

Morphotaxonomy of Tapeworm parasites of Freshwater fish, *Heteropneustes fossilis* from Central India

Aditya Narayan

Department of Zoology,
Bundelkhand University,
JHANSI (U.P.) INDIA

E-mail: dr.adityanarayan442@bujhansi.ac.in

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ABSTRACT

Morphotaxonomy of a rare tapeworm Parasites from fresh water fish, *Heteropneustes fossilis*. Morphology of tapeworm parasites declares them to belong to a *Pseudoneckinverta* n. g. of the capingentidae⁶ family. It differs from the other reported genus and accommodated as a *Pseudoneckinverta dhuaniensis* n.g., n.sp.

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KEY WORDS : Capingentidae⁶, *H. fossilis*, India, Morphotaxonomy, Tapeworm

Introduction

Various types of animal species reside in India. Which can be seen directly. But there are some species which are found inside the body of other living beings for food and shelter. These are tapeworm Parasites. That's why the morpho-taxonomic perusal of helminth parasites is an essential now a days. This number is not the last score of the biodiversity²⁴. The outcome of the study can be helpful for future research on morpho-taxonomic study of tapeworm parasites of freshwater fish.

Material and Methods

The fish *Heteropneustes fossilis* were procured for tapeworm parasites from Betwa river at Dhuani (Dhwani) village, block Chirgaon, district Jhansi Bundelkhand region of Uttar Pradesh, India. After examination of fish, many tapeworm parasites were seen in the lower digestive tract of fish. Probable technology for accumulation and shielding of the tapeworm were applied. Entire mounts were stained by Mayer's haemalum and processed in xylene. The diagrams were drawn by camera lucida attached to a light microscope (Fig.01) and digital photography captured by digital camera (Fig.02). All the measurements have been given in millimeters.

Description

Medium sized, unsegmented worm measures 9.5-11.5x 1.213-1.367 (10.5x 1.29). Spoon shaped scolex measures 0.365-0.413 x 0.275-0.413 (0.389 x 0.344), bears apical disc at the anterior tip. Neck very small measures 0.225-0.260 x 0.263-0.346 (0.243 x 0.305) with longitudinal groove. Testes promiscuous, elliptical measures 0.05-0.06 x 0.05-0.08 (0.055x0.065) expanded in testicular medullary region. Cirrus pouch medially located, measures 0.25-0.33 x 0.238-0.4 (0.29x0.319). External seminal vesicle measures 0.060-0.067 x 0.060-0.067 (0.064 x 0.064) and absence of internal seminal vesicle. Inverted A-shaped ovary measures 1.125-2.1 x 1.113-1.167 (1.613x1.14). Vitelline follicles expended in cortical and medullary region measures 0.04-0.07 x 0.04-0.08 (0.055 x0.06) and touches the ovarian lobes. Receptaculum seminis measures 0.15-0.2 x 0.167-0.31 (0.175 x 0.239). Uterus protracted, colied, measures 1.75-2.7 x 0.668-0.82 (2.23 x 0.744). Male and female genital pore open aside and founded near the cirrus pouch base. Oval and non-operculated eggs measures 0.025-0.033 x 0.029-0.045 (0.029x 0.037).

Result and Discussion

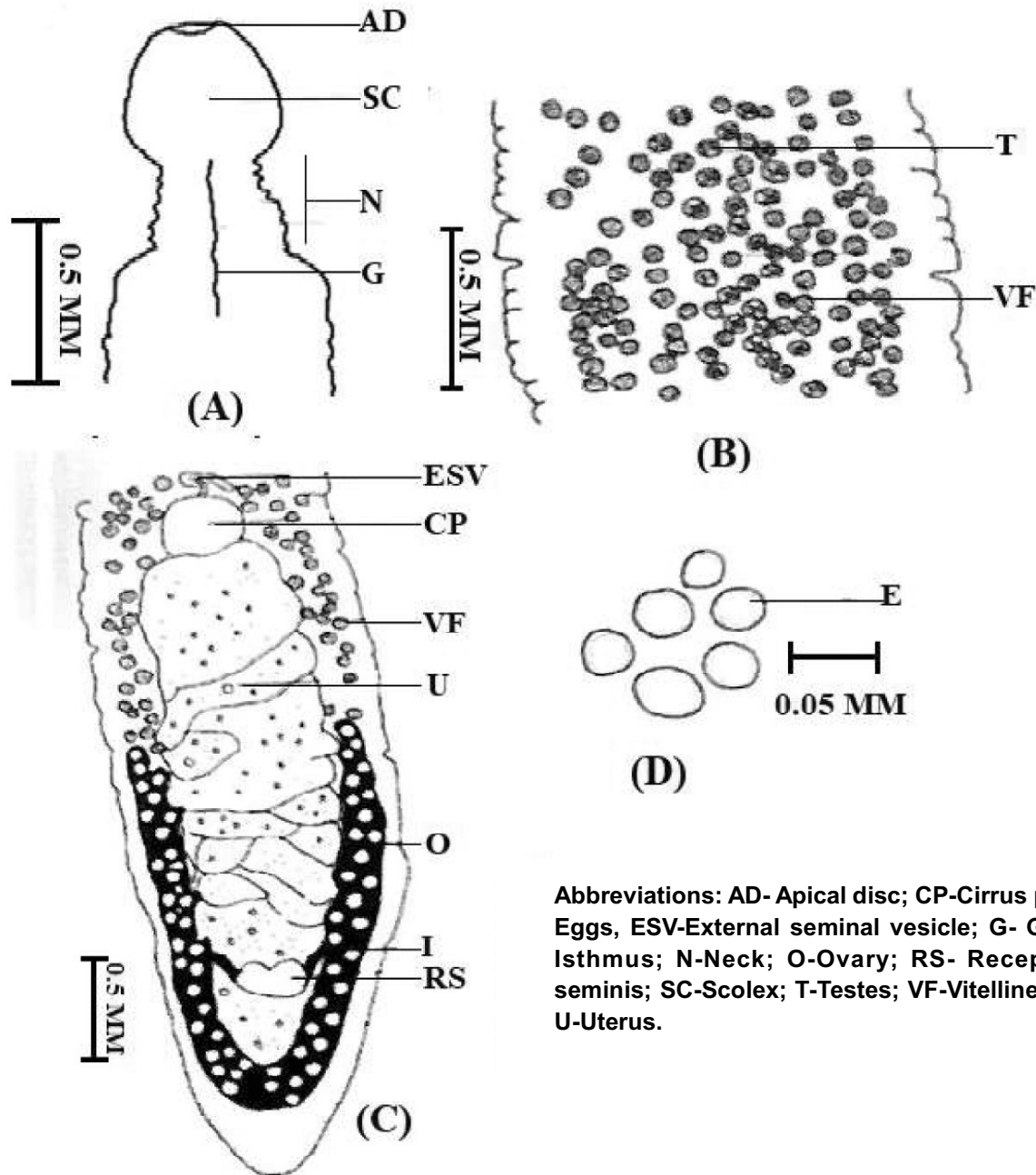
Presently this genus comes closer to *Pseudocaryophyllaeus*³; *Pseudobilobulata*¹⁸;

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TABLE-1: Comparison of the character of the genera of the family Capingentidae⁶

Sr. no	Genera	1	2	3	4	5
	Characters	<i>Pseudo-caryophyllaeus</i> ³	<i>Pseudobil-obulata</i> ¹⁸	<i>Pseudobatrachus</i> ¹⁵	<i>Sukhpatae</i> ²²	<i>Heeradevina</i> ²⁰
1	Scolex	Oval truncated	Blunt	Rounded	Blunt	Blunt
2	Apical disc	Absent	Absent	Absent	Absent	Absent
3	Neck Shape Groove	Very long Absent	Small absent	Very long Absent	Medium Absent	Very long Absent
4	Testes	Numerous	Numerous	Few in numbers	Numerous	Numerous
5	ESV	Absent	Absent	Absent	Absent	Absent
6	ISV	Absent	Absent	Absent	Absent
7	Ovary	Band shaped	Bilobed	H-shaped	Omega shaped	Inverted A-shaped
8	VF	Never touches the ovarian lobes	Touches the ovarian lobes	Never touches the ovarian lobes	Never touches the ovarian lobes
9	RS	Absent	Absent	Absent	Absent	Present
10	Uterus	Anterior to ovary	Reaches below the ovary	Anterior to ovary	Anterior to ovary	Anterior to ovary
11	Eggs	Nonoperculate	————	Operculate	Nonoperculate	Nonoperculate

Sr. no	Genera	6	7	8	9	Present form
	Characters	<i>Pseudoheteroinverta</i> ²¹	<i>Sudhaena</i> ⁷	<i>Pseudobulata</i> ¹⁶	<i>Pseudooarae</i> ¹³	<i>Pseudoneckinverta</i> n.g.
1	Scolex	Blunt	Blunt	Spoon	Dome shaped	Spoon
2	Apical disc	Absent	Absent	Absent	Absent	Present
3	Neck Shape Groove	Medium Absent	Medium Absent	Small Absent	Medium Absent	Very small Present
4	Testes	Numerous	Numerous	Numerous	Numerous	Numerous
5	ESV	Absent	Absent	Absent	Absent	Present
6	ISV	Absent	Present	Present	Present	Absent
7	Ovary	Inverted A-shaped	M-shaped	Uneven bilobed	Oar-shaped	Inverted A-shaped
8	VF	Never touches the ovarian lobes	Never touches the ovarian lobes	Never touches the ovarian lobes	Never touches the ovarian lobes	Touches the ovarian lobes
9	RS	Absent	Absent	Present	Absent	Present
10	Uterus	Anterior to ovary	Anterior to ovary	Reaches below the ovary	Reaches below ovary	Anterior to ovary
11	Eggs	Non operculate	Operculate	Operculate	Operculate	Nonoperculate



Abbreviations: AD- Apical disc; CP-Cirrus pouch; E- Eggs, ESV-External seminal vesicle; G- Groove; I- Isthmus; N-Neck; O-Ovary; RS- Receptaculum seminis; SC-Scolex; T-Testes; VF-Vitelline follicles; U-Uterus.

Fig. 1 : *Pseudoneckinverta dhuanensis* n.g., n.sp. (A) Scolex with Neck (B) Middle region of worm (C) Posterior region of worm (D) Eggs

*Pseudobatrachus*¹⁵; *Sukhpatae*²²; *Heeradevina*²⁰; *Pseudoheteroinverta*²¹; *Sudhaena*⁷; *Pseudolobulata*¹⁶; *Pseudoarae*¹³ of the family Capingentidae⁶ and order Caryophyllidea¹.

The present form differs from *Pseudocaryophyllaeus*³ in having spoon shaped scolex with apical disc at anterior tip of scolex, very small neck with prominent groove, presence of external seminal vesicle, presence of inverted A-shaped ovary and presence of receptaculum seminis.

From *Pseudobilobulata*¹⁸ it differs in having spoon

shaped scolex with apical disc at anterior tip, presence of groove in neck, prominent external seminal vesicle, Inverted A-shaped ovary present, vitelline follicles touches the ovarian lobes, existence of receptaculum seminis and uterus anterior to ovary.

Form *Pseudobatrachus*¹⁵ it differs in having spoon shaped scolex, prominent apical disc at the anterior tip, presence of very small neck with groove, numerous testes, presence of external seminal vesicle, ovary inverted A-shaped, receptaculum seminis present and eggs nonoperculate.

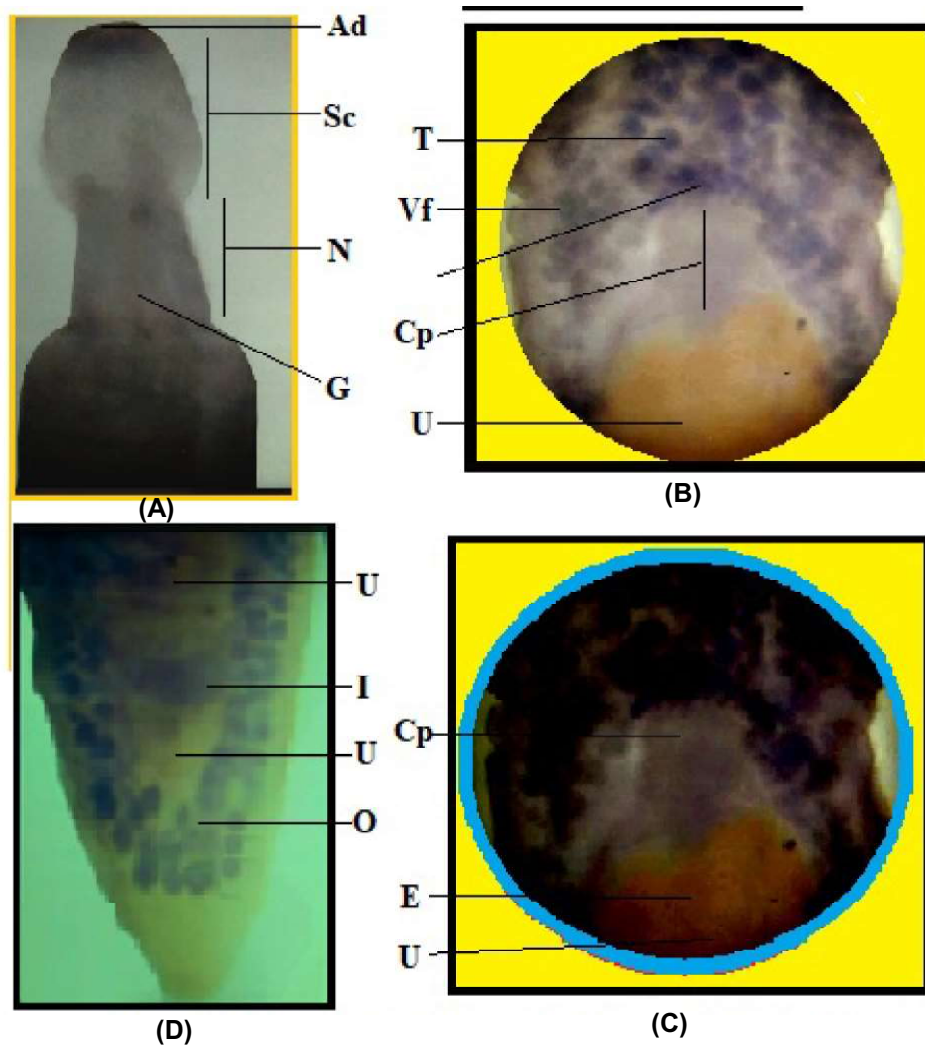


Fig. 2 : *Pseudoneckinverta dhuaniensis* n.g., n.sp. (A) Scolex with Neck (B) Middle region of worm (C) Cirrus pouch region of worm (D) Posterior region of worm

Abbreviations: Ad- Apical disc; Cp-Cirrus pouch; E- Eggs, ESV-External seminal vesicle; G- Groove; I-Isthmus; N-Neck; O-Ovary; Sc-Scolex; T-Testes; U-Uterus; Vf-Vitelline follicles.

From *Sukhpatae*²² it differs in having spoon shaped scolex with apical disc at anterior tip, neck very small with groove, External seminal vesicle present, ovary inverted A-shaped, vitelline follicles touches the ovarian lobes and receptaculum seminis present.

From *Heeradevina*²⁰ it differs in having spoon shaped scolex with apical disc at anterior tip, presence of very small neck with groove, prominent external seminal vesicle and vitelline follicles touches the ovarian lobes.

From *Pseudoheteroinverta*²¹ it differs in having scolex spoon shaped with apical disc at anterior tip, very small neck with groove, prominent external seminal vesicle, anterior portion of ovarian lobes touches by vitelline follicles and presence of receptaculum seminis.

From *Sudhaena*⁷ it differs in having spoon shaped scolex with apical disc at anterior tip, presence of very

small neck with groove, presence of external seminal vesicle, ovary inverted A-shaped, vitelline follicles touches the ovarian lobes, presence of receptaculum seminis and eggs nonoperculate.

From *Pseudolobulata*¹⁶ it differs in having apical disc at anterior tip of scolex, presence of groove in neck, prominent external seminal vesicle, internal seminal vesicle absent, ovary inverted A-shaped, vitelline follicles touches the ovarian lobes, uterus anterior to ovary and eggs nonoperculate.

From *Pseudooarae*¹³ it differs in having small worm, scolex spoon shaped with apical disc, small neck with groove, presence of external seminal vesicle and internal seminal vesicle absent, ovary inverted A-shaped, vitelline follicles touches the ovarian lobes, presence of receptaculum seminis, uterus never reaches below the ovary and eggs nonoperculate.

The morphotaxonomy of this parasite is different from all the above studied genera. That's why it can be accommodated in *Pseudoneckinverta dhuaniensis* n.g., n.sp.

The name of this species has been given from the locality of the fish collection.

New form : *Pseudoneckinverta dhuaniensis* n.g., n.sp.

Host fish : *Heteropneustes fossilis*

Position : Lower digestive tract

Destination address: Village Dhuani (Dhwani), block Chirgaon, district-Jhansi,

Bundelkhand region, Uttar Pradesh, India

Revised Key to the various genera of the family Capingentidae⁶

- 1a. Post-ovarian median vitellaria present—2
 1b. Post-ovarian median vitellaria absent—6
 2a. Uterine coils extend anterior to cirrus pouch, scolex with two large bothria—Capingens⁴.
 2b. Uterine coils not extending anterior to cirrus pouch. Scolex lacking bothria—3
 3a. Ovary shaped like on inverted A- shape—
 —————*Adenoscolex*².
 3b. Ovary not as above—4
 4a. Ovary dumbbell-shaped; scolex quite reduced; neck absent—*Breviscolex*⁹.
 4b. Ovary otherwise, scolex well developed; neck present—5
 5a. Ovary H-shaped—*Edlintonia*¹²
 5b. Ovary band shaped—*Capingentoides*³.
 6a. Ovary U-shaped, uterine coils extending anterior to cirrus pouch—*Spartoides*⁵.
 6b. Ovary U-shaped, uterine coils not extending anterior

to cirrus pouch—*Mystoides*¹⁰.

6c. Ovary not U-shaped, uterine coils not extending anterior to cirrus pouch—7

7a. Neck absent—8

7b. Neck present—9

8a. Ovary H-shaped —————*Pseudolytocestus*⁵.

8b. Ovary inverted A-shaped—*Pseudoadenoscolex*¹¹.

8c. Ovary fan-shaped—*Pseudoclariasis*¹⁷.

8d. Ovary inverted U-shaped—*Pseudoinverta*¹⁴.

8e. Ovary ear shaped—*Pseudoauricularia*⁸.

8f. Ovary uneven bilobed —————*Pseudounevenata*¹⁹.

8g. Ovary bean shaped—*Pseudobeanata*²³.

8h. Ovary band shaped—*Pseudostripata*¹⁶.

9a. Neck small, ovary bilobed—*Pseudobilobulata*¹⁸.

9b. Neck small, ovary inverted A-shaped—
 —————*Pseudoneckinverta* n.g.

9c. Neck small, ovary uneven bilobed—
 —————*Pseudolobulata*¹⁶.

9d. Neck medium, ovary oar-shaped—
 —————*Pseudooarae*¹³

9e. Neck medium, ovary inverted A-shaped—
 —————*Pseudoheteroinverta*²¹.

9f. Neck medium, ovary omega shaped—
 —————*Sukhpatae*²².

9g. Neck medium, ovary M shaped with long arms—
 —————*Sudhaena*⁷.

9h. Very long neck, ovary band-shaped—
 —————*Pseudocaryophyllaeus*³.

9i. Very long neck, ovary H-shaped—
 —————*Pseudobatrachus*¹⁵.

9j. Very long neck, ovary inverted A-shaped—
 —————*Heeradevina*²⁰.

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