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A New Nematode *Spirocotyle otolithi* n. gen, n.sp, (Camallanidae Railliet and Henry, 1915) from the Fish *Otolithus rubber* (Schneider) of Karachi Coast

Yasmin, A. and F.M. Bilquees,
Department of Botany and Department of Zoology,
Jinnah University for Women, Nazimabad, Karachi, 74600, Pakistan

Abstract: A new genus and species of camallanid nematode *Spirocotyle otolithi* is described here from the fish *Otolithus rubber* (Schneider) of Karachi coast. This is a medium sized nematode, pointed to its posterior extremity in male and blunt in female, with a buccal capsule oval in shape in both the sexes and having a sucker like structure in its anterior extremity. The wall of the buccal capsule is provided with fifteen spiral thickenings. Two unequal spicules are present in male. Ten pairs of caudal papillae are present, including five pairs preanal, four pairs postanal and one adanal. Valva in female is prominent, post equatorial

Key words: New nematode, intestine, *Otolithus rubber*, fish, Karachi coast, Pakistan

INTRODUCTION

Nematodes are found in all the body parts of fish either as larvae or adults. The organs commonly infected are intestine, liver and body cavity. While other organs involved are heart, kidney, spleen, reproductive organs, eyes and gills. Nematode parasites specially the larvae may cause blockage of organs. This is caused when the worms are in a great quantity. If these are present in the capillaries of gills, they block or obstruct the capillaries, fish become unable to respire and die.

Glandular secretion and parasitic metaboalites may be toxic for the fish resulting in weight losses, illgrowth and inhibition of fertilization in hosts. Parasites produce proteolytic enzymes which are so strong that liquefy the effective muscles.

Among helminth parasites one of the greatly and deadly harmful are nematodes. these have direct or indirect effect on fish. A strong invasion of gut nematodes may destroy the intestine partially or wholly, as a consequence, the intestine stiffens, its peristaltic movements slow down and digestion is hampered. In some fishes blindness is also caused by certain nematode larvae. Nematodes are one of the common parasites of fishes of Karachi coast (Rasheed, 1963; 1965a, b; 1966, 1968, 1970; Bilquees *et al.*, 1971; Akram, 1975; Ashraf *et al.*, 1977; Bilquees, 1979; Bilquees and Fatima, 1980a, b; Bilquees and Akram, 1982; Bilquees *et al.*, 2005; Akhtar and Bilquees, 2006).

There are also several reports on Camallanid nematodes (Khan and Yaseen, 1969; Rasheed, 1970; Bilquees *et al.*, 1971; Khan and Begum, 1971; Rehana and Bilquees, 1973a,b; Akram, 1975; Zaidi and Khan, 1975; Ashraf *et al.*, 1977).

Camallanid nematodes are also common in other parts of the world (Agarwal, 1930, Kulkarmi, 1935, Chakravarty, 1939, 1942; Annereaux, 1946; Karve, 1952; Kulasiri and Franando, 1956; Yeh, 1957; Agarwal, 1958; Chakravarty and Majumdar, 1959, 1960; Chakravarty *et al.*, 1961; Yamaguti, 1961; Pande *et al.*, 1963; Majumdar, 1965; Lal, 1965; Sinha and Sahay, 1965; Agarwal, 1966; Sahay and Narayan, 1966; Sahay, 1967; Verma and Verma, 1971; Majumdar and Datta, 1972; Bashirullah, 1973a,b; Gupta and Duggal, 1973; Bashirullah and Hafizuddin, 1974; Gupta and Srivastava, 1975; Bashirullah and Ahmed, 1976a,b; Gupta and Garg, 1976, 1977; Kalyankar and Palladwar, 1977; Petter, 1978; Gupta and Gupta, 1979, 1980; Arya, 1980; Dhar and Fotedar, 1980; Soota, 1983; Morvec *et al.*, 2003, 2004).

The genus *Spirocotyle* of family Camallanidae Railliet and Henry (1915) and sub family Camallaninae Yeh (1957) has spiral thickenings in the buccal capsule. Similar nematodes were recovered during the present studies and these are distinctly different in having a small sucker like structure in the anterior region of buccal capsule in addition to other differences in the diagnostic features. Therefore, a new genus *Spirocotyle* is proposed referring the sucker-like structure in the buccal capsule. Species name *S. otolithi* refers to the fish host.

MATERIALS AND METHODS

The fish *Otolithus rubber* were collected from West wharf Karachi. A total of thirteen fishes were examined and one was found infected with nematodes. Nematodes were fixed and cleared in a mixture of equal amount of 70% alcohol and glycerine for a detail study, diagrams were made with the help of a camera lucida, measurements are given length by width in millimeters.

Spirocotyle otolithi n.g.n.sp. (fig. 1-4)

Type Host: *Otolithus rubber* (Sciaenidae)

Type Locality: Fish harbour, Karachi coast.

Location: Intestine

Fish examined: 13 host examined, one infected with, one one female and male

Cat. No. Holotype male JUW. N.20; Allotype female JUW.N. 21

DESCRIPTION

Order: Spiruidea (Diesing, 1861)
Family: Camallanidae (Railliet and Henry, 1915)
Sub family: Camallaninae (Yeh, 1957)
Genus: *Spirocotyle* n. gen.

These are moderate sized worms, male is smaller than female. The body of the worms tapers gradually at its anterior and posterior extremity which is curved ventrally. The cuticle of the body is striated through out its length. The buccal capsule is oval in shape in both the sexes, with simple well-developed basal ring. Inner surface of the whole capsule provided with 15 spiral thickenings. A prominent sucker is present at the anterior region of buccal capsule. Muscular oesophagus is shorter and narrower than glandular oesophagus. Excretory vesicle is prominent. The tail is pointed in male and blunt in female.

Male: Length of body 10.4, maximum width 0.34. The wall of the buccal capsule is provided with 15 spiral thickenings, 0.11 in length and 0.09 in its maximum width at its glandular oesophagus region. A prominent sucker is present at the anterior region of buccal capsule. The nerve ring is 0.048 from anterior extremity. Oesophagus is divided into anterior muscular portion and posterior club shaped curved glandular portion. The anterior muscular portion measures 0.65 in length and 0.15 in width, while the glandular portion is much wider and measures 0.98 in its length and 0.28 at its maximum width. the nerve ring,

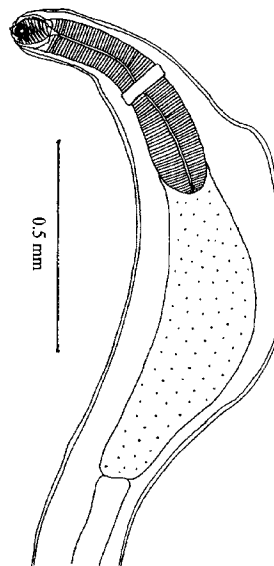


Fig. 1: Anterior end of male, holotype

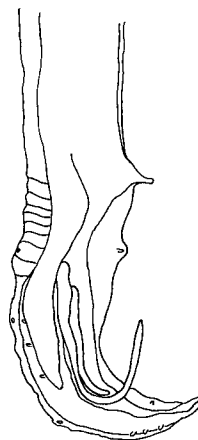


Fig. 2: Posterior end of male, holotype

0.3 in length and 0.11 in its width. The spicules similar in shape, unequal in length, large spicules is 0.71 long and small spicule is 0.34 long. Twelve pairs of caudal papillae are present, including seven pairs preanal, five pairs postanal. The tail is conical, 0.05 long with pointed end.

Female: Length of body 14.8, maximum width 0.6. The mouth leads into a buccal capsule which is similar in structure to that of male specimen and having a prominent sucker. It measures 0.11 in length and 0.1 in its width. The oesophagus is similar to that of male specimen except in size. The anterior muscular part is 0.45 in length and 0.26 at its maximum breadth. The longer posterior glandular part measures 1.18 in length and 0.43 in its maximum

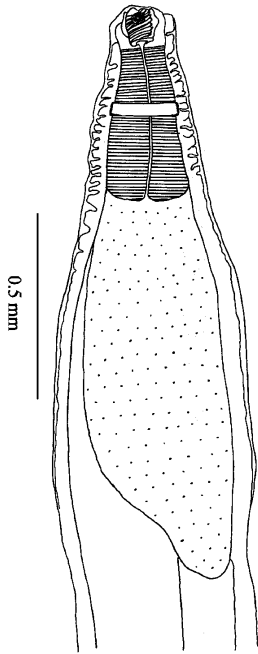


Fig. 3: Anterior end of female Allotype

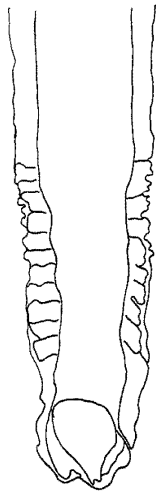


Fig. 4: Posterior end of female Allotype

breadth. The nerve ring is 0.27 from its anterior extremity. The tail is straight and oval with three prominent cuticular projections measuring about 0.1, 0.5, 0.8 from one groove to other. A pear shaped excretory vesicle is present, 0.02 in length. The valva, subterminal, 0.17 from posterior extremity.

DISCUSSION

The genus under study resembles in the buccal with *Spirocamallanus* but there are morphological

differences like, a prominent sucker in buccal capsule in both male and female, size of the body, size of the oesophagus, in number of spiral thickenings and size of spicules in male specimen and pear shaped excretory vesicle in female specimen, three cuticular projections at posterior end of female specimen. therefore it is desirable to propose a new genus *Spirocotyle*. The genus name *Spirocotyle* refers to the sucker-like structure in the buccal capsule and its relation to a *Spirocamallanus*, the species name to the fish host. The sucker-like structure is not found in any of the previously described spirocamallanid nematodes or other related genera.

Generic diagnosis: Camallanidae, sub family Camallaninae, moderate sized worms: Buccal capsule is provided with 15 spiral thickenings; a prominent sucker in buccal capsule; tridents absent; oesophagus divided into an anterior muscular and a longer and wider posterior glandular part.

Male: Posterior extremity in male, curved ventrally; tail conical, caudal alae present, with 7 pairs preanal, 5 pairs post anal, spicules unequal.

Female: Posterior extremity flat with three short, blunt processes; excretory pore terminal; vulva is sub terminal; parasites of marine fish.

Type species: *Spirocotyle otolithi*

Type locality: Karachi coast, Pakistan

REFERENCES

- Agarwal, M.P., 1930. A new nematode *P. mehrii* n. sp. from a local siluroid fish-*Wallapo altu*. Allahabad Univ. Stud., 6 sc. Sect., pp: 59-64.
- Agarwal, S.C., 1958. On a new species of *Procamallanus baylis*, 1923 (Nematode). Curr. Sci., 27: 348-349.
- Agarwal, V., 1966. On anew nematode, *Procamallanus muelleri* n.sp. from the stomach of a freshwater fish, *Heteropneustes fossilis*. Proc. Helminth. Soc. Wash., 33: 204-208.
- Akram, M., 1975. A preliminary review of the genus *Procamallanus Baylis*, 1923 with the description of a new species from the marine fish of Karachi coast. Biologica, Lahore, 21: 93-100.
- Akhtar, Y. and F.M. Bilqees, 2006. Checklist of Nematodes of marine fishes of Pakistan. Pak. J. Nematol., 24: 205-216.
- Annereaux, R.F., 1946. A new nematode, *P. pereirai*, with a key to the genus. Tr. Am. Microsc., 65: 299-303.
- Arya, S.N., 1980a. A new piscine nematode parasite, *Camallanus caballeroi* n .sp. from the freshwater fish, *Puncius ticto*. Indian J. Parasit., 3, Supplement, pp: 12.

- Arya, S.N. 1980b. A new nematode, *Camallanides kumaoni* n. sp. From a freshwater (Camallanoidea). Revta bras. Biol., 40: 463-465.
- Ashraf, S.A., M. Farooq and Z. Khanum, 1977. Two new nematode parasites of the family Camallanidae from marine fishes of Pak. Biol. Lah., 23: 111-116.
- Bashirullah, A.K.M., 1973a. Two new species of *Spirocamallanus olsen*, 1952. Am. Midl. Nat., 90: 221-224.
- Bashirullah, A.K.M., 1973b. Notes on *Spirocamallanus olsen*. Am. Midl. Nat., 92: 256.
- Bashirullah, A.K.M. and A.K.M. Hafizuddin, 1974. Two new nematode species Procammallanus Baylis, 1923 from freshwater fishes of Dacca, Bangladesh. Norw. J. Zool., 22: 53-55.
- Bashirullah, A.K.M. and B. Ahmed, 1976a. Larval development of *Spirocamallanus intestinecolus* (Bashirullah, 1973) Bashirullah, 1974 in copepods. Riv. Parassit., 37: 303-311.
- Bashirullah, A.K.M. and B. Ahmed, 1976b. Development of *Camallanus adamsi* Bashirullah, 1974 (Nematode: Camallanidae) in cyclopoid copepods. Can. J. Zool., 54: 2055-2060.
- Bilqees, F.M., Z. Khanum and Q. Jehan, 1971. Marine fish Nematodes of West Pakistan I. Description of seven new species of Karachi coast. J. Sci. Karachi, 1: 175-184.
- Bilqees, F.M. and Z. Khanum, 1974. Marine fish nematodes of Pakistan V. A new species of the genus Rhabdiascaroides Yamaguti, 1941. Pak. J. Zool., 6: 151-155
- Bilqees, F.M., 1979. *Rhabdochona parastrumatei* sp. N. (Nematoda: Rhabdochonidae) from the fish *Parastrumateus niger* (Bleeker) of the Karachi coast. Zool. Script, 8: 107-110
- Bilqees, F.M. and H. Fatima, 1980a. Marine fish nematodes of Pakistan XII. *Cucullamus quadrii*, new species (Cucullanidae) from Arius serratus (Day.) of Karachi coast. Pak. J. Zool., 12: 27-31.
- Bilqees, F.M. and H. Fatima, 1980b. Marine fish nematodes of Pakistan XI. Occurrence of *Indocucullamus longispiculum diacanthi* in the fish *Arius serratus* (Day.) of Karachi Coast. Pak. J. Sci. Ind. Res., 23: 42-48.
- Bilqees, F.M. and M. Akram, 1982. Revision of the family Camallanidae Railliet and Henry, 1915 (Nematoda: Camallenoidea. Biologia), 28: 31-46.
- Bilqees, F.M., Y. Akhtar, M.F. Haseeb and B. Khalil, 2005. A new nematode *cucullanus mujibi* n.sp. (cucullanidae Cobbold, 1864) from the fish *Arius serratus* (Day) of Karachi Coast. Proc. Parasitol., 39: 79-92.
- Chakravarty, G.K., 1939. On the nematode *Camallanus anabantis* Pearse, 1933. Sci. Cult., 5: 317-318.
- Chakravarty, G.K., 1942. A new nematode *Camallanus salmonae* from Kashmir. Curr. Sci., 1: 441-442.
- Chakravarty, G.K. and G. Majumdar, 1959. On two new parasites of the nematode families Ascaridae and Cucullanidae. Proc. Zool. Soc., Calcutta, 12: 115-120.
- Chakravarty, G.K. and G. Majumdar, 1960. On the classification of the nematode family Camallanidae Railliet and Henry, 1915. Ind. J. Helminth., 12: 93-94.
- Chakravarty, G.K., G. Majumdar and S.K. Sain, 1961. On a Camallanid nematode *Neocamallanus heteropneustii* n.g. et n. sp. with an emendation of the family. Zoo. Anz., 166: 221-224.
- Dhar, R.L. and D.N. Fotedar, 1980. On *Procammallanus Monospiculus kashmirensis* sp. Nov. from freshwater fish, *Wallago attu* from Jamamu, India. Indian J. Helminth., 31: 128-134.
- Morvec, F.P. Nie and G. wang, 2003. Some nematodes of fishes from central China, with redescription of *Procammallanus (Spirocamallanus) fulvidraconis* (Camallanidae) Folia parasitologica 50: 220-230
- Morvec, F. E.R., Cruz-Lacierda and K. Nagasawa, 2004. Two *Procammallanus* spp. (Nematoda, Camallanidae) from fishes in the Philliphines. Acata Parasitologica, 4: 309-318.
- Gupta, N.K. and C.L. Duggal, 1973. On one new and one already known species of the subgenus *Procammallanus* (Baylis, 1923), Ali, 1956 (Nematode: Camallanidae) from the freshwater fish and a key to the species of the subgenus, Riv. Parassit., 34: 295-304.
- Gupta, S.P. and A.B. Srivastava, 1975. Studies on three new species of the genus *Camallanus* from Pentkota Puri, Orissa. Proc. 62nd Indian Sci. Congr., part III, abstract, 2: 16.
- Gupta, N.K. and V.K. Garc, 1976. On two new *Spiruroid* nematodes from marine food fishes of India. Revta Iber. Parasit., 36: 181.
- Gupta, N.K. and V.K. Garg, 1977. On Indian species of the genus *Spirocamallanus* Olsen, 1952 with description of *S. ditchelli* n. sp. Indian J. Helminth., 28: 1-16.
- Gupta, S.P. and R.C. Gupta, 1979. On some nematode parasites of marine fishes. Indian J. Helminth., 29: 104-112.
- Gupta, S.P. and R.C. Gupta, 1980. *Camallanus ophichthi* sp. N. (Nematoda, Camallanidae) from the body cavity of a marine fish, *Ophichthys bro* Gunther from Puri, Orissa. Acia Parasit. Pol., 27: 31.
- Khan, D. and T. Yasin, 1969. Helminth parasites of fishes from East Pakistan I. Nematodes. Bull. Department Zool. Punjab. Univ., Article, 4: 1-33.

- Khan, D. and A. Begum, 1971. Helminth parasites of fishes from West Pakistan I. Nematodes. Bull. Department Zool. Punjab. Univ., 5: 1-22.
- Kalyankar, S. D. and V.D. Palladwar, 1977. A note on the family Camallanidae Railliet and Henry, 1915. Natural Sci. J. Marathwada Univ. J., 16: 91-94.
- Karve, J.N., 1952. Some parasitic nematode of fishes. III. J. Univ. Bombay, 21: 1-14.
- Kulasiri, C. and C.H. Franando, 1956. Camallanidae parasitic in some Ceylon fish. Parasitology, 46: 420-424.
- Kulkarni, R.B., 1935. A second species of *Procamallanus* Baylis, 1923, from India. Proc. Indian Acad. Sci., 2: 29-32.
- Lal, C., 1965. Two new species of genus *Procamallanus* Baylis, 1923 from North India. Labdev J. Sci. Technol., 3: 199-200.
- Majumdar, N., 1965. *Camallanidae hemidenta* sp. Nov. (Nematoda: Camallanidae), occurring in *Channa striatus* (Bloch). Zool. Anz., 175: 222-225.
- Majumdar, G. and B.K. Datta, 1972. Camallanid nematodes of silurid fishes. I. *Spirocamallanus ompoci* sp. N. (Nematoda, Camallanidae). Acta Parasit. Pol., 20: 193-203.
- Pande, B.P., B.B Bhatia and P. Rai, 1963. On the camallanid genus *Procamallanus* Baylis, 1923 in two of the fresh water fishes. Indian J. Helminth., 15: 105-118.
- Petter, A.J., 1978. Quelques Nematodes Camallanidae parasites de Piosson en Malaisie. Bull. Mus. nat. Hist. nat., Paris, ser. 3 (515), Zool., 354: 319-330.
- Railliet, A. and A. Henry, 1915. Sur less nematodes du genre *Camallanus* raill and Henry, 1915 (*Cucullanus* auct., non Mueller, 1777) Bull. Sec. Path. Exot., 8: 117-119.
- Rasheed, S., 1963. A revision of the genus *Philometra* Costa, 1845. J. Helminth., 37: 89-130.
- Rasheed, S., 1965a. On Cyrena (*Procyraea*) *Chabaudi* n. sp. From a fish, *Parastromateus* sp. In Pakistan: the first record of a *Habronematid* parasite in a piscine host. J. Helminth., 39: 343-348.
- Rasheed, S. 1965b. On a remarkable new nematode, *Lappetascaris lutjani* gen. Et sp. Nov. (Anisarcidae: Ascaridoidea) from marine fish of Karachi and an account of *Thynnascaris iniquies* (Linton, 1901) n. Comb. *Goezia intermedia* n. sp. J. Helminth., 39: 313-342.
- Rasheed, S., 1966. On some interesting nematode parasites of fish from Pakistan. Parasitology, 56: 151-160.
- Rasheed, S., 1968. The nematodes of the genus *Cucullanus* Muller, 1777 from marine fishes of Karachi Coast. Ann. Esc. Nac. Cienc. Bio. Mex., 15: 23-59.
- Rasheed, S., 1970. Some new and known camallanid parasites of marine food fish from Pakistan. Revta Soc. Mex. Hist. Nat: 31: 193-210.
- Rehana, R. and F.M. Bilqees, 1973a. *Procamallanus wallagus* sp.n. (Nematoda: Camallanidae) from the fish *Wallago attu* of Sindh. Sindh Univ. Res. J., 7: 13-16.
- Rehana, R. and F.M. Bilqees, 1973b. Three nematodes species of the genus *Procamallanus* Baylis, 1923 including two new species from the fishes of Kalri lake, Sind, Pakistan. Pak. J. Zool., 11: 281-293.
- Sahay, U., 1967. On a new nematode of the genus *Spirocamallanus* (Camallanidae, Procamallaninae, Nematoda) with a review of the genus. Indian J. Helminth., 18: 114-122.
- Sahay, U. and S. Narayan, 1966. On the Redescription of *Procamallanus mehrii* Agrawal, 1930 (Camallanidae, Nematoda). Ranchi U. J., 3: 64-66.
- Sinha, D.P. and U. Sahay, 1965. On a new species of *Spirocamallanus* Olsen, 1952 (Camallanidae, Procamallaninae, Nematoda) from *Eutropiichthys vacha*. Indian J. Helminth., 17: 49-53.
- Soota, T. D., 1983. Records of the Zoological survey of India, occasional paper no. 54 studies on nematode parasites of Indian vertebrates I. Fishes. 54:1-352
- Varma, S. and S. Varma, 1971. On *Procamallanus ottuci* sp. nov. (Nematoda: Spiruroidea). Indian J. Anim. Res., 5: 29-32.
- Yeh, L.S., 1957. On a new nematode, *Spirocamallanus mazabukae* sp. nov., from fresh water fish in South Africa. J. Helminth., 31: 126-130.
- Yamaguti, S., 1961. Systema Helminthum. Vol. III. The Nematodes of Vertebrates, Parts I and 2, Intersc. Publishers, pp: 1-1261.
- Zaidi, D.A. and D. Khan, 1975. Nematode parasites from fishes of Pakistan. Pak. J. Zool., 7: 51-73.