



Redescription of *Procamallanus (Spirocamallanus) mysti* (Karve, 1952) Infecting Freshwater Fishes from Muzaffarnagar, India

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ABSTRACT

During a survey of parasitic nematodes of freshwater fishes in Muzaffarnagar region, a known species of family Camallinidae belonging to the genus *Procamallanus (Spirocamallanus)* was isolated from two different fish host species- *Mystus cavasius* and *Ompok bimaculatus*. Morphological and morphometrical description supported by light microscopic drawings and photomicrographs is presented in the present communication.

Keywords: Parasitic nematodes, *Mystus cavasius*, *Ompok bimaculatus*, *Procamallanus mysti*.

INTRODUCTION

Procamallanus spp. belonging to the family Camallinidae is a globally distributed group of parasitic nematodes that primarily infects the digestive tract of marine and freshwater fishes and less often amphibians, turtles and snakes (Stromberg and Crites 1974; Rigby and Rigby 2014). Several species of genus *Procamallanus* are described from freshwater fishes in India. Descriptions in some of these cases are poor erroneous. These cause taxonomical confusion which in turn leads to unjustified description of additional new species (De *et al*, 1986). Present work redescribes the nematode parasite *Procamallanus (Spirocamallanus) mysti* (Karve, 1952), based on the morphological and morphometrical observations of specimens collected from the fishes *Mystus cavasius* and *Ompok bimaculatus*, along with its comparison with related forms described from other regions.

MATERIALS AND METHODS

Host fishes for the present study were procured through local fisherman at Muzaffarnagar, India. A total of 37 *M. cavasius* and 29 *Ompok bimaculatus* fishes were screened for the collection of parasites infecting the hosts. The only male specimen was recovered from *Ompok bimaculatus*, along with female parasites. The parasites were washed

thoroughly in normal saline just after collection from the hosts. As per standard procedures, parasites were fixed in 4% hot formalin and cleared in glycerin. Photomicrographs were taken with the help of Motic digital microscope and camera lucida drawings were sketched with the help of compound light microscope at different magnifications.

OBSERVATION AND DESCRIPTION

***Procamallanus (Spirocamallanus) mysti* (Karve, 1952)**

Host – *Mystus cavasius* (Siluriformes: Bagridae) and *Ompok bimaculatus* (Siluriformes: Siluridae)

Site of infection - Stomach

Locality - District Muzaffarnagar (29.4727° N, 77.7085° E) Uttar Pradesh, India

Total prevalence -: 43% (16 fish infected/37 fish examined in *Mystus cavasius*), 44% (13 fish infected/29 fish examined in *Ompok bimaculatus*)

Depository of voucher specimens - Department of Zoology, D.A.V. College, Muzaffarnagar (Uttar Pradesh), India

Synonyms: *S. gubernaculus* (Khera, 1955), *S. singhi* (Ali, 1957), *S. hyderabadensis* (Ali, 1957), *S. viviparus* (Ali, 1957), *S. chauhani* Sahay 1966, *S. fasciatusi* (Sood, 1967), *S. omtii* (Sood, 1907), *S. vittatusi* (Sood, 1967), *S. ompoci* Majumdar and Dutta 1972, *S. olseni* Bashirullah 1973,

S. intestinecolas Bashirullah 1974, *S. timmi* Bashirullah 1973, *S. inglisi* Baghirullah and Hafizuddin 1973, *S. notopteri* Bashirullah and Hafizuddin 1973, *S. bengalensis* Akram, 1976

Description (Plate 1, 2 and 3; Table 1 and 2)

All the infected fish were parasitized with one, two or three nematodes respectively. We found most of the specimens of females and only one male parasite. Worms are small having prominently thick transversely striated

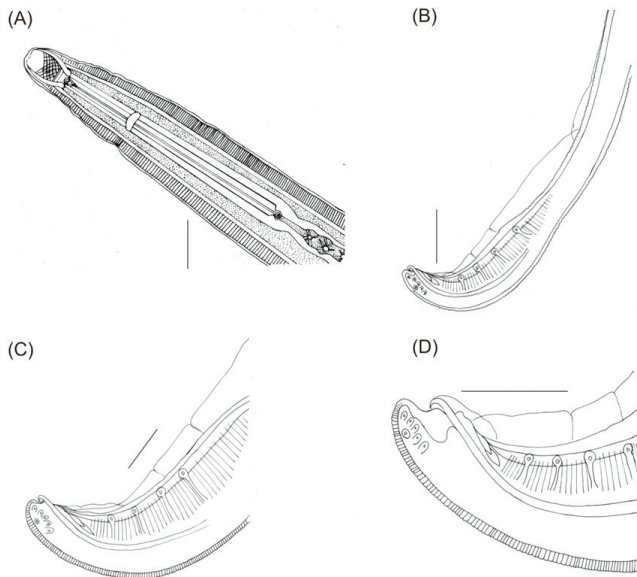


PLATE 1. Schematic illustration of *Procamallanus (Spirocamallanus) mysti*, Karve 1952; Male (A-D): A- anterior end, B- posterior portion; C & D- posterior end

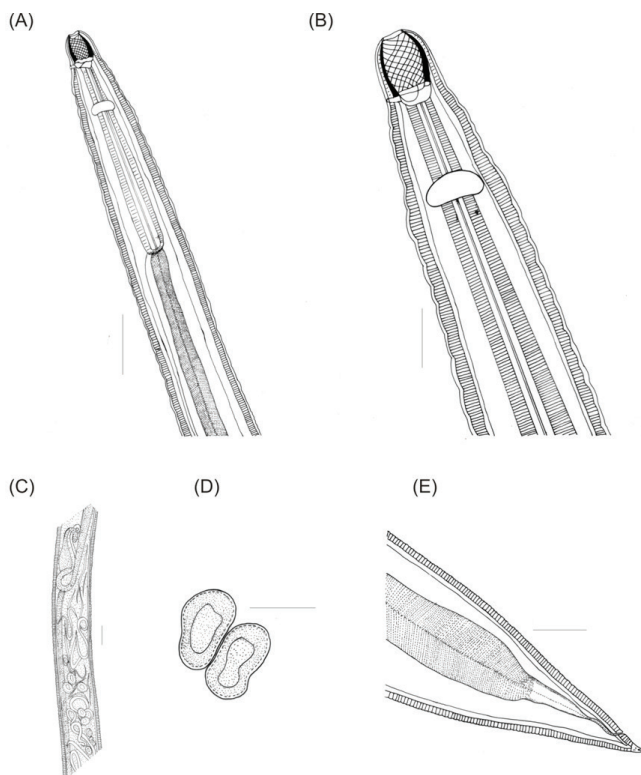


PLATE 2. Schematic illustration of *Procamallanus (Spirocamallanus) mysti*, Karve 1952; Female (A-E): A & B- anterior end, C- mid portion, D- fully developed eggs, E- posterior end

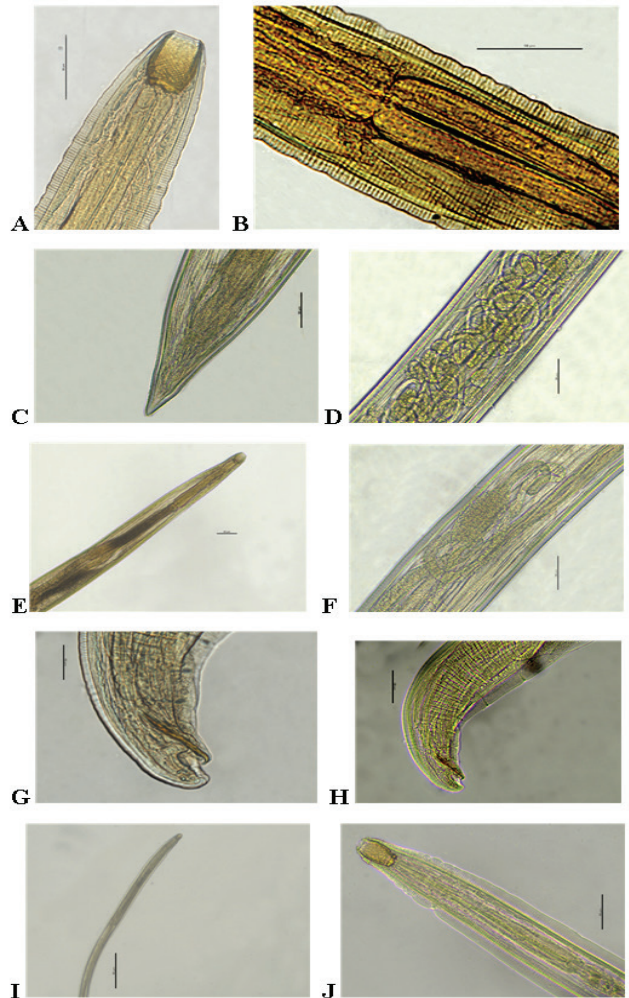


Plate 3: *Procamallanus (Spirocamallanus) mysti* (Karve, 1952); Female (A-F): A- anterior end, B- buccal capsule, C- posterior end, D- portion showing eggs, E- anterior portion, F- mid portion, Male (G-J): G & H- posterior end, I & J- anterior end

cuticle. Mouth opening large and circular. Buccal capsule barrel-shaped with ridges and a basal ring at the posterior end. Oesophagus of two types, muscular anterior part and posterior glandular part. Nerve ring was found at the region of muscular oesophagus. Excretory pore situated close to the connection of muscular and glandular oesophagus. Buccal capsule seen prominently at the anterior region of parasites. Measurements of body parts of the recovered specimens are presented in Table 1. Comparative measurements of specimens described by other workers are presented in Table 2.

Table 1. Measurements of the present species *Procamallanus (Spirocamallanus) mysti* (Karve, 1952) recovered from *Mystus cavasius* and *Ompok bimaculatus*

	<i>Mystus cavasius</i> (Female)	<i>Ompok bimaculatus</i> (Male)	<i>Ompok bimaculatus</i> (Female)
Body length	3.474-6.975	2.099	2.75-3.125
Body width	0.099-0.189	0.021	0.06-0.065
Length of buccal capsule	0.054-0.063	0.05	0.027-0.061
Width of buccal capsule	0.036-0.41	0.03	0.017-0.046
Muscular oesophagus length	0.225-0.297	0.275	0.127-0.327
Muscular oesophagus width	0.045-0.072	0.031	0.015-0.047
Glandular oesophagus length	0.279-0.459	0.375	0.19-0.335
Glandular oesophagus width	0.036-0.072	0.026	0.015-0.032
Nerve ring from anterior region	0.117-0.144	0.121	0.06-0.122
Excretory pore length from anterior region	0.261-0.297	0.132	0.0262-0.0275
Tail length	0.045-0.072	0.041	0.048-0.067
Vulva length from anterior region	2.286-4.725	-	2.15-2.775
Eggs length	-	-	0.063-0.065
Eggs width	-	-	0.033-0.038
Spicule-Right	-	0.240	-
Left	-	0.096	-

Table 2. Comparative measurement of the related species of parasite reported from India, species marked by asterisk is reported from Bangladesh. All measurements are of female specimens.

	<i>S. mysti</i> (Karve, 1952)	<i>S. gubernaculus</i> (Khera, 1955)	<i>S. viviparus</i> (Ali, 1957)	<i>S. chauhani</i> (Sahay, 1966)	<i>S. vittatusi</i> (Sood, 1967)	* <i>S. timmi</i> (Bashirullah, 1973)	<i>S. mysti</i> De et al., 1986
Length of body	5.3 – 7.3	7.59 – 9.06	4.98 – 5.27	14.79	5.23 – 5.63	5.51 – 9.12	3.033 – 10.998
Width of body	0.12 – 0.15	0.10 – 0.20	0.183 – 0.211	0.140	0.15 – 0.16	0.12 – 0.19	0.054 – 0.198
Length of muscular oesophagus	0.33	0.31 – 0.39	0.29 – 0.31	0.568	0.28 – 0.30	0.33 – 0.41	0.225 – 0.477
Length of glandular oesophagus	0.4 – 0.52	0.49 – 0.60	0.41 – 0.43	1.0968	0.44 – 0.47	0.56 – 0.67	0.279 – 0.664
Nerve ring length from anterior end	0.145 – 0.16	0.13 – 0.145	0.133 – 0.138	0.2013	0.13 – 0.15	0.108 – 0.170	0.117 – 0.184
Distance of vulva from anterior end	2.73 – 4.21	4.81 – 5.70	–	8.441	4.21 – 4.52	3.71 – 6.15	1.674 – 6.894
Length of tail	0.09 – 0.12	0.07 – 0.81?	0.038	0.188	0.044 – 0.068	0.03 – 0.04	0.036 – 0.099
Host Distribution	<i>M. cavasius</i>	<i>M. cavasius</i>	<i>M. microthalmus</i>	<i>M. cavasius</i>	<i>M. vittatus</i>	<i>M. cavasius</i> , <i>M. vittatus</i> , <i>H. fossilis</i>	<i>A. seenghala</i> , <i>M. bleekeri</i> , <i>M. convasive</i> , <i>M. tengara</i> , <i>M. vittatus</i> , <i>O. bimaculatus</i> <i>W. attu</i>

DISCUSSION

Genus *Spirocamallanus* was erected by Olsen (1952) to include the members of the genus *Procamallanus* Baylis, 1923. Later on, it was objected by subsequent workers like Khera 1955, Ali 1957, 1960, Chakravarty and Majumdar 1960, Yamaguti 1961, Agrawal 1966, Sood 1967, Bilquees et al. 1971, Akram 1976, Ashraf et al. 1977, Rehana and Bilquees 1979 and supported by some other workers like Yeh 1960, Sinha and Sahay 1965, Khan and Yaseen 1969, Ivashkin et al. 1971, Khan and Begum 1971, Majumdar and Dutta 1972, Chabaud 1975 and Petter 1979.

Many of the species recorded from India, show similarities in morphology and in many cases, their conspecificity can be assumed (De et al, 1986). A group of such closely related forms are: *Spirocamallanus mysti* (Karve, 1952), *S. gubernaculus* (Khera, 1955), *S. singhi* (Ali, 1957), *S. hyderabadensis* (Ali, 1957), *S. viviparus* (Ali, 1957), *S. chauhani* Sahay, 1966, *S. fasciatusi* (Sood, 1967), *S. vittatusi* (Sood, 1967), *S. gomtii* (Sood, 1967), *S. ompoci* Majumdar and Dutta, 1972, *S. timmi* Bashirullah, 1973, *S. intestinecolas* Bashirullah, 1974, *S. notopteri* Bashirullah and Hafizuddin, 1973 and *S. inglisi* Bashirullah and Hafizuddin, 1973. Sood (1968) redescribed *S. gubernaculus* and treated *S. chauhani* as its synonym and supported by Petter (1979) and Soota (1983). Bashirullah (1974) renamed *S. olsenii* as *S. intestinecolas*.

Akram (1976) considered the genus *Spirocamallanus* as synonym of the genus *Procamallanus* Baylis, 1923 and perhaps due to ignorance changed the name *P. (S.) olsenii* (Bashirullah, 1973) as *P. bengalensis* as the name was preoccupied by *P. (S.) olsenii* (Campana Rouget and Razarihelissoa, 1965). It seems probable that some authors overlooked the original left spicule and mistakenly mentioned the gubernaculum as left spicule (De et al, 1986). Similar such cases have been reported by Moravec and Amin (1978) in *Procamallanus siluri* Osmariov, 1961 and De and Moravec (1980) in *P. spiculogubernaculus* Agarwal, 1958. Majumdar and Dutta (1972), Bashirullah (1973) and Bashirullah and Hafizuddin (1973) recorded the number of postanal papillae of their described species wrongly (De et al, 1986). Presence or absence of mucrons on the tail tip of adult females were treated as reliable specific features of members of *Procamallanus* by Moravec (1975) and Moravec and Amin (1978).

In the light of above discussion, we are of opinion that the biodiversity of *Procamallanus* species from India should be supported by molecular data along with the morphological and morphometrical data and explored with proper description, for a better understanding of their phylogenetic relationship.

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