



**A NEW NEMATODE SPECIES (*PARALEPTUS JAMMUENSIS*) SP. N.
(PHYSALOPTORIDAE RALLIET, 1895) AND FIRST HOST RECORD FROM
THE STATE OF JAMMU & KASHMIR, RECOVERED FROM FISH HOST
MASTACEMBELUS ARMATUS, FROM A TRIBUTORY OF FRESHWATER
RIVER POONCH**

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ABSTRACT

A new nematode species *Paraleptus jammuensis* sp. n. is described from intestine of fresh water fish *Mastacembelus armatus* from a tributary of Poonch river of J & K state. The nematode is characterized mainly by large body size; male is 22.6-30.8 mm in length and 0.41-0.43 mm in width. Mouth is dorsoventrally bounded by two lips each bearing a conical tooth and cuticular cephalic collar. The posterior extremity of body is spirally coiled. Caudal alae are well developed not meeting ventrally. Nine pairs of pedunculate papillae (4 preanal and 5 post anal) spicules are equal, similar and gubernaculum absent. Female is long and cylindrical (24.94-36.6mm in length, 0.46-0.48mm in width). Mouth is elongated dorsoventrally, bounded by two lips each bearing a conical tooth and cuticular cephalic collar is present. Head is 0.27-0.29 in diameter, nerve ring at 0.34-0.38 from anterior end. Vulva is slightly posterior to mid body, uterine branches are opposed; eggs: oval thick shelled embryonated at deposition, 0.036-0.050 x 0.036 V 0.050-0.025 in size and tail is blunt. The present species differs from all the congeners mainly in shape of collerette, position and shape of nerve ring, in morphometric details like total body length and proportionate differences in in width, muscular and glandular oesophagus *etc.*, in having equal and similar spicules in males besides difference of locality. The recovery of this parasite is first ever host record for collection of any nematode from host fish *Mastacembelus armatus* from the state of Jammu & Kashmir.

KEY WORDS: *Paraleptus* n. sp., Fresh water fish, *Mastacembelus armatus*, Tributary of Poonch river.

INTRODUCTION

The host *Mastacembelus armatus* was obtained from a tributary of Poonch river of J&K state. Recovery of parasites was done as per methods employed by Moravec *et al.* (1997). The nematodes were fixed in hot 70% alcohol and preserved in 10% glycerine alcohol. These specimens were cleared in lactophenol for appropriate observations. En face preparations followed the methods of Anderson (1958), and identification of nematodes to species level was based on Yamaguti (1961), Moravec and Arai (1971) and Sood (1989).

Observations

Super family : Physalopteroidea Railliet, 1995

Family : Physalopteridae Railliet, 1893

Sub family : Proleptinae Schulz, 1927 (Fig. 1-9, Table-1, 2, 3)

Host: *Mastacembelus armatus*

Location: Intestine

Locality : Station II at Poonch, Station III & IV at Jammu.

Based on 24 randomly selected worms from fresh water fish *Mastacembelus armatus* (Fig. 1 to 15, Table-1, 2, 3), body of

the worm is described as under: Body: long and cylindrical (24.94-33.6 in length, 0.46-0.48 in width) Mouth: elongated dorsoventrally, bounded by two lips each bearing a conical tooth and cuticular cephalic collar is present. (Fig.1, 6, 11) Male: Body: 22.6-30.8 in length and 0.41-0.43 in width. Oesophagus: divided into muscular portion measuring 0.64-0.70 and glandular portion measuring 3.05-3.18. Tail: 0.24-0.26 in length. The posterior extremity of body is spirally coiled. Caudal alae: well developed not meeting ventrally. Nine pairs of pedunculate papillae (4 preanal and 5 post anal) Spicules: equal, similar and gubernaculum absent (Fig.5 to 9).

Female: Oesophagus is divided into anterior muscular (0.43-0.46 x 0.07-0.09) and posterior glandular (3.40-3.48 x 0.14-0.18). Head: 0.27-0.29 in diameter, nerve ring at 0.34-0.38 from anterior end; Vulva: post-equatorial slightly posterior to mid body, at 13.76-20.6 from anterior end. Uterine branches: opposed: Eggs: Oval thick shelled, embryonated at deposition, 0.036-0.050 x 0.02-0.025 Tail blunt 0.43-0.49 (Fig.3, 4 & 10 to 15).

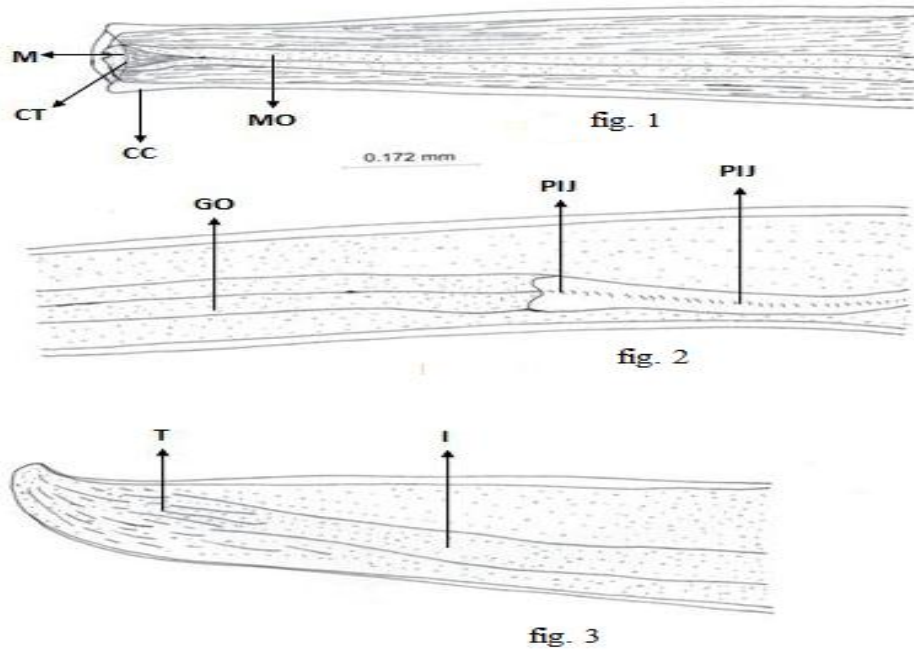


FIGURE 1-3: Camera lucida drawing of *Paraleptus jammuensis* n.sp.

Fig. 1: Anterior region showing cephalic collar and conical tooth

Fig.2: Pharyngo-intestinal junction

Fig.3: Tail region of female

M- Mouth; CT – Conical tooth; CC- Cuticular cephalic collar

MO- Muscular oesophagus ; GO-Glandular oesophagus

PIJ – Pharyngo- intestinal junction T-Tail; I - Intestine

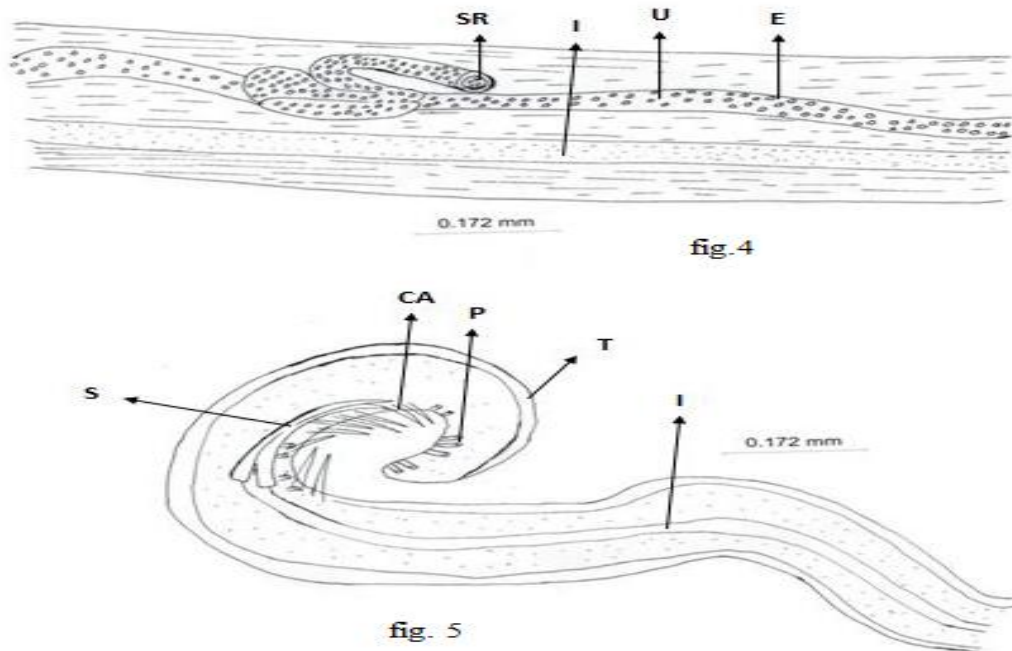


FIGURE 4 - 5: Camera lucida drawing of *Paraleptus jammuensis* n.sp.

Fig. 4: Showing seminal receptacle

Fig.5: Posterior end of male showing caudal alae, papillae and spicules.

SR - Seminal receptacle; I – Intestine; U –Uterus; E – Eggs

T – Tail; P – Papillae; CA – Caudal alae; S – Specule



fig. 6



fig. 7



fig. 8



fig. 9

Figure 6-9 : Microphotographs of *Paraleptus jammuensis* male n.sp
Fig. 6: Anterior end of body showing cephalic cuticular collar & conical tooth
Fig.7: Showing spirally coiled posterior end of male worm
Fig.8: Middle of male worm showing alimentary canal in male
Fig. 9: Posterior end of male showing caudal alae, papillae and spicules

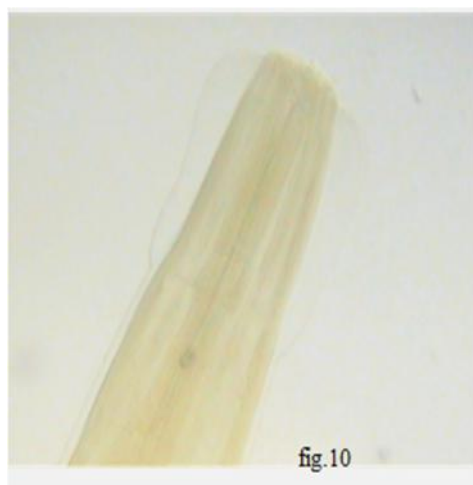


fig.10

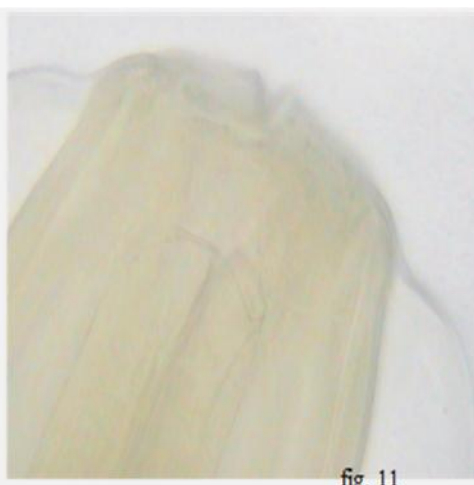


fig. 11

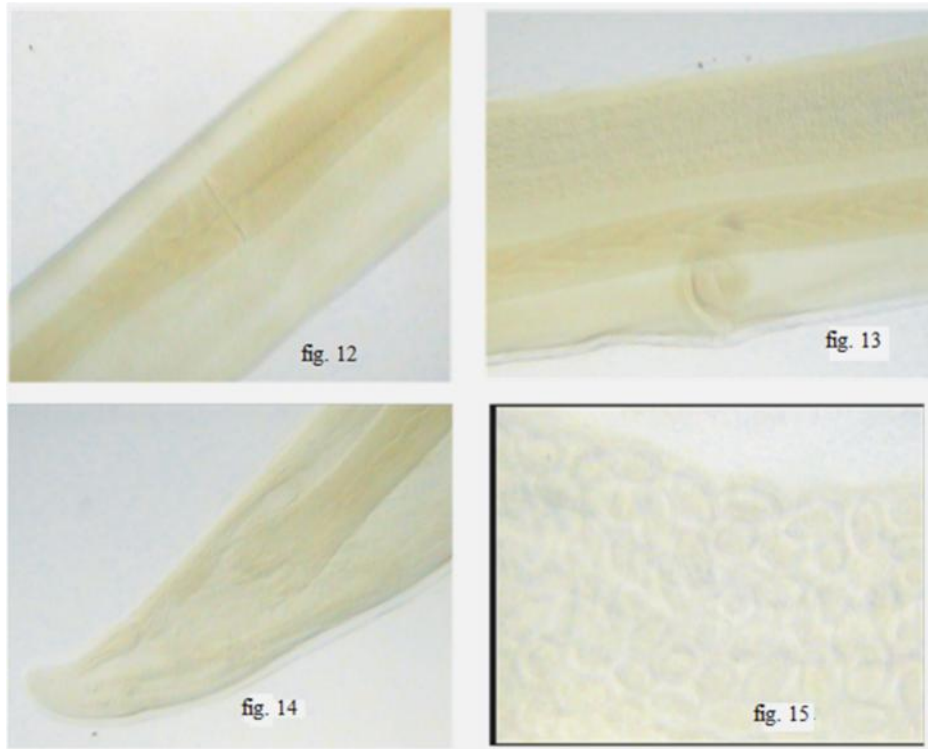


FIGURE 10-15: Microphotographs of *Paraleptus jammuensis* female n.sp
 Fig. 10: Anterior end of female body showing cephalic cuticular collar & conical tooth
 Fig. 11: Anterior end of female enlarged showing cephalic cuticular collar & conical tooth
 Fig. 12: Pharyngio intestinal junction
 Fig. 13: Showing vulva
 Fig. 14: Tale of female
 Fig. 15: Showing eggs

TABLE 1: Morphometry data of *Paraleptus jammuensis* collected from *Mastacembelus armatus* from Poonch Station II and Jammu Station III & IV.

Organs Character	Measurement in mm
Male specimen	
Body	22.6-34.8±8.6
Maximum width	0.41-0.63 ± 0.1
Head diameter	0.270-0.43 ± 0.1
Muscular oesophageal length	0.64-0.72 ± 0.05
Glandular oesophageal length	3.054-4.2 ± 0.8
Tail length	0.24 – 0.26 ± 0.01
Spicules	Two, equal, dissimilar Lt. 3.41 & Rt. 3.41± 8.2
Female specimen	
Body	24.94-36.6 ± 0.06
Maximum width	0.46-0.55 ± 0.03
Head diameter	0.27-0.32 ± 0.03
Muscular oesophageal length	0.43-0.60 ± 0.12
Glandular oesophageal lenth	3.40 – 3.80 ± 0.28
Nerve ring	0.34-o.38+- o.01
Tail length	0.43-0.46 ± 0.02

DISCUSSION

The worm under discussion is a round worm and belongs to class Nematoda as the body cavity is not lined with epithelia, gonads continuous with their ducts and cloaca is absent in female specimen. Out of seven orders of the class namely Trichridea, Tetanonematidea, Dictyophymidea, Ichthyostromylyidea, Oxyuroidea, Ascarididea, Spiruridea

and Philometridea, the worm appears to belong to order Spiruridea Diesing, 1861 because of characters like (i) mouth within two lips aurrounding a chitinous buccal cavity (ii) Oesophagus long cylindrical and divided in to two parts, a shorter anterior muscular portion and a longer glandular posterior portion (iii) Intestine simple without diverticula

(iv) vulva slightly posterior to middle of body and (v) parasite of alimentary canal of fish. Out of eight families of order Spiruridea, viz. Hedruridae, Camallanidae, Cuculanidae, Gnathostomatidae, Physalopteridae, Spiruridae, Rhabdochoniidae and Haplonematidae, the worm recovered from the alimentary canal of host *Mastacembelus armatus* during present investigation shows very close resemblance to family physalopteridae Leiper, 1908 due to its characters like (i) Mouth with two lateral lips each armed with a tooth (ii) presence of a large cephalic collarette and absence of buccal capsule (iii) Presence of large caudal alae

supported by long coniform papillae. Further detailed studies of the worm revealed that out of four genera under the class namely *Proleptus* Dujardin, 1845, *Heliconema* Travassos, 1920, *Paraleptus* Wu, 1927 and *Pseudoproleptus* Khera, 1955, the worm seemingly appears to belong to genus *Paraleptus* Wu, 1927 because like genus *Paraleptus* the present form too has vulva (in female) slightly posterior to middle of body, and in male specimens the spicules are equal in size and similar in shape. A comparison between present form and known species of genus *Paraleptus* is given in the table – 2.

TABLE 2: Comparison between different species of *Paraleptus* known from India and present form (*Measurements in mm*).

Particulars	<i>Paraleptus komiyai</i> Sood, 1970	<i>Paraleptus balarami</i> Agarwal, 1981	<i>Paraleptus macronemi</i> , Gupta and Srivastava, 1981	Present author
Male				
Body	19.47-24.11	14-15	21.6-30.3	22.6-34.8±8.6
Maximum width	0.28-0.45	0.4-0.6	0.4-0.6	0.41-0.63 ± 0.1
Head Dia	0.9-0.12	0.2-0.25 x 0.13-0.15	0.20-0.25	0.270-0.43 ± 0.1
Muscular	0.34-0.42 x	0.25-0.26 x	1.2-1.4 x 0.10-	0.64-0.72 ± 0.1
Oesophagus	0.06-0.07	0.12-0.15	0.12	
Glandular Oesophagus	2.13-3.0 x 0.13-0.16	2.5-1.7 x 0.16-0.18	1.80-2.72 x 0.17-0.20	3.054-4.2 ± 0.8
Entire Oesophagus	2.5-3.34	-	3.0-4.12	3.70-4.95 ± 0.1
Nerve ring distance	0.25-0.31	0.32-0.30	-	0.42-0.46 ± 0.1
Excretory pore distance	0.28-0.35	0.32-0.35	-	-
Spicules	Unequal dissimilar	Unequal	Equal, similar	equal, similar Lt. 3.41 & Rt. 3.41 ± 0
Female				
Body	21.66-28.83	14.5-15.0		24.94-36.6 ± 8.2
Maximum width	0.37-0.57	0.35-0.52		0.46-0.65 ± 0.06
Head Dia	0.10-0.15	0.21-0.23 x 0.15-0.18		0.27-0.32 ± 0.03
Muscular Oesophagus	0.41-0.45x 0.07-0.09	0.24-0.27x0.11- 0.13		0.43-0.60 ± 0.12
Glandular Oesophagus	2.67-3.27x 0.15-0.18	2.6-2.9 x 0.13-0.8		3.40-4.20 ± 0.28
Entire Oesophagus	3.08-3.72	-		3.85-4.90 ± 0.74
Nerve ring distance	0.27-0.31	-		0.44-0.48 ± 0.02
Excretory pore distance	0.29-0.34	-		
Position of Vulva	Post equatorial 12.46-16.89	Pre equatorial 6.2-6.5		slightly post equatorial 12.5-18.5 ± 4.24
Tail length	0.15-0.18	0.18-0.20		0.43-0.46 ± 0.02
Egg size & shape	0.022-0.015 x 0.015- 0.025 Oval, Thick Shelled embryonated	not well developed		0.034-0.038 ± 0.002x x 0.033-0.036 ± 0.002 oval thick shelled embryonated
Host	<i>Mastacembelus armatus</i>	<i>Catla Catla</i>		<i>Mastacembelus armatus</i>
Locality	Lucknow	Muzaffarpur (Bihar)	<i>Upeneus macronemus</i> Pentkota Puri, Orrisa	Poonch, Jammu district of J&K State

A glance at the table-2, very clearly reveals that the present form differ from *P. macronemi* Gupta and Srivastav, 1981 in unequal spicules, and from *P. balarami* Agarwal, 1981, it differs in having post equatorial vulva. The present form however resembles closely with *P. komiyai* Sood, 1970 in

respect of (i) Post equatorial position of vulva (ii) shape of eggs which are oval, thick shelled and embryonated in both cases, but it differs from it in having equal and similar spicules which in case of *P. komiyai* are unequal and dissimilar, in shape of collerette, position and shape of nerve

ring which in present form it is thin and dim but in *P. komiyai* it is thick and dark. The present form differs from *P. komiyai* Sood (opcit.) in all morphometric details like total body length and proportionate difference in width, muscular and glandular oesophagus etc. besides these differences of

locality, the author gives a new name to the species as *Paraleptus jammuensis*. The recovery of this parasite is first ever host record for collection of any nematode from host fish *Mastacembelus armatus* from the state of Jammu & Kashmir (Table 3).

TABLE 3: Nematode parasites of *Mastacembelus armatus* reported from India by different authors

Host	Parasite	Author(s) of record	Location	Locality
<i>Mastacembelus armatus</i>	<i>Eustrongylides</i> sp, larva	Das and Rahimullah (1933)	Liver, outer wall of stomach	Hyderabad
	<i>Spimitetus mastacembeli</i>	Karve and Naik (1951) Naidu (1983)	Stomach Intestine	Poona, Nagpur Poona
	<i>Pseudoproleptus vestibulus</i>	Khera (1953) Soota and Sarkar (1980)	Intestine Intestine	Lucknow Siliguri
	<i>Camallanus unisiculus</i>	Khera (1954)	Intestine	--
	<i>Spinitectus major</i>	Khera (1954)	Intestine	--
	<i>Spinitectus singhi</i>	Ali (1956)	Stomach	Hydrabad
	<i>Parascarophis bharti</i>	Agarwal (1965)	Stomach	Assam
	<i>Pseudoproleptus alatae</i>	Majumdar (1965)	Intestine	Dhapa, Calcutta
	<i>Cylicostrongylus thapari</i>	Sood (1966)	Intestine	Lucknow
	<i>Ascaridia ganpatii</i>	Sood (1966)	Intestine	Lucknow
	<i>Camallanus patani</i>	Sahay and Sinha (1966) De et. al. (1978)	Intestine	Patna
	<i>Camallanus mastacembeli</i>	Agarwal (1967), Sood (1968)	Intestine Intestine	Sonarpur W. Bengal Lucknow
	<i>Contraecaeum</i> sp. larva	Rai and Pande (1968)	Muscles	Mathura, Gorakhpur
	<i>Proleptus inflatus</i>	Khan and Yaseen (1969)	Stomach	Sylhet
	<i>Camallanus magna</i>	Khan and Yaseen (1969) Bilqees (1976)	Intestine	Khulna Sind
	<i>Paraleptus komiyai</i>	Sood (1970)	Intestine	Lucknow
	<i>Procamallanus bilaspurensis</i>	Gupta and Duggal (1973)	Intestine	Bilaspur (H.P.)
	<i>Camallanus barragi</i>	Zaidi and Khan (1975)	Intestine	Taunsa Barrage
	<i>Camallanus jullundurensis</i>	Gupta and Duggal (1977)	Intestine	Jullundur
	<i>Heliconema longissima</i>	De et. al. (1978)	Stomach, intestine	Sonarpur, W. Bengal
	<i>Eustrongylides</i> sp. larva	Naidu (1979)	Body cavity etc.	Kanhan
	<i>Haplodidentus indicus</i>	Naidu and Thakare (1981)	Intestine	Tunasar
	<i>Rhabdochona</i> sp.	Naidu (1983)	Intestine	Maunda
	<i>Procamallanus meszarosi</i>	Arya (1984)	Intestine	Nainital
	<i>Paraleptus jammuensis</i>	Present Author 2011	Intestine	Poonch, Jammu Distts. Of J&K

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