

MATERIAL AND METHODS

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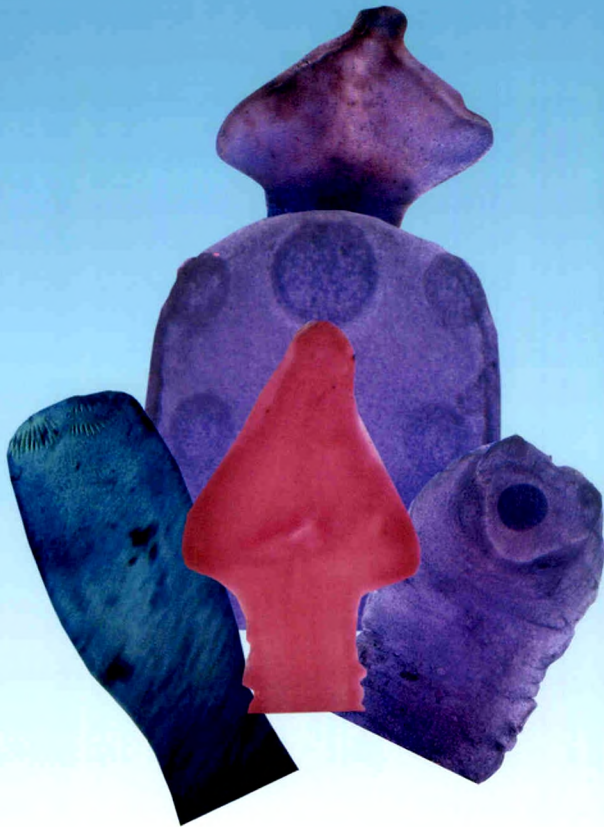
The cestode parasites from fishes were collected from various localities of Krishna river at Karad, Khubi, Rethare Bk and Khodashi dam. The specimens of cestode parasites were collected live and fixed in 4% formalin, for taxonomical study. The worms were stained in Harris haematoxylin, dehydrated, cleared in xylol and were mounted in D.P.X. for systematic study. The drawings are made with the aid of camera lucida. All the measurements are in millimeters unless otherwise indicated. The photoplates are also included in the dissertation.

Five new species of cestodes of fishes in Krishna river identified and classified on the basis of "Advances in the Zoology of Tapeworms" 1950-1970 by Wardle, McLeod and Radinovsky, 1974, "Systema Helminthum" Vol. II by S. Yamaguti, 1939 and recent references.

Keys to the species of the genera *Senga*, *Circumoncobothrium*, *Gangesia*, *Silurotaenia* are provided.

All the specimens, slides of cestode parasites are deposited in the laboratory, Department of Zoology, Krishna Mahavidyalaya, Rethare Bk., Dist. Satara.

TAXONOMY



Senga govindi n. sp.

Cotyloda	Wardle, McLeod and Radinovsky, 1974.
Pseudophyllidea	Carus, 1863.
Ptychobothridae	Luhe, 1902.
<i>Senga</i>	Dollfus, 1934

Senga govindi n. sp.

INTRODUCTION

The genus *Senga* was established by Dollfus, 1934 with its type species *S. besnardi* from *Betta splendens*, the Siamese fighting fish in an aquarium at Vincennes, France, *S. ophiocephalina* Tseng, 1933 as *Anchistrocephalus ophiocephalina* from *Ophiocephalus argus* at Tsinan, China and identified with a form previously recorded by Southwell, 1913 as *Anchistrocephalus polyptera* (*Anchistrocephalus monticelli* 1890 - Syn *Anchistrocephalus*, Luhe 1899) from *Ophiocephalus straiatus* in Bengal, India *S. pycnomerus* Woodland, 1924 as *Bothriocephalus pycnomerus* from *Ophiocephalus marulius* at Allahabad, India. *S. lucknowensis* Johri, 1956 from *Mastacembellus armatus* in India. Fernando and Furtado, 1963 recorded *S. malayana* from *Channa striata*, *S. parva* and *S. filiformis* from *Channa micropelles* at Malacca. Ramadevi and Hanumantharao, 1966 reported the plerocercoid at *Senga* sp. from *Panchax panchax*. Tadros, 1968 synonymised the genus *Senga* with the genus *Polyonchobothrium* and proposed new combs for the species. Furtado and Chauhan, 1971 reported *S. pahangensis* from *Channa micropeltes* at Tasek Bera. Shinde, 1972 redescribed *S. besnardi* from *Ophiocephalus gachua* in India and Ramadevi and Rao, 1973 reported another species *S. visakhapatnamensis* from *Ophiocephalus punctatus* at Visakhapatnam, 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 Tadros' statement. Wardle, McLeod and Radinovsky, 1974 put *Senga* as a distinct genus in the family Ptychobothridae. Later on Shinde and Deshmukh, 1980 added *Senga khami* from *Ophiocephalus marulius*; Jadhav and Shinde added two new species of the genus *Senga* i.e. *Senga godavari* and *Senga aurangabadensis* from *Mastacembellus armatus*. *Senga paithanensis* was reported by Kadam *et al.* 1981 from *Mastacembellus armatus*. Later on Majid *et al.*, 1984 added two species i.e. *Senga raoi* and *Senga jagannathae* from *Channa punctatus*. *Senga gachuae* reported by Jadhav *et al.*, 1991 from *Channa gachua*. Jadhav *et al.* 1991 described *Senga maharashtrii* from *Mastacembellus armatus*. In 1992 Monzer Hasnain described *Senga chauhani* from *Chana punctatus*. *Senga armatusae* was reported by Hiware, 1999 from *Mastacembellus armatus*. Later Patil *et al.* 2003 added *Senga tappi* from *Mastacembellus armatus*. Bhure D.B. *et al.* 2007 added *Senga jadhavae* from *Mastacembellus armatus*.

Recently Mulla *et al.*, 2008 added *S. bhauraoae* from *Mastacembellus armatus*.

The present communication deals with the description of *Senga govindi* n. sp., collected from intestine of fresh water fish *Mastacembellus armatus*, at Khodashi dam, Khodashi, Tal. Karad, Dist. Satara, M.S., India.

DESCRIPTION

Seven cestode parasites were collected from the intestine of fresh water fish, *Mastacembellus armatus* from Krishna river at Khodashi dam, Khodashi, Tal. Karad, Dist. Satara. These parasites were flattened, preserved in 4% formalin. These specimens were stained with Harris haematoxyline, passed through various alcoholic grades; cleared in xylol and these parasites were mounted in D.P.X. and permanent slides were prepared for further taxonomical study.

The scolex is large in size, long barrel shaped in appearance with armed rostellum and two bothria; distinctly marked off from the strobila and measures 0.089 in length and 0.036 in width. The rostellum is medium in size measures 0.02912 in length and 0.09708 in width. The rostellar hooks are pointed; straight 50-53 in number, arranged in two semicircles. The bothria are large in size, extends upto posterior end of the scolex and measures 0.033 to 0.034 in length and 0.0029 to 0.0030 in breadth.

Neck is short.

Mature segments are large in size, broader than long, three times broader than long with lateral margin measure 0.04854 in length and 0.1213 in breadth. The testes are 318-320 (319) in number, small in size, oval in shape, pre-ovarian, scattered in lateral sides of the segments, evenly distributed. The cirrus pouch is small, pre-ovarian, antero-posteriorly elongated and measures 0.9708 in length and 0.9701 in breadth.

Ovary is small, distinctly bilobed, dumbell shaped in appearance, in middle of the segment and measures 0.0364 in length and 0.0361 in breadth. Ovarian lobes are rounded measures 0.099 in diameter. Lobes are connected by each other by isthmus and measures 0.0169 in length. Vagina is long, opens into ootype. Ootype is small, rounded in shape, measures 0.002427 in diameter.

The genital pores are small in size, oval in shape, situated in anterior half of the segment, pre-ovarian and opens medially.

The vitellaria are granular, thin strips from anterior to the posterior margin of the segments on each lateral side of the segment.

DISCUSSION

The genus *Senga* is erected by Dollfus in 1934 as a type species *S. besnardii* from *Betta splendens*. Later on the following species are added to this genus.

- | | | |
|-----|------------------------------|------------------------------|
| 1. | <i>S. opiocephalina</i> | Tseng, 1933 |
| 2. | <i>S. pcynomera</i> | Woodland, 1934 |
| 3. | <i>S. lucknowensis</i> | Johri, 1956 |
| 4. | <i>S. malayana</i> | Furnando and Furnando, 1964 |
| 5. | <i>S. parua</i> | Furnando and Furnando, 1964 |
| 6. | <i>S. pahangensis</i> | Furtado <i>et al.</i> , 1971 |
| 7. | <i>S. visakhapatnamensis</i> | Ramadevi <i>et al.</i> 1973 |
| 8. | <i>S. khami</i> | Deshmukh and Shinde, 1980 |
| 9. | <i>S. aurangabadensis</i> | Jadhav <i>et al.</i> , 1980 |
| 10. | <i>S. godavari</i> | Shinde, <i>et al.</i> , 1980 |
| 11. | <i>S. paithaensis</i> | Kadam <i>et al.</i> , 1981 |

PLATE - 1

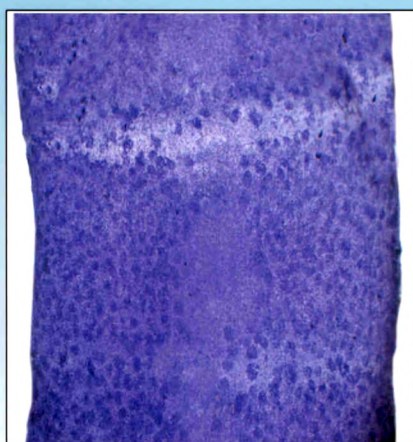
Senga govindae n.sp.



Scolex



Hooks

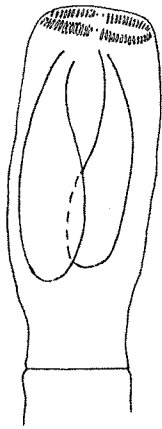


Mature segment

PLATE - I

***Senga govindi* n. sp.**

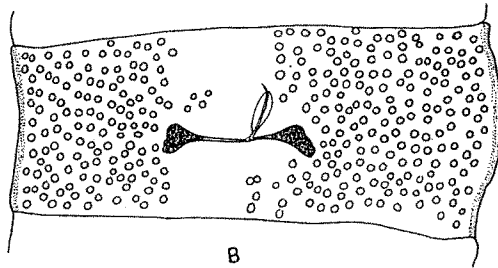
- A. Scolex
- B. Mature Segment
- C. Hooks



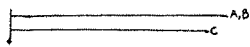
A



C



B



12.	<i>S. raoii</i>	Majid and Shinde, 1984
13.	<i>S. jagannathae</i>	Majid and Shinde, 1984
14.	<i>S. gachuae</i>	Jadhav <i>et al.</i> , 1991
15.	<i>S. maharashtrii</i>	Jadhav and Tat, 1991
16.	<i>S. chauhani</i>	Monzer Hasnain, 1992
17.	<i>S. mohekarae</i>	Tat and Jadhav, 1997
18.	<i>S. armatusae</i>	Hiware, 1999
19.	<i>S. tappi</i>	Patil, 2003
20.	<i>S. ayodhensis</i>	Pande <i>et al.</i> , 2006
21.	<i>S. baughi</i>	Pande <i>et al.</i> , 2006
22.	<i>S. jadhavae</i>	Bhure <i>et al.</i> , 2007
23.	<i>S. bhauraoae</i>	Mulla <i>et al.</i> , 2009

1. The present worm differs from *S. besnardi* in the shape of scolex which is triangular, rostellar hooks are 50 in number; neck absent; total number of testes 160-175.
2. The present cestode differs from *S. ophiocephalina*, which shows rostellar hooks 47-50 in number; neck absent; testes are 50-55 in number.
3. The present tapeworm differs from *S. pycnomera* in the shape of elongated scolex, rostellar hooks 68 in number; mature segments are indistinct; ovary is discontinuous, in two groups.
4. The present worm differs from *S. lucknowensis* which shows pear shaped scolex, rostellar hooks 36-48 in number; vitellaria lobulate and discontinuous in two groups.
5. The present cestode differs from *S. malayana* which shows circular scolex with 60 rostellar hooks.

6. The tapeworm differs from *S. parua* because *S. parua* having pear shaped scolex, rostellar hooks 38-40 in number.
7. The present cestode differs from *S. pahangensis* in the shape of triangular scolex, rostellar hooks are 52 in numbers. Testes laterally situated in the proglottids; vitellaria lobulated.
8. The worm differs from *S. vishakhapatnamensis* which shows circular scolex, rostellar hooks are 46-52 in number, two large rudimentary hooks; neck absent; testes 50-55 in number.
9. The present worm differs from *S. khami* which has rectangular scolex, shallow bothria, rostellar hooks are 55-57 in number; testes rounded, 155 in number; cirrus pouch is elongated.
10. The cestode differs from *S. aurangabadensis* which bear oval scolex, rostellar hooks 50-52 in number, in two half crowns overlapping on each other; neck absent, mature segment longer than broad. Testes 240-260 in number.
11. The present tapeworm differs from *S. godavari* in having pear shaped scolex, broader in the center and tapering at anterior and posterior end, hooks 40-42 in number, which overlap on each other. Neck absent. Testes are rounded, 220-230 in number.
12. This cestode differs from *S. paithanensis* which shows prominent large triangular scolex, rostellar hooks are 54 in number and arranged in two half crowns overlap on each other. Testes are rounded, 130-135 in number. Cirrus pouch oval and curved anteriorly to the isthmus of the ovary in the centre of the segment.

13. This tapeworm differs from *S. jaggnathae* which bears large, oval scolex, rostellar hooks 40-44 in numbers, testes 200-210 in number and vitellaria non lobate to lobate.
14. The present cestode differs from *S. raoii* which bears pear shaped scolex; neck is absent; testes 65-70 in number; vagina is short tube.
15. The cestode under discussion differs from *S. gachuae* in having scolex medium, oval, elongated, rostellar hooks are 22-25 in number. Mature segments almost three times broader than long; testes 300-310 in number and elongated ovary.
16. The present cestode differs from *S. maharashtrii* which shows muscular scolex. Hooks 45-47 in number, large and arranged in two half crowns. Neck absent. Testes oval, 80-90 in number.
17. The present tapeworm differs from *S. chauvani* which shows large oval scolex, rostellar hooks 40-44 in number; testes 200-210 in number and vitellaria are non lobate to lobate.
18. The present cestode differs from *S. mohekarae* which shows rostellar hooks 22-26 in number. Testes 60-70 in number; ovary bilobed, posterior to middle of segments.
19. The worm under discussion differs from *S. armatusae* which shows triangular scolex, rostellar hooks are 32-40 in number, neck absent.
20. The present cestode differs from *S. tappi* which has hooks 42-44 in number. Mature segment three times broader than long. Testes small, rounded; ovary bilobed, elongated, post equatorial, medially situated.
21. The present tapeworm differs from *S. ayodhensis* in the shape of scolex conical, rostellar hooks are 29 in number. Neck absent.

Testes are numerous. Cirrus pouch placed centrally. Ovary bilobed and pre-equatorial.

22. The worm under discussion differs from *S. baughi* which bears two bothria, fleshy notched on two sides; rostellar hooks are 28 in numbers. Neck present. Testes rounded 40-50 in numbers and compact, oval, large, unilobed ovary.
23. The present cestode differs from *S. jadhavae* which has triangular scolex, rostellar hooks 50-54 in numbers. Neck present. Testes are small, rounded 310-320 in number. Cirrus pouch oval and preovarian and large bilobed ovary.
24. The worm under discussion differs from *S. bhauraoe* which having large, dome shaped scolex; rostellar hooks are 35-40 in number. Testes are 150-200 in number. Ovary long, sac like. Vitellaria follicular.

These characters are valid enough to erect new species to these worms under the genus *Senga*, hence the name *Senga govindi* n. sp. is proposed, in honour of Dr. G.B. Shinde, renowned helmenthologist and founder member in the field of study of cestodes in India.

Type species	<i>Senga govindi</i> , n. sp.
Host	<i>Mastacembellus armatus</i>
Habitat	Intestine
Locality	Khodashi Dam, Khodashi, Tal. Karad, Dist. Satara (M.S.), India
Date of collection	30 th Sept. 2007.

A Key to the species of the genus *Senga* Dollfus, 1934

- | | | |
|--|---|---|
| Scolex circular | - | 1 |
| Scolex triangular | - | 2 |
| Scolex oval | - | 3 |
| Scolex pear shaped | - | 4 |
| Scolex elongated | - | 5 |
| Scolex triangular | - | 6 |
| Scolex conical | - | <i>S. ayodhensis</i> Pande <i>et al.</i> ,
2006 |
| | | |
| 1) Hooks below 50
in numbers | - | <i>S. visakhapatnamensis</i>
Ramadevi, 1973 |
| Hooks above 50
in numbers | - | <i>S. malayana</i> Furnando
<i>et al.</i> , 1973 |
| | | |
| 2) Testes 50-57 in
Numbers | - | <i>S. khami</i> Deshmukh <i>et al.</i> ,
1980 |
| Testes below 100
in numbers | - | <i>S. maharashtrii</i> Jadhav
<i>et al.</i> , 1991 |
| 3) Testes in between
100-210 in numbers | - | <i>S. chauhani</i> Monzer
Hasnain, 1992 |
| Testes above 210
in numbers | - | <i>S. aurangabadensis</i> Jadhav
<i>et al.</i> , 1980. |
| Testes 318-320 in
number | - | <i>S. govindi</i> , n.sp. |
| Testes numerous | - | <i>S. armatuse</i> Hiware, 1999. |

- | | | | |
|----|--------------------------------|---|---|
| 4) | Vitellaria follicular | - | 7 |
| | Vitellaria granular | - | 8 |
| | Vitellaria lobulate | - | 9 |
| 5) | Hooks below 100
in numbers | - | <i>S. pycnomera</i> Woodland,
1924 |
| | Hooks above 100
In number | - | <i>S. mohekarae</i> Tat <i>et al.</i> , 1997 |
| 6) | Vitellaria granular | - | 10 |
| | Vitellaria follicular | - | 11 |
| | Vitellaria lobulate | - | <i>S. pahangensis</i> Furtado
<i>et al.</i> , 1971 |
| 7) | Neck absent | - | <i>S. godavari</i> Shinde <i>et al.</i> ,
1980 |
| | Neck present | - | 12 |
| 8) | Testes below 200
in numbers | - | 13 |
| | Testes above 200
in numbers | - | <i>S. jagnnathae</i> Majid <i>et al.</i> ,
1984 |
| 9) | Testes below 100
in numbers | - | <i>S. ophiocephalina</i> Teseng,
1933 |
| | Testes above 100
in numbers | - | <i>S. lucknowensis</i> Johri, 1956 |

- | | | | |
|-----|--------------------------------|---|--|
| 10) | Hooks above 50
in numbers | - | <i>S. besnardi</i> Dollfus, 1934 |
| 11) | Neck absent | - | <i>S. armatusae</i> Hiware, 1999 |
| | Neck present | - | 14 |
| 12) | Ovary bilobed | - | <i>S. gachuae</i> Jadhav <i>et al.</i> ,
1991 |
| | Ovary compact | - | <i>S. boughi</i> Pande <i>et al.</i> 2006 |
| 13) | Neck present | - | <i>S. parua</i> Furnando and
Furtado, 1964 |
| | Neck absent | - | 15 |
| 14) | Testes below 200
in numbers | - | <i>S. paithanensis</i> Kadam
<i>et al.</i> , 1981 |
| | Testes above 200
in numbers | - | <i>S. tappi</i> Patil <i>et al.</i> , 2003 |
| 15) | Testes below 100
in numbers | - | <i>S. raoii</i> Majid and Shinde,
1984. |

Comparative chart showing distinguishing characters of the species of the genus *Senga* Dollfus, 1934

Species Characters	<i>S. ophiocephalina</i> Teseng, 1933	<i>S. besnardi</i> Dollfus, 1934	<i>S. pycnomera</i> Woodland, 1924
Scolex	Pear shaped	Triangular	Elongated
Bothria	Shallow	Shallow	Shallow
Hooks	47-50 in numbers	50 in numbers	68 in numbers
Neck	Absent	Absent	Absent
Mature Proglottids	Broader than long	Wider than long, finally longer wide	Indistinct
Testes	50-55 in numbers	160-175 in numbers	120-150 in numbers
Cirrus pouch	Oval	Oval	Oval
Genital pore	Middle of the proglottid	Mid dorsal	Middle of the proglottid
Ovary	Bilobed but equatorial in position	Compact, not bilobed	Discontinuous in two groups
Vagina	Short tube	Posterior to cirrus pouch	Short tube
Vitellaria	Lobate	Granular	Granular
Host	<i>Ophiocephalus argus</i>	<i>Betta splendens</i>	<i>Ophiocephalus marulius</i>
Country	Tsinan, China	France	India

Species ♂ Characters ♀	<i>S. lucknowensis</i> Johri, 1956	<i>S. maliana</i> Furnando & Furtado, 1964	<i>S. parua</i> Furnando & Furtado, 1964
Scolex	Pear shaped	Circular	Pear shaped
Bothria	Shallow	Shallow	Shallow
Hooks	36-48 in numbers	60 in numbers	38-40 in numbers
Neck	Absent	Present	Present
Mature Proglottids	Broader than long	Broader than long	Broader than long
Testes	100-150 in numbers	120-150 in numbers	150-180 in numbers
Cirrus pouch	Oval	Oval	Oval
Genital pore	Middle of the proglottid	Mid dorsal	Middle of the proglottid
Ovary	Bilobed, post equatorial	Slightly bilobed compact, not bilobed	Discontinuous in two groups
Vagina	Short tube	Posterior to cirrus pouch	Short tube
Vitellaria	Lobate, Discontinuous in two group	Lobated, Discontinuous in two group	Granular
Host	<i>Mastacembellius armatus</i>	<i>Channa striata</i>	<i>Channa micropeltis</i>
Country	India	Malacca	Malacca

Species ♂ Characters ♀	<i>S. pahangensis</i> Furtado <i>et.al.</i> , 1971	<i>S. visakhapatnamensis</i> Ramadevi <i>et.al.</i> , 1973	<i>S. khani</i> Deshmukh & Shinde, 1980
Scolex	Triangular	Circular	Rectangular
Bothria	Shallow	Shallow	Shallow
Hooks	52 in numbers	46-50 in numbers	55-57 in numbers
Neck	Present	Absent	Present
Mature Proglottids	Broader than long	Broader than long	Broader than long
Testes	Testicular lobes situated laterally in the medulla.	50-55 in numbers	Rounded in two field, 155 in numbers
Cirrus pouch	Oval	Oval	Engorgated, anterior half of the numbers
Genital pore	Middle of the proglottid	Mid dorsal	Middle of the proglottids
Ovary	Bilobed, post equatorial	Bilobed	Post equatorial, Bilobed
Vagina	Short tube	Short tube	Convolutated tube
Vitellaria	Lobulated	Bilobated, post equatorial	Follicular
Host	<i>Chianna micropeltis</i>	<i>Ophiocephalus punctatus</i>	<i>Ophiocephalus maritius</i>
Country	Tasak, Bera	India	Aurangabad, M.S., India

Species ♂	<i>S. aurangabadensis</i> Jadhav et.al., 1980	<i>S. godavari</i> Shinde et.al., 1980	<i>S. paithaensis</i> Kadam et.al., 1981
Characters ♀			
Scolex	Oval	Pear shaped, broad a middle, tapering at anterior and posterior	Prominent large, triangular, tapering anteriorly
Bothria	Shallow	Shallow	Shallow
Hooks	50-52 in numbers	40-42 in numbers	54 in numbers
Neck	Absent	Absent	Present
Mature Proglottids	Two times broader than long	Broader than long	Broader than long
Testes	240-260 in numbers, rounded	Rounded arranged in two fields 220-230 in numbers	Rounded, oval 130-135 in numbers, distributed in two lateral group
Cirrus pouch	0.14 in length and 0.06 in breathmedullary	Oval, situated in anterior half of the proglottids	Oval, curved anteriorly to the isthmus of the centre of the proglottids
Genital pore	Middle of the proglotted, rounded	Middle of the proglottids & rounded dorsal	Small and central
Ovary	Bilobed, post equatorial	Bilobed	Post equatorial, Bilobed
Vagina	Short tube	Short tube	Convoluted tube
Vitellaria	Lobulated	Bilobated, post equatorial	Follicular
Host	<i>Mastacembellus armatus</i>	<i>Mastacembellus armatus</i>	<i>Mastacembellus armatus</i>
Country	Tasak, Bera	India	Aurangabad, M.S., India

Species ♂	<i>S. roii</i>	<i>S. jagannathae</i>	<i>S. gachuae</i>
Characters ♀	M.A.Majid & G.B.Shide, 1984	M.A.Majid & G.B.Shide, 1984	Jadhav <i>et.al.</i> , 1991
Scolex	Pear shaped, broad at middle and tapering at both the ends	Pear shaped, broad posterior ends	Medium, oval, elongated
Bothria	Two shallows, latter extending upto the posterior region of the scolex	Pear shaped, broader posterior ends	Two bothria, extended upto posterior end of the scolex
Hooks	46 in numbers	40-44 in numbers	22-25 in numbers
Neck	Absent	Short	Short
Mature Proglottids	Broader than long	Broader than long	Broader than long, almost three times broader.
Testes	65-70 in numbers, rounded	Small, rounded, 240-250 in numbers	300-310 in number
Cirrus pouch	Oval, anterior side of the segment open by common genital pore	Oval in shape	Small and oval.
Genital pore	Middle of the proglottids	Middle of the proglottids	Oval, middle of the proglottid
Ovary	Post equatorial bilobed, each lobe compact	Bilobed, compact, spatulate	Bilobed, elongated
Vagina	Short tube	Anteriorly to cirrus pouch	Thin, long, coiled
Vitellaria	Granular, lateral to testicular fields	Granular	Follicular in 3-4 rows
Host	<i>Channa punctatus</i>	<i>Channa punctatus</i>	<i>Channa gachua</i>
Country	Tasak, Bera	India	India

Species ♂	<i>S. maharshtrii</i> Jadhav & Tat., 1991	<i>S. chauhani</i> Monzer Hasnain, 1992	<i>S. mohetkarae</i> Tat & Jadhav, 1997
Characters ♀			
Scolex	Oval, muscular, broader posterior narrow anteriorly	Large, oval, anteriorly blunt and hooks on rostellum	Pear shaped
Bothria	2, oval extended upto the posterior end of the scolex	Not mentioned	Two bothria, extended upto the posterior end.
Hooks	45-47 in numbers	40-44 in numbers	20-26 in number
Neck	Absent	Short	Present
Mature Proglottids	Broader than long almost double in width than length	Broader than long	4-5 times broader than long
Testes	Broader than long almost in two fields, 80-90 in number	Rounded to oval and the number range between 200-210	60-70 in number
Cirruspouch	Oval in shape	Oval in shape	Small, oval
Genitalpore	Small, oval	Small and central	Oval, middle of the proglottid
Ovary	Bilobed	Bilobed	Bilobed, elongated, posterior to middle of the proglottid
Vagina	Thin, coiled short tube	Thin, tube like, posterior to cirrus pouch	Thin long, coiled
Vitellaria	Follicular, rounded in corticalar region lateral to field, in 4-5 rows	Non-lobulated to lobate	Follicular, 5-6 rows in each side.
Host	<i>Mastacembellus armatus</i>	<i>Channa punctatus</i>	<i>Mastacembellus armatus</i>
Country	Amravati (Daryapur) India	M.S., Jamshedpur, India	Osmanabad, M.S., India

Species ♂ Characters ♀	<i>S. armatusae</i> C.J. Hiware, 1999	<i>S. tappi</i> D.N. Patil, 2003	<i>S. ayodhensis</i> Pande <i>et al.</i> , 2006
Scolex	Triangular, anterior end pointed and posterior end broad	Triangular, anterior end pointed and posterior end broad	Conical
Bothria	2, extended from anterior to posterior end of scolex	2, extended from anterior to posterior end of scolex	Two bothria
Hooks	32-40 in numbers	42-44 in numbers	29 in numbers
Neck	Absent	Present	Absent
Mature Proglottids	Four times broader than long	Three times broader than long	Broader than long
Testes	Small, rounded, distributed densely at lateral side of proglottid	Small, rounded 285-295 in numbers	Numerous, rounded in two lateral in two fields
Cirruspouch	Oval, situated at middle of proglottid, rounded	Small and rounded	Middle of the proglottid, rounded
Genitalpore	Middle of proglottid, rounded	Small and rounded	Middle of the proglottid, rounded
Ovary	Post-equatorial, bilobed, elongated,	Bilobed, elongated, post equatorial	Bilobed, pre-equatorial
Vagina	Anterior, thin tube	Anterior, thin tube	Thin coiled tube
Vitellaria	Double rows follicular, distributed	Follicular, lateral to testicular fields	Thin coiled tube
Host	<i>Mastacembellus armatus</i>	<i>Mastacembellus armatus</i>	<i>Amphipneustes cichia</i>
Country	Pune, M.S., India	Shirpur, (Dhule), M.S., India	India

Species ♂	<i>S. baughi</i> Pande <i>et al.</i> , 2006	<i>S. jadhavae</i> Bhure <i>et al.</i> , 2007
Characters ♀		
Scolex	Pear shaped	Triangular, anterior end pointed and posterior end broad
Bothria	Two, fleshy, notched on two side	Two, ended from anterior to posterior end of the scolex
Hooks	28 in numbers	50-54 in numbers
Neck	Present	Present
Mature Proglottids	broader than long	Three times broader than long
Testes	Rounded, 40-50 in numbers	Small, rounded in shape, distributed in two fields on either side of cirrus pouch 310-320 in numbers
Cirruspouch	Oval,	Oval, preovarian, in the anterior half of the proglottid
Genitalpore	Median, anterior to ovary on dorsal side	Small and rounded
Ovary	Compact, oval, large unlobed	Large, bilobed
Vagina	Thin coiled tube	Thin tube
Vitellaria	Follicular	Follicular, lateral side of proglottid
Host	<i>Rita rita</i>	<i>Mastacembellus armatus</i>
Country	India	India

Species ♂ Characters ♀	<i>S. bhairaoae</i> Mulla <i>et al.</i> , 2008	<i>S. govindii</i> , n. sp.
Scolex	Large, dome shaped	Large, long, barrel shaped in appearance
Bothria	Two in number	Two in number
Hooks	35-40 in numbers	50-53 in numbers
Neck	Very short	Very short
Mature	Broader than long	Three times broader than long
Proglottids		
Testes	Smaller, 150-200 in number	Small, oval 318-320 in number
Cirruspouch	Medium in size ,	Small, preovarian anterior-posteriorly elongated
Genitalpore	Small	Small
Ovary	long sac like	Distinctly bilobed, dumb-belled shaped
Vagina	Slightly coiled tube	Long tube like
Vitellaria	Follicular	Granular
Host	<i>Mastacembellus armatus</i>	<i>Mastacembellus armatus</i>
Country	India	India

Circumoncobothrium karadensis n. sp.

Cotyloda	Wardle, McLeod and Radinovsky, 1974.
Pseudophyllidea	Carus, 1863.
Ptychobothridae	Luhe, 1902.
<i>Circumonocobothrium</i>	Shinde, 1968
<i>Circumonocobothrium karadensis</i> n. sp.	

INTRODUCTION

The genus *Circumonocobothrium* is erected by Shinde in 1968, from the intestine of freshwater fish, *Ophiocephalus leucopunctatus* as a type species *C. ophiocephali*. Chincholikar in 1976 described two new species of *Circumonocobothrium* as *C. shindei* and *C. bagariusi* from freshwater fishes *Mastacembellus armatus* and *Bagariusi* sp. respectively.

Shinde, 1976 described *C. khami* from *Ophiocephalus striatus*. Later Jadhav and Shinde, 1976 added two new species of this genus viz. *C. aurangabadensis* and *C. raoi* from *Mastacembellus armatus*. Further Jadhav and Shinde 1976 described *C. gachuae* from *Ophiocephalus gachua*. Later Chincholkar and Shinde in 1977 added two new species *C. shindei* and *C. bagariusi*. Shinde 1977 reported *C. khami* from *Ophicephalus*. Jadhav *et al.*, 1990 recorded *C. yamaguti* from *Mustacembellus armatus*. Shinde *et al.*, 1999 reported *C. alii* from *Mustacembellus armatus*.

Patil *et al.* 1998 reported *C. vadgaonensis* and Wongsawad *et al.*, 1998 described *C. baimaii*. Kalase and Shinde *et al.*, in 1999 reported *C.*

punctatusi. Shinde *et al.*, 2002 reported *C. Mastacembellusae* from *Mastacembellus armatus*. Pawar *et al.*, 2002 reported new species *C. armatusae* from *Mastacembellus armatus*.

Tat and Jadhav, 2004 reported *C. manjari* from *Ophiocephalus gachua*. Supugade *et al.*, 2005 added *C. vitellariensis* from *Mastacembellus armatus*.

Recently, Kharade *et al.*, 2008 added *C. cirrhinae* from *Cirrhina mrigala*.

The present communication deals with the description of two new species under the same genus as *C. karadensis*, n. sp. and *C. retharensis*, n. sp. from the intestine of freshwater fish *Mastacembellus armatus* and *Channa marulius* from Krishna river at Karad and Rethare Bk., Tal. Karad, Dist. Satara, (M.S.), India.

DESCRIPTION

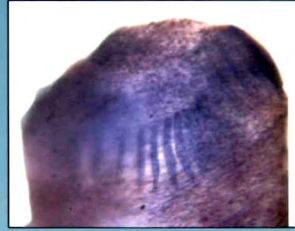
Seven specimens of cestode parasites were collected from the intestine of fresh water fish, *Mastacembellus armatus* at Karad, Tal. Karad, Dist. Satara. These parasites were flattened, preserved in 4% formalin. The parasites were stained with Harris haematoxylin. After passing through various alcoholic grades, parasites were cleared in xylol, mounted in D.P.X. and then observed under microscope for taxonomical studies.

PLATE - 2

Circumoncobothrium karadensis n.sp.



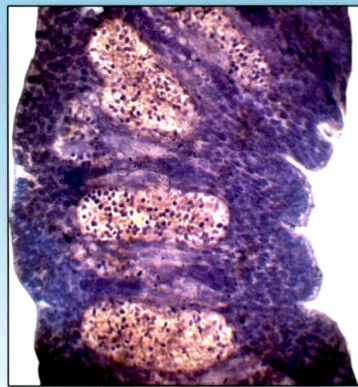
Scolex



Hooks



Mature segment

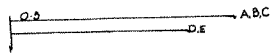
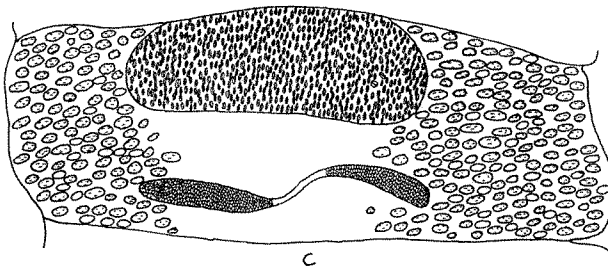
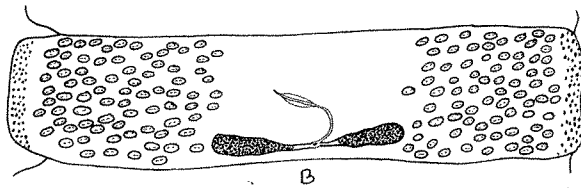
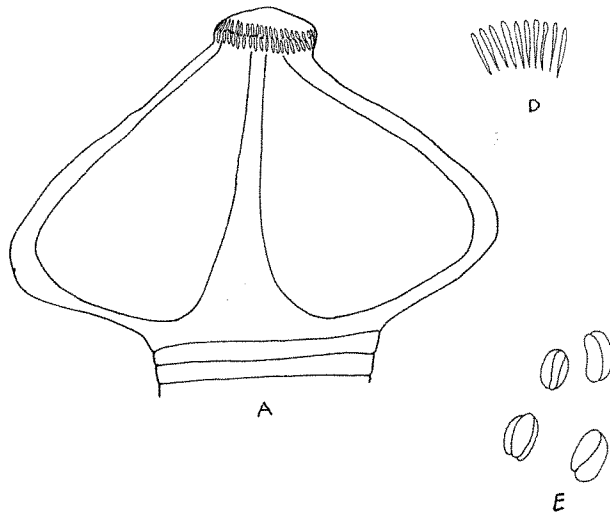


Gravid segment

PLATE - II

***Circomoncobothrium karadensis* n. sp.**

- A. Scolex
- B. Mature Segment
- C. Gravid segment
- D. Hooks
- E. Fertilized eggs



The scolex is larger in size and roughly pear shaped in appearance, narrow at anterior side and posterior side, broad in middle and measures 0.08252 in length and 0.01213 in breadth.

Rostellum is distinct and measures 0.0995 in length and 0.02427 in breadth. The rostellar hooks are present, they are 40-43 in number; no gap in between. The hooks are arranged in four quadrants and measures 0.0995 in length and 0.002427 in width.

The bothria are two in number, large, slightly triangular extending almost upto the posterior end of the scolex and measures 0.6796 in length and 0.0728 in breadth.

The neck is absent.

The mature segments are broader than long. It is three times broader than long with irregular convex lateral margin and measures 0.03154 in length and 0.01456 in width.

Testes are oval in shape, follicular, 150-154 in number; on lateral side of ovary, scattered at both side, from anterior to posterior margins of the segments and measures 0.08707 in length and 0.02813 in breadth. The cirrus pouch is medium in size, oval in shape, pre-ovarian, almost at the centre of the segment. It measures 0.004851 in diameter. Cirrus is thin, runs anteriorly.

Ovary is medium in size, distinctly bilobed, lobes are oval transversely placed. It measures 0.04854 in length and 0.01698 in width.

The ootype is small and rounded in shape, measures 0.2427 in length and 0.2326 in breadth. Genital pores are small and oval in shape.

Vitelline follicles are small in size, oval in shape arranged in 4-5 rows at each lateral side.

Gravid proglottids are broader than long. It consists of bean shaped uterus at posterior side of segment and measures 0.048 in length and 0.148 in breadth. The uterus is filled with eggs. The eggs are oval, measures 0.026 in length and 0.075 in width.

DISCUSSION

The genus *Circumoncobothrium* was erected by Shinde, 1968 with the type species *C. ophocephali*. Later on following species are added to this genus.

- | | |
|------------------------------|-------------------------------|
| 1. <i>C. aurangabadensis</i> | Jadhav and Shinde, 1976 |
| 2. <i>C. raoii</i> | Shinde and Jadhav, 1976 |
| 3. <i>C. gachuae</i> | Jadhav and Shinde, 1976 |
| 4. <i>C. shindei</i> | Shinde and Chincholikar, 1976 |
| 5. <i>C. bagariusi</i> | Chincholikar and Shinde, 1976 |
| 6. <i>C. khami</i> | Shinde, 1977 |
| 7. <i>C. yamaguti</i> | Jadhav <i>et al.</i> , 1990 |

8. <i>C. alii</i>	Shinde <i>et al.</i> , 1994
9. <i>C. vadgaonensis</i>	Patil, 1998
10. <i>C. baimaii</i>	Wongsawad and Jadhav, 1998
11. <i>C. punctatusi</i>	Kalase and Shinde <i>et al.</i> , 1999.
12. <i>C. armatusae</i>	Shinde <i>et al.</i> , 1999.
13. <i>C. Mastacembellusaei</i>	Shinde <i>et al.</i> , 2002.
14. <i>C. armatusae(Minor)</i>	Pawar <i>et al.</i> , 2002.
15. <i>C. manjari</i>	Tat and Jadhav, 2004.
16. <i>C. vitellariensis</i>	Supugade <i>et al.</i> , 2005
17. <i>C. cirrhinae</i>	Kharade <i>et al.</i> , 2008.

The tapeworm under discussion, *Circumonocobothrium karadensis* n. sp. is having the scolex large and rounded; rostellar hooks are 40-43 in number. Neck is absent. Mature segment three times broader than long. Testes 150-154 in number. Cirrus pouch is medium, oval in shape. Ovary is bilobed.

1. The worm under discussion *Circumonocobathrium karadensis* n. sp. differs from *C. ophiocephali* is not having distinct scolex; rod shaped rostellar hooks, 80 in number; presence of neck. Testes are 90-100 in number. Large, oval, single, compact ovary. Vitellaria 3-4 in rows.
2. The present cestode differs than *C. aurangabadensis* as it's hooks are rod shaped, 42 in number. Neck is present. Testes are 130-140 in number. Unequal lobed bilobed ovary is present. Vitellaria follicular in 2-3 rows.

3. The present worm differs from *C. raoii* as it has 46 rod shaped hooks. Neck is present. Testes are 190-200 in number. Enequal lobed ovary is present. Vitellaria in 2-3 rows.
4. The worm under discussion differs from *C. gachuae* which is having oval scolex. 46 rostellar hooks. Neck is present. Mature segment squarish, testes 375-400 in number.
5. The present cestode differs from *S. shindei* which bears broad scolex. 49 rostellar hooks are rod shaped. Neck is present. 260-275 testes are present. Dumbell shaped ovary is present. Granular vitellaria.
6. The present tapeworm differs from *C. bagariusi* which has 55, rod shaped longer hooks, neck is absent, testes 275-285, 5 to 6 lobed ovary is present.
7. The worm under discussion differs from *C. khami* as it's scolex is cylindrical with even width, apical disc separated by notch, lancet shaped, small and large 48 rostellar hooks are present. Neck is absent. Mature segments are squarish. 199-200 rounded testes are present. Ovary is bilobed with compact lobes, near posterior and centre of the segment folliculars, are in single layer.
8. The tapeworm differs from *C. yamaguti* which bears distinct scolex, 56 number of rostellar hooks. Neck is absent. Testes are 130-150 in number. Granular, cortical Vitellaria.
9. The cestode differs from *C. alii* as it shows triangular scolex, 36 rostellar hooks. Neck is present. Testes are 230-240 in number. Vitellaria are granular.

10. The present cestode differs from *C. vadgaonensis* as it bears triangular scolex; large and small rostellar hooks, 56 in number. Vitellaria are follicular in two rows.
11. The present tapeworm differs from *C. baimaii* which bears pear shaped scolex, rostellar hooks are 48 in number. Testes are 88-100 in number.
12. The present cestode parasite also differs from *C. punctatusi* is not having rectangular scolex, rostellar hooks 40-50 in number. Neck is present. Mature preglottids are squarish. Testes are 140-150 in number. Ovary is small with rounded acini. Vitellaria are small, follicular with 3-6 rows.
13. The present cestode differs from *C. armatusae* which has triangular scolex; slightly curved 23 rostellar hooks are present. Testes are 90-100 in number. Vitellaria are 3-4 in rows.
14. The worm under discussion differs from *C. Mastacembellusaei* which bears pear shaped scolex. Rostellar hooks are rod shaped 38 in number. Neck is absent. 130-140 testes are present. Vitellaria follicular in 2-3 rows.
15. The present cestode differs from *C. armatusae* which is having triangular scolex. Straight rostellar hooks, 58 in number. Neck is absent. Testes are 190-200 in number. Unequal lobes, distinct ovary. Vitellaria follicular 2-3 in rows.
16. The tapeworm differs from *C. manjari* as having triangular scolex; rostellar hooks are 48 in number with single circle. Neck is present, 128-145 testes are present.
17. The worm under discussion differs from *C. vilellariensis* which shows triangular, large scolex, 48 number of rostellar hooks are

present. Neck is absent. Testes are 250-260 in number. Ovary bilobed with unequal lobes. Vitellaria follicular in 3-4 rows.

18. The worm under discussion differs from *C. cirrhinae* as it is having barrel shaped scolex. Rostellar hooks are 56 in number, arranged in single circle. Short neck is present. Mature segment is large and squarish. 300-305 testes are present. Ovary is dumbbell shaped. Vitellaria are granular in the form of thin strips.

The above noted characters are enough to erect a new species for these worms and hence the name *Circumonocobothrium karadensis* n. sp. is proposed after name of Karad city of Satara district.

Type species	<i>Circumonocobothrium karadensis</i> , n. sp.
Host	<i>Mastacembellus armatus</i>
Habitat	Intestine
Locality	Karad, Tal. Karad, Dist. Satara (M.S.), India
Date of collection	30 th Sept. 2007.

Circumoncobothrium retharensis n. sp.

Cotyloda	Wardle, McLeod and Radinovsky, 1974.
Pseudophyllidea	Carus, 1863.
Ptychobothridae	Luhe, 1902.
<i>Circumonocobothrium</i>	Shinde, 1968.

Circumonocobothrium retharensis n. sp.

DESCRIPTION

Six specimens of cestode parasites were collected from the intestine of *Channa marulius* from Krishna river at Rethare Bk., Tal. Karad, Dist. Satara, M.S., India.

These parasites were flattened and preserved in 4% formalin. The worms were stained with Harris haematoxylin and passed through various alcoholic grades, cleared in xylol and mounted in D.P.X. for observation under the microscope for the taxonomical studies.

The worms are thin, elongated, consist of scolex, immature, mature and gravid proglottids.

The scolex is large in size, conical in shape, longer than broad, pointed at anterior side, larger at middle and becomes narrow at posterior. It measures 0.01019 in length and 0.08252 in breadth.

Rostellum is distinct, large, muscular, oval in shape, armed with hooks and measures 0.02427 in length and 0.01456 in breadth.

The rostellar hooks are 40 in number arranged in a single circle, in four quadrants, stout, rod shaped. It measures 0.07766 in length and 0.03398 in width.

The bothria are large in size, sac like in appearance, narrow anteriorly, broad posteriorly, occupying almost the whole region of the scolex and measures 0.034 in length and 0.0027 in breadth.

Neck is short.

The mature segments are broader than long, almost six times broader than long with convex lateral margin, with short, blunt projections and measures 0.013 to 0.177 in length and 0.150 to 0.161 in width. The testes are 172-176 in number. small in size. oval in shape and distributed lateral to ovary at the lateral 1/3 rd width of the segments on each side, leaving 1/3rd space in the middle of the segment from anterior to posterior margins of the segment.

Cirrus pouch small in size. oval in shape. pre-ovarian. almost at the centre of the segments and measures 0.090 in length and 0.034 in width. Cirrus is thin and measures 0.102 in length and 0.011 in width.

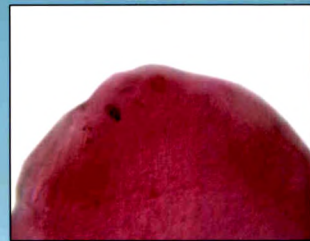
Ovary is small in size, distinctly bilobed, transversely placed almost posterior to middle of the segments and measured 0.035 in length and 0.032 in breadth. Ovarian lobes are connected to each other by tube like structure isthmus. Vagina arises from genital

PLATE - 3

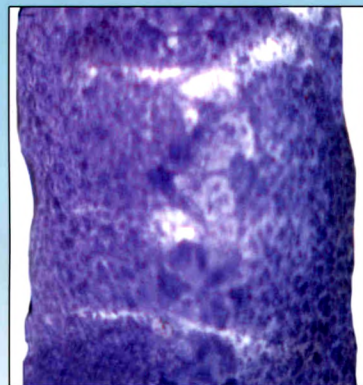
Circumoncobothrium retharesis n.sp.



Scolex



Hooks



Mature segment

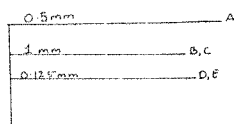
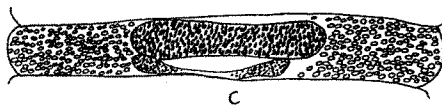
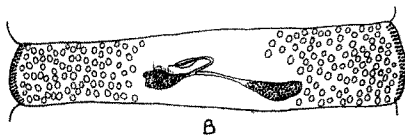
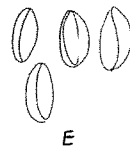
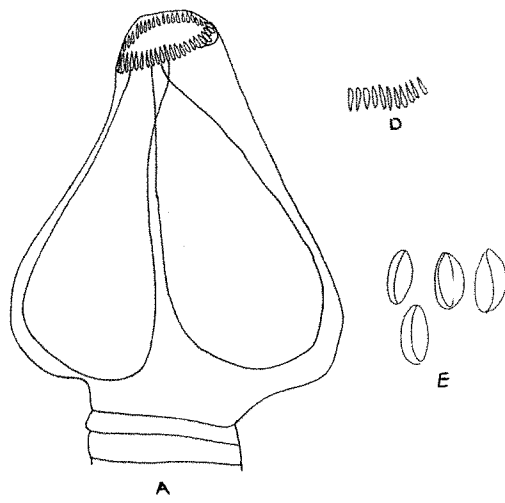


Gravid segment

PLATE - III

***Circomoncobothrium retharensis* n. sp.**

- A. Scolex
- B. Mature Segment
- C. Gravid segment
- D. Hooks
- E. Fertilized eggs



pore, takes one curve, runs posteriorly, reaches and opens in to the ootype and measures 0.0037 in length and 0.0031 in breadth.

Ootype is small in size, rounded in shape, placed on isthmus and measures 0.022 in diameter. Genital pores are small in size, oval in shape, pre-ovarian, almost at the centre of the segments and measures 0.043 in length and 0.0023 in width.

Vitellaria are follicular, small in size, arranged in 3-4 rows on each lateral side, lateral to the testicular field from anterior to posterior margin of the segments.

Gravid segments consist of transversely elongated uterus, pre-ovarian and loaded with oval eggs; measures 0.022 in length and 0.219 in width. Fertilized eggs are oval measures 0.004 in length and 0.002 in width. Uterus is sac like, measures 0.017 in length and 0.00777 in breadth.

DISCUSSION

The genus *Circumoncobothrium* was erected by Shinde, 1968. The following species are added to this genus.

- 1) *C. ophiocephali* Shinde, 1968
- 2) *C. aurangabadensis* Jadhav and Shinde, 1976
- 3) *C. raoii* Shinde and Jadhav, 1976
- 4) *C. gachuae* Jadhav and Shinde, 1976
- 5) *C. shindei* Shinde and Chincholikar, 1976
- 6) *C. bagariusi* Chincholikar and Shinde, 1976

- | | | |
|-----|-----------------------------|--|
| 7) | <i>C. khami</i> | Shinde, 1977 |
| 8) | <i>C. yamaguti</i> | Jadhav <i>et al.</i> , 1990 |
| 9) | <i>C. alii</i> | Shinde <i>et al.</i> , 1994 |
| 10) | <i>C. vadgaonensis</i> | Patil, 1998 |
| 11) | <i>C. baimaii</i> | Wongsawad and Jadhav 1998 |
| 12) | <i>C. panctatusi</i> | Kalose and Shinde <i>et al.</i> , 1999 |
| 13) | <i>C. armatusae</i> | Shinde <i>et al.</i> , 1999 |
| 14) | <i>C. Mastacembellusae</i> | Shinde <i>et al.</i> , 2002 |
| 15) | <i>C. armatusae</i> (Minor) | Pawar <i>et al.</i> , 2002 |
| 16) | <i>C. manjari</i> | Tat and Jadhav, 2004 |
| 16) | <i>C. vitellariensis</i> | Supugade <i>et al.</i> , 2005 |
| 17) | <i>C. cirrhinae</i> | Kharade <i>et al.</i> , 2008 |
| 18) | <i>C. karadensis</i> | (described earlier) |

The tapeworm under discussion, *Circumonocobothrium retharensis* n.sp. is having large scolex, rostellar hooks are 40 in number, arranged in single circle. Short neck is present. Mature segments broader than long. Testes 174-176 in number. Ovary is bilobed, connected by isthmus. Vitellaria are follicular in 2-3 row.

1. The worm under discussion differs from *C. ophlocephali* bearing distinct scolex with rod shaped rostellar hooks which are 80 in number. Neck is present. 90-100 testes are present. Vitellaria are follicular 3-4 rows.
2. The worm under discussion differs from *C. aurangabadensis* which have 42 rod shaped hooks. 130-140 testes are present. Bilobed ovary.

3. The new cestode differs from *C. raoi* as having rod shaped 46 rostellar hooks. Neck is present. 190-200 testes are present. Vitellaria are in 2-3 rows.
4. The present cestode differs from *C. gachae* without oval scolex. Rostellar hooks are 46 in number. Neck is present. Mature segment is squarish in shape. Testes are 375-400 in number.
5. The present cestode differs from *C. shindei* with broad scolex. Rostellar hooks are rod shaped 49 in number. 260-275 number of testes are present. Ovary is dumbell shaped.
6. The worm under discussion differs from *C. bagariusi* as bearing rod shaped 55 rostellar hooks. Testes are 275-285 in number. Multilobed ovary is present.
7. The cestode differs from *C. khami* which bears cylindrical scolex with even width, apical disc separated by notch. Rostellar hooks are 48 in number which are lancet shaped. Mature segment is squarish. Testes are 199-200 in number.
8. The tapeworm under discussion differs from *C. yamaguti* as having distinct scolex. Rostellar hooks are 48 in number. Neck is absent. 130-150 testes are present. Vitellaria are granular.
9. The worm under discussion differs from *C. alii* which bear triangular scolex. Rostellar hooks are 36 in number. Neck is present. 230-240 testes are present. Vitellaria is granular.
10. The worm under discussion differs from *C. vadgaonensis* which have triangular scolex. Rostellar hooks are 56 in number. Neck is present. Testes are 490-510 in number.
11. The tapeworm differs from *C. baimaii* as having pear shaped scolex. 48 number of rostellar hooks. Testes are 88-100 in number.

12. The present cestode differs from *C. punctatusi* which bears rectangular scolex. 40-50 rostellar hooks are present. Mature segment is squarish. 140-150 testes are present small, rounded ovary is present.
13. The worm under discussion differs from *C. armatusae* as having triangular scolex. Rostellar hooks are 23 in number. 90-100 testes are present.
14. The cestode differs from *C. Mastacembellusaei* as having pear shaped scolex. Rod shaped 38 rostellar hooks are present. Neck is absent. Testes are 130-140 in number.
15. The worm under discussion differs from *C. armatusae* which bears triangular scolex. Rostellar hooks are 58 in number. Testes are 190-200 in number. Ovary is distinct. Vitellaria are follicular.
16. The cestode differs from *C. manjari* which bears triangular scolex; 48 rostellar hooks. Neck is present. Testes are 128-145 in number.
17. The tapeworm differs from *C. vitelloriensis* as bearing triangular scolex. Rostellar hooks 48 in number 250-260 testes are present. Ovary is bilobed.
18. The cestode differs from *C. cirrhinae* which bears barrel shaped, scolex. Rostellar hooks are 56 in number. Neck is present. Squarish mature segment is present. Testes are 300 to 305 in number. Ovary is dumbbell shaped. Vitellaria are granular.
19. The cestode under discussion differs from *C. karadensis* n. sp. (described earlier) which bears large and rounded scolex. Rostellar hooks 40-43 in number. Neck is short. Testes 150-154 in number. Ovary is bilobed. Vitellaria follicular in 4-5 rows.

The above noted characters are enough to erect a new species for these worm and hence the name *Circumoncobothrium retharensis* n. sp. is proposed after the name of the village Rethare Bk., Dist. Satara.

Type species	<i>Circumoncobothrium retharensis</i> n. sp.
Host	<i>Channa marulius</i>
Habitat	Intestine
Locality	Rethare Bk., Tal. Karad, Dist. Satara, M.S., India
Date of collection	5 th January 2007

**A KEY TO THE SPECIES OF THE GENUS
CIRCUMONCOBOTHRIUM SHINDE, 1968**

- | | | | |
|--|---|--|---|
| Neck present | - | | 1 |
| Neck absent | - | | 2 |
| | | | |
| 1) Vitellaria granular | - | | 3 |
| Vitellaria follicular | - | | 4 |
| | | | |
| 2) Mature proglottids squarish | - | <i>C. khami</i> Shinde, 1977 | |
| Mature proglottids broader than long | - | | 5 |
| | | | |
| 3) Scolex triangular | - | <i>C. alii</i> Shinde, <i>et al.</i> , 1994 | |
| Scolex pear shaped | - | <i>C. baimaii</i> Wongsawad
and Jadhav, 1998 | |
| Scolex narrows anteriorly
and broad posteriorly | - | <i>C. shindei</i> Chincholikar
<i>et al.</i> , 1976 | |
| Scolex broad in the middle
and narrow at both end | - | | 6 |
| | | | |
| 4) Mature proglottids squarish | - | | 7 |
| Mature proglottids broader
than long | - | | 8 |
| | | | |
| 5) Hooks 21-25 in number | - | <i>C. armatusae</i> Shinde <i>et al.</i> , 1999 | |
| Hooks above 30 in numbers | - | | 9 |

- Hooks in between 45-50 in numbers - *C. vitellariensis* Supugade *et al.*, 2005.
- Hooks above 50 in numbers - 10
- 6) Testes below 200 in numbers- *C. aurangabadensis* Jadhav *et al.*, 1976
- Testes above 200 in numbers - *C. raoii* Jadhav and Shinde, 1976
- Testes above 300 in number - *C. cirrhinae* Kharade *et al.*, 2008
- 7) Scolex rectangular in shape - *C. punctatusae* Jadhav *et al.*, 1976
- Scolex pear shaped - *C. gachuai* Jadhav *et al.*, 1976
- 8) Hooks 40 in number - *C. karadensis* n. sp.
- Hooks 48 in numbers - *C. manjari* Tat *et al.*, 2004
- Hooks 56 in numbers - *C. vadgaonensis* Patil, 1998
- Hooks 80 in numbers - *C. ophiocephali* Shinde, 1968.
- 9) Scolex pear shaped - *C. Mastacembellusaei* Shinde *et al.*, 2002.
- 10) Testes in between 130-150 in numbers *C. yamaguti* Jadhav *et al.*, 1990
- Testes in between 174-176 in numbers *C. retharensis* n. sp.
- Testes in between 190-200 in numbers *C. armatusae minor* Pawar *et al.*, 2002.
- Testes in between 275-285 in numbers *C. bagariusi* Chincholikar *et al.*, 1976.

Comparative chart showing an account of old and new species of the genus *Circumonobothrium* Shinde, 1968.

Species ♂ Characters ♀	<i>C. ophicephali</i> Shinde, 1968	<i>C. aurangabadensis</i> Jadhav and Shinde, 1976	<i>C. raoii</i> Jadhav and Shinde, 1976
Scolex	Distinct	Broad in middle and narrow at both ends	Broad in middle and narrow at both ends
Hooks	80 in numbers, rod shaped	42 in numbers, rod shaped	46 rod shaped
Neck	Present	Present	Present
Mature Proglottids	Broader than long length 0.34, breadth 1.83	Broader than long length 0.52, breadth 2.11	Broader than long length
Testes	Small, oval, follicular, distributed in two lateral field, 90-100 in number	130-140 in numbers, unevenly distributed in lateral field	190-200 in number, unevenly distributed in two group
Ovary	Large, oval, a single mask and compact	Distinctly bilobed, compact, unequal lobes	Distinctly bilobed, situated at posterior half of the segment, lobe unequal
Vitellaria	Follicular, small, round in 3-4 rows on each side	Small follicular, round arranged in 2-3 row on each side	Follicular, oval in 2-3 rows open each side.
Host	<i>Ophicephalus leucopuntatus</i>	<i>Mastacembellus armatus</i>	<i>Mastacembellus armatus</i>
Country	India	India	India

Species ♂	<i>C. gachuae</i>	<i>C. shindei</i>	<i>C. bagariusi</i>
Characters ♀	Jadhav and Shinde, 1976	Shinde & Chincholikar, 1976	Chincholikar and Shinde, 1977
Scolex	Pear shaped	Narrow anteriorly, broad	Narrow anteriorly
Hooks	46 in numbers,	49 in numbers, rod shaped	55 rod shaped larger
Neck	Present	Present	Absent
Mature Proglottids	Squarish	Broader than long	Broader than long
Testes	375-400 in number	Evenly distributed 260-275 (273) in numbers	In two lateral fields 275-285 (276) in numbers
Ovary	Bilobed, posterior-equilateral short, with blunt acini,	Bilobed, dumbell shaped with long isthmus lobes rounded and compact situated in the centre of the segment length	Bilobed in middle one third of segment each lobe with 5-6
Vitellaria	Follicular	Granular	Follicular
Host	<i>Ophiocephalus gachua</i>	<i>Mastacembellus armatus</i>	<i>Bagarius bagarius</i> species
Country	India	India	India

Species & Characters ♂	<i>C. khami</i> Shinde, 1977	<i>C. yamaguti</i> Jadhav et al. 1990	<i>C. alii</i> Shinde et al., 1994
Scotex	Cylindrical with even width, apical disc separated by notch	Distinct narrow anteriorly, broad posteriorly	Triangular, narrow anteriorly broad posteriorly
Hooks	48, lancet shaped, two type large and small	56, single circle, straight stout	36, single circle, two types
Neck	Absent	Absent	Present
Mature Proglottids	Squarish	Broader than long	Broader than long
Testes	199-200 in numbers, rounded	130-150 in numbers, rounded in two lateral fields	230-240 in numbers, evenly distributed
Ovary	Bilobed, each lobe compact situated in near the posterior and centre of the segment	Bilobed, centrally placed near the posterior margin of the segment	Distinctly bilobed, centrally placed lobes, oval and compact
Vitellaria	Follicules, rounded in a single layer near the lateral margin	Granular, cortical, along lateral margin	Granular, at lateral margin of the proglottids
Host	<i>Ophiocephalus</i>	<i>Mastacembellus armatus</i>	<i>Mastacembellus armatus</i>
Country	India	India	India

Species ♂ Characters ♀	<i>C. vadgaonensis</i> Patil, Shinde <i>et al.</i> , 1998	<i>C. baimaii</i> Wongsawad and Jadhav, 1998	<i>C. punctatusi</i> Kalse and Shinde <i>et al.</i> , 1999
Scolex	Triangular	Pear shaped	Medium, rectangular
Hooks	56, of two types large and small in single circle	48, of two type large and small in single circle	40-50 (48), arranged in single circle, stout, tapering at both ends
Neck	Present	Present	Present
Mature Proglottids	Slightly broader than long	Broader than long	Squarish, 6-7 times broader than long
Testes	490-510 in numbers, evenly distributed	88-100 in numbers	140-150 in numbers
Ovary	Distinctly bilobed, lobes compact, situated at posterior half of the proglottid	Compact	Medium, short blunt, round acini
Vitellaria	Follicular, oval in two rows	Granular at lateral sides	Follicular, small, round in 3-6 rows on each side
Host	<i>Mastacembellus armatus</i>	<i>Mastacembellus armatus</i>	<i>Ophiocephalus punctatus</i>
Country	Vadgaon, Dist. Kolhapur (M.S.) India.	India	India

Species ♂ Characters ♀	<i>C. armatusae</i> Shinde et al., 1999	<i>C. Mastacembellusaei</i> Shinde et al., 2002	<i>C. armatusae</i> (Minor) Pawar et al., 2002
Scolex	Large, Triangular	Pear shaped	Triangular, broad at the base tapering at apex
Hooks	23, slightly curve, stout, larger hooks in center	38, rod shaped	58, straight, small and large in single circle
Neck	Present	Absent	Absent
Mature Proglottids	3-4 times broader than long	Broader than long	Broader than long
Testes	Small, oval, follicular, distributed in two lateral field, 90-100 number	130-140 in numbers, unevenly distributed in lateral field	190-200 in numbers, unevenly distributed in two group
Ovary	Large, oval, a single mask and compact	Distinctly bilobed, compact, unequal lobes	Distinctly bilobed, situated at posterior half of the segment, lobe unequal
Vitellaria	Follicular, small, round in 3-4 rows on each side	Small follicular, round arranged in 2-3 row on each side	Follicular, oval in 2-3 rows open each side
Host	<i>Mastacembellus armatus</i>	<i>Mastacembellus armatus</i>	<i>Mastacembellus armatus</i>
Country	India	India	India

Species & Characters ♀	<i>C. manjari</i> Tat and Jadhav, 2004	<i>C. vitellariensis</i> Supugade et al., 2005	<i>C. cirrhinae</i> Kharade et al. 2007
Scolex	Triangular, broader at the base tapering at anteriorly	Triangular, broader at the base tapering at apex	Cylindrical barrel shaped, almost even with 1.030 length, 0.374 to 0.495 breadth
Hooks	48, small and large in single circle	48, round at the base, pointed at the apex, short and long	56 smaller and larger
Neck	Present	Absent	Short
Mature Proglottids	Broader than long, convex lateral margin	3-4 times broader than long	Squarish, slightly broader than long
Testes	128-145 in numbers, rounded	250-260 in numbers, oval, pre-ovarian	300-305 distributed in two groups
Ovary	Bilobed, just posterior to the middle of the proglottid	Distinctly bilobed, compact, unequal lobes	Distinctly bilobed, dumbbell shaped with 7-8 short, blunt round acini
Vitellaria	Follicular, small, round in 3-4 rows on each side	Follicular, small, rounded, 3-4 rows on each lateral side	Granular, thin strips, contricular on each lateral side
Host	<i>Opiocephalus gachua</i>	<i>Mastacembellus armatus</i>	<i>Cirrhinae mrigala</i>
Country	India	India	India

Species ♂ Characters ♀	<i>C. karadensis</i> n. sp.	<i>C. retharensis</i> n. sp.
Scolex	Large, round in shape	Large, conical pointed antero-posteriorly
Hooks	40-43 in number arranged in quadrants	40 in number arranged in single circle.
Neck	Absent	Short
Mature Proglottids	3 times broader than long	Broader
Testes	Oval, 150-154 in number	174-176 in number
Ovary	Medium sized, bilobed ovary	Bilobed, lobes are connected to each other by isthmus
Vitellaria	Follicular, in 4-5 rows	Follicular, in 2-3 rows
Host	<i>Mastomys armatus</i>	<i>Chaerma marulius</i>
Country	India	India

Gangesia (G.) subhashae n. sp.

Eucestoda	Wardle, McLeod and Radinovsky, 1974.
Protocephalidea	Mola, 1928
Proteocephalidea	La Rue, 1914
<i>Gangesia</i>	Woodland, 1924

Gangesia (G.) subhashae n. sp.

INTRODUCTION

The genus *Gangesia* was erected by Woodland in 1924. The description of *Gangesia* by Southwell, 1913 was very meager and Verma, 1928 gave a fresh account of the same form. In the same paper Verma also described *G. pseudotropii* from *Silurus gangia* and *G. agraensis* from *Wallago attu*. Southwell, 1930 however recognized only four valid species of the same genus, other being regarded as synonyms and *G. parasiluri* was reported by Yamaguti, 1934. Later on Wardle, McLeod, 1952 accepted Verma's *G. pseudotropii* which is proposed as new genus *Vermala* by Nybelin, 1942 but later Dhar and Fotedar, 1980 added on more species and given a revised diagnosis of the genus *Gangesia* and proposed to divide genus *Gangesia* Woodland, 1924 into two sub-genera as 1) *Gangesia (Gangesia)* 2) *Gangesia (Vermaia)*.

Gangesia (Gangesia) have genital proes irregularly alternating, neck and strobila without spines, rostellum with single or double rows of hooks and testes in one field; *Gangesia (Vermaia)* have genital pores regularly alternating, neck and strobila with spine, rostellum with single crown of hooks and testes in single or double field. The

species reported by Fotedar and Dhar, 1980, *G. jamunensis* and *G. kashmirensis* are placed in sub genus *Vermaia* and *Gangesia* respectively. They further pointed out that in *G. pogpnchis* and *G. polyonchis*, Freze, 1956 are referred to be the subgenus *vermaia*. Dhar *et al.*, 1980 were not including *Gangesia sindensis*, Rchana and Bilgue, 1977 in their list. Later Malhotra added *G. sanechensis* and *G. mehanadabadensis* in 1980 and 1981 respectively. Malhotra *et al.*, 1980 have upheld the synonymy of *G. lucknowai*, Singh, 1948, with *G. bengalensis* Southwell, 1913 as discussed earlier by Rai, 1966. But later Seth and Capoor, 1982 have accommodated *G. polygonchis* and *G. oligonchis* previously kept in subgenus *Vermaia* by Dhar *et al.* and erected a new subgenus *frezia*.

The present communication deals with the description of *Gangesia subhashae* n. sp. from the genus *Gangesia* collected from the intestine of freshwater fish at Khubi, Tal. Karad, Dist. Satara, M.S., India.

DESCRIPTION

Five specimens of cestode parasites were collected from the intestine of *Mastacembellus armatus* at Khubi, Tal. Karad, Dist. Satara. These parasites were flattened, preserved in 4% formalin. The parasites were stained with Harris haematoxylin. After passing through various alcoholic grades, parasites were cleared in xylol, mounted in D.P.X. and then observed under microscope for taxonomical studies.

PLATE - 4

Gangesia subhashae n.sp.



Scolex



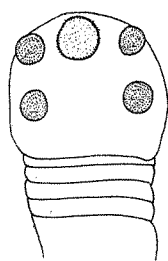
Mature segment

PLATE - IV

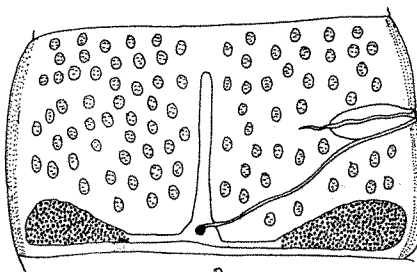
***Gangesia (G.) subhashe* n. sp.**

A. Scolex

B. Mature Segment



A



B



Scolex is distinctly marked off from the strobila, large in size and muscular with four simple suckers. Fifth apical sucker is present. Scolex measures 0.056 in length and 0.0606 in width.

Rostellum is rounded and measures 0.015 in diameter. Four suckers are medium in size, rounded in shape, arranged in two pairs, one pair in each half of scolex, not overlapping each other and measures 0.085 in diameter.

Neck is absent, segmentation starts immediately behind the scolex.

The mature segments are distinct, large in size. It is broader than long with convex lateral margins. It measures 0.0545 to 0.643 in length and 1.150 to 1.785 in breadth. Testes are medium in size, oval in shape, these are scattered in each half side of mature proglottids, 90 in number, unevenly distributed in two lateral fields, pre-ovarian and measures 0.013 in length and 0.0011 in width.

Cirrus pouch is medium in size, oval in shape, cylindrical, slightly obliquely placed, situated just anterior to middle of the segments and measures 0.241 - 0.281 in length and 0.014 - 0.021 in breadth. Cirrus is thin, coiled, contained within the cirrus pouch and measures 0.284 - 0.305 in length and 0.031 - 0.091 in breadth. Vas deferens is short and thin.

Ovary is distinctly bilobed, medium in size, situated near the posterior margin of the segments with unequal lobes and measures 0.473 in length and 0.221 in width.

Vagina is thin, starts from genital pore, placed posterior to cirrus pouch, extending obliquely, reaches and opens in ootype and measures 0.741 - 0.751 in length and 0.08 - 0.45 in breadth.

Ootype is small, round and measures 0.201 in diameter. Uterus is elongated and sac like and measures 0.475 in length and 0.23 in breadth.

Genital pores are small in size, almost oval, irregularly alternately situated.

Vitellaria are granular, thin strips, from anterior to posterior margins of the segments on each lateral side of the segments.

DISCUSSION

The genus *Genesia* was erected by Woodland in 1924. Southwell, 1913 gave description of *Gangesia*. Verma, 1928 described *G. pseudotropii* from *Silurus gangia* and *G. agraensis* from *Wallago attu*.

Later on many species have been added by different authors in the genus *Gangesia* (*Gangesia*) are as follows.

1. *G. bengalensis* Southwell, 1913
2. *G. macrons* Woodland, 1924
3. *G. pseudotropii* Varma, 1928

- | | | |
|-----|---------------------------|-------------------------------|
| 4. | <i>G. parasiluri</i> | Yamaguti, 1934 |
| 5. | <i>G. lucknowia</i> | Singh, 1948 |
| 6. | <i>Polyonchis</i> | Roitmand and Frezz 1609 |
| 7. | <i>G. mehamdabadensis</i> | Malhotra <i>et al.</i> , 1981 |
| 8. | <i>G. sonhensis</i> | Malhotra <i>et al.</i> , 1980 |
| 9. | <i>G. haryanae</i> | Gupta and Arora, 1982 |
| 10. | <i>G. indica</i> | Gupta and Arora, 1982 |
| 11. | <i>G. fotedari</i> | Dhar and Majdah, 1984 |
| 12. | <i>G. hanumaniti</i> | Amitha Seth and Capoor, 1982 |
| 13. | <i>G. godavarii</i> | Kadam <i>et.al.</i> , 1983 |
| 14. | <i>G. paithanensi</i> | Jadhav <i>et.al.</i> , 1983 |
| 15. | <i>G. aurangabadensis</i> | Shinde and Wankhede, 1990 |
| 16. | <i>G. sumani</i> | Shinde and Wankhede, 1990 |
| 17. | <i>G. maharashtrii</i> | Jadhav and Hiware, 1995 |
| 18. | <i>G. dharurensis</i> | Jadhav and Tar, 1997 |
| 19. | <i>G. seenghali</i> | Hiware, 1999 |
| 20. | <i>G. clariusae</i> | Jadhav <i>et.al.</i> , 2001 |
| 21. | <i>G. rohita</i> | Pawar <i>et.al.</i> , 2004 |
| 22. | <i>G. (G.) mastacembi</i> | Hemlata Wankhede, 2004 |

All the above authors have not considered the subgenus *Gangesia* (*Gangesia*) and later suggested by Dhar and Fotedar, 1980. But the literature show that there are no spines on scolex and strobila, genital pores irregularly alternating, hence above species should be placed in the subgenus *Gangesia*.

1. The worm under discussion differs from *G. bengalensis*; which has scolex narrow at anterior and posterior and broad at middle. Hooks are 28-42 in numbers. Short neck is present.

Testes are 100 in numbers. Ovary is bilobed and compact. Uterus has lateral diverticulae on each side.

2. The present cestode differs from *G. macrons* which has broad scolex. Hooks are 33 in single complete ring. Neck is absent. Testes are 100 in numbers. Bilobed, compact ovary is present. Vagina is posterior to cirrus pouch. Uterus with 20-30 diverticulae.
3. The present cestode differs from *G. perudotropii* which bears the scolex broader at middle. Hooks are 17-20 in number, a compact ring. Short neck is present. Testes are 100-160, in two lateral fields. Ovary is bilobed.
4. The worm under discussion differs from *G. parasiluri* which bears scolex, broader in middle and narrow at anterior and posterior side. 34 hooks are in two rows. Short neck is present. Testes are 8-85 in two lateral fields. Bilobed ovary with many acini. Uterus with 20 lateral diverticulae on each side.
5. The worm under discussion differs from *G. lucknowia* which bears short neck. Testes are 130-150, in number. Bilobed ovary with squarish lobes. Uterus is with 16-18 lateral diverticulae.
6. The cestode is differ from *G. polyonchis* which bears 40-52 number of hooks and uterus is with 12-18 lateral diverticulae.
7. The worm under discussion differs from *G. mahamdabadensis* which has small scolex and 66 rostellar hooks.
8. The present cestode differs from *G. sanhensis* which bears indistinct from body sucker. Hooks are 22-25 in single circle. Neck is present. 112-118 testes are present. Vas deferens is coiled. Ovary is follicular at posterior end of segment. Uterus is branched with 10-12 finger shaped diverticulae.

9. The cestode under discussion differs from *G. haryanaei* as lacks of spines on the sucker. 20 rostellar hooks are present. Uterus is with 20 lateral diverticulae on each side.
10. The cestode under discussion differs from *G. indica* which has 24-26 hooks in two circles. Neck is absent. Testes are 25 in number. Uterus is with 18-20 diverticulae.
11. The present worm differs from *G. fotedari* which has oval scolex. Rostellar hooks are 30-48 in number. Neck is absent. Testes are 120-134 in numbers.
12. The worm under discussion differs from *G. hanumanthi* as it is having hooks 24-28 in number. Testes are in 45-75 in number. Ovary is anterior to posterior to cirrus pouch. Uterus is with 9-16 lateral diverticulae. Vitellaria are follicular.
13. The cestode under discussion differs from *G. paithanensis* which bears oval scolex. Hooks are 11 in number. Neck is absent. Testes are 280-300 in number. Ovary is bilobed with few blunt acini. Uterus is with 16-18 lateral diverticulae. Vitellaria are follicular in 3-4 rows.
14. The cestode under discussion differs from *G. godavari* which bears scolex almost triangular with four round suckers. 22 hooks are in semicircle. Neck is short. Testes are 220-240 in number. Bilobed ovary is present. Uterus is tubular.
15. The present tapeworm differs from *G. aurangabadensis* as it bears oval scolex with four large suckers. Hooks are 48 in number arranged in two circle. Neck is present. Testes are 350-360 in number. Ovary is bilobed. Uterus is long, tube like.
16. The worm differs from *G. sumani* which is having scolex with triangular rostellum. Neck is short. Testes are 103 in number,

arranged in two field. Ovary is bilobed with 4-6 acini. Uterus is tubular.

17. The tapeworm under discussion differs from *G. maharashtri* which is having triangular and distinctly marked scolex. Hooks are 40-45 in single circle. Neck is absent. Testes are 170-185 in number.
18. The present cestode differs from *G. dhaaruensis* which have globular distinctly marked scolex. Hooks are 35-40 in number. Long neck is present. Testes are 60-70 in number, distributed throughout the segment. Bilobed, compact ovary is present. Uterus is sac like.
19. The present tapeworm differs from *G. senghali* which is having distinct scolex, globular, muscular and with rostellum and four large round suckers. Neck is absent. Testes are 220-230 in number. Ovary bilobed, 'H' shaped, with small acini. Uterus tubular with 18-19 diverticulae.
20. The worm under discussion differs from *G. clariusae* as it is having triangular scolex. Hooks are long, nail like, 17-20 in number. Neck is long and thick. Testes are 85-90 in number. Ovary is bilobed, long with finger like lobes. Sac like uterus is present.
21. The cestode differs from *G. rohita* which bears oval scolex with four suckers. Rostellar hooks are 30-32 in number. Short neck is present. Testes are 145-155 in number. Vas deferens thin, short and curved. Ovary large and bilobed.
22. The worm under discussion differs from *G. (Gangesia) mastacembi* which bears triangular scolex. Hooks are broad at base and tapering at the end. Neck is absent. Testes are 170-190

in number. Ovary is bilobed with 4-6 acini. Uterus is tubular, long, extends upto the anterior end of segment.

The above noted characters are valid enough to accommodate these worms into a new species, hence the name *Gangesia (G.) subhashae* n. sp. is proposed in the honour of Dr. Subhash V. Kharade, Former Reader and head, Department of Zoology and Former I/c Principal of Krishna Mahavidyalaya, Rethare Bk., who is the founder member of Department of Zoology and Krishna Mahavidyalaya, Rethare Bk., Tal. Karad, Dist. Satara, (M.S.) India.

Type species	<i>Gangesia (G.) subhashae</i> n. sp.
Host	<i>Wallago attu</i>
Habitat	Intestine
Locality	Khubi, Tal. Karad, Dist. Satara, M.S., India
Date of collection	9 th January 2007

Key to the species of the genus *Gangesia*, Woodland, 1924

- | | | |
|--|---|--|
| Present of neck | - | 1 |
| Absence of neck | - | 2 |
| | | |
| 1) Uterus tubular | - | <i>G. godavari</i> , Kadam <i>et al.</i> , 1983 |
| Uterus sac like | - | 3 |
| Uterus with 10-24
diverticula | - | <i>G. polyonchis</i> , Riotman and
Frez, 1964 |
| Uterus with 16-18
diverticula | - | <i>G. lucknowia</i> Singh, 1934. |
| Uterus with 20-24
diverticula | - | <i>G. parasiluri</i> , Yamaguti, 1934. |
| Uterus with 20-28
diverticula | - | <i>G. haryanae</i> , Gupta and Arora,
1982. |
| Uterus with 30-40
diverticula | - | <i>G. pseudotropii</i> , Verma, 1928. |
| | | |
| 2) Rostellar hooks 11-12
in numbers | - | <i>G. paithanensis</i> , Kadam
<i>et al.</i> , 1983 |
| Rostellar hooks 18
in numbers | - | <i>G. mastacembali</i> , Wankhede,
2004 |
| Rostellar hooks 22-25
in numbers | - | <i>G. sanhensis</i> , Malhotra, Capoor
and Shinde, 1982 |
| Rostellar hooks 24-28
in numbers | - | <i>G. indica</i> Gupta and Parmar,
1982 |

- Rostellar hooks 35-47 - *G. teesgaonesis* n. sp.
in numbers
- Rostellar hooks 33 - *G. macrone*, Woodland, 1924
in numbers
- Rostellar hooks 36-38 - *G. seengali*, Hiware, 1999
in numbers
- Rostellar hooks 40-50 - *G. maharastrii*, Jadhav *et al.*, 1995
in numbers
- 3) Scolex oval in shape - *G. rohita*, Pawar *et al.*, 2004
Scolex globular in shape - *G. dharurensis*, Jadhav and
Tat, 1997
- 4) Ovary bilobed, finger like- *G. clariusae*, Jadhav *et al.*, 2001
Ovary bilobed, butterfly - *G. Subhashae* n. sp.
Shaped
- 5) Testes 100 in number - *G. bengalensis* Southwell, 1913
Testes 120-134 - *G. fotedari* Dhar & Majdah, 1984
in numbers

Comparative chart showing distinguishing characters of the species of the genus *Gangesia* Woodland, 1924

Species ♂ Characters ♀	<i>G. bengalensis</i> Sowthwell, 1913	<i>G. macrons</i> Woodland, 1924	<i>G. pseudotropii</i> Verma, 1928
Scolex	Narrow, anterior and posterior, broader at the middle	Broader in the middle	Broader at the middle
Hooks	28-42 in numbers	33 in numbers	17-20 in numbers
Neck	Short	Neck is absent	Short
Testes	100 in numbers	100 in numbers	100-160 in two lateral fields
Vas deferens	Do not continue inside the cirrus pouch	Do not continue inside the cirrus pouch	Continue inside the cirrus pouch
Ovary	Bilobed, compact	Bilobed, compact	Bilobed, compact
Vagina	Anterior or posterior to cirrus pouch, posteroventral to cirrus pouch	Posterior to cirrus pouch	---
Uterus	Lateral diverticulae on each side	20-30 diverticulae on each side	30-40 diverticulae
Host	<i>Ophiocephalus striatus</i>	<i>Macrones seengala</i>	<i>Pseudotrophius garua</i>
Country	---	India	---

Species ♂ Characters ♀	<i>G. parasiluri</i> Yamaguti, 1934	<i>G. lucknowia</i> Singh, 1948	<i>G. polyorchis</i> Roitman and Frezz, 1969
Scolex	Narrow, anterior and posterior broader at the middle	--	--
Hooks	34 in two rows	--	40-52 in numbers
Neck	Short	Neck short	--
Testes	80-85 in numbers	130-150 in numbers	--
Vas deferens	Continue inside the cirrus pouch	--	--
Ovary	Bilobed with many acini	Bilobed, lobes squarish	--
Vagina	posterior to cirrus pouch,	--	--
Uterus	20 lateral diverticulae on each side	16-18 lateral diverticulae	12-18 lateral diverticulae
Host	<i>Parasilurus asotus</i>	<i>Eutropichtithys vacha</i>	---
Country	India	Japan	--

Species ♂ Characters ♀	<i>G. mehamdabadensis</i> Malhotra et al. 1981	<i>G. haryanaei</i> Gupta and Arora, 1982	<i>G. sanhensis</i> Malhotra et al. 1982
Scolex	Small	Lacking spines on the sucker	Indistinct from body, sucker with 4-5 rows of spines
Hooks	66 in numbers	20 in numbers	22-25 in single circle
Neck	-	Short	Present
Testes	-	200 in numbers	112-118 bounded laterally by excretory canal
Vas deferens	--	--	Coiled
Ovary	--	--	Follicular at posterior end of segment
Vagina	-	--	Posterior to cirrus pouch
Uterus	--	20 lateral diverticulae on each side	Branched with 10-12 lateral finger shaped diverticulae
Host	<i>Mystus tengra</i>	<i>Wallago attu</i>	<i>Cirrhina mrigala, Wallago attu</i>
Country	India	India	India

Species ♂	<i>G. indica</i>	<i>G. hanumanthi</i>	<i>G. fotedari</i>
Characters ♀	Gupta and Parmar, 1982	Amita Seth & Capoor, 1982	Dhar and Majdah, 1984
Scolex	--	0.330-0.350 x 0.3664-0.519	oval
Hooks	24-26 in two circles	24-26 in numbers	30-48 in numbers
Neck	Neck absent	Absent	Absent
Testes	125 in numbers	45-75 in number	120-134 in number
Vas deferens	--	--	--
Ovary	--	--	--
Vagina	-	Anterio posterior to cirrus pouch	--
Uterus	18-20 lateral diverticulae	9-16 lateral uterine diverticulae	9-15 diverticulae
Host	<i>Wallago attu</i>	<i>Wallago attu</i>	<i>Glyptothorax</i>
Country	India	India	India

Species ♂ Characters ♀	<i>G. paithanesis</i> Jadhav et al. 1983	<i>G. godavari</i> Kadam et al. 1983	<i>G. aurangabensis</i> Shinde and Wankhede, 1990
Scollex	Oval	Almost triangular, 4 round suckers	Oval in shape, 4 large suckers
Hooks	11 in number	22 hooks in semi circle, two types of hooks	48 hooks arranged in two circles
Neck	absent	Short	Present
Testes	280-300 in numbers	220-240 in number	350-360 in number, oval in shape
Vas deferens	Short	Very coiled	--
Ovary	Bilobed with few blunt acini	Bilobed	Bilobed and compact
Vagina	Anterior to cirrus pouch	posterior to cirrus pouch	--
Uterus	16-18 lateral diverticulae	Tubular	Tube like long
Host	<i>Barbus ticto</i>	<i>Barbus ticto</i>	<i>Macrones shinghala</i>
Country	India	India	India

Species ♂ Characters ♀	<i>G. sumani</i> Shinde and Wankhede, 1990	<i>G. maharashtri</i> Hiware and Jadhav, 1995	<i>G. dharurensis</i> Jadhav and Tat, 1997
Scolex	Scolex with triangular rostellum	Triangular and distinctly marked	Globular distinctly marked
Hooks	--	Hooks in single circle, 40-45 in number	35-40 in number
Neck	Short	Neck absent	Nack long
Testes	103 in number, arranged in two fields	170-185 in number, distributed throughout, small, oval, preovarian	60-70 in number, distributed throughout segment
Vas deferens	Coiled	Thin posterior bent	Large, straight, thin
Ovary	Bilobed with 4-6 acini	Bilobed, lobed compact with irregular margin	Bilobed, compact
Vagina	Posterior to cirrus pouch	Thin, posterior to cirrus pouch, curved	Wide, Antero-lateral to cirrus pouch
Uterus	Tubular	Sac like	Uterus sac like
Host	<i>Mastacembellius armatus</i>	<i>Wallago attu</i>	<i>Wallago attu</i>
Country	India	India (Karad, dist. Satara, M.S.)	India (Ambachondi river, Dist. Beed)

Species ♂ Characters ♀	<i>G. senghali</i> Hiwale, 1999	<i>G. clariusae</i> Jadhav et al., 2001	<i>G. rohita</i> Pawar et al., 2004
Scolex	Distinct, globular, muscular with rostellum and 4 big round suckers.	Triangular	Oval with 4-suckers, armed rostellum
Hooks	36-38 in number, single circle	Long, nail like 17-20 in number	Rostellar hooks, 30-32 in number
Neck	Neck absent	Long and thick	Short
Testes	220-230 in number, oval to elongated, small, pre ovarian at anterior ¾ part of proglottids	Round to oval, 85-90 in number	Medium, oval 145-155 in number
Vas deferens	Coiled	Very short, straight, thin	Thin, short, curved
Ovary	Bilobed 'H' shaped, with small acini	Bilobed, long, finger like lobes	Large and bilobed
Vagina	Posterior to cirrus pouch	Thin	Thin posterior to cirrus pouch
Uterus	Tubular, 18-19 diverticulae	Sac like	--
Host	<i>Mystus senghala</i>	<i>Clarias batrachus</i>	<i>Labeo rohita</i>
Country	India (Satara M.S.)	India	India

Species ♂ Characters ♀	<i>G. (Gangesia) mastacemblii</i> Wankhede Hemlata, 2004	<i>G. (Gangesia) subhashae</i> n.sp.
Scolex	Triangular, with rostellum, 4- big oval sucker	Larger, muscular
Hooks	Broader at the base and tapering at the end	-
Neck	Neck absent	Short neck
Testes	170-190 in number, oval	80-90 in number
Vas deferens	Long, coiled	Long and thin
Ovary	Bilobed with 4-6 acini	Bilobed, medium sized
Vagina	Posterior to cirrus pouch	In ootype
Uterus	Tubular, long, extends upto the anterior end of segment	Sac like
Host	<i>Mystus seenghala</i>	Walagoatta
Country	India (Godavari river)	India

Silurotaenia jadhavae n. sp.

Eucestoda	Wordle, McLeod and Radinovsky, 1994
Preteocephallidea	Mola, 1928
Proteocephalidae	La Rue, 1911
<i>Silurotaenia</i>	Nybelin, 1942

Silurotaenia jadhavae n. sp.

INTRODUCTION

The genus *Silurotaenia* was erected by Nybelin, 1942 from *Silurus glanis*. Later on Shinde, Deshmukh and Chincholikar, 1975 described *S. nybelini* from *Pseudeutroplus taakree*. Later Shinde, Kadam and Jadhav, 1984 reviewed the genus. *S. macroni* was reported from *Macrones singhala* and *Barbus ticto*.

Shinde, 1984 reported *S. singhali* from *Macrones singhala*, *S. barbusi* & *S. ticto* from *Barbus ticto*. Deshmukh, 1984 reported *S. behairnathi* and Wankhede, 2002 reported *S. godavari* from *Saperata seengala*.

The present communication deals with description of *Silurotaenia jadhavae* n.sp. collected from the intestine of fresh water fish *Wallago attu* at Karad, Tal. Karad, Dist. Satara.

DESCRIPTION

Four specimens of cestode parasite were collected from the intestine of fresh water fish *Wallago attu* from Krishna river at Karad, Tal. Karad, Dist. Satara, (M.S.), India.

The worms were flattened, preserved in 4% formalin, stained with Harris haematoxylin, cleared in xylol and mounted in D.P.X., whole mount slides were prepared for further taxonomical studies. The drawings are made with the aid of Camera lucida. All the measurements are in millimeter.

The scolex is large in size, almost quadrangular in shape, highly muscular, measures 0.06060 in length and 0.7575 in breadth. Rostellum is large, rounded in shape present at the centre of segment, larger than suckers and measures 0.0215 in length and 0.0201 in breadth. The suckers are four in number, rounded in shape, small in size, equidistantly placed almost at four corners of a segment. They are muscular; measures 0.01508 in diameter.

Neck is short.

The mature segments are large in size, nearly three times broader than long with irregular convex lateral margins and measures 0.04854 in length and 0.1116 in breadth.

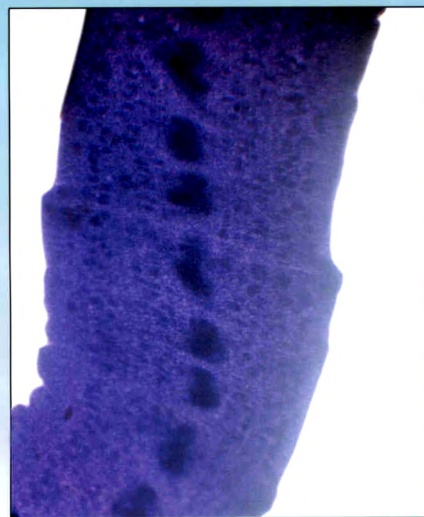
The testes are oval, 101 in number, scattered in two lateral fields, from anterior to posterior margins of segments. Cirrus pouch is medium in size, elongated, situated in anterior 1/3rd segments and opens marginally. It measures 0.004854 in length and 0.0040 in breadth. Cirrus is thin, coiled. Vas deferens is thin, short, medium in size, runs obliquely, directed slightly posterior.

PLATE - 5

Silurotaenia jadhavae n.sp.



Scolex

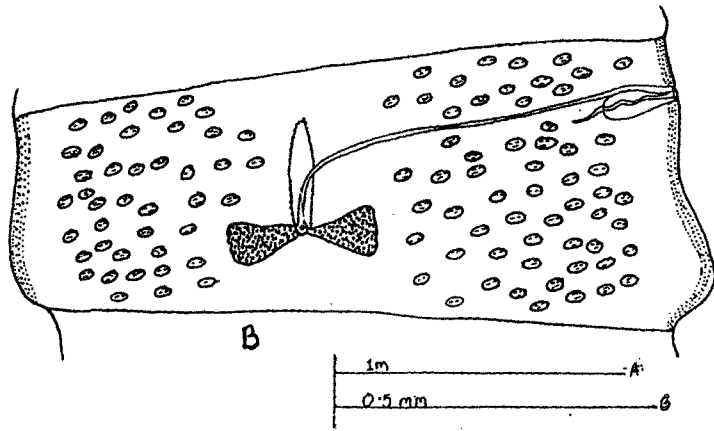
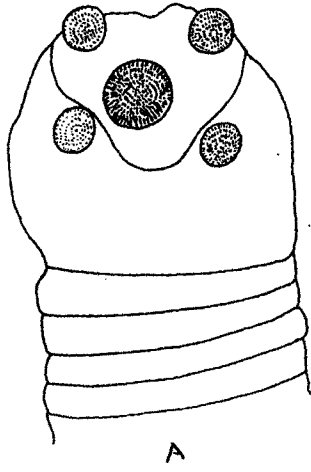


Mature segment

PLATE - V

***Silurotaenia jadhavae* n. sp.**

- A. Scolex
- B. Mature Segment



Ovary is medium in size, butterfly shaped showing ootype at the centre, situated at posterior half of the segment and measures 0.02427 in length and 0.02420 in breadth. The ovarian lobes are large in size, almost triangular in shape and measures 0.0085 in length and 0.0080 in breadth.

Vagina is thin, tube like, situated anterior to the cirrus pouch, starts from the genital pores, extends medially, obliquely, turns posteriorly, reaches and opens in to ootype and measures 0.004800 in length and 0.00340 in breadth.

Ootype is smaller, oval in shape and measures 0.004851 in length and 0.004800 in breadth. Genital pores are small, oval in shape situated marginally at 1/3rd part of the segment and measure 0.0033 in length and 0.0027 in breadth. Uterus is sac like, present at anterior side of the segments.

The vitellaria are granular strips of medium width on each lateral side and from anterior to the posterior margins of the segments.

DISCUSSION

The genus *Silurotaenia* was erected by Nybelin, 1942 from *Silurus glanis*. Later on the following species are added to this genus.

- | | | |
|----|------------------------------|-----------------------------|
| 1. | <i>Silurotaenia nybelini</i> | Shinde <i>et al.</i> , 1975 |
| 2. | <i>Silurotaenia macroni</i> | Shinde, 1984 |
| 3. | <i>Silurotaenia singhali</i> | Shinde, 1984 |

- | | | |
|----|----------------------------------|-------------------------------|
| 4. | <i>Silurotaenia barbusi</i> | Shinde <i>et al.</i> , 1984 |
| 5. | <i>Silurotaenia tictco</i> | Shinde <i>et al.</i> , 1984 |
| 6. | <i>Silurotaenia behairvnathi</i> | Deshmukh <i>et al.</i> , 1989 |
| 7. | <i>Silurotaenia godavari</i> | Wankhede and Jadhav 2002 |

1. The present worm differs from *S. nybelini*, which is having well developed bluntly pointed scolex; 'U' shaped ovary; testes are 130-140 in number.
2. The worm under discussion differs from *S. macroni* which bears large scolex, mature segments are almost squarish. Testes are rounded, medium in size, 68 in number. Ovary is bilobed, each lobe is broad with six to seven short acini; uterus tubular.
3. The present cestode under discussion, differs from *S. singhali* which has very long scolex, broader at the base and tapering anteriorly, rostellum is transversely elongated. Testes are oval in shape, 375-395 in number, ovary bilobed with blunt acini.
4. The present cestode differs from *S. barbusi* which bears large scolex, rostellum large. Testes are of medium size, rounded, 135-140 in number. Ovary bilobed, broad fan shaped lobes with many short blunt acini.
5. The worm under discussion differs from *S. tictco* as having scolex well marked, broad at the base and tapering anteriorly. Rostellum is large, oval in shape. Testes are medium in size, 575-590 in number. Ovary is bilobed, elongated with few short and blunt acini.
6. The present cestode differs from *S. behairvnathi* with distinct longer scolex, neck long. Proglottids almost squarish. Ovary

almost quadrangular, single mass, large. Testes spherical 200-250 in number. Cirrus sac oval. Cirrus thin, unarmed.

7. The present worm differs from *S. godavari* with small quadrangular, scolex indistinctly marked off from neck. Rostellum is large, armed with two circles of hooks. Mature segments are squarish, broader than long. Testes oval in shape, 220-230 in number. Ovary bilobed and compact.

In the view of above differences it is regarded as a new species for which the name *Silurotaenia jadhavae* n.sp. is proposed in the honour of Late Dr. B. V. Jadhav, Professor and Head, Department of Zoology, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, who has contributed a lot in our knowledge of Helminthology.

Type species	<i>Silurotaenia jadhavae</i> n. sp.
Host	<i>Wallago attu</i>
Habitat	Intestine
Locality	Karad, Tal. Karad, Dist. Satara, M.S., India
Date of collection	30 th September 2007

Key o the species of the genus *Silurotaenia* Nybelin 1984

- | | | | |
|----|-------------------------------------|----|---------------------------|
| 1. | Testes less than 200 | .. | 2 |
| | Testes more than 200 | .. | 3 |
| 2. | Ovary bilobed | .. | 4 |
| | Ovary 'U' shaped | .. | <i>S. nybelini</i> |
| 3. | Ovary fan shaped, testes | .. | |
| | 130-140, Cirrus pouch cylindrical, | | |
| | extends upto the middle | | |
| | of the segment | .. | <i>S. barbusi</i> |
| | Ovary extends upto the | .. | |
| | Excretory canal, Testes 68-70, | | |
| | Vitellaria are in group of granular | | <i>S. macroni</i> |
| 4. | Vitellaria follicular | .. | 5 |
| | Vitellaria granular, testes | .. | |
| | 575-590, cirrus pouch saccular | .. | <i>S. ticto</i> |
| 5. | Cirrus pouch elongated a little | | |
| | beyond the excretory canal | | |
| | testes 370-390 | .. | <i>S. singhala</i> |
| | Cirrus pouch not extended | | |
| | beyond excretory canal, testes | | |
| | 220-230, vitellaria follicular | .. | <i>S. siluri</i> |
| 7. | Small, triangular scolex | .. | <i>S. godavari</i> |
| 8. | Small, qudrangular scolex, | | |
| | testes 101 in number | .. | <i>S. jadhavae</i> n. sp. |

Comparative chart showing distinguishing characters of the species of the genus *S. nybelini* Shinde *et al.* (1975)

Species ♂ Characters ♀	<i>S. nybelini</i> Shinde <i>et al.</i> (1984)	<i>S. macroni</i> Shinde, 1984	<i>S. singhali</i> Shinde, 1984
Scolex	Scolex is distinct, well developed	Large	Long scolex
Hooks	Irregularly scattered hocks	--	--
Neck	-	Neck is present	Short
Mature Proglottids	Longer than broad	Almost squarish	Broader than long
Testes	130-140 in numbers	68 in numbers	375-395 in number
Ovary	'U' shaped	Ovary bilobed each lobe is with six to seven acini	Bilobed with blunt acini
Vitellaria	Vitelloria are in lateral fields	Granular, in 3-4 rows	Follicular in 4-5 rows
Host	<i>Pseudeutropius taakree</i>	<i>Macrones singhala</i>	<i>Marcones singhala</i>
Country	India	India	India

Species ♂ Characters ♀	<i>S. barbusi</i> Shinde <i>et al.</i> (1984)	<i>S. ticto</i> Shinde <i>et al.</i> 1984	<i>S. behairvanathi</i> Deshmukh <i>et al.</i> 1989
Scolex	Larger, broader at apex and tapering anteriorly	Scolex well marked, broad at base	Scolex distinct, longer than broad
Hooks	--		Six to seven rows of hooks
Neck	-	short	Long neck
Mature	Longer than broad at the base	Broader than long	Almost squarish
Proglottids	tapering anteriorly		
Testes	135-140 in numbers	575-590 in numbers	200-250 in numbers
Ovary	Bilobed, broad fan shaped lobes with blunt acini	Bilobed, elongated with few short blunt acini	Almost quadrangular single mass long
Vitellaria	Granular	Granular	Granular
Host	<i>Barbus ticto</i>	<i>Barbus ticto</i>	<i>Mastacemtellus armatus</i>
Country	India	India	India

Species ♂ Characters ♀	<i>S. godavari</i> Wankhede & Jadhav 2002	<i>S. jadhavae</i> n. sp.
Scolex	Quadrangular	Small, almost quadrangular, highly muscular
Hooks	Two circle of hooks 48 in numbers	---
Neck	Short	Very short
Mature Proglottids	Squarish	Three times broader than long
Testes	220-230 in numbers	100 in number
Ovary	Bilobed	Bilobed, butterfly shaped
Vitellaria	Granular	Granular
Host	<i>Separata senghala</i>	<i>Wallago attu</i>
Country	India	India

**SYSTEMATIC LIST OF
CESTODE PARASITES WITH THEIR HOSTS**

(Classification of parasites - Wardle, McLeod and Radinovsky, 1974)

PARASITES

HOSTS

Class : Cotyloda -

Wardle, MacLeod and

Radinovsky 1974

Order : Pseudophyllidea -

Carus, 1883

Family : Ptychobothridae,

Luhe, 1902

Genus : *Senga* Dollfus, 1934

Species : *S. govindi* n. sp.

Mastacembellus armatus

(Lacepede, 1800)

Class : Cotyloda -

Wardle, MacLeod and

Radinovsky 1974

Order : Pseudophyllidea

Carus, 1883

Family : Ptychobothridae,

Luhe, 1902

Genus : *Circumoncobothrium* Shinde, 1968

Species : *S. karadensis* n. sp.

Mastacembellus armatus

(Lacepede, 1800)

Class : Cotyloda -

Wardle, MacLeod and

Radinovsky 1974

Order : Pseudophyllidea -

Carus, 1863

Family : Ptychobothridae,

Luhe, 1902

Genus : *Circumoncobothrium* Shinde, 1968

Species : *C. retharensis* n. sp.

Channa marulius

(Hamilton, 1822)

Class : Cotyloda -

Wardle, MacLeod and

Radinovsky 1974

Order : Proteocephalidea

Mola, 1928

Family : Proteocephalidea

La Rue, 1914

Genus : *Gangesia*

Woodland, 1924

Species : *G. subhashae* n. sp.

Wallago attu

(Bloch)

Class : Eucestoda

Wardle, McLeod and

Radinovsky 1974

Order : Proteocephalidea

Mola, 1928

Family : Proteocephalidea

La Rue, 1914

Genus : *Silurotaenia*

Species : *S. jadhavae* n. sp.

Wallago attu

(Bloch)

SYSTEMATIC LIST OF HOSTS
WITH THEIR PARASITES

HOSTS

PARASITES

Class : Actinopterygii

Order : Perciformes

Family : Channidae

Genus : *Channa*

Species : *C. marulius*

(Hamilton, 1822)

1. *Circumoncobothrium retharensis* n. sp.

Class : Actinopterygii

Order : Synbranchiformes

Family : Mastacembelidae

Genus : *Mastacembellus*

Species : *M. armatus*

(Lacepede, 1800)

1. *Senga govindi* n. sp.

2. *Circomoncobothrium karadensis* n. sp.

Class : Actinopterygii

Order : Cypriniformes

Family : Siluridae

Genus : *Wallago*

Species : *W. attu*

(Bloch)

1. *Gangesia subhashae* n. sp.
2. *Silurotaenia jadhavae* n. sp.