Boll. Soc. Zool.France, 59: 476-490. | 9. Felsenstein J. (1985): Confidence limits on phylogenies: An approach using the bootstrap. Evolution 39:783-791. | 10. Fernando, C.H and Furtado, J.I. (1964): Helminth parasite of some Malayan freshwater fishes. Bukketin of the national museum state of Singapore, 32:45-71. | 11. Furtado, J.E. and Chaulan, L. (1971): Two new helminth species from the fish, Channa micropeltes, Cuvier Ophicephalae) of Malaysia. Folia Parasit, Praba 18(4): 365. | 12. Gairola, D.and Malhotra S.K. (1986): Cestode fauna of fishes in river Ganges around an India sub humid region Senga gangesia n.sp from Mystus vittatus. Japanase of para. 35(6) 471-474. | 13. Gupta, V. and Parmar, S. (1985): On a new cestode Senga indica Sp. Nov. from the intestine of a freshwater fish Mastacembelus armatus (Lacepede 1800) from Lucknow. Indian J. Helminth, 37 (2) 96-99. | 14. Jadhav, B.V. (1980): On a new cestode Senga aurangabadensis n.sp. from the fishes, Mastacembelus armatus. Bioresearch, 1980(4):25-27. | 15. Jadhav, B.V and Shinde, G.B. (1980): A new tapeworm Senga godavari n.sp.from Mastacembelus armatus at Aurangabad. Indian Biology, 2 (4):46-48. | 16. Jadhav, B.V, Gavahane, A.B.and Jadhav, A.P. (1991): On new pseudophyllidean cestode from Mastacembelus armatus at Daryapur M.S.India. Riv. parass.8 (1): 19-22. | 17. Johri, G.N. (1956): A new cestode Senga lucknowensis from Mastacembelus armatus Lecep. CurrentScience,Bangalore, 25 (6): 193- 195. | 18. Kadam, S.S, Jadhav, B.V. and G.B.Shinde (1981): On a new cestode Senga paithenesis n.sp (cestode ptychobothridae) Mastacembelus armatus. Bio. Research, 1981 5(1):95-96. | 19. Kalse, A.T (2009): Senga panzaraensis from Mastacembelus armatus at Dhule India. Uttarpradesh journal of zoology 2009, vol.29 no.1. Pp. 105-108. | 20. Majid, M.A. and Shinde, G.B. (1984): Two new species of the genus senga Dollfus 1934 (cestoda –Pseudophylldea) from fresh water fishes at Jagannathpuri, Orisa. India, J of para. (1)169-172. | 21. Nilima M. Kankale (2008): A new species of the genus Senga nathsagarensis from a fresh water fish Mastacembelus armatus. National journal of life sciences, 5 (3) 81-84. | 22. P.R. Pardeshi (2011): A new pseudophyllidean Senga rupchandensis n.sp. from Channa striatus (Bloch, 1973) at Jalna District (M.S), India. RRST 3(12): 17-22. | 23. Pande, P.N., Mittal Neetu and Sing, S.R. (2000): On a new cestode of the genus Senga, Dollfus, 1934 from the intestine of fresh water fish Mastacembelus armatus (Lacepede) from Kanpur, U.P. India. J.Hel. (N.S.) 5-8. | 24. 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. | 25. Pardeshi, K.S. A.T. Kalse, and V.N.Andhare (2007): A new psedophyllidae worm fresh water fishes of Beed (M.S.) Nat.J life. Sci. 4 (3) 107-110) | 26. Patil D.N. and Jadhav, B.V. (2003): On new species the Senga Dollfus, 1934 (Cestoda- Ptychobothridae Lune, 1902) as S.tappi n.sp. Jour. Comp. tox. Physiol, Vol -1, 68-72. | 27. Ramadevi, P. and Rao (1976): On Sengavisakhapatnamensis n.sp. (Cestoda: Pseudophyllideaarasite de Poisson d' Ornement. from the intestine of the freshwater fishOphiocephalus punctatus (Bloch.). Rivista Di Parasitol.,Vol. 34, No. 4: 281-286. | 28. Ramadevi, P. and Rao, K.H. (1966): Plerocercoid of Senga n.sp. (Pseudophyllidea, ptychobothriidae) from fresh water fish, Panchax panchax (Ham. and Buch).Current Sci. 35 (247): 626-627. | 29. Shinde, G.B. (1972): Studies on Indian cestode redescription of Senga benesardi Dollfus, 1923,Marathwada Univ. J. Sci. 11: 39-40. | 30. Shinde, G.B. and Jadhav, B.V. (1980): New tapeworm,Senga godavarii from Mastacembelus armatus,Aurangabad (M.S.) India. Biology. Vol.II 40: 46-48. | 31. Tat, M.B. and Jadhav B.V. (1997): Senga mohekaraei n.sp. (Cestoda Ptychobotehridae from Mastacembelus armatus). Rivista di parasitologia Vol.XVII (LVII) N .2.293-296. | 32. Tseng (1933): Study on some cestodes from fishes. Jour.of Science National Univ. Shantuma, Tsingtao, China (2):1-21. | 33. R.A.Mcloed, J.A. and Radinovsky, S (1974): Advances in the Zoology of tapeworms, 1950-1970. Univ.Minnesota. Minnetoba Press, Monneapolis, 1-274. | 34. Wongsawad, C; Tanu, Marayong, Jadhav, B.V. (1998): A new Ptychobothridae tapeworms from Maesa stream, Chiang Mai, Thailand. Rivista Di Parasitologia, vol XV (LIX) N-3. | 35. Yamaguti, S (1959): Systema helminthum vol.II.The cestodes of Vertebrates, Interscience public.New Yorsk and London 1- 860.