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Bursaphelenchus eroshenkii sp. n. (Nematoda: Aphelenchoididae) from the Russian Far East, with a key to some species of *Bursaphelenchus* Fuchs, 1937

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Summary. *Bursaphelenchus eroshenkii* sp.n. is described from specimens extracted from dead wood of *Pinus sibirica*, collected in the Russian Far East. It differs from all other species of the genus *Bursaphelenchus* by the presence of a spicula cucullus and absence of a vulval flap. *Bursaphelenchus eroshenkii* sp. n. is similar to *B. borealis* Korentchenko, 1980, but differs by spicula and tail terminus shape.
Key words: *Bursaphelenchus eroshenkii* sp. n., key, morphology, *Pinus sibirica*, Russia.

The genus *Bursaphelenchus* was established by Fuchs (1937) for nematode species in the family Aphelenchoididae, associated with bark beetles and other insects. In a recent review of the aphelenchids Hunt (1994) listed 47 valid *Bursaphelenchus* species. Most of these are associated with insects, and the group of species comprising the pinewood nematode group - *B. xylophilus* (Steiner & Buhrer, 1934) Nickle, 1970, *B. mucronatus* Mamiya & Enda, 1979, *B. fraudulentus* Ruhm, 1956 and *B. kolymensis* Korentchenko, 1980 - are associated with tree wood. *Bursaphelenchus fraudulentus* is associated with deciduous tree-hosts, and *B. mucronatus, B. kolymensis* and *B. xylophilus* are associated with conifers. These four species have similar morphology, but exhibit considerable inter- and intra-specific morphological variability. The taxonomic status of these species has been reviewed by several workers (Riga *et al.*, 1992; Bolla & Boshert, 1993; Magnusson & Kulinich, 1996). As a result of inter-specific morphological variation Webster *et al.* (1990) proposed that *B. mucronatus, B. kolymensis* and *B. xylophilus* be referred to as the "Pinewood Nematode Species Complex (PWNSC)".

A new species *Bursaphelenchus eroshenkii* sp. n., was extracted from the wood of dead Siberian cedar, *Pinus sibirica* Mayr., and may be considered a putative member of the PWNSC. However, *B. eroshenkii* sp. n. differs in its morphology from other members of the PWNSC.

MATERIALS AND METHODS

Nematodes were extracted from cut cedar wood by the Baermann funnel method. Specimens were heat killed, fixed in TAF, processed and mounted in glycerin. The description was prepared from specimens mounted on permanent slides. Male spicula terminology used in the description follows that of Yin *et al.* (1988). Spicule lengths were measured along the outer arc.

DESCRIPTION

Bursaphelenchus eroshenkii sp. n. (Figs. 1 & 2)

Holotype female: L=840 μm, a=44, b=13.1, c=25, c'=3.0, V%=76, stylet=13 μm.

Allotype male: L=728 μm, a=49, b=12.3, c=29, spicule=19.2 μm, stylet=12 μm, T%=44.

Paratypes females (n=10): L=703 (589-952) μm, a=39 (35-43), b=11.1 (9.6-14.4), c=25 (21-30), c'=2.9 (2.1-3.4), V%=74 (70-77), stylet=12.5 (12-13) μm.

Paratypes males (n=10): L=652 (486-896) μm, a=46 (38-56), b=10.1 (7.7-12.6), c=26 (23-30), spicule=18.3 (17.5-23.0) μm, stylet=12 (11-13) μm, T%=53 (42-60).

Female. Body slender, elongated. Cuticular annuli 0.6-1.0 (0.8) μm wide. Lateral field 3-4 μm wide,

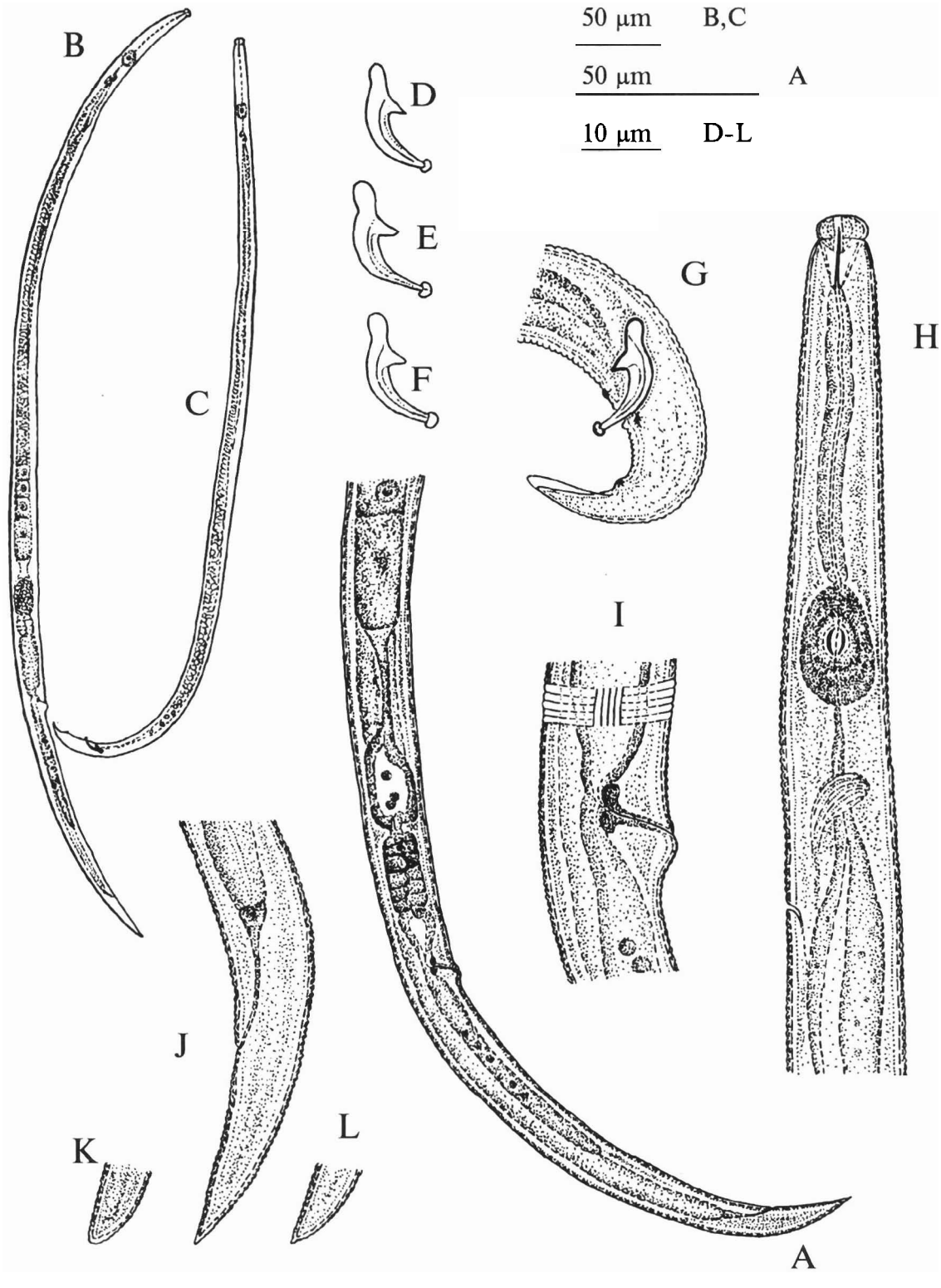

Fig. 1. *Bursaphelenchus eroshenkii* sp. n. A: Female posterior body region; B: Female; C: Male; D-F: Spicula; G: Male tail; H: Female anterior body end; I: Vagina region; K, J, L: Female tail terminus.

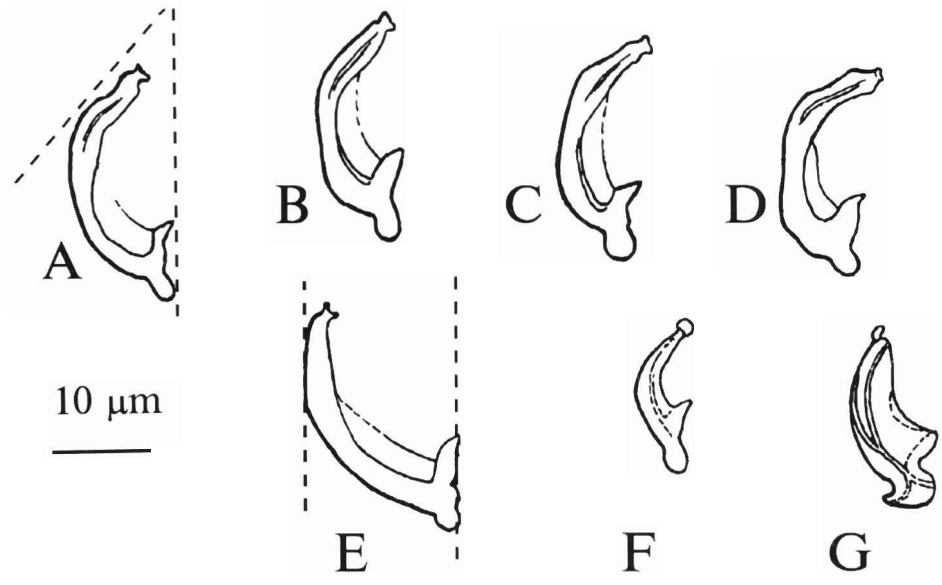

Fig. 2. Morphology of spicules of some *Bursaphelenchus* species. A: *B. fraudulentus;* B: *B. mucronatus* (Japan); C: *B. xylophilus* (Japan); D: *B. kolymensis* (paratype); E: *B. abruptus;* F: *B. eroshenkii* sp .n.; G: *B. borealis.* [A-D - redrawn from Magnusson & Kulinich (1996); E - redrawn from Giblin-Davis *et al.,* (1993); F - original, G - redrawn from Korentchenko, (1980)].

with 5 incisures. Lip region 3 x 6-7 μm, rounded, offset. Cephalic framework with light sclerotization. Stylet weakly developed, with small knobs. Anterior stylet cone less than 1/2 total stylet length. Median bulb oval, 15-18 (16) x 9.5-11 (10) μm, located 50 m posterior from anterior body end. Bulb valve 4 μm dia., in bulb center. Excretory pore 75-90 (82) μm posterior from anterior body end, at level of nerve ring or slightly posterior. Oesophageal glands separated, length of longest dorsal gland 48-60 (53) μm. Ovary straight or reflexed; anterior end position varying from the level of the dorsal oesophageal gland end to 5 body dia. from the dorsal gland. Oogonia a single row; oocytes as 2-3 rows in the growth zone. Spermatheca oval, 25-30 x 12-18 μm, with thick walls (3-4 μm), frequently filled with round spermatozoa, 3 μm dia. Preuteral gland developed, 20-23 x 12-13 μm, formed by two rows of 6-9 cells. Vulval lips different: anterior lip flat, not offset; posterior lip knob-like, protuberant. Vulval flap absent. Vagina weakly muscularized. Post-uterine gonad branch well developed, 65-120 (96) μm long, equal to 5.3 vulval dia. and 66% of vulva-anus distance. Anus clear; anal protuberance absent. Rectum 2-2.5 anal dia. long. Tail conical, 23-33 (29) μm long. Tail terminus rounded with nipple-like end, or, conical with pointed end without mucro. Hyaline part of tail 1-2 μm long.

Male. Body elongate, J-shaped when heat relaxed. Cuticular annuli 0.8 μm wide at body center. Lateral field 3 μm wide, with 5 lines. Anterior body similar to that of females. Reproductive system monorchic, testis straight or reflexed, extending 1/2 of body length. Spermatogonia arranged in 2-3 rows; spermatocytes as single row. Spicules arcuate, with sharp, beak-like rostrum and hemispherical condylus; distal end of spicula with prominent, rounded cucullus. Tail strongly ventrally arcuate, terminus pointed, with short bursa. Five papillae present as single preanal papilla, pair of adanal papillae and pair of large postanal papillae, at anterior end of bursa.

Differential diagnosis. *Bursaphelenchus eroshenkii* sp. n. differs from all other *Bursaphelenchus* species by its spicula shape, presence of a spicula cucullus and, in females, the absence of a vulval flap. *B. eroshenkii* sp. n. is similar to *B. borealis* Korentchenko, 1980, *B. nuesslini* Ruhm, 1956, *B. pityogeni* Massey, 1974 and *B. hunanensis* Yin *et al.*, 1988. It differs from *B. borealis* by spicula and tail terminus shape; from *B. nuesslini* by male stylet length (11-12 *vs* 15 μm) and spicula length (17-23 *vs* 15-16 μm); from *B. pityogeni* by stylet length (11-12 *vs* 14-15 μm) and absence of a vulval flap; and from *B. hunanensis* by stylet length (12-13, *vs* 20-26 μm), presence of stylet knobs and length of post-uterine gonad branch (5.3 *vs* 1.0 vulval dia.).

Type material. Holotype and allotype - N 72/4, paratypes female - 72/5, and paratypes male - 72/6, specimens deposited in the Nematode Collection of the Institute of Parasitology RAS (Moscow).

Type locality. Zabolotchennaya river valley, Terneiskii region, Primorski territory, Far East of Russia.

Type habitat. Dead wood of *Pinus sibirica* Mayr.

Key for species of the genus *Bursaphelenchus* with a cucullus on the male spicula

Bursaphelenchus eroshenkii sp. n. clearly differs from most other species in the genus by the presence of a cucullus on the male spicula. The following key distinguishes all species with a cucullus.

1. Condylus of spicula with a hook-like dorsal appendix, rostrum angle from 90 to 45 degrees (Fig. 2) ..... *B. borealis*
- Condylus of spicula hemispherical rounded, rostrum sharp, beak-like 2
2. Female vulval flap absent..... *B. eroshenkii* sp. n.
- Vulval flap present 3
3. Male spicula "L"-formed..... B. *abruptus*
- Male spicula "G"-formed ..... PWNSC species

All *Bursaphelenchus* species, included by Webster *et al* (1990) in the PWNSC, have males with similar spiculae with a cucullus. *Bursaphelenchus borealis* (Korentchenko, 1980) and *B. abruptus* (Giblin-Davis *et al.*, 1993) also have a spicula cucullus (Fig. 2E & G).

In *Bursaphelenchus abruptus*, a line drawn across the top of the capitulum and the anterior point of the rostrum does not intersect a line extending from the distal end of the spicula - this is a "L"-formed spicula (Fig. 2E). With PWNSC species the lines drawn as described above intersect and these are the "G"-formed spicula (Fig. 2A-D).

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Колосова Н.В. *Bursaphelenchus eroshenkii* sp. n. (Nematoda: Aphelenchoididae) с Дальнего Востока России и ключ к некоторым видам рода *Bursaphelenchus* Fuchs, 1937.

Резюме. По экземплярам, выделенным из древесины погибшей сосны с Дальнего Востока России, описывается *Bursaphelenchus eroshenkii* sp. n., отличающийся от других видов рода *Bursaphelenchus* наличием спикулярного капюшона и отсутствием вульварной складки. *Bursaphelenchus eroshenkii* sp. n. сходен с *B. borealis* Korentchenko, 1980, но отличается от него строением спикулы и терминусом хвоста.