Russian Journal of Nematology, 1993, 1 (2), 97 - 101

Severianoia annamensis sp. n. from a Surinam cockroaches *Pycnoscelus surinamensis* from Quang Tri province, Viet Nam

Pham Van Luc* and Sergei E. Spiridonov**

*Institute of Biological Resources, Viet Nam National Center of Scientific Research, Nghia Do, Tu Liem, Hanoi, Viet Nam.
**Institute of Parasitology of Russian Academy of Sciences, Leninskii Prospect, 33, Moscow, 117071, Russia.

Accepted for publication 10 April 1993

Summary. *Severianoia annamensis* sp. n. is described from the hind gut of cockroaches *Pycnoscelus surinamensis* collected in Quang Tri province, Viet Nam. Morphological dimorphism in males is reported. The composition and diagnosis of the genus *Severianoia* are discussed. A single female of *Suifunema* sp. and numerous immature *Leidynema* females were also found in the same host.

Key words: *Severianoia annamensis* sp. n., Thelastomatidae, Oxyurida, cockroach host, South-East Asia.

Nematodes of the family Thelastomatidae Chitwood, 1932 inhabit the hind gut of different arthropods, where they feed on other symbionts of their hosts (mainly bacteria, but also on protozoa and other thelastomatids). Little is known about the South-East Asia thelastomatids, although specific hosts of thelastomatids are quite abundant in this region. A new species belonging to the poorly studied genus Severianoia, recovered from Surinam cockroaches collected in Viet Nam is described below.

MATERIALS AND METHODS

Cockroaches were collected between organic debris and rotten wood on black pepper plantations, transported alive to the laboratory where they were dissected in saline (without heating, therefore some eggs continue their embryonic development). All drawings and measurements were made from specimens on glycerol mounts, except body length and width which were obtained from specimens in fixative.

DESCRIPTION

Severianoia annamensis sp. n. (Fig. 1)

Holotype female: L = 3450 μm, a = 18.2, b = 8.2, c = 31.4, oesophagus length = 420 μm, V = 59%, eggs = 76-77 x 28-32 μm.

Paratype females (n = 16): L = 2836 (2130-3490) μm, a = 14.0 (11.2-17.5), b = 7.0 (5.1-7.9), c = 25.5 (15.9-30.9), oesophagus length = 401 (320-460) μm, V = 60 (59-62) %, eggs = 72-79 x 28-34 μm.

Paratype males (n = 10), L = 775 (610-1068) μm, a = 9.6 (6.7-13.4), b = 5.3 (4.3-6.7), c = 18.0 (12.0-21.9), oesophagus length = 144 (130-160) μm, spicula length = 27 (25-29) μm.

Paratype male (with arcade glandular cells), L = 912 μm, a = 10.2, b = 6.1, c = 17.5, oesophagus length = 150 μm, spicula length = 28 μm.

Female. Large spindle-shaped brownish nematodes, with distinctly annulated cuticle. Eight labial protuberances around the stomatal opening. First cuticle ring 20 μm wide, adjacent rings 7-8 μm wide, other rings 8-11 μm wide throughout the body.

Stoma total length 17-18 μm with sclerotized tubular part 10 μm long and 10 μm in inner diameter of distinctly two-layered walls. Outer diameter of sclerotized tube - close to stoma bottom 17 μm. Portion of stoma before the cuticularized part covered with continuation of body cuticle 5-6 μm long. No dentiform projections on stoma bottom. Anterior swollen part of oesophagus (oesophageal collar) 35-37 μm dia. Corpus 28-30 μm dia. anteriorly, 49-50 μm posteriorly. Isthmus 30-32 μm dia. Bulbus 130-145 μm dia. with valves and two types of additional pieces: triangular 25 μm long and rounded 15-16 μm long. Cardia 13-16 μm long. Excretory pore at 720-870 μm from anterior end. Flattened excretory duct 20-25 μm long, and rounded rectangular excretory vesicle 60-80 x 45-50 μm. Four 20 μm wide excretory channels situated around vesicle in the shape of "X". Intestine with 180 μm wide proventricular portion, 100-120 μm wide at mid-body and 55-60 μm wide close to rectum. Posterior part of intestine covered irregularly with muscular fibers. Three rounded rectal glands. Muscular vagina 40 μm wide running anteriorly from vulva. Didelphic, with numerous eggs in uteri. Egg shell without operculum, with fine punctuation on the surface. No longitudinal convoluted ridges on shell surface.

Male. Body colourless. Lateral alae from isthmus to anus 10-14 μm wide. Head end rounded, without labial protuberances. First cuticle annulation at 20 μm from anterior end. Cuticle rings 5-6 μm wide. Stoma total length 5-9 μm, maximal width 6-7 μm. One thin cuticular ring close to stoma bottom. Corpus 16-17 μm wide close to stoma, narrowing posteriorly up to 10-12 μm. Isthmus 10-12 μm wide, bulbus 60-67 μm long and 32-36 μm wide with valves only. Excretory pore at 169-240 μm from anterior end. Distinctly X-shaped excretory system. Intestine about 40 μm wide anteriorly and 10-20 μm wide close to rectum. Testis flexure at 240-340 μm from anterior end, filled with spermatocytes, 3 μm dia. Vas deferens with mature spindle-shaped spermatocytes 5-6 μm long and 2 μm wide. Tail conoid, with only slight cuticle annulation. Two large preanal, 5 μm high, papillae and two smaller adanal papillae. Two pairs of papillae on tail: subventral and subdorsal, both 2 μm high.

Two males with darkly brown arcade cells were also found (Fig.1 E, B). One male was deformed thus measurements are presented only for one of these males. All arcade glandular cells in both males are elongated but have different size: dorsal cell about 15 x 7 μm, ventral cell - 20 x 5 μm size, ventrolateral cells are 15 x 3 μm size and the dorsolateral cells are 30 μm long and up to 10 μm wide. Prominent nuclei in dorsolateral cells. General morphology of these two males corresponds to that described above for males without coloured arcade glands (e.g. in tail morphology - Fig. 1. G & H), but spermatocytes close to testis flexure are 8-10 μm dia. Also, head end is more swollen in these two males and the subdorsal pair of caudal papillae are situated behind the phasmid pore.

Type host and locality. Surinam cockroaches *Pycnoscelus surinamensis* (Linnaeus) imago females and last instar nymphs were collected in December 1989 and April 1990 near Tan Lam village, 45 km to the West from Quang Tri town, Viet Nam.

Type material. Holotype female (Jc 386) and paratype male (Jc 387) deposited in Zoological Museum of Moscow State University. Paratype male (RIT 432) and female (RIT 433) deposited in Koninklijk Belgish Instituut voor Naturwetenschappen.

Differential diagnosis. The species described above is included in the genus *Severianoia* Schwenk, 1926 because of the strong similarity between this Vietnamese species and the type species of the genus - *S. severianoi* (Schwenk, 1926), which was described from the same host - *P. surinamensis*. The shape of the anterior end, oesophagus, female tail, vulva position and egg-shell general shape are similar in these two species. Nevertheless, the length of the male tail in *S. severianoi* is twice that in *S. annamensis* sp. n. Oesophagus size in males and females of both species are markedly different (400 μm and 525-550 μm respectively in *S. severianoi* and 130-160 μm and 320-460 μm respectively in *S. annamensis* sp. n.). Spicula length 38 μm in the type species but only 25-29 μm in *S. annamensis* sp. n. Other morphological differences

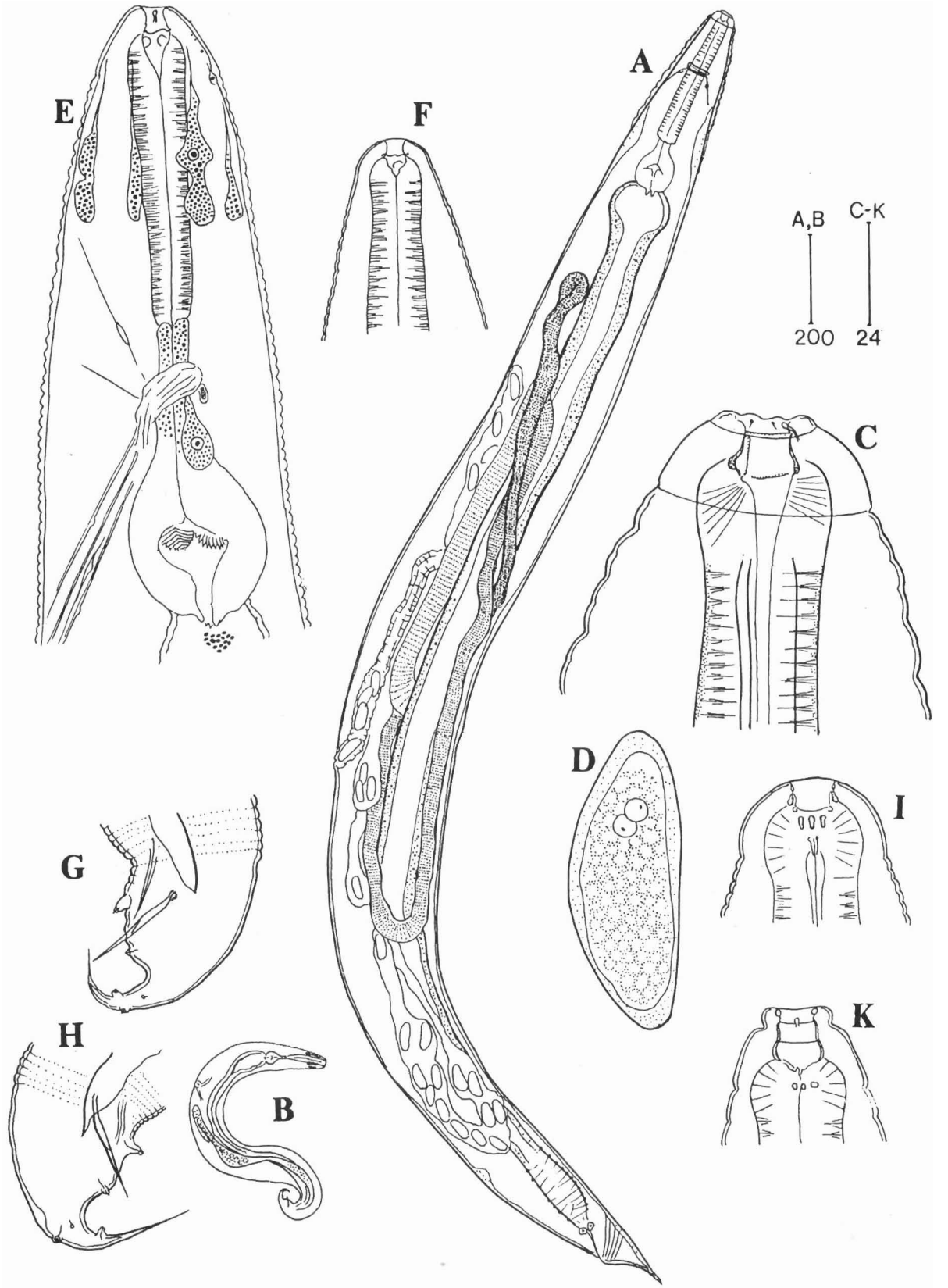

Fig.1. *Severianoia annamensis* sp. n. and accompaniing nematodes. A: Female, total view; B: Male, total view; C: Female anterior end, lateral; D: Egg-shell; E: Anterior end of male with developed arcade cells, lateral; F: End of male without arcade cells, lateral; G: Tail of male with developed arcade cells, lateral; H: Tail of male without developed arcade cells, lateral; I: Head end of *Suifunema* sp. female, lateral; K: Head end of *Leidynema* sp. female, lateral. Bars in μm

are also present: no large preanal papillae were reported for *S. severianoi*, which are replaced by small swellings. These swellings are probably preanal papillae, and therefore their morphology is different in the species under consideration. No ridges were found on egg-shells of *S. annamensis* sp. n. observed in the uteri and in the muscular part of the vagina close to vulva. These ridges are characteristic for most *Severianoia* species, apart from *S. magna* Pereira, 1935, which can be easily distinguished from the Vietnamese species by its larger body dimensions and egg size.

Taxonomic notes. Specimens of two other thelastomatid genera were found in *P. surinamensis* simultaneously with *S. annamensis* sp. n. These were immature females of a *Leidynema* sp. which resembled with *L. appendiculata* but differed (Leibesperger, 1960) in stoma structure (more thinner walls, smaller cuticularized pieces at stoma bottom). Also, a single female of *Suifunema* sp. was present, which had several characteristic features for this genus e. g. rounded head end; metacorpal swelling limited anteriorly by the nerve ring (Zervos, 1987). These thelastomatids were not positively identified because of the lack of specimens.

Males obtained from the hind gut of *P. surinamensis* were identified as *S. annamensis* sp. n. This identification was based on the fact that these males was not members of the *Leidynema* or *Suifunema* genera. *Leidynema* males are characterized by an almost complete reduction of the tail region with only a short rounded arcuate projection, with terminal spike being present. *Suifunema* males have an abrupt constriction on the caudal end behind the cloacal opening which produces a filiform tail shape (Zervos, 1987).

Differences observed in arcade cell colour was very pronounced in the males studied. Other differences (in head-end shape, position of caudal papillae and testis flexure) were considered of minor taxonomic importance. This dimorphism in *S. annamensis* males is similar to that reported for *Thelastoma attenuatum* by Lee (1974), who identified two races of males in this species. Specimens of one race were without spicula and with protruded caudal papillae, whereas the other race had spicula and short, button-like papillae. Therefore, differences between two male races of the same species can be distinct. Another explanation for differences in colour in the arcade cells may be in the active uptake of foreign substances from the nematode cavity by arcade cells and pseudocoelomocytes. Peregrine (1974) reported that arcade cells and pseudocoelomocytes developed the colour of a dye which was mixed into water consumed by the cockroach hosts. Intestinal contents in *S. annamensis* sp. n. and their hosts are often dark brown in colour, therefore the arcade cells colour may result from ingestion of this material.

ACKNOWLEDGEMENT

This study was supported in part by a grant to the second author from International Science Foundation ("Soros Fund") for biodiversity studies in the former USSR.

REFERENCES

Chitwood, B. G. 1932. A synopsis of the nematodes parasitic in insects of the family Blattidae. *Zeitschrift fur Parasitenkunde* 5: 14-50.

Dollfus, R.-Ph. 1952. Quelques Oxyuroidee de Myriapodes. *Annales de Parasitologie Humaine et Comparee* 27: 143-226.

Lee, D. L. 1974. On the occurence of dimorphic males in *Thelastoma attenuatum* Leidy, 1849. *Helminthologia* 15: 839-844.

Leibesperger, E. 1960. *Die Oxyuroidea des europaischen Arthropoden*. Parasitologische Schriftenreihe, Jena, Gustav Fisher Verlag. 151 pp.

Peregrine, P. C. 1974. Observations on arcade cells and pseudocoelomocytes in some oxyuroid nematodes parasitic in cockroaches. *Parasitology* 66: 165-180.

Pereira, C. 1935. Sobre un Lepidonemidae Travassos, 1919 e um Rhabdiasidae Raillet, 1915 (Nematode) novos. *Revista de Biologia e Hygiene* 6: 19-21.

Skryabin, K. I., Shikhobalova, N. P. & Lagodovskaya, E. A. 1964. [*Essentials of Nematodology: Oxyurata of Animals and Man*]. Part 4, Vol. 13, Moscow, Academy of Sciences of the USSR. 538 pp.

Zervos, S. 1987. *Protrellus dalei* n. sp., *Blatticola barryi* n. sp. and *Suifunema mackenziei* n. sp., thelastomatid nematodes from New Zealand cockroaches. *New Zealand Journal of Zoology* 14: 239-250.

Фам Ван Лык, Спиридонов С. Э. *Severianoia annamensis* sp. n. от Суринамских тараканов *Pycnoscelus surinamensis* вьетнамской провинции Куанг Чи.

Резюме. Из задней кишки тараканов *Pycnoscelus surinamensis* L. собранных в провинции Куанг Чи в центральном Вьетнаме описываются *Severianoia annamensis* sp. n. близкие к типовому *S. severianoi*, но отличающиеся размерами пищевода и спикулы, а также строением хвостового конца самца и оболочки яйца. Описаны две морфологические формы самцов *S. annamensis* sp. n. Обсуждается состав и диагноз рода *Severianoia*. В тех же хозяевах были обнаружены многочисленные неполовозрелые самки *Leidynema* sp., а также единственная самка *Suifunema* sp.