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A New Species and First Host Record of Camallanus, Railliet and Henry, 1915, in Alimentary Canal of Fresh Water Fish Schizothorax Richardsoni from Poonch River of Jammu and Kashmir, Union Territory of India

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Abstract - A new nematode species, Camallanus schizothoraxi is described from the intestine of fresh water fish Schizothorax *richardsoni* (Ham.) from Poonch river of J&K UT of India. It seems to be the first host record for parasite belonging to genus *Camallanus* not only from India but also from other South Asian countries as well. The body of the parasite is cylindrical and pointed at both the ends. Mouth is slit-like, buccal capsule comprises of two lateral chitinous valves. Female: Body; 9.97 in length and 0.13 in width. Male: 8.53 in length and 0.144 in width.

Keywords - Camallanus schizothorxi n. sp. Fresh water fish Schizothorax richardsoni, Poonch river.

I. Introduction

Genus *Camallanus* was created by Railliet and Henry in 1915 for *C. lacustris* as type species, which is a spiruid enteric nematode parasite of fresh water fishes. This parasite was earlier described as *Cacullanus lacustris* by Zoega in 1776. However, in 1915 Railliet and Henry established a separate family Camallanidae, which was subsequently emended by Travassos in 1920, to place many other species *of Camallanus* and related genera under the revised systematic dispensation. While most of the species of *Camallanus* are parasitic in stomach and intestine of fishes, many have also been reported from Amphibians and reptiles hosts as well. The family was revised by Bilqees and Akram (1982). Sood in 1989 published

an extensive report on *Camallanus* species in his book "Fish nematodes" pp (23-156). More than 53 species of *Camallanus* have so far been reported from both fresh water and estuarine fish hosts from India and South-Asian waters Singh, 1997.

A total of 206 mature worms of both sexes were collected from 86 specimens of *Schizothorax richardsoni* at station I during the tenure of present investigation, which on preliminary investigations broadly confirmed to the diagnostic features of the genus *Camallanus* and have, therefore, been described below as a species of *Camallanus*.

II. Materials and Methods

The host Schizothorax richardsoni was collected from Poonch river of J&K UT. Recovery of parasites was done as per the methods employed by Moravec et al. (1997). The nematodes were fixed in hot 70% alcohol and preserved in 10% glycerene alcohol. The specimens were cleared in lactophenol for appropriate observation. En face preparations followed the methods of Anderson (1958), and identification of these nematodes to species level was based on Yamagutti (1961), Moravec and Arai (1971) and Sood (1959).

III. Observation

 Family : Camallanidae Railliet and Henry, 1915.

 Genus: Camallanus, Railliet and Henry, 1915, Camallanus schizothoraxi sp. N. Materials: 5

 males and 5 females

 Host: Schizothorax richardsoni

 Locality: Poonch river of J&K UT.



Figure 1 to 3: Camera lucida drawing of *Camallanus schizothoraxi* n.sp Fig.1: Anterior region Fig.2: Pharyngio- intestinal junction Fig.3: Showing eggs



Fig.4 to 7: Showing different views of camallanus shizothoraxi n. sp.

Fig.4: Anterior region of Camallanus schizothoraxi n.sp showing mouth, buccal capsule etc.

Fig.5: Middle region of *Camallanus schizothoraxi* n.sp showing vulva and eggs.

Fig.6: Posterior end of female Camallanus schizothoraxi n.sp showing eggs and larvae.

Fig.7: Posterior end of male *Camallanus schizothoraxi* n.sp showing spicules and papillae on curved tail.

IV.Camallanus schizothoraxi n.sp

Descriptive Note: Based on 10 randomely selected mature worms from fresh water fish *Schizothorax richardsoni*. (Fig. 1 - 3, Morphometry provided in table 1).

Mouth is slit-like, buccal capsule comprises of two lateral chitinous valves with longitudinal rib-like thickenings internally, a chitinous ring present at the junction of the valves and oesophagus. Oesophagus; comprises of a short anterior muscular portion and a long posterior glandular portion which is enlarged posteriorly (Fig. 4 & 5).

Female: Body; 9.97 in length and 0.13 in width (Table 1). Cuticle finely striated.

Oesophagus: bipartite, anterior muscular portion 0.515 and posterior glandular portion 2.49. The glandular oesphagus ending in a globular enlargement. Nerve ring at distance of 0.32 from anterior end at junction of proximal one third with distal two third of muscular portion of Oesophagus. Vulva: Conspicous equatorial at distance of 4.99 from anterior end, provided with well developed prominent lips (fig 5). The vulva backed up by a muscular vagina and two long uterine tubes. Gravid female packed with young free embryos (Fig. 93). Tail; 0.25 in length tapering posteriorly.

Male: 8.53 in length and 0.144 in width.

Oesphagus: anterior muscular portion 0.45 long (Table 1) and posterior glandular portion is 2.25 long. Tail is 0.21 long Genital papillae: 10 to 13 pairs preanal, 4-6 pairs postanal, 2 pairs circum anal. Spicules: two, unequal, right longer and more prominent, left comparatively much smaller.

Tail; 0.32 in length and curved.

Host: Schizothorax richardsoni

Location: Intestine

Stations: Station I of Poonch.

Organs Character	
Male Specimens	
Total length	$8.53 - 10.4 \pm 0.42$
Maximum breadth	$0.12 - 0.15 \pm 0.02$
Buccal capsule length	0.032 ± 0.01
Buccal capsule breadth	0.035 ± 0.01
Chitinous ring diameter	0.46 ± 0.01
Chitinous ring thickness	$0.45 - 0.51 \pm 0.03$
Muscular oesophageal length	$0.48_0.51 \pm 0.01$
Glandular oesophageal lenth	$2.25 - 3.10 \pm 0.35$
Tail length	0.32 ± 0.04
Female specimen	
Total length	$9.97 - 12.43 \pm 0.35$
Maximum breadth	0.13 ± 0.01
Buccal capsule length	0.035 ± 0.01
Buccal capsule breadth	0.034 ± 0.01
Chitinous ring diameter	0.47 ± 0.02
Chitinous ring thickness	0.48 ± 0.04
Muscular oesophageal length	$0.515 - 0.590 \pm 0.01$
Glandular oesophageal length	$2.49 - 3.15 \pm 0.07$
Distance from anterior end to valve	$4.99 - 6.22 \pm 0.14$
Size of egg	0.028 ± 0.001
Tail length	$0.10 - 0.25 \pm 0.02$

Table-1 : Morphometric data of *Camallanus* sp. Collected from *Schizothorax richardsoni* Station I

V. Discussion

The family Camallinidae Raillet and Henry, 1915 includes 4 genera, namely; *Camallanus* Railliet and henry, 1915 *Camallanides* Baylis and Daubney, 1922, *Paracamallanus* Yorke and Maplestone, 1926 and *Procamallanus* Baylis, 1923. Of these *Camallanides* stands apart from the remaining three in possessing (i) buccal valves each with two large external thickenings and (ii) Simple rod-like tridents. On the contrary, in *Procamallanus* the buccal capsule is not broken up into paired lateral valves and does not possess any tridents. The walls of the buccal capsule however, may be smooth or spirally thickened. The remaining two genera, viz; *Camallanus* and *Paracammallanus* are very similar to one another so much so that they have often been regarded as synonyms of one another. The only demarkable feature between the two being the presence of a large chitinous bipartite buccal valves, with an anterior armed and a posterior unarmed portions in *Paracamallanus* against no much divisioning of buccal capsule in *Camallanus*. However, the presence of chitnous trident which was earlier regarded as yet another characteristic feature of the genus (Railliet and Henry, 1915), is now no longer regarded so because a number of worms that came to be subsequently described under the genus did not possess any such tridents.

While describing a new genus *Neocamallanus* singhi, Ali (1956) generalized that all species of *Camallanus* without a trident known till then be considered as species of his newly created genus *Neocammallanus*. Although Yeh(1960b) disregarded the features of unarmed longitudinal buccal ridges as of sufficient taxonomic importance for creation of a separate genus, a view point also maintained by Campana-Rouget (1961) and by Gupta and Gupta (1980). They however also advocated at the same time that *Neocamallanus* to be synonum of *Camallanus*. Yamaguti (1961), Sahay and Narayan (1967), Kalyankar (1971), Soota and Chaturvedi (1971) and Naidu and Thakare (1980) on the other hand, considered *Neocamallanus* as an independent genus. Sood (1980) following Chabaud (1975) however stated that *Neocamallanus* be treated as only a synonym of *Paracamallanus*. Thus, all such species which are described as *Neocamallanus* have been relegated to *Paracamallanus* subsequent to Chabaud's(op.cit) systematic treatment of the Nematodes of vertebrates.

As already stated, that only 53 species of *Camallanus* stand so far reported from different fishes of South Asia (Table-16).

A look of the table reveals that fish host belonging to geneus *Channa* are most common hosts of *Camallanus*, as more than 15 species of *Camallanus* given in the table prefer *Channa* species as their hosts, next to *Channa* as preferred host of *Camallanus* species is *Mastacembelus armatus*. From fish *Channa*, Bashirullah 1973, reported a *Camallanus* species, which in table is mentioned as *C*. spp. but is incompletely described and thus taxonomically not established as a species. Therefore, not recorded here for any systematic comparison.

In having equatorial vulva, the resent form differs from *C. atridentus*, *C. anabantis*, *C. gomtii*, *C. intestinalis*, *C. ophiocephali* & *C. adamsi* in all of which vulva is pre-equatorial.

Concerning absence of trident, the present form differs from *C. sweeti* (Moorthy, 1973) and many others, all of which have presence of a trident. In the light of the fact that presently both male and females of *Camallanus* have been recorded, the present form thus seemingly stands comparable to *Camallanus xenentodoni* (Khan and Yaseen, 1969) in which similar to present form vulva is equitorial, trident is absent and chitinous ring is present. Further comparision of the present form was therefore done with *C. xenentodoni* for various other morphological features, measurements and ratios as shown in Table-2.

Morphological features	C. xenentoni	
Compared	Khan and Yaseen,	Present author
	1969	
Male Specimens		
Body		$8.53-10.4 \pm 0.42 \ge 0.12-0.15 \pm$
Buccal Capsule		0.02
Muscular Oesophageal		$0.032 \pm 0.01 \ x \ 0.035 \pm 0.01$
length		$0.45 - 0.51 \pm 0.03$
Glandular Oesophageal		$2.25 - 3.10 \pm 0.35$
length		-
Caudal papilla papillae		-
Spicules		$0.09\text{-}0.18 \pm 0.02$
Tail	7.91-15.85 x 0.24-	
Female Specimens:	0.41	9.97-12.43±0.35x0.024-0.032
Body	0.17-0.18 x 0.18-	± 0.01
Buccal Capsule	0.21	$0.23 \ge 0.035 \pm 0.01$
Muscular Oesophageal	0.47-0.64 x 0.12-	$0.515 \text{-} 0.590 \pm 0.01$
length	0.15	2.49-3.15 ±0.07
Glandula oesophageal	0.45-0.62 x 0.09-	equatorial $4.99-6.22 \pm 0.001$
length	0.13	$0.10\text{-}0.25 \pm 0.02$
Vulva	equatorial	A
Tail	0.04-0.09	87 1
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Table-2: Comparative data of different species of Camallanus

The comparative data reveals that the *Camallanus* of present form differs from *C. xenontoni* Khan and Yaseen, (1969) in morphology and micrometery of buccal capsule (which in present form is narrow from anterior margin, unlike *C. xenontoni*) and have a ring – like structure in middle of buccal cavity which is not present in *C.xenontoni*. Measurements of muscular oesophagus and glandular oesophagus (Table-2) length of tail etc. besides a buccal ring in buccal cavity. As for as males of this nematodes is concerned it is worth mentioning that these in *C. xenontoni* Khan and Yaseen, 1969 have not been described. Moreover, host and locality are also different, which in case of *C. xenontoni* is *Xenentodon Cancila* (Ham.) from Khulna and Sylhet and in present form it is *Schizothorax richardsoni* (Ham.) from Poonch river of J&K State. Based up on above discussion and strong differences, the present form described here appears to be a new species and because *Camallanus* has so far not been recovered from this host, the name *Camallanus schizothoraxi* is being proposed in honour of this host fish. The present host viz. *Schizothorax richardsoni* (Ham.) seems to be the first host record for parasite belonging to genus *Camallanus* not only from India but also from other South Asian countries as well. (Table-2).

Key of the identification of Camallanus sp.

1.	Vulva pre-equatorial2
	Vulva equatorial
	Vulve post-equatorial
2.	Trident absent
	Trident present
3.	Spicule single
4.	Spicule single forked at tipC. surmai (Rasheed,1970)
	Spicules dounble
5.	Buccal ridges with teeth-like projectionsC. Varanasiensis
6.	Trident absent
	Trident present7
7.	Buccal ridges 9C. magna (Khan Yaseen, 1969)
	Buccal ridges 15C. salmonae Chakarvarty,(1942)
8.	Buccal cavity without a globular structureC. xenentodoni (Khan &
	Buccal cavity with a globular structure C. schizothoraxi

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