

Biosystematic studies on Nematoda *Spinitectus garuai* sp.nov. from *Clupisoma garuai* (Hamilton)

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ABSTRACT: *The genetic diversity among the fascinating biota is the result of several thousand years of tough competition within an individual among species, with other organism and several biotic and abiotic environmental factors during the process of evolution. One of the new species has been added in this series described and figured from the small intestine of Clupisoma garuai (Hamilton). After going through the literature the present form comes closer to known valid sp. of the genus Spinitectus in having all the essential morphological characters as body medium, having annulations, annula bearing spines, oesophagus divided into parts muscular anterior and glandular posterior one, thin cuticle. Males are smaller than females, spicules unequal, tail curved in male, two ovaries situated at one anterior and other posterior one, tail pointed in females but differs due to three longitudinal cuticular ridges present at the posterior part of the body and well developed lateral alae in both the sexes, no. of caudal papillae 10 pairs, 6 pairs preanal, 1 pair adanal and 3 pairs postanal, spicule ratio 1:2.16 instead of 1:2.7.*

Key Words: *Spinitectus, Nematoda, Biosystematics*

INTRODUCTION: Long and slender worms. Mouth with indistinct lips. Cuticle provided with a series of transverse rings, to the posterior edge of which are attached backwardly directed spines, diminishing in size and numbers posteriorly. Vestibule funnel shaped. Oesophagus divided into two parts, anterior muscular small and posterior glandular part long. Tail of male spirally coiled with well developed caudal alae and lateral alae, but not uniformly developed. In females also uniformly developed lateral alae present and tail with spine.

MATERIALS AND METHODS: Fishes procured for the present investigation were mostly collected from fishing sites caught by nets. Fishes were examined for parasitic infection. The recovered nematodes washed in physiological saline and then fixed in hot 4% formaldehyde solution. For light microscopical examination, the nematodes were cleared with glycerine. Drawings were made with the aid of camera lucida. All the measurements are in millimetres. The specimen has been deposited to co-ordinator of All India Project on Taxonomy (AICOPTAX) sponsored by Ministry of Environment and Forest, Govt. of India, New Delhi.

Male: Body 6.21-6.45 long, 0.17-0.18 wide. Spiny annulations 120 in male of which 39 are conspicuous. Number of spines 10-12 in first and second rows. First ring of spines 0.13 from anterior end in male. First two rings are set close, distance between first and second ring 0.4, second and third ring 0.045, third and fourth ring 0.05, fourth and fifth ring 0.055, fifth and sixth ring 0.055, sixth and seventh ring 0.06, seventh and eighth ring 0.06, eighth and ninth ring 0.065, ninth and tenth ring 0.07. Upto thirteen ring distance between the ring is 0.07-0.08. After 13 rings distance between the ring decreases and become equidistant upto 15-30 rings, after 30 rings the distance decreases upto the posterior end of body. Cephalic papillae 3 pairs, two submedian and one lateral. Vestibule funnel shaped 0.03 long. Muscular oesophagus divided into two parts anterior muscular 0.25-0.29 long, 0.03 wide. Posterior glandular 1.11-1.15 long, 0.06 wide. Entire oesophagus 1.36-1.43 long. Nerve ring 0.18-0.20 from anterior end. Excretory pore not visible. Tail 0.12-0.15 long with well developed caudal alae and feebly developed spines. Spicules dissimilar, unequal, left 0.26-0.31 long, right 0.12-0.15 long, spicule ratio (right: left) 1:2.16, caudal papillae 10 pairs, 6 pairs preanal, 1 pair adanal and 3 pairs postanal, all are pedunculated except the posterior sessile postanal pair. Three longitudinal cuticular ridges are present at the posterior part of the body.

Female: Body 10.33-15.81 long, 0.30-0.38 wide, vestibule 0.03-0.04 long. Distance between the first two rings 0.04-0.05, second and third 0.05-0.06, third and fourth 0.05-0.06, fourth and fifth 0.055-0.06, fifth and sixth 0.06-0.065, sixth and seventh 0.06-0.065, seventh and eighth 0.065-0.07, eighth and ninth 0.07-0.08, ninth and tenth 0.08-0.09. Total spiny annulations 215-276 of which 65-90 are conspicuous. Number of spines in first and second row is 13-15, third and fifth ring have 15, fourth, sixth, seventh, eighth, ninth, tenth to fifteen rings have 16 spines. The number of spines are not clear after fifteenth ring. Anterior muscular oesophagus 0.35-0.51 long, 0.04 wide. Posterior glandular oesophagus 1.19-1.98 long, 0.1 wide. Entire oesophagus 1.54-2.49 long. Nerve ring 0.26 from anterior end. Vulva preequatorial, 4.22-7.31 from anterior end, uteri opposed. Tail 0.18-0.26 long, conical, ending in a pointed spine. Eggs embryonated 0.03-0.04x0.025-0.03.

Host	-	<i>Clupisoma garuai</i> (Hamilton)
Location	-	Small intestine
Locality	-	Lucknow
Prevalence		5 male and 5 female specimens from 3 hosts out of 105 examined.

Discussion And Results: Fourment (1883) erected the genus *Spinitectus* with *Spinitectus oviflagellis* as its type species from *Merlangus vulgaris*. Sahay and Prasad (1964) created the species *Spinitectus komiyai* for their specimen from *Eutropiichthys vacha*. Agarwal (1965) described *Spinitectus pseudotropii* from *Clupisoma (=Pseudotropius) garua*. Sood (1968) considered *Spinitectus pseudotropi* to be synonym of *Spinitectus komiyai* Sahay and Prasad (1964). Rai (1969) added another new species *S. pandei*. From two fishes viz *Eutropiichthys vacha* and *Clupisoma garua*, separating it from *Spinitectus pseudotropii* namely on the basis of the structure of caudal papillae which however is considered as intraspecific variation.

Soota(1985) considered *Spinitectus pandei* Rai (1969) and *Spinitectus komiyai* are conspecific and synonym of *Spinitectus neilli* Karve and Naik (1951). Gupta and Masoodi (1900) redescribed *Spinitectus komiyai* from *Mystus seenghala*. Sahay(1970) and Soota(1983) revalidated the synonymy of *Spinitectus komiyai* and *Spinitectus pseudotropii*. The author is in agreement with Sood (1968) and Soota(1985) in the synonymy of the above species.

Moravec(1996) described *S.inermis* from *Anguilla Anguilla* on the basis of configuration of the pseudolabia and the presence of sublabial. Choudhary and Perryman (2003) added another species *Spinitectus macrospinosus* n.sp. based on spines length. *S. petrowi* Belnis(1965) and *S.gigi* Fujita(1927) redescribed by Moravec and Wang(2004) and reported peg like cuticular spine on ventral side of the tail and preanal region in female in *S.petrowi* and first two rings of spines located close to each other relatively long distances between the 2nd-7th rings and the body spination extending posteriorly to the tail in females in *S.gigi*. *S.osorioi* Choudhury and Perez-Ponce de Leon (2001) redescribed by Moravec, Maldonado and Mandujano (2010) found out certain characteristic features different from original.e terminal mucron with numerous pointed processes on female tail. Brure and Nanware (2013) created another species *Spinitectus indica* for their specimen from *Mastacembelus armatus* on the basis of 9 pairs caudal papillae and vulvar opening in front of anus. Another species *S.darwini* added by Nawab , Tikam ,Chauhan and Khare having 280 spiny annulations (12-24) in each annulations. *S. gabata* Poiner, Weistein Garcia-Vedreneand Kuris(2014) created with a characteristic feature of bifurcation of the long , left spicule and short right spicule serving as gubernaculum.

The present sp. differs from all the known sp. of the genus in having 3 long cuticular ridges in males and has close resemblance with *S.osorioi* in having well developed caudal and lateral alae in male and preequatorial vulva but differs from it in having well developed lateral alae in both the sexes, number of caudal papillae 10 pairs instead of 9 pairs, spicule ratio 1:2.16 instead of 1:3.8 and female tail ending with pointed spine like structure instead of terminal cuticular spike with numerous pointed processes on female tail.

It is evident from the present study that author's specimen exhibit certain morphological features in which it differs considerably from the majority of its conspecific..Present species is named after the specific name of the host.

Acknowledgement: Author is thankful to Ministry of Environment and Forest for providing Financial assistance and supervisor Prof. Vinod Gupta for guidance and support to complete the research work.

Plate 1: Figure 1

Spinitectus garuai sp. nov.

1. Anterior end of body. Lateral view
2. Posterior end of male. Lateral view
3. Vulvar region. Lateral view
4. Posterior end of female. Lateral view



References:

- [1] Agarwal S.C. 1965. Some new nematode parasites from fresh water fishes of Lucknow. *Indian Journal of Helminthology*. 17(1): 1-17
- [2] Choudhury ,A. And Perez-Ponce de Leon 2001. *Spinitectus osorioi* n. Sp. (Nematoda: Cystidicolidae) from *Chirostoma* sp. In lake Patzcuaro, Michoacan, Mexico. *Journal of Parasitology* 87,648-655
- [3] Choudhury, A. And Perryman 2003. *Spinitectus macrospinosus* n. Sp.(Nematoda: Cystidicolidae) from the channel catfish *Ictalurus punctatus* in southern Manitoba and its distribution in other *Ictalurus* spp. *Journal of Parasitology* 89,782-791
- [4] Gupta, P.C. and Masoodi, B. A. 1990. Two new and one known Spirurid nematode from fresh water fishes at Kanpur. *Indian Journal of Helminthology* 42(1): 31-36
- [5] George Poinar, Jr. , Weinstein, Sara B., Garcia- Vedrenne, Ana E. And Kuris, Armand M. 2014. First description of a nematode, *Spinitectus gabata* n. sp. (Spirurina: Cystidicolidae), from the deep sea oarfish, *Regalecus russelii*(Regalecidae) in Japan. *International Journal of Nematology*. 24 (2) 117-123.
- [6] Karve, J.N. And Naik, G. G. 1951. Some parasitic nematodes of fishes-III *J.Univ. Bombay, Sec. B. Biol. Sci.*101(3): 9-42.
- [7] Moravec, F., P. Nie and G. Wang 2004. New data on the morphology and systematic status of *Spinitectus petrowi* and *Spinitectus gigi* (Nematoda: Cystidicolidae) parasitic in catfishes in central China. *Folia Parasitologica* 51, 346-358.
- [8] Moravec, F.and S. Klimpel 2007.New data on the morphology of *Spinitectus oviflagellis* Fourment, 1884 (Nematoda: Cystidicolidae) from the pyloric caeca of *Macrourus berglax* (Macrouridae) in the eastern Greenland Sea. *Systematic Parasitology* 67,43 -50.
- [9] Moravec, F., L. Garcia-Magana, and G. Salgado-Maldonado 2002. *Spinitectus tabascoensis* sp.nov. (Nematoda , Cystidicolidae) from *Ictalurus furcatus* (Pisces) in southeastern Mexico. *Acta Parasitologica* 47, 224-227.
- [10]Moravec, F., G. Salgado-Maldonado J. M. Caspeta- Mandujano and D. Gonzalez-Solis 2009.Redescription of *Spinitectus tabascoensis* (Nematoda-Cistidicolidae) from fishes of the Lacandon rain forest in Chiapas, southern Mexico.*Memorias do Instituto Oswaldo Cruz* 105, 52-56.
- [11]Rai, P. 1969. On some of the hitherto known and unknown nematodes parasitic in some of the fresh water Siluroid fishes. *Indian Journal of Helminthology* 21(2): 94-108
- [12]Soota, T. D. 1983. Studies on nematode parasites of Indian Vertebrates I. Fishes. *Rec. Zool. Surv. India. Occ. Paper* No. 54.
- [13]Saraiva, A., Moravec, F., Pereira, A. And Cruz, C. 2002. Development of *Spinitectus inermis* (Nematoda: Cystidicolidae) a parasite of eel, *Anguilla Anguilla*, in Europe. *Folia Parasitologica* 49, 118-126.
- [14]Yamagutti, S. 1961. *Systema Helminthum*. The nematodes of vertebrates. Parts I and II. *Interscience Publ. Inc., New York and London*. 1-1261pp.

