



Study of Caryophyllidean (Capingentidae: *Pseudobatrachus*) tapeworms of fresh water fishes of Bundelkhand region of Madhya Pradesh, India: Part-III

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Abstract: Presently eight species are reported from the World in the genus, *Pseudobatrachus*, Pathak and Srivastav, 2005 i.e. *P. chandrai* Pathak and Srivastav, 2005; *P. moolchandrai* Srivastav *et al*, 2006; *P. chandlaensis* Sahu, 2007; *P. madhyapadeshensis*, Khare, 2008; *P. chhatrasali* Sahu *et al*, 2009; *P. Sengarii* Singh, 2009; *P. kenensis* Srivastav *et al*, 2010 and *P. ramchandrai*, Srivastav and Aditya, 2010. The present form is the ninth one from the Indian sub-continent as well as from the whole world and differs on the basis of various morphometric character viz. size of worm, size and shape of scolex, presence of bothridea and grooved rostellum, size of neck, size and number of testes, size of cirrus pouch, presence of internal seminal vesicle, size of ovary and shape of ovarian lobes, size of vitellaria and their distribution, presence of receptaculum seminis, size of uterus, size and type of eggs and their hosts. The caryophyllidean is unique among cestodea in having monopleuroide body plane, i.e. without internal or external proglottidization and with a single set of reproductive organ. Thus it is provisionally accommodated as *P. ramsagarensis* n. sp.

Keywords: *Channa punctatus*, Datiya, Hunter, Monopleuroide, Rostellum

INTRODUCTION

In India a number of researchers are engaged in cestode taxonomy and listed 28 genera and 99 species in the order Caryophyllidea Beneden and Olesson (1893) from Indian subcontinent (Pandey *et al*, 2010). During the course of study we came across the important district, Datiya, which is Located between 78°30' – 78°51' East Altitude and 25°33' – 26°18' North latitude. Ramnagar (Ramsagar pond) is nearly 08 km ahead from district headquarter. The present paper deals with a new record of a very interesting Caryophyllids Cestode obtained from snake headed fresh water fish, *Channa punctatus* (Linn.) from Ramsagar pond, village Ramnagar district Datiya of Bundelkhand region, Madhya Pradesh, India.

MATERIALS AND METHODS

The freshwater fishes were collected from various parts of Bundelkhand region (M.P.), India. The alimentary canals of the fishes were removed from hosts and cut open into saline water. These was lightly shaken and content decanted several times and thoroughly examined under the simple microscope. The parasites were found attached in the intestinal mucosa of the host by its scolex. Worms were stretched in the lukewarm water with help of fine brush and later fixed in 5% formalin. Whole mounts were stained in Mayer's haemalum and cleared in xylol. Camera Lucida drawings were made. All the measurements

have been given in millimeters unless otherwise stated.

RESULTS

Worms medium sized, unsegmented, measure 11.28 - 12.52 (11.9) in length and 0.31 - 0.41 (0.36) in width. Scolex spoon shaped measures 0.62 X 0.47. Bothridea measure 0.50 - 0.52 X 0.15 - 0.17 (0.51 X 0.16). Groove measure 0.05 X 0.07. Neck very long measure 3.78 - 4.01 X 0.050 - 0.060 (3.89 X 0.055). Testes oval to round, numerous, measure 0.038 - 0.050 X 0.038 - 0.050 (0.044 X 0.044), scattered in medullary parenchyma, anterior to cirrus pouch. Cirrus pouch well developed, median, spherical, measure 0.18 - 0.22 X 0.15 - 0.20 (0.20 X 0.17). Male genital pore centrally located along with female genital aperture. Internal seminal vesicle measure 0.050 - 0.054 X 0.050 - 0.054 (0.052 X 0.052). External seminal vesicle absent. Female genitalia posteriorly situated. Ovary 'H' shaped measure 0.93 in maximum length and 0.63 in maximum widths, situated posterior to cirrus pouch. Ovarian arms lie in cortical as well as in medullary region. Isthmus entirely in medullary region and measure 0.52 - 0.55 X 0.28 - 0.33 (0.53 X 0.31). Receptaculum seminis spherical, measure 0.12 - 0.14 in diameter. Vitellaria numerous, oval to round, partly cortical and partly medullary, measure 0.040 - 0.052 X 0.027 - 0.040 (0.048 - 0.031), reaches below to cirrus pouch but never touches the ovarian lobes. Post-ovarian vitellaria absent. Uterus long, coiled, measure 0.69 - 0.79 X 0.14 - 0.25 (0.75 X 0.19) located

Table 1. Comparison of the characters of the species *Pseudobatrachus Ramsagarensis* n. sp.

S. No.	Characters	<i>P. chandrai</i> Pathak and Srivastav, 2005	<i>P. moolchandrai</i> Srivastav et al, 2006	<i>P. chandluensis</i> Sahu, 2007	<i>P. madhyapradeshen</i> sis Khare, 2008	<i>P. chhatrasali</i> Sahu et al, 2009	<i>P. Sengarii</i> Singh, 2009	<i>P. Kenensis</i> Srivastav et al, 2010	<i>P. ranchandrai</i> Srivastav and Narayan , 2010	<i>P. ramsagarensis</i> n. sp.
1	Size of worms	6.0 - 20.0 X 0.90 - 1.06	11.7 - 18.7 X 0.56 - 0.87	13.95 X 0.58	10 - 16.0 X 0.34 - 0.50	11.9 X 0.84	11.37 X 0.59	17.5 X 2.18	21.0 X 1.05	11.28 - 12.52 X 0.31 - 0.41
2	Shape	Oval to round	Spoon shaped	Spoon shaped	Spoon-shaped	Spoon-shaped	Simple Blunt	Spoon-shaped	Simple elongated	Spoon-shaped
	Size	0.81 - 1.01 X 0.25 - 0.51	0.63 - 1.06 X 0.44 - 0.71	0.62 X 0.42	0.40 - 0.45 X 0.34 - 0.39	0.63 X 0.48	0.62 X 0.32	1.22 X 0.56	1.08 X 0.41	0.62 X 0.47
	Apical Sucker	Absent	Absent	Absent	Present	Absent	Absent	Absent	Absent	Absent
	Accessory Sucker	Absent	Absent	Absent	Present	Absent	Absent	Absent	Absent	Absent
	Apical disc	Absent	Absent	Absent	Absent	Absent	Absent	Present	Absent	Absent
3	Bothridia	Absent	Absent	Present	Absent	Present	Absent	Present	Absent	Present
	Grooves	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Present
4	Rostellum	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Present
	Neck	4.51 - 5.01 X 0.18 - 0.24	3.96-6.89X 0.14-0.18	4.63 X 0.17	2.89 - 4.0 X 0.098 - 0.13	4.71 X 0.26	2.04 X 0.33	1.44 X 0.7	3.68 X 0.41	3.78 - 4.01 X 0.05 - 0.06
5	Testes	5-10	Numerous	Three	Numerous	Numerous	Numerous	Numerous	Numerous	Numerous
	Size	0.23 - 0.26 X 0.23 - 0.33	0.15 - 0.21 X 0.14 - 0.22	0.11 - 0.12 X 0.10 - 0.11	0.051 - 0.07 X 0.07 - 0.09	0.14 - 0.25 X 0.20 - 0.86	0.016-0.042X 0.019 - 0.072	0.075 - 0.15 X 0.081 - 0.162	0.02-0.10X 0.020-0.070	0.038 - 0.050 X 0.037 - 0.050
6	Cirrus pouch	0.31 - 0.4 X 0.33 - 0.4	0.32 - 0.36 X 0.25 - 0.32	0.30 X 0.25	0.14 - 0.18 X 0.11 - 0.13	0.25 X 0.19	0.14 X 0.16	0.50 X 0.056	0.31 - 0.59 X 0.16 - 0.27	0.18 - 0.22 X 0.15 - 0.020
	External Seminal Vesicle	Absent	Absent	Present	Absent	Absent	Absent	Absent	Absent	Absent
7	Internal Seminal Vesicle	Absent	Present	Present	Present	Absent	Present	Present	Present	Present

Contd.

Table 1. Contd.

8	Ejaculatory duct	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent
	O- va- ry	Straight 0.64 - 0.80 X 0.60 - 0.80	Straight 0.69 - 1.19 X 0.19 - 0.76	Slightly curved 0.70 X 0.44	Straight 0.58 - 0.68 X 0.23 - 0.30	Curved 0.93 X 0.62	Straight 1.04 X 0.54	Straight 0.57 X 0.80	Curved 1.30 - 2.37 X 0.70 - 0.9
	Vit- ell- aria	Touches to ovarian lobes	Not touches to ovarian lobes	Not touches to ovarian lobes	Not touches to ovarian lobes	Touches to ovarian lobes	Not touches to ovarian lobes	Not touches to ovarian lobes	Touches to ovarian lobes
10	Size	0.070 .13 X 0.084 -0.13	0.062 - 0.18 X 0.062 - 0.087	0.05 - 0.06 X 0.06 - 0.07	0.03 -0.040X 0.026-0.042	0.037 - 0.075 X0.075 - 0.15	0.011 -0.048 X0.012-0.048	0.042 - 0.10 X 0.037 -0.81	0.040 - 0.052 X 0.027 - 0.040
11	Receptaculum Seminis	Absent	Absent	Absent	Present	Absent	Absent	Absent	Present
12	Uterus	1.52 - 1.81 X 0.11 - 0.55	1.12 - 1.85 X 0.025 - 0.41	1.09 X 0.32	1.03 - 1.18 X 0.19 -0.24	1.46 X 0.39	1.48 X 0.21	1.44 X 0.81	1.65 - 0.86 X 0.040 - 0.67
13	Eggs	Operculate 0.025 - 0.04 X 0.05 - 0.06	Operculate 0.033 -0.054X 0.021 - 0.039	Operculate 0.05 - 0.06 X 0.03 - 0.05	Non- Operculate 0.02 - 0.03 X 0.03 - 0.04	Operculate 0.045 - 0.054 X0.033-0.045	Not seen	Not seen	Operculate 0.029 - 0.04 X 0.020 - 0.022
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>Heteropneust es fossilis</i> (Bloch)	<i>Clarias batrachus</i> (Linn.)	<i>Heteropneuste s fossilis</i> (Bloch)
15	Locality	Jalaun (U.P.)	Chhatarpur (M.P.)	Chhatarpur (M.P.)	Tikamgrah (M.P.)	Chhatarpur (M.P.)	Hamirpur (U.P.)	Chhatarpur (M.P.)	Mahoba (U.P.)

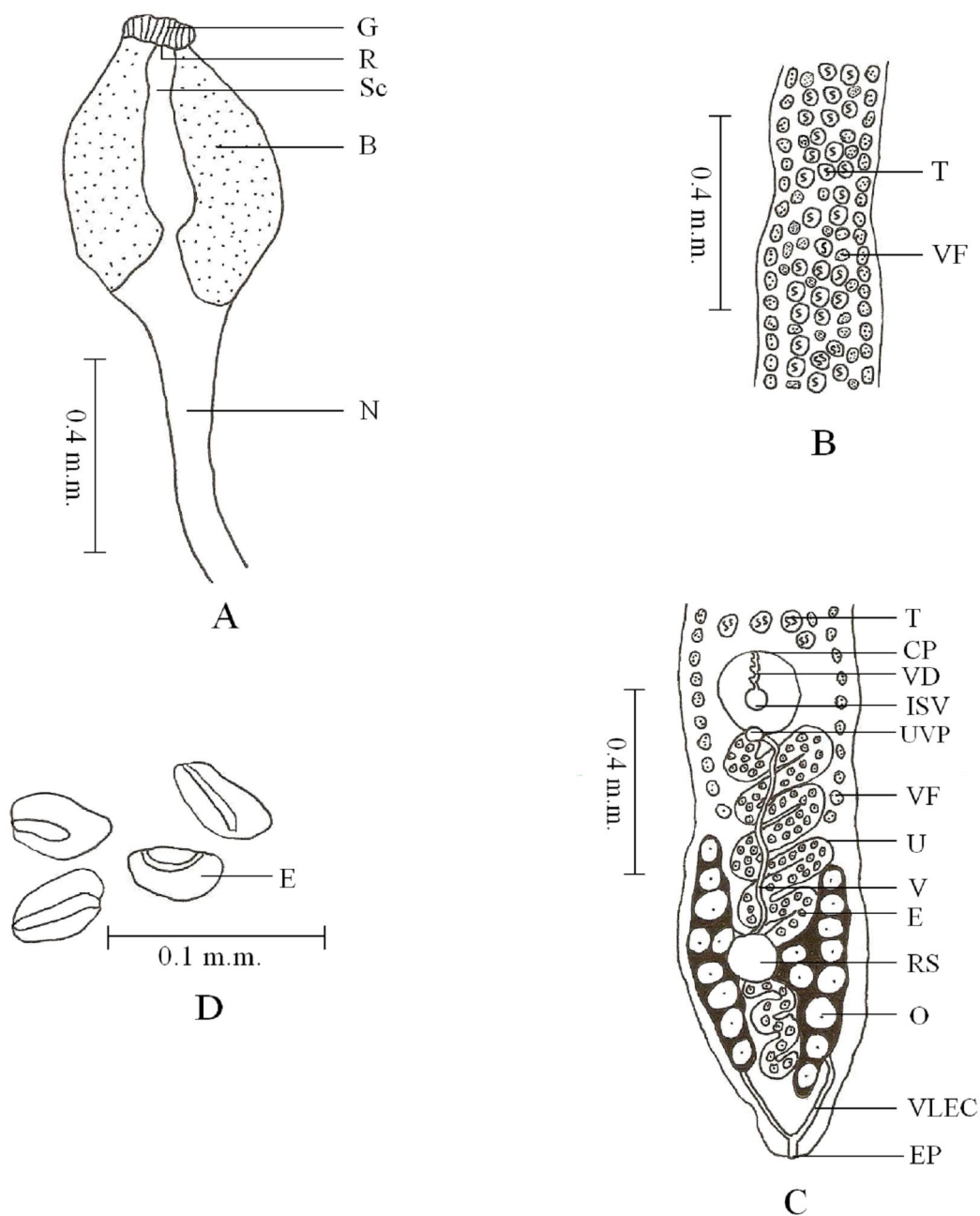


Plate-01. *Pseudobatrachus ramsagarensis* n. sp., A – Scolex (50X), B- middle region of body (50 X), C – Posterior region of the body (50 X), D – Eggs (225 X). **Abbreviations:** B- Bothridea, CGP- Common Genital Pore, CP- Cirrus Pouch, E- Egg, EP- Excretory Pore, G- Grooves, I- Isthmus, ISV- Internal Seminal Vesicle, O- Ovary, R- Rostellum, RS- Receptaculum Seminis, SC- Scolex, T- Testes, U- Uterus, UVP- Utero-Vaginal Pore, V- Vagina, VD- Vitelline Duct, VF- Vitelline Follicle, VLEC- Ventral Longitudinal Excretory Canal

posterior to cirrus pouch but never reaches below the ovarian lobes. Male and female genital pores open separately. Vagina, 0.012 in diameter. Excretory canal, 0.011 – 0.12 (0.011) in diameter. Excretory pore measure 0.018 – 0.020 (0.019). Eggs oval, operculate, numerous in number, measures 0.027 – 0.051 X 0.021 – 0.033 (0.039 X 0.027).

DISCUSSION

Eight species have been recognized so far from the whole world in the genus, *Pseudobatrachus* Pathak and

Srivastav, 2005, family Capingentidae Hunter, 1930, Order Caryophyllidea Beneden and Olesson, 1893. Present form comes closer to *P. chandrai* Pathak and Srivastav, 2005, *P. moolchandrai* Srivastav et al, 2006, *P. chandlaensis* Sahu, 2007, *P. madhyapradeshensis* Khare, 2008, *P. chhatrasali* Sahu et al, 2009, *P. sengarii* Singh, 2009, *P. kenensis* Srivastav et al, 2010 and *P. ramchandrai* Srivastav and Aditya, 2010 (Table 1).

The present form differs from *P. chandrai* Pathak and Srivastav, 2005 in having narrower worm, larger spoon

shaped scolex, two pair of bothridea and rostellum, narrower neck, numerous smaller testes, well developed smaller cirrus pouch, internal seminal vesicle, absence of external seminal vesicle, longer ovary with curved lateral lobes, receptaculum seminis, smaller vitellaria never touches the ovarian lobes and absence of ejaculatory duct. It differs from *P. moolchandrai* Srivastav *et al*, 2006 in having bothridea, rostellum with grooves, smaller testes, smaller cirrus pouch, smaller ovary, smaller vitellaria, receptaculum seminis and smaller uterus. It differs from *P. chandlaensis* Sahu, 2007 in having narrower worm, rostellum with grooves, smaller numerous testes, smaller cirrus pouch, absence of external seminal vesicle, larger ovary, smaller vitellaria, receptaculum seminis and smaller uterus. It differs from *P. madhyapradeshensis* Khare, 2008, in having absence of apical and accessory sucker, rostellum with grooves, bothridea, smaller testes, larger cirrus pouch, ovary with curved lateral lobes, smaller spherical receptaculum seminis, larger vitelline follicles, smaller uterus and larger operculate eggs. It differs from *P. Chhatrasali* Sahu *et al*, 2009 in having narrower worm, rostellum with grooves, narrower neck, smaller testes, internal seminal vesicle, receptaculum seminis and smaller uterus. It differs from *P. sengaraii* Singh, 2009 in having spoon shaped scolex armed with bothridea and grooved rostellum, larger neck, ovary with curved ovarian lobes, receptaculum seminis and smaller uterus. It differs from *P. kenensis* Srivastav *et al*, 2010 in having smaller worm, smaller scolex, rostellum with grooves, absence of apical disc, longer neck, smaller testes, smaller cirrus pouch, curved lateral ovarian lobes, smaller vitelline follicles, receptaculum seminis and smaller uterus. It differs from *P. ramchandrai* Srivastav and Aditya, 2010 in having smaller worm, spoon shaped smaller scolex armed with bothridea and grooved rostellum, wider neck, smaller cirrus pouch, smaller ovary, smaller vitellaria never touches ovarian lobes and smaller uterus (Table 1 and Plate I).

Thus the present form differs from all 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 ramsagarensis* n. sp.

The species is named after the name of pond Ramsagar from where the host was collected.

Type species	: <i>Pseudobatrachus ramsagarensis</i> n. sp.
Host	: <i>Clarias batrachus</i> (Linn.)
Habitat	:Intestine.
Locality	:Ram Sagar, Village - Ram nagar,

District - Datia (M.P.) India

Number of specimen	:02
Date of collection	:01 March 2006
Accession number	:BBCZD/HC/1057-1058
Deposition	:Parasitological laboratory, Deptt. of Zoology, Bipin Bihari (P.G.) College, Jhansi (U.P.) India

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