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Studies on a new species of Genus *Senga* (Dollfus, 1934) Cestoda: Ptychobothridae, from freshwater fish *Mastacembelus armatus* at. Wakadi Dam, Dist. Parbhani (M.S.) India

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ABSTRACT

The present discussion deals with the study of Genus Senga wakadii sp. nov. collected from fresh water fish Mastacembelus armatus at. Wakadi dam, Dist Parbhani (M.S.) India. The present cestode parasite's character come closer to the earlier known species of Genus Senga but also having some differentiating remarkable characters. Scolex is vessel shaped with two bothria, inner portion of bothridia is convoluted, overlapped internally in the middle and extend up to the posterior part of scolex. Rostellar hooks are arranged in circular manner, rostellar hooks 30-35 in numbers. Mature segment two to three times broader than long, testes 55-65 in number, the cirrus is thin tube, within the cirrus pouch. Vas deferens is a thin slightly curved. The vagina arises from posterior side of cirrus pouch as a short narrow tube. Ovary large, bilobed, located at the posterior side of the segment, Uterus starts from ootype, median, balloon shaped and vitellaria are granular

Keywords: *Senga, Mastacembelus Armatus, Hooks, Wakadi*

1. INTRODUCTION

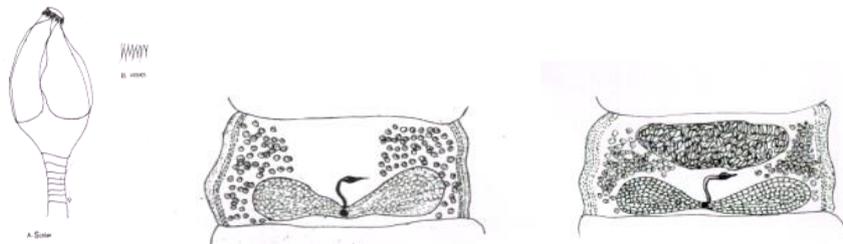
The Genus *Senga* was established by Dollfus in 1934 with the type species *S. besnardi* from *Betta splendens* (fighting fish) at Vincennes, France. *S. ophioccephalina* Tseng, 1933 as *Anchistrocephalus ophioccephalana* from *Ophioccephalus argus* at Tsinan, China and identified as *Anchistrocephalus polyptera* (*Anchistrocephalus Monticelli Anchistrocephalus*) from *Ophioccephalus striatus* in Bengal, India. *S. pycnomeris* Woodland, 1924 as *Bothriocephalus pycnomeris* from *Ophioccephalus morulius* at Allahabad, India. *S. lucknowensis*, Johari, 1956 from *Mastacembelus armatus* in India. Furnando and Furtado, 1963 recorded *S. malayana* from *Channa striatus*, *S. parva* and *S. filiformis* from *Channa microptles* at Malacca. Ramdevi and Humanah Rao, 1966 reported the plerocercoid of *Senga* species from *Panchax panchax*. Tadros, 1968 found the genus *Senga* with the genus *Polyonchobothrium* and proposed new combinations for the species. Furtado and Chauhan, 1971 synonymised *S. pahangensis* from *Channa microptles* at Tesak Bera. Shinde, 1972 redescribed *S. besnardi* from *Ophioccephalus gachua* in India. Ramdevi and Rao, 1973 reported *S. vishakhapattanamensis* in India. Ramdevi, 1976 describe the life cycle of *S. vishakhapattanamensis* from *Ophioccephalus punctatus* in a lake of Kondakaria, Andhra Pradesh, India. But they do not agree with the statement of Tadros. Wardle, McLeod and Radinovsky, 1974 put *Senga* as a distinct genus in the family ptychobothridae. Deshmukh, 1980 reported *S. khami* from *Ophioccephalus morulius* from fresh water fish, Kham River at Aurangabad. Jadhav and Shinde, 1980 reported *S. godavari* from *Mastacembelus armatus* at Nanded, M.S. India. Jadhav and Shinde, 1980 added one more species *S. aurangabadensis* from *Mastacembelus armatus* at Aurangabad. After that new addition made by Kadam et. al., 1981 as *S. paithansis* from *Mastacembelus armatus*. Majid et.al, 1984 added *S. raoi* and *S. jagannathae* from *Channa morulius*. Tat and Jadhav, 1997 added *S. mohekarae* from intestine of *Mastacembelus armatus* at Parli Dist. Beed, M.S. India. Patil and Jadhav, 2003 added *S. tappi* from *Mastacembelus armatus*. Jadhav, 2005 made the review article of the genus *Senga* from fresh water fish of Maharashtra state, India. Pande et.al, 2006 added two new species *S. ayodhensis* from *Amphinuous cuchia* and *S. baghui* from Rita rita. Bhure et.al, 2010 added one new species *S. madhavii*. Later on, Bhure and Nanware, in 2011 *S. satarensis* and *S. mangalabaiae* reported from *Mastacembelus armatus* from Maharashtra state. Pardeshi and Hiware, 2011 described *S. rupchandensis* from *Channa striatus* at Jalna, M.S. India. Dhole et.al, 2011 *S. rostellarae* and *S. chandrashekhari* from *Mastacembelus armatus*, M.S. India. Puinyabati et.al., 2013 reported *Senga silcharensis* from the intestine of *Channa punctatus* from Assam, India. Bhure et.al, 2014 described *S. microrostellata* from *Mastacembelus armatus* at. Parbhani, M.S. India. Fartade

and Fartade, 2014 described *S. nandedensis* from fresh water fish *Mastacembelus armatus* in Godavari river basin M.S. India. Deshmukh V.S., 2015 reported *S. rostellata* and *S. triangulate* from fresh water fish *Mastacembelus armatus* from the unpublished Ph.D. thesis S.R.T.M. University, Nanded M.S. India. More recently Fartade and Fartade, 2015 described *S. Mastacembelus* from *Mastacembelus armatus* from Godavari basin M.S. India. Later on Khade and Dabhade, in 2017 added one new species *S. bothriolata* from *Mastacembelus armatus* (Lacepede, 1800) Warkhed, Tehsil Telhara Dist. Akola (M.S.) India.

2. MATERIAL AND METHODS

Seventeen specimens of the cestode parasites were collected from the intestine of *Mastacembelus armatus* (Lacepede) from wakadi dam Dist Parbhani (M.S.) India, during the period of May 2017 to Jun 2018. Out of seventeen cestode parasites seven cestodes are flattened, preserved in 4% formaldehyde solution and are stained in haematoxyline. This cestode are dehydrated in alcohol, cleared in xylene and finally mounted in D.P.X. drawings are made in camera lucida. All measurements are in millimeters.

3. DESCRIPTION



A. Scolex, B. Hooks, C. Mature Segment, D. Gravid Segment

Seventeen specimens of the cestode parasites were collected from the intestine of *Mastacembelus armatus* at. Wakadi dam, Dist Parbhani (M.S.) India, during the period of May 2017 to Jun 2018. The cestodes are considerably long with numerous proglottids having length of 40 to 45 mm and 1 to 2 mm in breadth.

Scolex is well developed, distinct, longer than broad, vessel shaped, bluntly pointed anteriorly and broad posteriorly, it measures 0.122 (0.104-0.139) in length and 0.067 (0.036-0.099) in breadth. The scolex bears two bothria extend from anterior part and runs towards the posaterior part of scolex. Bothria are internally convolutes and in middle overlap on each other. It measures 0.032 (0.028-0.036) in length and 0.022 (0.017-0.026) in breadth, rostellum medium, oval, narrow anteriorly and broad posteriorly and measures 0.042 (0.033-0.050) in length and 0.029(0.023-0.035) in breadth. The rostellar hooks are pointed, triangular in shape and measures 0.014 (0.012-0.016) in length and 0.005 (0.002-0.007) in breadth. Neck is absent. Mature segments are broader than long about two to three times and measures 0.313 (0.291-0.335) in length and 1.435 (1.403-1.466) in breadth. The testes are small in size oval to rounded, arranged in two lateral field, pre-ovarian, 55 to 65 in numbers and measures 0.053 (0.049-0.058) in diameter. The cirrus sac is oval in shape, transversely placed in the middle of the segment and measures 0.190 (0.180-0.199) in length and 0.062 (0.029-0.092) in breadth. The cirrus is thin tube, within the cirrus pouch and measures 0.111 (0.107-0.116) in length and 0.012 (0.010-0.015) in breadth. Vas deferens is a thin slightly curved, measures 0.165 (0.160-0.170) in length and 0.012 (0.010-0.015) in breadth. The vagina arises from posterior side of cirrus pouch as a short narrow tube and measures 0.105 (0.102-0.107) in length and 0.008 (0.005-0.010) in breadth. Seminal receptaculum runs towards the posterior side, reaches to ootype and measures 0.604 (0.548-0.660) in length and 0.012 (0.010-0.015) in breadth. Vagina and cirrus pouch open through a common genital pores which is oval, irregularly alternate and measures 0.029 (0.015-0.043) in length and 0.055 (0.053-0.058) in breadth. Ovary large, bilobed, located at the posterior side of the segment and measures 0.083 (0.053-0.112) in length and 0.553 (0.485-0.582) in breadth. Uterus starts from ootype, median, balloon shaped, extends almost the anterior margin of the segment and measures 0.177 (0.160-0.194) in length and 0.057(0.039-0.072) in breadth. Vitellaria are granular, corticular arranged on either side of the segment.

Table: 1. Comparative chart of Genus Senga.

Species↓ / organs→	Scolex	Neck	Hooks	M.segment	Testes	Ovary	C. pouch	Vitellaria
<i>S. besnardi</i>	Triangular	Absent	50	wider than long	160-175	--	oval	Lobate
<i>S. ophiocephalina</i>	Pear	Absent	47-50	Broader than ling	50-55	Bilobed	oval	Granular
<i>S. pcynomera</i>	Elongated	Absent	68	Distinct	120-150		oval	Granular
<i>S. lucknowensis</i>	Pear	Absent	36--48	Broader than ling	100-150	Bilobed	oval	Lobulated & discontinuous
<i>S. malayana</i>	Circular	Present	60	Broader than ling	120-150	Bilobed	oval	Lobulated & discontinuous

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<i>S. parva</i>	Pear	Present	38-40	Broader than ling	150-180	<i>Bilobed</i>	<i>oval</i>	Granular
<i>S. pahangensis</i>	Triangular	Present	52	Broader than ling		<i>Bilobed</i>	<i>oval</i>	Lobulated
<i>S. vishakapatanamensis</i>	Circular	Absent	46-52	Broader than ling	50-55	--	<i>oval</i>	Bilobed, post equatorial
<i>S. khami</i>	Pear-oval	Present	55-57	Broader than ling	155	<i>Bilobed</i>	<i>elongated</i>	Follicular
<i>S. aurangabadensis</i>	Oval	Absent	50-52 overlap	--	240-260		<i>Medullary</i>	Follicular, corticular
<i>S. godavarii</i>	Pear	Absent	40-42	Broader than long	220-230	<i>Bilobed</i>	<i>Oval</i>	Follicular, in 3-4 row
<i>S. paithanensis</i>	Triangular	Present	54	Broader than long	130-155	<i>Bilobed, center</i>	<i>Oval, curved</i>	Follicular, in 2-3 row
<i>S. raoi</i>	Pear	Absent	46	Broader than ling	65-170	<i>Bilobed</i>	<i>oval</i>	Granular
<i>S. jagannathae</i>	Pear	Present	44	Broader than ling	240-250	<i>Bilobed</i>	<i>oval</i>	Granular
<i>S. gachuae</i>	Pear	Present	22-25	Broader than ling	60-70	<i>Bilobed</i>	<i>oval</i>	Follicular
<i>S. maharashtrii</i>	Muscular	Absent	45-46	Broader than long	80-90	<i>Bilobed</i>	<i>Oval</i>	Follicular in 4-5 rows
<i>S. chauhani</i>	Oval	Absent	40-44	Broader than ling	200-210	<i>Bilobed</i>	<i>oval</i>	Follicular in 4-5 rows
<i>S. armatusae</i>	Triangular	Absent	32-40	4 times broader than long	230-240	<i>Bilobed, elongated</i>	<i>oval</i>	Follicular in double row
<i>S. mohekarae</i>	Pear	Present	151	Broader than ling	300-310	<i>Bilobed</i>	<i>Oval</i>	--
<i>S. tappi</i>	Triangular	Present	42-44	3 times broader than long	285-295	<i>Bilobed</i>	<i>Oval</i>	Follicular lateral to testicular
<i>S. ayodhensis</i>	Conical	Absent	29	Broader than ling	Numerous, rounded	<i>Post equatorial, bilobed</i>	<i>Central</i>	Small, follicular
<i>S. baughi</i>	Pear	Present	28	Broader than ling	40-50	<i>Compact, oval, unilobed</i>	<i>oval</i>	Follicular
<i>S. jadhavae</i>	triangular	Present Short	50-54	3 times broader than long	310-320	<i>Bilobed</i>	<i>oval</i>	Follicular
<i>S. chandkapurensis</i>	Barrel	Present Short	28-30	Broader than long	170-180	--	--	Granular
<i>S. kaigaonensis</i>	Triangular	Absent	--	--	285-295	--	<i>Pre-ovarian</i>	--
<i>S. madhavae</i>	Triangular	Absent	40-44	5-6 times broader than long	--	--	--	Granular
<i>S. mangalbaiae</i>	Conical	Absent		--	--	--	--	Granular, 2-3 row
<i>S. rupchandensis</i>	Flat, tubular, cylindrical	Absent	42-55	--	--	--	--	Follicular
<i>S. rostellarae</i>	Pear	Absent	--	--	--	--	<i>Elongated, oval</i>	Follicular
<i>S. chandrashekhari</i>	Broad	Short	--	--	98-117	--	--	--
<i>S. silcharensis</i>	Pear	Absent	44	--	--	<i>Post</i>	<i>Post</i>	--

						<i>equatorial, bilobed</i>	<i>ovarian bilobed</i>	
<i>S. microtrigularis</i>	Triangular	Absent	18-20	8-9 times broader than long	250-300	<i>Dumbbell</i>	<i>Small</i>	Follicular
<i>S. nandedensis</i>	Triangular	Absent		--	150-200	<i>Bilobed</i>	<i>Oval</i>	Follicular
<i>S. rostellata</i>	Oval	Long	20-22	3 times broader than long	25-30	<i>Bilobed</i>	<i>Cylindrical</i>	Follicular
<i>S. microtrigularis</i>	Triangular	Absent	--	4-5 times broader than long	55-60	<i>Bilobed, dumbbell</i>	<i>Thin, curved.</i>	Follicular
<i>S. mastacembelusae</i>	Triangular	Absent	20-22	Rectangular	--	--	--	--
<i>S. madhukarii</i>	Cylindrical	Absent	45	--	130	<i>Bilobed</i>	<i>oval</i>	Follicular, 2-3 row
<i>S. bothriolata</i>	Small triangular	Long and broad	23-25	5 times broader than long	50-55	<i>Bilobed</i>	<i>Round</i>	Granular

4. DISCUSSION AND RESULT

- The genus *Senga* was established by Dollfus, 1934 with the type species *Senga besenardi* from *Betta splendens*. The present cestode parasite comes closer to the known species of the genus *Senga* in general topography of organs but differs in some characters from following species.
- The present cestode parasite differ from *S. besnardi* Dollfus, 1934 in shape of scolex vessel against triangular, hooks 30-35 against 50, mature segment two to three times broader than long against wider than long, testes 55-65 against 160-175 and vitellaria granular against lobate.
- The present worm differs from *S. ophiocephalina* Teseng, 1933 in shape of scolex vessel against pear, hooks 30-35 against 47-50, testes 55-65 against 50-55, ovary large bilobed against bilobed.
- The present tapeworm differs from *S. pcynomera*, Woodland, 1924 in having shape of scolex vessel against elongated, hooks 30-35 against 68 in numbers, mature segment two three times broader than long against distinct, ovary 55-65 against 120-150 in numbers.
- The present worm differs from *S. lucknowensis* in the shape of scolex vessel against pear, testes 55-65 against 100-150 in numbers and vitellaria granular against lobated and discontinuous.
- The present tapeworm differs from *S. malayana* in the shape of scolex vessel against circular, rostellar hooks 30-35 against 60, testes 55-65 against 120-150 in numbers and vitellaria granular against lobulated and discontinuous.
- The present parasite differs from *S. parva* in the shape of scolex vessel against pear, rostellar hooks 30-35 against 38-40, testes 55-65 against 150-180 in numbers, ovary bilobed against oval.
- The present cestode differs from *S. pahangensis* in the shape of scolex vessel against triangular, rostellar hooks 30-35 against 52 and vitellaria granular against lobulated.
- The present worm differs from *S. vishakapatanamensis* in the shape of scolex vessel against circular, rostellar hooks 30-35 against 46-52, testes 55-65 against 50-55 in numbers and vitellaria granular against bilobed, post equatorial.
- The present cestode differs from *S. khami* in the shape of scolex vessel against pre oval, rostellar hooks 30-35 against 50-55, testes 55-65 against 155 in numbers, cirrus pouch oval against elongated and vitellaria granular against follicular.
- The present worm differs from *S. aurangabadensis* in the shape of scolex vessel against oval, rostellar hooks 30-35 against 50-52, testes 55-65 against 240-260 in numbers cirrus pouch is oval against medullary.
- The present tapeworm differs from *S. godavarii* in the shape of scolex vessel against pear, rostellar hooks 30-35 against 40-42, testes 55-65 against 220-230 in numbers.
- The present cestode parasite differs from *S. paithanensis* in the shape of scolex vessel against triangular, rostellar hooks 30-35 against 54, testes 55-65 against 130-135 in numbers.
- The present worm differs from *S. raoi* in the shape of scolex vessel against pear, rostellar hooks 30-35 against 46, testes 55-65 against 65-170 in numbers.
- The present parasite differs from *S. jagannathae* in the shape of scolex vessel against pear, rostellar hooks 30-35 against 44, testes 55-65 against 240-250 in numbers and vitellaria granular against -- and discontinuous.
- The present worm differs from *S. gachuae* in the shape of scolex vessel against pear, rostellar hooks 30-35 against 20-25, testes 55-65 against 60-70 in numbers and vitellaria granular against follicular
- The present cestode parasite differs from *S. maharashtrii* in the shape of scolex vessel against muscular, rostellar hooks 30-35 against 45-46, testes 55-65 against 80-90 in numbers and vitellaria granular against follicular in 4-5 rows.
- The present worm differs from *S. chauhani* in the shape of scolex vessel against oval, rostellar hooks 30-35 against 40-45, testes 55-65 against 200-210 in numbers and vitellaria granular against follicular in 4-5 rows.
- The present parasite differs from *S. armatusae* in the shape of scolex vessel against triangular, mature segment 2 to 3 times broader than long against 4 times broader than long, testes 55-65 against 230-204 in numbers and vitellaria granular against follicular.

- The present tapeworm differs from *S. mohekarae* in the shape of scolex vessel against pear, rostellar hooks 30-35 against 151, testes 55-65 against 300-310 in numbers.
- The present worm differs from *S. tappi* in the shape of scolex vessel against triangular, testes 55-65 against 285-295 in numbers and vitellaria granular against follicular lateral to testicular.
- The present cestode parasite differs from *S. ayodhensis* in the shape of scolex vessel against conical, mature segment two to three times broader than long against broader than long, testes 55-65 against numerous rounded, and vitellaria granular against follicular
- The present parasite differs from *S. baughi* in the shape of scolex vessel against pear, testes 55-65 against 40-50 in numbers and vitellaria granular against follicular.
- The present form differs from *S. jadhavae* in the shape of scolex vessel against triangular, rostellar hooks 30-35 against 50-54, testes 55-65 against 310-320 in numbers and vitellaria granular against follicular
- The present worm differs from *S. chandkapurensis* in the shape of scolex vessel against barrel, rostellar hooks 30-35 against 28-30, testes 55-65 against 170-180 in numbers.
- The present cestode differs from *S. kaigaonensis* in the shape of scolex vessel against triangular, testes 55-65 against 285-295 in numbers.
- The present form differs from *S. madhavae* in the shape of scolex vessel against triangular, rostellar hooks 30-35 against 40-44, mature segment two to three times broader than long against 5-6 times broader than long.
- The present worm differs from *S. mangalbaiiae* in the shape of scolex vessel against conical.
- The present cestode parasite differs from *S. rupchandensis* in the shape of scolex vessel against flat, tubular, rostellar hooks 30-35 against 42-55 and vitellaria granular against follicular
- The present tapeworm differs from *S. rostellarae* in the shape of scolex vessel against pear, and vitellaria granular against follicular.
- The present cestode differs from *S. chandrashekhari* in the shape of scolex vessel against broad, testes 55-65 against 98-117 in numbers.
- The present worm differs from *S. silcharensis* in the shape of scolex vessel against pear, rostellar hooks 30-35 against 44, ovary large, bilobed against post equatorial, bilobed.
- The present parasite differs from *S. microtrigularis* in the shape of scolex vessel against triangular, rostellar hooks 30-35 against 18-20, mature segment two to three times broader than long against eight to nine times broader than long, testes 55-65 against 250-300 in numbers and vitellaria granular against follicular.
- The present form differs from *S. nandedensis* in the shape of scolex vessel against triangular, testes 55-65 against 150-200 in numbers and vitellaria granular against follicular
- The present cestode differs from *S. rostellata* in the shape of scolex vessel against oval, rostellar hooks 30-35 against 20-22, testes 55-65 against 25-30 in numbers and vitellaria granular against follicular.
- The present tapeworm differs from *S. microtrigularis* in the shape of scolex vessel against triangular, mature segment two to three times broader than long against four to five times broader than long.
- The present worm differs from *S. mastacembelusae* in the shape of scolex vessel against triangular, rostellar hooks 30-35 against 20-22, mature segment two to three times broader than long against rectangular.
- The present cestode differs from *S. madhukarii* in the shape of scolex vessel against cylindrical, rostellar hooks 30-35 against 45, testes 55-65 against 130 in numbers and vitellaria granular against follicular.
- The present form differs from *S. bothriolata* in the shape of scolex vessel against terminated in to rostellum, rostellar hooks 30-35 against 23-25, mature segment two to three times broader than long against five times broader than long, cirrus pouch oval against rounded, and vitellaria granular against follicular.
- These distinct characters are more than enough to erect as a new species from the genus *Senga* and hence the name *senga wakadii* n.sp. proposed as it is reported from the wakadi dam dist. Parbhani (M.S.) India.

Genus: *Senga* (Dollfus, 1934)

Species: *Senga wakadii* n.sp.

Host: *Mastacembelus armatus*.

Collection area: Wakadi dam Dist. Parbhani (M.S.) India.

5. REFERENCES

- [1] Deshmukh VS (2015) Biosystematic Studies on some Helminth Parasites of freshwater fishes. Ph.D. Thesis, S.R.T.M. University, Nanded, M. S. India. pp. 1-347.
- [2] Deshmukh VS, Nanware SS and Bhure DB (2016) Taxonomic Studies on Cestode Genus *Senga* (Dollfus, 1934) (Ptychobothridae, Luhe, 1902) From *Mastacembelus Armatus* (Lacepede, 1800) With Description of A New Species. *Asian Journal of Agriculture & Life Sciences*. 1(1): 33-42.
- [3] Khade RN and Dabhade DS (2016): Morpho-Taxonomy of new Pseudophyllidean tapeworm *Senga* from *Mastacembelus armatus*. (Lacepede, 1800)
- [4] Bhure DB, Nanware SS and Deshmukh VS (2014) Biosystematic studies on Cestode genus *Senga* (Dollfus, 1934) (Ptychobothridae, Luhe, 1902) from *Mastacembelus armatus* with Description of a new species. Proceeding: Modern Parasitology, Narendra Publishing House, Delhi. International Conference on Recent Trends in Climate Change Researches vis-a-vis Biodiversity” 1, pp. 233-244.
- [5] Nanware SS, Deshmukh VS and Bhure DB (2016) Bio- Systematic Studies on Cestode Genus *Senga* (Dollfus, 1934) (Ptychobothridae, Luhe, 1902) from *Mastecembelus armatus* (Lacepede, 1800) with Description of a New Species, *World Scient i fic News* 45(2) (2016) 224-238.

- [6] Fartade AM and Fartade MM (2015) New species of Cestodes parasite *Senga mastacembalusae* Sp.nov. from freshwater fish *Mastacembelus armatus* from Godavari basin M.S. (India). *Science park research journal*, 3 (5): 1-7.
- [7] Fartade AM and Fartade MM (2014) A New Species of the Genus *Senga* (Ptychobothridae) from Fresh Water Fish *Mastacembelus armatus* in Godavari Basin (M.S) India. *International Science Journal*, 1(2):23-29.
- [8] Fartade A, Fartade M and Boarde S (2015) A pseudophyllidean *Senga madhukarii* Sp.Nov. from a freshwater fish *Mastacembelus armatus* from Godavari basin Maharashtra state, India. *Scholarly Research Journal for Interdisciplinary studies*, 3(18): 303-2012.
- [9] Puinyabati H, Shomorendra M and KAR D (2013) *Senga silcharensis*, a New Cestode Species from the Intestine of the Fresh Water Fish *Channa punctatus* (Bloch) from Chatla Haor, Silchar, Assam. *Sci. and Cult.* 79 (5-6) 245-247.
- [10] Dhole JS, Sonune BV, Reddy YR and Chavan RJ (2011) Two Pseudophyllidean Tapeworms from Fresh Water Fish *Mastacembelus armatus* of Maharashtra State (India) with Revised Key to Species of Genus *Senga*. *Acta Parasitologica Globalis*, 2 (2): 25-33.
- [11] Pardeshi PR and Hiware CJ (2011) A new pseudophyllidean *Senga rupchandensis* n. sp. from *Channa striatus* (Bloch, 1973) at Jalna District (M.S), India. *R.R.S.T.* 3(12): 17-22.
- [12] Wankhede H and Reddy Y (2009) On a new species of the genus *Senga* (Dollfus, 1934) (Cestode: Ptychobothridae, Luhe, 1902) from fresh water fish *Mastacembelus armatus*. *Environmental Conservation J.*, 10(3): 63-66.
- [13] Khadap RM, Jadhav BV and Suryawanshi NV (2007) A new species of the genus *Senga* (Dollfus, 1934) (Cestodes: Ptychobothridae) from fresh water teleost *Mastacembelus armatus*. *Nat. Jr. of Life Sci.* 4(3): 77-79.
- [14] Pande PN, Tripathi M and Mittal N (2006) On two new species of genus *Senga* Dollfus, 1934 (family- Ptychobothriidae Luhe, 1902) from the intestine of freshwater fishes. *India J. Hel. (N.S.)* 24: 6-10.
- [15] Patil DN and Jadhav BV (2003) On a new species the *Senga* Dollfus, 1934 (Cestoda-Ptychobothridae) Lune, 1902) as *S. tappi* n.sp. *Jour. comp. Tox. Physiol.* 1 68-72.
- [16] Hasnain (1992) On a new cestode *Senga chauhani* n.sp. from fish host, *Channa punctatus* from Jamshedpur. *National Journal of Helminthology*. 44 (1): 123-127.
- [17] Tat MB and BV Jadhav (1997) *Senga mohekarae* n.sp (Cestoda-Ptychobothridae) from *Mastacembelus armatus*. *Riv. Di. Para.* 17 (38) :203-296.
- [18] Jadhav BV., Ghavane AB and Jadhav AP (1991) On a new Pseudophyllidean cestode from *Mastacembelus armatus* at Daryapur (M.S.) India. *Rivista Di Parasit*, 8(1):19-22.
- [19] Kadam SS, Jadhav BV and Shinde GB (1981) On a new Cestodes *Senga paithanensis* n.sp. (Cestoda; Ptychobothriidae) from *Mastacembellus armatus*. *Bioresearch*, 5 (1): 95-96.
- [20] Majid MA and Shinde GB (1984) Two new species of the genus *Senga* Dollfus, 1934 (Cestoda- Pseudophyllidea) from fresh water fishes at Jagannathpuri, Orisa. *India. J. of Para.* (1):169- 172.
- [21] Johri GN (1956) A new Cestodes *Senga lucknowensis* from *M. armatus* Lep. *Current science*, 25 (6): 193- 195.
- [22] Jadhav BV and Shinde GB (1980) On a new Cestodes *Senga aurangabadensis* n.sp. from the fish *Mastacembelus armatus*. *Bioresearch*, (4): 25-27.
- [23] Deshmukh RA and Shinde GB (1980): On *Senga khami* (Cestoda: Ptychobothridae) from the freshwater fish. *Indian Jour. of Zoology*, (8): 1-2.
- [24] Woodland WNF (1924) On a new genus of *Proeocephalidae* from Indian freshwater fishes. *Parasit.* 16: 441-451.
- [25] Southwell T (1913) Parasites of fishes-notes of Bengal fisheries laboratory. *Rec. Ind. Mus.* 9: 98-99.
- [26] Luhe M (1999) Ueber die Fixierung der Helminthen an der Daimwandung ihrer write und die dadurch verursachten pathologisch-anatomischen Veränderungen des Wirtsdarmes. *Verhandel. Interen. Zool. Cong. Berlin.*, 1901: 698-706.
- [27] Tseng (1933) Study on some Cestodes from fishes. *Jour. of science National Univ. Shantuma, TSENGLO, China.* (2): 1-21.
- [28] Tadros G (1968) A redescription of *Polygonchobothrium clarius* (Woodland, 1925) Meggit, 1930 (Bothricephlidae: cestoda) with a brief review of the genus. *Polygonchobothrium*. Diesing 1854 and the identity of the genera *Teracampos* Wedl, 1961, *Senga* Dollfus 1935 and *Oncobothriocephalus Yamaguti* 1959. *J. Vet. Sc. VAR*, (5) 53-84.
- [29] Monticelli FS (1890) Note elmintologiche. *Boll. Soc. Nat. Napoli*, 4: 189-208.
- [30] Fernando CH and Furtado JI (1963) A study of some helminth parasites of freshwater fishes in Ceylon *Zeit. Parasitenkunde*, (23): 141-163.
- [31] Furtado JE and Chauhan L (1971) Two new helminth species from the fish *Channa micropatters* Cuvier (*Ophiocephallus*) Malaysia. *Folio Parasit* 18:365.
- [32] Ramadevi P (1973) On *Senga visakhapatnamensis* n.sp. (Cestoda - Pseudophyllidea) from the intestine of the freshwater fish *Ophiocephalus punctatus* Bloch. *Rivista Di. Para.* 34(4) : 281-286.
- [33] Wardle RA, Mcleod JA and Radinovskiy A (1974) *Advances in the Zoology of tapeworm* 1950-1970, University of Minnesota Press, Minneapolis 1- 780.
- [34] Dollfus RPH (1934) Sur un cestode Pseudophyllidaeparasite de Poisson d' Ornement. *Boll. Soc. Zool.France.* 59: 476-490.
- [35] Khade et.al. (2017) *Senga* (ptychobothridae) bothriolata a parasite infestation of *Mastacembelus armatus*. *Int.J. of life science, special issue*, A88/ September,2017.(77-84).
- [36] Ashok Mote et.ai. ((2015) on a new species of genus *Senga* Dollfus, 1934 (Cestoda: ptychobothridae) from fresh water fish *Mastacembelus armatus* (Lecepede, 1800) at Aurangabad Dist. (M.S.) India. *Gjra-Global Journal For Research Analysis-* 265.