

STUDY OF CARYOPHYLLIDEAN (CAPINGENTIDAE: *PSEUDOBATRACHUS*) TAPEWORMS OF FRESH WATER FISHES OF BUNDELKHAND OF MADHYA PRADESH, INDIA: PART-IV

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The hosts, Fresh water walking cat fish, *Clarias batrachus* (Linn.), were purchased from the Local fish market of village Chandla; district Chhatarpur, Madhya Pradesh for the study of piscine cestodes. After thoroughly examination we obtained single cestode from one of the nine hosts. Morphological study of the worm revealed it in the genus, *Pseudobatrachus* Pathak and Srivastav (2005), of the family Capingentidae Hunter (1930), order Caryophyllidea van Beneden in carus, 1863 and identified as a new record and provisionally accommodated as *Pseudobatrachus chandlaensis* sp. nov.

Keywords: Caryophyllidea, Capingentidae, *Clarias batrachus*, Hunter, Chandla

INTRODUCTION

Disease and much of it due to parasite is the single most important factor threatening the fishery industry worldwide, particularly in Tropics Schmidt and Robert (2000). Among the parasite that infect fresh water fishes, Helminth, represented by 5 well characterized taxonomic units, Cestode, Trematoda, Nematoda, Monogenoidea and Acanthocephala, form a major group and often cause veterinary problem worldwide William and Jones, 1994. Helminth parasites are important not only because they cause fish and human disease but also because they are an essential component of global biodiversity (Poulin and Morand, 2004). These parasites constitute more than half of the biodiversity (Toft, 1986). Many of them yet waiting for their exploration and naming. Many researchers are engage in this field in India as well as abroad by which 28 genera with 99 species reported from Indian subcontinent Pandey *et al.* (2010). In this continuation present study deals with an unknown monopleuroide worm, *Pseudobatrachus chandlaensis* sp. nov.

METHODOLOGY

The hosts, *Clarias batrachus* (Linn.) were obtained from local fish catchers. The alimentary canals were cut open in normal saline water and then tapeworm infection was observed. Tapeworms were stretched in lukewarm water. Tapeworms were preserved in 5 per cent formalin. The whole mounts were stained in Mayer's haemalum,

cleared in xylol and mounted in canada balsam. All the measurements have been given in millimetres unless otherwise stated.

Description

Pseudobatrachus chandlaensis sp. nov. (Fig. 1: A - D)

Medium sized, unsegmented worm measures 13.95 X 0.57. Scolex well developed, spoon shaped measure 0.62 X 0.425. Bothridea measure 0.52 – 0.53 X 0.16 – 0.16 (0.52 X 0.16). Very long neck measures 4.64 in length and 0.17 in width. Testes three in number, measure 0.11 - 0.12 X 0.10 - 0.11 (0.115 X 0.105) located in medullary parenchyma, in anterior region, surrounded by vitellarian follicles. Cirrus pouch well developed, measures 0.30 X 0.25 oval in shape medially located in the posterior half of the worm. Internal and External seminal vesicle, measure 0.10 X 0.10 and 0.10 X 0.12 respectively. Ovary 'H' shaped, long, measures 0.70 X 0.44 situated posteriorly. Lateral arms of ovary cortical as well as medullary while isthmus purely medullary and thin structure. Receptaculum seminis absent. Vitelline follicles oval to round, partly cortical and partly medullary, measure 0.051 - 0.063 X 0.063 – 0.078 (0.056 X 0.071), extended up to the level of uterus never touches the ovarian lobes. Post ovarian vitellaria absent. Uterus non-glandular, long, coiled extended in between cirrus pouch and posterior extremity, measures 1.088 X 0.32. Uterus filled with numerous eggs. Eggs

oval, operculate, measure 0.048 - 0.061 X 0.033 - 0.048 (0.054 X 0.054).

DISCUSSION

Present form comes closer to *Pseudobatrachus chandrai* (Pathak and Srivastav, 2005), *Pseudobatrachus moolchandrai* (Srivastav *et al.*, 2006), *Pseudobatrachus madhyapradeshensis* (Khare, 2008), *Pseudobatrachus chhatrasali* (Sahu *et al.*, 2009), *Pseudobatrachus kenensis* (Srivastav *et al.*, 2010), *Pseudobatrachus ramchandrai* (Srivastav and Narayan, 2010), *Pseudobatrachus ramsagarensis* (Sahu, 2012) and *Pseudobatrachus sengarii* (Sahu, 2012) (Table 1). The present form differs from *Pseudobatrachus chandrai* in having bothridea, lesser number of smaller testes, internal and external seminal vesicles, vitellaria never touch the ovarian lobes and in absence of grooves in scolex and ejaculatory duct (Pathak and Srivastav, 2005). It differs from *Pseudobatrachus moolchandrai* in having bothridea, only three testes, and external seminal vesicle (Srivastav *et al.*, 2006). It differs from *Pseudobatrachus madhyapradeshensis* in having spoon shaped scolex, two pair of bothridea, three testes, external seminal vesicle, operculate eggs and absence of apical sucker, apical accessory sucker, receptaculum seminis (Khare, 2008). It differs from *Pseudobatrachus chhatrasali* in having larger worm, only three smaller testes, internal and external seminal vesicle and smaller ovary (Sahu *et al.*, 2009). It differs from *Pseudobatrachus kenensis* in having smaller size, longer neck, only three smaller testes, smaller cirrus pouch, external seminal vesicle, larger ovary with curved lateral ovarian lobes, operculate eggs and in absence of apical disc (Srivastav *et al.*, 2010). It differs from *Pseudobatrachus ramchandrai* in having smaller size, spoon shaped smaller scolex with bothridea, longer neck, only three larger testes, external seminal vesicle, smaller ovary, smaller vitellaria never touches ovarian lobes, larger eggs and in absence of receptaculum seminis (Srivastav and Narayan, 2010). It differs from *Pseudobatrachus ramsagarensis* in having wider worm, scolex without rostellum and grooves, wider neck, only three larger testes, larger cirrus pouch, external seminal vesicle, smaller ovary, larger vitellaria, absence of receptaculum seminis and larger uterus (Sahu, 2012). It differs from *Pseudobatrachus sengarii* in having spoon shaped scolex with bothridea, longer neck, only three larger

testes, larger cirrus pouch, external seminal vesicle, smaller ovary and larger vitellaria (Sahu *et al.*, 2012) (Table 1).

Thus the present form differs from all the known species of genus *Pseudobatrachus* (Pathak and Srivastav, 2005). In the light of above discussion the present form may be provisionally accommodated as a new species, *Pseudobatrachus chandlaensis* sp. Nov. The name of species is given after the name of place from where the host was collected.

Type species	: <i>Pseudobatrachus chandlaensis</i> sp. nov.
Host	: <i>Clarias batrachus</i> (Linn.)
Habitat	: Intestine
Locality	: Village - Chandla, Tehsil - Laundi, District - Chhatarpur, (M.P.) India
Accession number	: BBCZD/HC/1052
Deposition	: Parasitological laboratory, Deptt. Of Zoology, Bipin Bihari (P.G.) College, Jhansi, (U.P.) India

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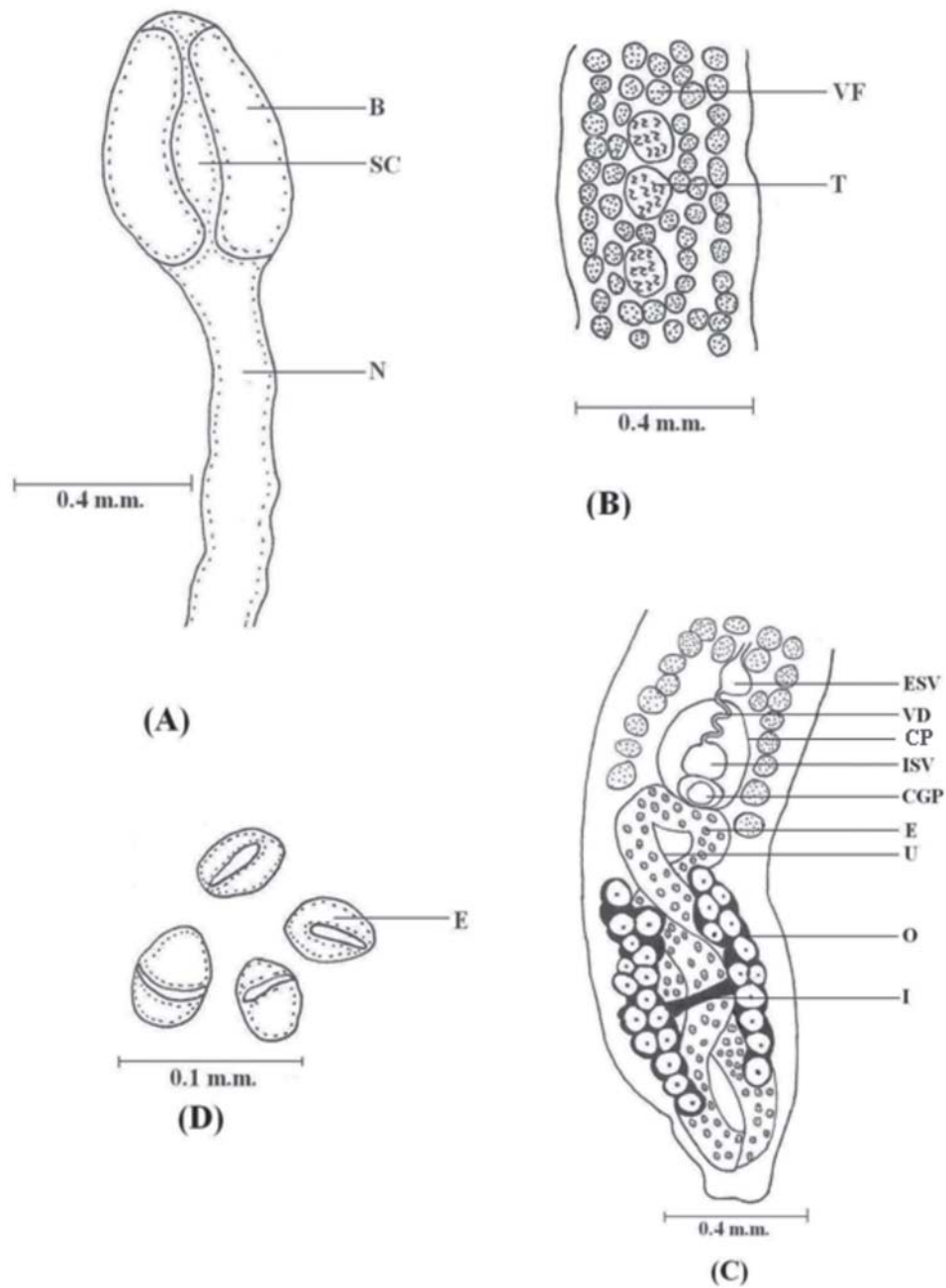


Fig. 1: *Pseudobatrachus chandlaensis* sp. nov. A - Scolex (50X), B- Middle region of body (50X), C – Posterior region of the body (50X), D – Eggs (225X)

Abbreviations: B- Bothridea, CGP- Common Genital Pore, CP- Cirrus Pouch, E- Egg, ESV- External Seminal Vesicle, I- Isthmus, ISV- Internal Seminal Vesicle, O- Ovary, RS- Receptaculum Seminis, SC- Scolex, T- Testes, U- Uterus, VD- Vitelline Duct, VF- Vitelline follicle.

Table 1: Comparisons of the characters of the species *Pseudobatrachus chandlaensis* sp. Nov.

Sl. No.	Characters	<i>P. chandrai</i> Pathak & Srivastav, 2005	<i>P. moolchandrai</i> Srivastav et al., 2006	<i>P. madhyapradachensis</i> Khare, 2008	<i>P. chhatrasali</i> Sahu et al., 2009	<i>P. kenshis</i> Srivastav et al., 2010	<i>P. ramchandrai</i> Srivastav & Narayan, 2010	<i>P. ramsgangensis</i> Sahu, 2012	<i>P. sengarii</i> Sahu et al 2012	<i>P. chandlaensis</i> sp. nov.
1	Size of worms	6.0 - 20.0 X 0.90 - 1.06	11.7 - 18.7 X 0.56 - 0.87	10 - 16.0 X 0.34 - 0.50	11.9 X 0.84	17.5 X 2.18	21.0 X 1.05	11.28 - 12.52 X 0.31 - 0.41	11.37 X 0.59	13.95 X 0.58
2	Shape	Oval to round	Spoon shaped	Spoon-shaped	Spoon-shaped	Spoon-shaped	Simple elongated	Spoon-shaped	Simple Blunt	Spoon shaped
	Size	0.81 - 1.01 X 0.25 - 0.51	0.63 - 1.06 X 0.44 - 0.71	0.40 - 0.45 X 0.34 - 0.39	0.63 X 0.48	1.22 X 0.56	1.08 X 0.41	0.62 X 0.47	0.62 X 0.32	0.62 X 0.42
	Apical Sucker	Absent	Absent	Present	Absent	Absent	Absent	Absent	Absent	Absent
	Accessory Sucker	Absent	Absent	Present	Absent	Absent	Absent	Absent	Absent	Absent
	Apical disc	Absent	Absent	Absent	Absent	Present	Absent	Absent	Absent	Absent
	Bothridia	Absent	Absent	Absent	Present	Present	Absent	Present	Absent	Present
	Grooves	Present	Absent	Absent	Absent	Absent	Absent	Present	Absent	Absent
	Rostellum	Absent	Absent	Absent	Absent	Absent	Absent	Present	Absent	Absent
3	Neck	4.51 - 5.01 X 0.18 - 0.24	3.96-6.89X 0.14-0.18	2.89 - 4.0 X 0.098 - 0.13	4.71 X 0.26	1.44 X 0.7	3.68 X 0.41	3.78 - 4.01 X 0.05 - 0.06	2.04 X 0.33	4.63 X 0.17
4	Testes	5-10	Numerous	Numerous	Numerous	Numerous	Numerous	Numerous	Numerous	Three
	Size	0.23 - 0.26 X 0.23 - 0.33	0.15 - 0.21 X 0.14 - 0.22	0.051 - 0.07 X 0.07 - 0.09	0.14 - 0.25 X 0.20 - 0.86	0.075 - 0.15 X 0.081 - 0.162	0.02-0.10X 0.020-0.70	0.038 - 0.050 X 0.037 - 0.050	0.016-0.042X 0.019 - 0.072	0.11 - 0.12 X 0.10 - 0.11
5	Cirrus pouch	0.31 - 0.4 X 0.33 - 0.4	0.32 - 0.36 X 0.25 - 0.32	0.14 - 0.18 X 0.11 - 0.13	0.25 X 0.19	0.50 X 0.056	0.31 - 0.59 X 0.16 - 0.27	0.18 - 0.22 X 0.15 - 0.020	0.14 X 0.16	0.30 X 0.25
6	External Seminal Vesicle	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Present
7	Internal Seminal Vesicle	Absent	Present	Present	Absent	Present	Present	Present	Present	Present
8	Ejaculatory duct	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
9	Lateral lobes	Straight	Straight	Straight	Curved	Straight	Curved	Curved	Straight	Slightly curved
	Size	0.64 - 0.80 X 0.60 - 0.80	0.69 - 1.19 X 0.19 - 0.76	0.58 - 0.68 X 0.23 - 0.30	0.93 X 0.62	0.57 X 0.80	1.30 - 2.37 X 0.70 - 0.9	0.93 X 0.63	1.04 X 0.54	0.70 X 0.44
10	Vitellaria	Touches to ovarian lobes	Not touches to ovarian lobes	Not touches to ovarian lobes	Touches to ovarian lobes	Not touches to ovarian lobes	Touches to ovarian lobes	Not touches to ovarian lobes	Not touches to ovarian lobes	Not touches to ovarian lobes
	Size	0.070 - 0.13 X 0.084 - 0.13	0.062 - 0.18 X 0.062 - 0.087	0.03 - 0.040 X 0.026 - 0.042	0.037 - 0.075 X 0.075 - 0.15	0.042 - 0.10 X 0.037 - 0.81	0.25 - 0.13 X 0.025 - 0.13	0.040 - 0.052 X 0.027 - 0.040	0.011 - 0.048 X 0.012 - 0.048	0.05 - 0.06 X 0.06 - 0.07
11	Receptaculum Seminis	Absent	Absent	Present	Absent	Absent	Present	Present	Absent	Absent
12	Uterus	1.52 - 1.81 X 0.11 - 0.55	1.12 - 1.85 X 0.025 - 0.41	1.03 - 1.18 X 0.19 - 0.24	1.46 X 0.39	1.44 X 0.81	1.65 - 0.86 X 0.040 - 0.67	0.69 - 0.79 X 0.14 - 0.25	1.48 X 0.21	1.09 X 0.32
13	Eggs	Operculate	Operculate	Non-Operculate	Operculate	Operculate	Operculate	Operculate	Operculate	Operculate
	Size	0.025 - 0.04 X 0.05 - 0.06	0.033 - 0.054 X 0.021 - 0.039	0.02 - 0.03 X 0.03 - 0.04	0.045 - 0.054 X 0.033 - 0.045	-----	0.029 - 0.04 X 0.020 - 0.022	0.027 - 0.051 X 0.021 - 0.033	0.05 - 0.06 X 0.03 - 0.05
14	Host	<i>Clarias batrachus</i> (Linn.)	<i>Clarias batrachus</i> (Linn.)	<i>Clarias batrachus</i> (Linn.)	<i>Clarias batrachus</i> (Linn.)	<i>Clarias batrachus</i> (Linn.)	<i>Heteropneustes fossilis</i> (Bloch)	<i>Clarias batrachus</i> (Linn.)	<i>Heteropneustes fossilis</i> (Bloch)	<i>Clarias batrachus</i> (Linn.)
15	Locality	Jalaun (U.P.)	Chhatrapur (M.P.)	Tikamgrah (M.P.)	Chhatrapur (M.P.)	Chhatrapur (M.P.)	Mahoba (U.P.)	Datiya (M.P.)	Hannipur (U.P.)	Chhatrapur (M.P.)