

Spirocamallanus sindensis n. sp. from Catfish *Rita rita* (Siluriformes: Bagridae) of Pakistan

Hira Soofi^{a*}, Nadir Ali Birmani^a, Abdul Rasool Abbasi^b and Arifa Bhutto^c

^aDepartment of Zoology, University of Sindh, Jamshoro, Pakistan

^bDepartment of Fresh Water Biology and Fisheries, University of Sindh, Jamshoro, Pakistan

^cDepartment of Information and Communication Technology, University of Sindh, Jamshoro, Pakistan

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Abstract. The aimed of present studies to examination of helminth parasites of Indus river Siluriformes catfishes. 57 (41 ♀ and 16 ♂) specimens were collected from 31 hosts fishes *Rita rita* (F. Hamilton, 1822) belong to genus *Spirocamallanus* (Baylis, 1923) processes as live specimen were killed in hot 70% ethanol, preserved, made temporary mounts for detail study. On the basis of differential characters such as body shape and size, striated cuticle format, buccal capsule shape and 13-14 spiral numbers, cephalic and cervical papillae, basal ring shape, spicules shape and size, vulva position and shape, vagina shape, the new species *Spirocamallanus sindensis* identified.

Keywords: *Spirocamallanus sindensis*, nematodes, *Rita rita*, catfishes

Introduction

Genus *Procamallanus* erected by Baylis in 1923 which including the parasitic nematodes found in freshwater and marine fishes. Olsen (1952) on the basis of presence or absence of spiral thickenings in buccal capsule split the genus into two subgenus such as *Procamallanus* for forms lacking thickenings and *Spirocamallanus* for those showing their presence. But, Rehana and Bilqees (1979); Ashraf *et al.* (1977), Akram (1975); Bilqees *et al.* (1971); Sood (1967); Agrawal (1966); Yamaguti (1961); Chakravarty *et al.* (1961); Chakravarty and Majumdar (1960); Ali (1957); Khera (1955) disagreed to the splitting, the first two authors pointing out that spiral thickenings are not the only structures found on the walls of the buccal capsule. *Spirocamallanus* was given the rank of subgenus by Sahay (1966) and it was given the status of genus by Zaidi and Khan (1975); Bashirullah and Hafizuddin (1973); Bashirullah (1973); Majumdar and Datta (1972); Khan and Begum (1971); Khan and Yaseen (1969); Sinha and Sahay (1965); Yeh (1960) and currently upheld by Petter (1978).

Various species of genus recorded from world are *S. alii* Kalyankar (1971) and Petter (1978), *S. ditchelli* by Gupta and Garg (1977), *S. dussumieri* by Bilqees, Khanum and Jehan (1971), *S. gubernaculus* by Khera (1955), *S. kalriai* by Rehana and Bilqees (1979), *S. kerri* by Olsen (1952), *S. mysti* by Kerve (1952), *S. neobuccalis* by Bilqees *et al.* (1977), *S. otolithi*

Ashraf *et al.* (1977), *S. pereirei* by Olsen (1952), *S. singhi* by Ali (1957), *S. sparus* by Akram (1975), *S. spiralis* by Baylis (1923), *S. vachai* by Sinha and Sahay (1965), *S. rebecca* by Andrade-Salas *et al.* (1994), *S. penneri* by Alan and Daniel (1978), *S. cricotus* by Alan and Robin (1978), *S. halitrophus* by Alan and Robin (1978), *S. papillicaudatus* by Bashirullah and Williams (1980), *S. partitus* by Bashirullah and Williams (1980), *S. spinicaudatus* by Bashirullah and Williams (1980), *S. garnotus* by Bashirullah and Williams (1980), *S. plumierus* by Bashirullah and Williams (1980), *S. ashoruri* by Nahed *et al.* (2001). In Pakistan little work has been done on the genus *Spirocamallanus* and present study has great contribution to the taxonomy of *Spirocamallanus* genus of nematode parasites.

Materials and Methods

During current study live 31 hosts fishes *Rita rita* of Jamshoro, Sindh, Pakistan, brought to the Department of Zoology, University of Sindh, Jamshoro. Host fishes were cut longitudinally on the dissecting tray. 57 (41 ♀ and 16 ♂) specimens were collected during examination of entire alimentary canal, viscera separately under stereo dissecting microscope. Processing of recovered nematodes, live specimens will be killed in hot 70% ethanol and preserved in alcohol-glycerol solution in glass vials. Temporary mounts in glycerol and lactophenol made for the detailed study. Diagrams were made with the help of camera Lucida. Measurements of the body and other structures will be taken in millimeters (mm). All

*Author for correspondence; E-mail: hirasooft@gmail.com

labeled specimens were deposited in the Department of Zoology, University of Sindh, Jamshoro.

Result and Discussion

Systematic position. **Family:** Camallanidae by Henry (1915); **Genus:** *Spirocamallanus* by Baylis (1923); **Species:** *Spirocamallanus sindensis* sp.; **Status:** New species; **Number of specimen recovered:** 57 (41 ♀ and 16 ♂) **Number of host infected:** 31; **Host:** *Rita rita*; **Site of infection:** Stomach; **Etymology:** The name of new species denoted to the Sindh province from where host fishes were collected.

Description of Fig. 1-2. General. Body of worm dark brown, elongate, covered with striated cuticle. Broadest at level of vulvar region in female and at posterior region of esophagus in male. Buccal capsule elongate, square in shape, have 13-14 spiral bands in male and 12-14 spiral bands in female, 2 lateral thickenings. Buccal capsule surrounded by 4 submedian papillae and 2 lateral papillae, 2 lateral amphids, end with cervical basal ring bear 2 knob like structures and 2 cervical papillae. Esophagus divide into two parts muscular end glandular. Muscular esophagus in female and curved in male. Glandular esophagus in female large and in male short, straight. Two spicules elongate, cylindrical, wider, unequal in size, mushroom like in shape, anterior end rounded cup shape and posterior end pointed. 6 caudal papillae. End of male broad with caudal alae and pointed tip. End of female elongate with spherical tip. Vulva in female post-equatorial, anterior vulvar lip broad and posterior hook shape, vagina tubular, uterus muscular fill with eggs. Eggs rounded to oval in shape.

Male. Body measures 24.6-23.17 × 0.9-0.21. Buccal capsule measures 0.11-0.19 × 0.06-0.07. Muscular esophagus measures 0.25-0.43 × 0.03-0.07. Glandular esophagus measures 0.7-0.9 × 0.024-0.034. Larger spicule measures 0.24-0.3 × 0.03-0.037. Smaller spicule measures 0.2 × 0.03-0.032. Tail measures 0.03-0.05.

Female. Body measures 38.4-39.7 × 0.14-0.30. Buccal capsule measures 0.05-0.07 × 0.02. Muscular esophagus measures 0.29-0.34 × 0.032-0.35. Glandular esophagus measures 0.19-0.40 × 0.04-0.06. Genital pore from anterior extremity measures 14.4-15.18. Eggs measures 0.05-0.06 × 0.048-0.056. Tail measures 0.4-0.7.

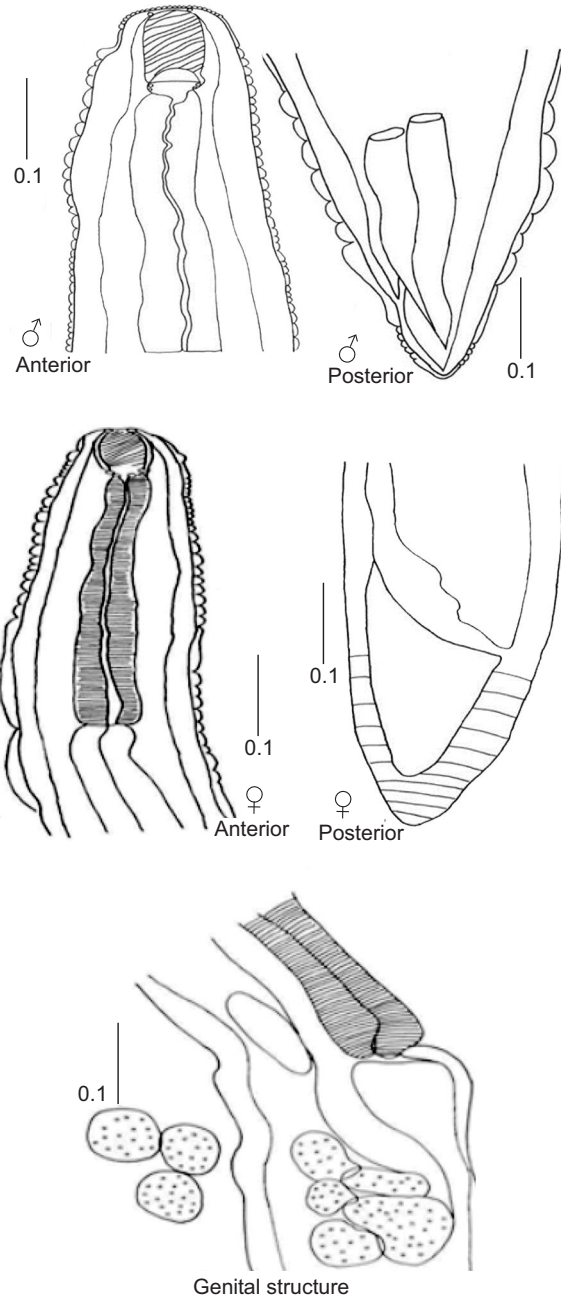


Fig. 1. *Spirocamallanus sindensis* n. sp. anterior and posterior diagrams of female worm with genital structure. Scale bar in mm.

Conclusion

New species *Procamallanus sindensis* compare with other species of genus *Procamallanus* show morphometric differential diagnostic characteristics (Table. 1).

S. alii by Kalyankar (1971) and Petter (1978) collected from intestine of *Johnius carutta*, *Johnius dussumieri*

and *Polynemus indicus* of India, Bangladesh differs from present species in having Smaller in length; nerve ring present; two cervical papillae; gubernaculum present; 11-13 pairs of caudal papillae; vulva preequatorial.

S. ditchelli by Gupta and Garg (1977) gathered from intestine of *Pellona ditchella* of India varies from present species in having smaller in length, buccal capsule with lateral finger like thickenings, nerve ring present, posterior end of male curved, spicule narrow, 7 pairs of caudal papillae, tail of female end with two spines at tip, vulva pre-equatorial.

S. dussumieri by Bilqees *et al.* (1971) gathered from intestine of *Johnius dussumieri* of (Karachi) Pakistan varies from present species in having only male specimen, Smaller in length, buccal capsule with 13

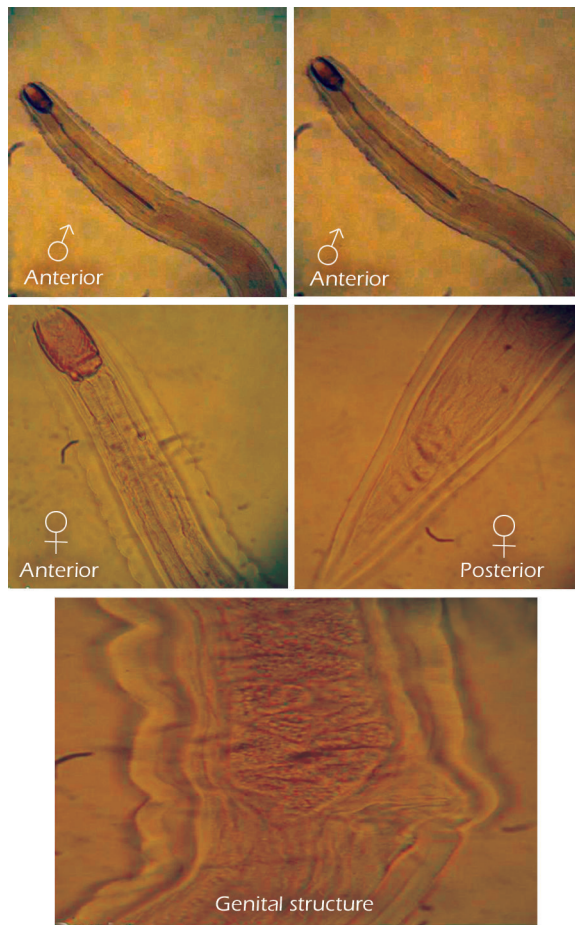


Fig. 2. *Spirocamallanus sindensis* n. sp. anterior and posterior photographs of male and female worm with genital structure.

Table 1. Comparison of present species with closely related species of genus *Spirocamallanus*

Species	Present species	<i>S. dussumieri</i> Bilqees <i>et al.</i> (1971)		<i>S. crossorhombi</i> Zaidi and Khan (1975)		<i>S. Neobuccalis</i> Bilqees <i>et al.</i> (1977)		<i>S. rebecca</i> Andrade-salas <i>et al.</i> (1994)		
Host	<i>Rita rita</i> Jamshoro, Pakistan	<i>Jahnius dussumieri</i> Karachi, Pakistan		<i>Crossorhombus azureus</i> Karachi, Pakistan		Mexico		<i>Cichlasoma helleri</i>		
Locality		Karachi, Pakistan		Karachi, Pakistan		Mexico				
Gender	Male	Female	Male	Female	Male	Female	Male	Female	Male	
Body	24.6-23.17	38.4-39-.7	14.4	-	13.92-13.99	-	-	14.16-19.8	12.1-13.7	12.1-21.9
Buccal capsule	0.11-0.19×0.06-0.07	0.05-0.07×0.02-0.02	0.091×0.078	-	0.071-0.072×0.06-0.062	-	-	0.096×0.072-0.084	98-103	98-117×67-80
Muscular esophagus	0.25-0.43×0.03-0.07	0.29-0.34×0.032-0.35	-	-	0.423	-	-	0.048-0.064	356-456	456-531
Glandular esophagus	0.7-0.9×0.024-0.034	0.19-0.40×0.04-0.06	-	-	0.542	-	-	0.78-1.04	681-850	638-1025
Large spicule	0.24-0.3×0.032-0.037	-	0.13	-	-	-	-	-	503-544	-
Small spicule	0.2×0.036- 0.032	-	0.10	-	-	-	-	-	281-297	-
Vulva from anterior end	-	14.4-15.18	-	-	-	-	-	6.06-6.09	-	6.5-11.8
Eggs	-	0.05-0.06×0.048-0.056	-	-	-	-	-	0.024-0.032	-	-
Tail	0.03-0.05	0.4-0.7	0.17	-	0.028	-	-	0.192-0.24	-	-

spiral thickenings, posterior end with knob like structures; tail without caudal alae; 9 pairs of caudal alae.

S. gubernaculus Khera (1955) gathered from intestine of *Rita rita*, *Mystus cavasius* and *Notopterus notopterus* of India varies from present species in having smaller in length, buccal capsule barrel shape with 16-18 spiral thickenings, 11-12 caudal papillae, nerve ring present, female tail with pair of papillae at tip, vulva preequatorial.

S. kalriai by Rehana and Bilqees (1979) gathered from swim bladder of *Wallago attu* of (Sindh) Pakistan varies from present species in having only female specimen, smaller in length, buccal capsule barrel shape, tail conical with two spiny structures at tip.

S. kerri by Olsen (1952) gathered from intestine of *Glossogobius giuris* of India varies from present species in having smaller in length, buccal capsule barrel shape, vulva pre-equatorial, tail with two spinous processes at tip.

S. mysti by Kerve (1952) gathered from intestine of *Mystus cavasius* and *Mystus vittatus* of India varies from present species in having smaller in length; buccal capsule with discontinuous ridges; nerve ring present, tail of male with pointed tip, gubernaculum present, 13-15 pairs of caudal papillae, tail of female with a pair of papillae and rounded tip with two processes.

S. neobuccalaris by Bilqees *et al.* (1977) gathered from intestine of *Probnibea diacanthus* of (Karachi) Pakistan varies from present species in having smaller in length, buccal capsule with 12 spiral thickenings, 2 teeth and 3 conical processes, nerve ring present, tail end with spike, vulva pre-equatorial.

S. otolithi by Ashraf *et al.* (1977) gathered from intestine of *Otolithes argenteus* (Karachi) Pakistan varies from present species in having only male specimen, buccal capsule barrel shape with 11 spiral thickenings and 3 teeth like structures, nerve ring present, tail with fork tip, numerous caudal papillae.

S. pereirei by Olsen (1952) gathered from intestine of *Mugil speigleri* and *Otolithes ruber* of (Karachi) Pakistan varies from present species in having smaller in length, nerve ring present, 11 pairs of caudal papillae, vulva preequatorial.

S. singhi by Ali (1957) gathered from intestine of *Mystus* species, *Heteropneustes fossilis* and *Ompok bimaculatus*

of India, Bangladesh varies from present species in having smaller in length, nerve ring present, 10-14 pairs of caudal papillae, female tail end with processes at tip.

S. sparus by Akram (1975) gathered from intestine of *Argyrosp spinifer* of (Karachi) Pakistan varies from present species in having smaller in length; mouth with two pairs of papillae and 10-12 spiral in buccal capsule, 10 pairs of caudal papillae, gubernaculum present, tail with spike, vulva preequatorial.

S. spiralis by Baylis (1923) gathered from body cavity of *Tachyurus caelatus* and *Sphaeroides lunaris* of (Karachi) Pakistan varies from present species in having smaller in length, buccal capsule anterior with four teeth like structures, nerve ring present, tail with two small at tip, vulva pre-equatorial.

S. penneri by Alan and Daniel (1978) gathered from intestine of *Trachycorstes insignis* of Colombia varies from present species in having smaller in length, 3 cephalic papillae, buccal capsule with 12-20 spiral bands, nerve ring present, female tail with single spine and male tail with 6 pairs of caudal papillae, a pair of phasmid, vulva equatorial.

S. cricotus by Alan and Robin (1978) gathered from intestine of *Micropogonias undulates* of Mexico varies from present species in having cephalic papillae in 3 rings, buccal capsule with 10-15 spiral bands, nerve ring present, tail with two spine like projections, spicules end with truncated tips, gubernaculum present, 8 pairs of caudal papillae, female tail with 3 rectal glands.

S. papillicaudatus by Bashirullah and Williams (1980) gathered from intestine of *Polydactylus oligodon* of North America varies from present species in having smaller in length, buccal capsule bear 8 muscles strips, between buccal capsule 4 elongate sinuses and 15 spiral in male and 10 in female, 15 pairs of caudal papillae in male and 2 pairs in female, tail with two papillae like processes.

S. partitus by Bashirullah and Williams (1980) gathered from intestine of *Pomacentrus partitus* of north America varies from present species in having smaller in length; buccal capsule bear 12 spiral thickenings, between buccal capsule 4 elongate sinuses and 4 papillae, nerve ring present, 15 pairs of caudal papillae in male and female tail with two papillae like projections.

S. spinicaudatus by Bashirullah and Williams (1980) gathered from intestine of *Holocentrus marinus* of north

America varies from present species in having smaller in length; buccal capsule bear 13 spiral thickenings, between buccal capsule 4 elongate sinuses, 4 papillae and two amphids, nerve ring present, 13 pairs of caudal papillae in male and female tail with two papillae like structures and two spines.

S. garnotus by Bashirullah and Williams (1980) gathered from intestine of *Choeres garnoti* of north America varies from present species in having smaller in length, buccal capsule bear 13 spiral thickenings, between buccal capsule 4 elongate sinuses and 4 papillae, two amphids, nerve ring present, 11 pairs of caudal papillae in male and with two papillae like structures at tip, female tail with two papillae like projections.

S. plumierus by Bashirullah and Williams (1980) gathered from intestine of *Diapterus plumieri* of north America varies from present species in having smaller in length, buccal capsule with 8 muscles strips, 10 spiral thickenings, between buccal capsule 4 elongate sinuses and 4 papillae, two amphids, nerve ring present, 14 pairs of caudal papillae in male and with two papillae like structures at tip, female tail with two papillae like projections.

S. rebecae by Andrade-Salas *et al.* (1994) collected from intestine of *Cichlasoma helleri* of Mexico differs from present species in having Smaller in length, 3 pairs of cephalic papillae and a pair of deirids; buccal capsule with 12-14 spiral thickenings, tail with 3 spine like projections; nerve ring present, 10 pairs of caudal papillae and phasmids, female with 3 rectal glands.

S. ashoruri by Nahed *et al.* (2001) collected from intestine of *Mulloidis vanicolensis* of Egypt differs from present species in having anterior end conical in shape, mouth bear 4 papillae, buccal capsule with 11-12 spiral bands, nerve ring present, 12 pairs of caudal papillae, 3 rectal glands present in female.

The comparison of present species with closely allied species of genus and cited following differences in the diagnostic characteristics such as body shape and size, striated cuticle format, buccal capsule shape and 13-14 spiral numbers, cephalic and cervical papillae, basal ring shape, spicules shape and size, vulva position and shape and vagina shape, specify that the present nematodes is a new species for which the name *Spirocamallanus sindensis* is proposed. The name of new species denoted to the Sindh province from where host fishes were collected.

Conflict of Interest. The authors declare no conflict of interest.

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