NEW SPECIES OF SOIL NEMATODES FROM VIETNAM

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Five new species of nematodes from the families Neotylenchidae (Ecphyadophoroides theae sp. n.) and Hoplolaimidae (the remaining four species) were observed in different districts of Vietnam in the rhizosphere of several cultivated plants. The material was fixed with a solution of T.A.F. Measurements and illustrations were made from permanent glycerine preparations. Holotypes of all the new species are kept at the Biological Soil Institute of the Far Eastern Scientific Center, USSR Academy of Sciences (Vladivostok); paratypes, at the Biological Institute of the Center of Scientific Research, Socialist Republic of Vietnam (Hanoi); and paratypes of E. theae, in the Helminthological Laboratory of the USSR Academy of Sciences (Moscow) as well.

Ecphyadophoroides theae Eroshenko et Nguen Vu Thanh, sp. n.
(Figure 1)

Material: 8 ♀♀, 4 ♂♂, Han Lan district of Nghe Tinh province, rhizosphere of Thea sinensis L. Holotype: L = 0.68 mm; a = 82; b = 4.6; c = 6.5; V = 69; stylet 8.4 μm. Paratypes ♀♀ -- L = 0.58-0.71 mm; a = 76-84; b = 4.6-4.9; c = 5.7-6.5; V = 65-69; stylet 7.2-8.4 μm; ♂♂ -- L = 0.63-0.7 mm; a = 77-85; b = 4.3-4.9; c = 5.5-6.3; stylet 7-9 μm; spicules 12-13 μm.

Description. Nematode females with a thin cylindrical body, tapering in the tail area. Cuticle finely annulated, with weakly marked longitudinal lines. Lateral field in the form of two lines, in some places poorly marked. Labial area with smooth cuticle, elongated, and narrower than the contour of the body. Stylet very thin, with small basal knobs arranged asymmetrically. Esophagus tubular, widening faintly in the middle part; its glands lie on the intestine. Excretory pore located at a distance of 76-85 μm from anterior end of body. Ovary short; germinal zone with oocytes arranged in a single row. Spermatheca elongated. Length of posterior uterus equals 1.2-1.3 times vulval body diameter. Rectum well-marked. Tail 108-123 μm long and ending with a pointed, sometimes threadlike, tip.

The male does not differ from the females in the measurements of the body and the structure of the trophico-sensory section. Bursa wing-shaped and smooth. Spicules slightly bent and knobbed; their distal ends have small clavate thickenings. Gubernaculum small and bent.

Differential diagnosis. The new species is well differentiated from species of this genus which have been described earlier (Sumenkova, 1975; Corbett, 1964; Husain & Khan, 1968). By the structure of the copulatory apparatus and the presence of longitudinal lines on the cuticle, the species being described is close to E. annulatus Corbett, 1964, from which it is distinguished by the finely annulated cuticle, and by the

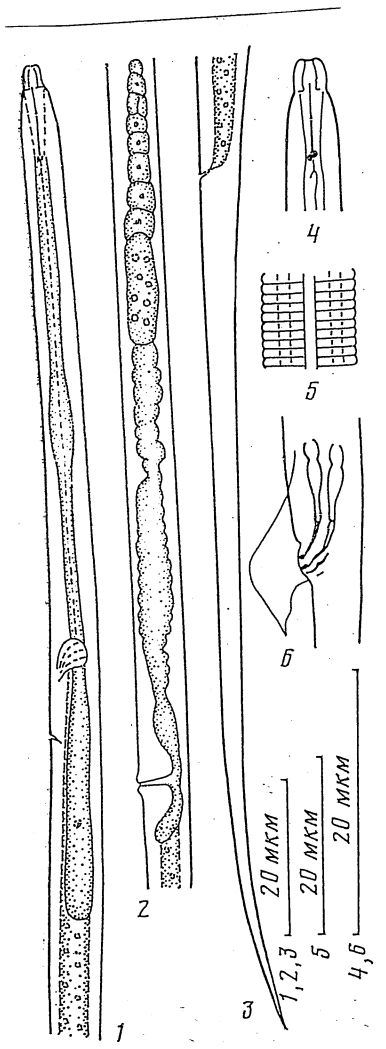

Figure 1. Details of the structure of Ecphyadophoroides theae sp. n.: 1 - Trophico-sensory section of the body; 2 - Trophico-genital section of the body; 3 - Tail of the female; 4 - Head end; 5 - Cuticle in the middle part of the body; 6 - Copulatory apparatus.

small stylet with asymmetrical knobs (9.5-12 um--E. annulatus). The new species is distinguished from another close species, E. tenuis Corbett, 1964, by a different structure of the copulatory apparatus and a longitudinal striation of the cuticle.

Helicotylenchus falcatus Eroshenko & Nguen Vu Thanh, sp. n.
(Figure 2, A-F)

Material: 11 $\overset{\circ\circ}{++}$, Haiphong province, roots of Citrus aurantum Osb. Holotype $\overset{\circ}{+}$: L = 0.53 mm; a = 27; b = 5; b' = 4.3; c = 34; V = 63;

stylet 21 µm; o = 38. Paratypes 10 ♀♀, L = 0.53-0.61 mm; a = 25-31; b = 5-6; b′ = 4.2-5.1; c = 34-47; V = 58-63; stylet 21-22 µm; o = 35-45. Males not observed.

Description. Body shape in form of an open spiral. Labial area conical, and flattened at the front end. Cuticle without obvious annulation at the head end. Stylet knobs anteriorly weakly indented or flat. Dorsal gland duct opens into esophagus lumen at a distance of 8-10.5 µm from basal part of stylet. Metacorpal bulb spherical. Excretory pore situated above the esophageal-intestinal valve. Hemizonid located directly over the excretory pore. Ovaries symmetrical, with a monostichous germinal zone. Spermatheca spherical and without spermatozoids. Vulval membrane absent. Tail bluntly rounded, with cuticle smooth at the extremity.

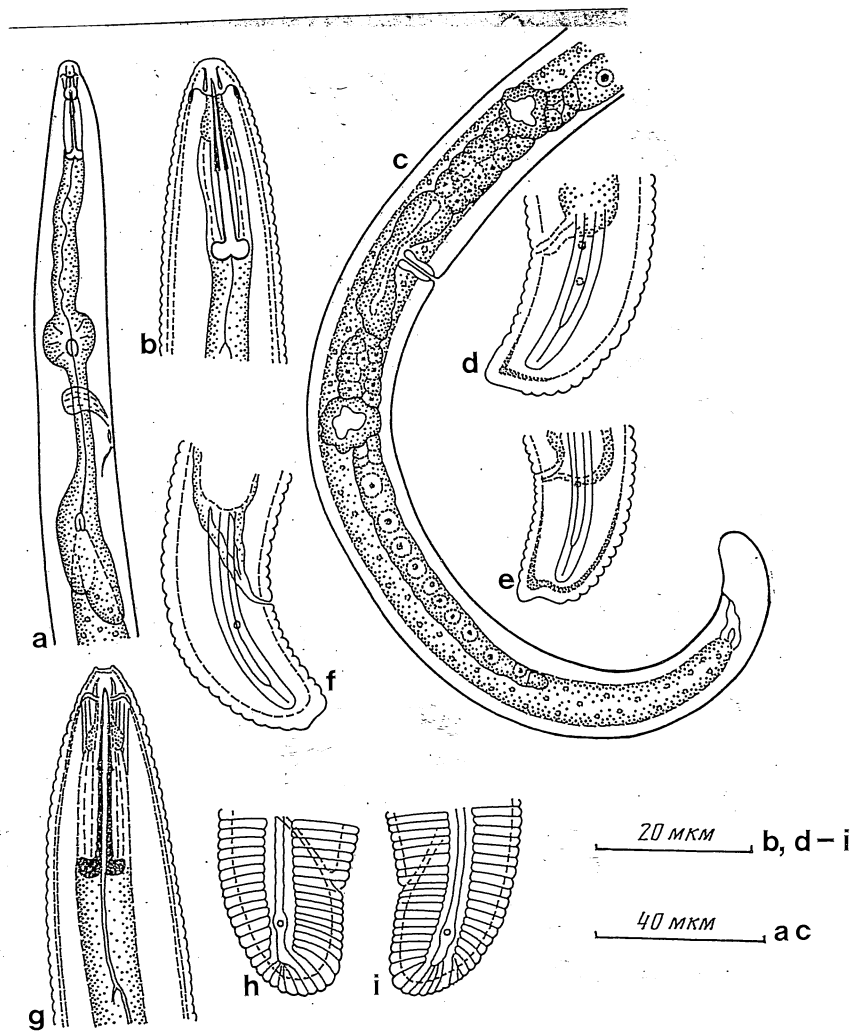

Figure 2. Details of the structure of Helicotylenchus falcatus sp. n. (A-F) and Helicotylenchus ferus sp. n. (G-I): A - Trophico-sensory section of the body; B - Anterior end of the body; C - Trophico-genital and caudal sections of the body; D-F - Variations of the tail; G - Anterior end of body; H-I - Tail.

There are 8-10 cuticular annules on ventral side of tail. The shape of the tip varies from semispherical to conical. Inner lines of lateral field merge at level of the lower half of tail. Phasmids small and situated at anus level on one of the inner lines of the lateral field.

Differential diagnosis. According to the position of the phasmids and the structure of the head end and of the tail, the species being described is close to H. leiocephalus Sher, 1966, from which it differs by the smaller length of the body, by the short stylet (21 as against 24-29 μm), and by the value of o (16-30 in H. leiocephalus). In comparison with the related species H. astriatus Khan & Nanjappa, 1972 the new species has more rounded stylet knobs, spherical metacorpal bulb, higher location of the excretory pore, different location of the phasmids, and larger number of cuticular annules on ventral side of tail.

Helicotylenchus ferus Eroshenko et Nguen Vu Thanh, sp. n.
(Figure 2, G-I)

Material. 6 ♂♂, Haiphong province, rhizosphere of Citrus limon Osb. Holotype ♀, L = 0.52 mm; a = 19; b = 5.5 b' = 4; c = 41; V = 68; stylet 21 μm; o = 53. Paratypes--5 ♀♀, L = 0.47-0.49 mm; a = 21-23; b = 5-5.4; b' = 4.2-4.3; c = 43-45; V = 65-66; stylet 22-23 μm; o = 40-57. Males not observed.

Description. Body shape spiral. Head end conical and truncated; cuticle without annulation. Stylet knobs faintly concave or flattened. The dorsal gland duct opens into the esophagus lumen at a distance of 9-12.6 μm from the basal part of the stylet. Excretory pore located above level of esophageal-intestinal valve. Hemizonid situated 2-3 cuticular annules above excretory pore. Spermatheca not noticeable. Vulva without a cuticular membrane. Tail short and semispherical, and with an annulated cuticle on the tip. Lateral field with wavy lines which do not merge at tail tip. Phasmids small, and situated 3-5 cuticular annules below the anus.

Differential diagnosis. According to the location of the phasmids, the species is close to H. belli Sher, 1966, H. labiodiscinus Sher, 1966 and H. graminophilus Fotedar et Mahajan, 1974. It differs from H. belli and H. graminophilus by the small dimensions of the body and the stylet, by the short semispherical tail, by the non-merging lines of the lateral field on the tip of the tail, and by the large value of o (18-27 in the case of H. belli). In comparison with H. labiodiscinus the species being described has a greater value of o, a different location of the excretory pore, and wavy lines of the lateral field which do not merge on the tip of the tail.

Helicotylenchus dignus Eroshenko & Nguen Vu Thanh, sp. n.
(Figure 3, A-E)

Material 11 ♂♂, province of Binh Tri Thien, rhizosphere of Thea sinensis L. and Coffea arabica I. Holotype ♀: L = 0.6 mm; a = 27; b = 5.9; b' = 4.7; c = 31; c' = 0.85; V = 64; stylet 25.2 μm; o = 50.

Paratypes -- $\overset{oo}{++}$: L = 0.51-0.58 mm; a = 20-27; b = 4.2-5.4; b' = 3.2-4.2; c = 42-69; c' = 0.9-1.1; V = 63-70; stylet 25-27.6 μm; o = 39-52. Males not observed.

Description. Body in the form of an open spiral. Width of cuticular annules in middle part of body about 1.5 μm. Labial area semispherical, with 3-5 cuticular annules. Stylet thin, with concave knobs. Metacorpal bulb oval. Esophageal glands compact. Excretory pore situated above the level of esophageal-intestinal valve and at a distance 90-110 μm from anterior end of body. Hemizonid located 1-2 cuticular annules above excretory pore. Spermatheca spherical and without spermatozoids. Tail broadly rounded, more bent from the dorsal side, and sometimes faintly concave dorsally. Inner lines of lateral field merge in the lower third of tail. Phasmids 9-13 cuticular annules above the anus.

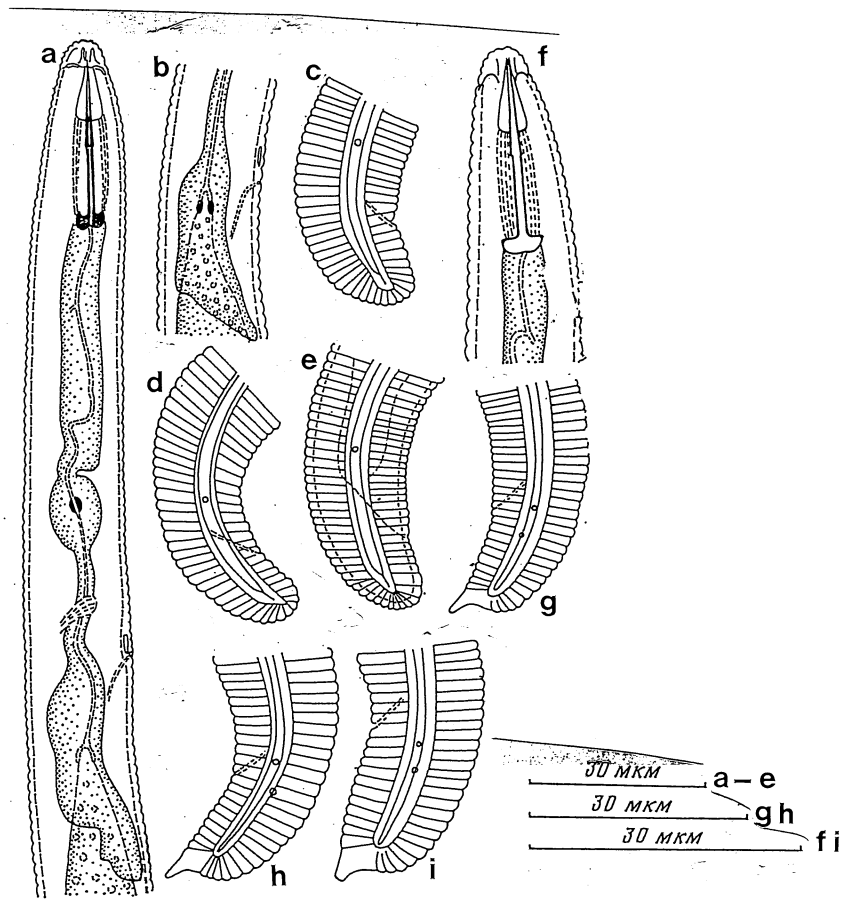

Figure 3. Details of the structure of Helicotylenchus dignus sp. n. (A-E) and Helicotylenchus coffae sp. n. (F-I): A - Anterior end of body; B - Region of the esophageal glands; C-E, G-I - Variations in the structure of the tail; F - Head end.

Differential diagnosis. The species being described is close to H. cavenessi Sher, 1966, H. concavus Román, 1961, and H. retusus Siddiqi & Brown, 1964. It differs from H. cavenessi by the high location of the phasmids (9-13 cuticular annules against 3-7), by the low position of the vulva, and by the value of the index o (39-40). In comparison with H. concavus the new species has smaller dimensions of body and stylet, clear annulation of the cuticle in the labial area, and a lower placement of the phasmids. It differs from H. retusus by the small dimensions of the body, by the low position of the vulva, and by the merging of the inner lines of the lateral field.

Helicotylenchus coffae Eroshenko & Nguen Vu Thanh, sp. n.
(Figure 3, F-I)

Material. 6 $\overset{oo}{\underset{o}{++}}$, province of Binh Tri Thien, rhizosphere of Coffea arabica L. Holotype +: L = 0.58 mm; a = 20; b = 5.3; b' = 4.5; c = 27; c' = 2.1; V = 61; stylet 24 µm; o = 40. Paratypes -- 5 oo: L = 0.38-0.59 mm; a = 18-22; b = 4.2-5.4; b' = 3.8-4.5; c = 24-28; c^{++} = 1.3-2.2; V = 53-61; stylet 24-25 µm; o = 40. Males not observed.

Description. Body shape in form of a spiral. Head end semispherical with 4-5 faintly noticeable cuticular annules. Stylet knobs anteriorly flattened or faintly concave. Dorsal gland duct opens into esophagus lumen at a distance 9.6 µm from basal part of stylet. Metacorpal bulb of esophagus oval. Esophageal glands compact. Excretory pore situated at level of esophageal-intestinal valve or above it. Hemizonid located directly over excretory pore. Spermatheca spherical and without spermatozoids. Tail dorsally bent, with a ventral projection the end of which is bluntly rounded. There are 10-12 cuticular annules on the ventral side tail. Inner lines of lateral field draw together in the lower third of tail but do not merge. Phasmids arranged asymmetrically in relation to one another and located from 2 cuticular annules above to 3 below the anus level.

Differential diagnosis. In distinction from the related species H. bambesae Elmiligy, 1970, the species being described has flattened or faintly concave knobs of the stylet, a smaller index o, a high location of the vulva and a longer tail (in the case of H. bambesae o = 50; V = 62-63; c = 34-42).

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Summary

Five new species of nematodes were found in the rhizosphere of some species of cultivated plants in different regions of Vietnam: *Ecphyadophoroides theae* sp. n. (Neotylenchidae) from the rhyzosphere of *Thea sinensis* L. Unlike the closely related species *E. annulatus*, it has a fine-annulate cuticle and a small stylet, with small asymmetrical heads. As compared with *E. tenuis*, the new species has another structure of copulative system and longitudinal striation of cuticle. The other four species belong to the family Hoplolaimidae. *Helicotylenchus falcatus* sp. n. differs from the closely related species *H. leiocephalus* and *H. astriatus* by the body and stylet size, another position of phasmids and excretory pore. *H. ferus* sp. n., as compared with *H. belli*, *H. labiodiscus* and *H. graminophilus*, has a short tail and undulate lines of lateral field, not confluent on the tail terminus. *H. dignus* sp. n. is closely related to *H. cavenessi*, *H. concavus* and *H. retusus*; it differs from the first by a higher position of phasmids and a low position of vulva, from the second by a short stylet and a low position of phasmids and from the third by smaller body size, a low position of vulva and another structure of lateral field in the region of tail. *H. coffae* sp. n. differs from the closely related *H. bambesae* by flattened heads of stylet, a high position of vulva and a longer tail.