

ECTOPARASITIC NEMATODES OF PINEAPPLE PLANTATIONS IN THE
NORTHERN AND CENTRAL PROVINCES OF VIETNAM

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In this work descriptions are given of 11 species of nematodes ectoparasitic on roots causing damage to pineapples in northern and central provinces of Vietnam. Collections of the Soviet-Vietnam expedition of 1977-1798 provided the material. The nematodes were fixed in T. A. F. and were processed according to Seinhorst (1959). The holotypes of the new species are preserved in the laboratory of general helminthology, Biological Soil Institute of the Far Eastern Scientific Center, USSR Academy of Sciences; the paratypes, are kept at the same place and in the Institute of Biology, Center for Scientific Research, Socialist Republic of Vietnam.

Helicotylenchus cavenessi Sher, 1966
(Fig. 31, A, F)

♀♀: L = 0.55-0.61 mm; a = 22-27; b = 4.6-5.3; b' = 3.8-4.6;
c = 33-46; V = 64-65%; stylet 24-26.5 μ m; o = 38-48.

The body very seldom takes the shape of a closed spiral; it is only the posterior end of the body that is often bent ventrally. Labial area hemispherical, with 3-5 indistinctly expressed cuticle annules. Stylet knobs faintly concave or flattened. Dorsal gland duct opening into the esophageal lumen at 11.5-12 μ m from the basal part of the stylet. Excretory pore situated above the level of esophageal-intestinal valve. Hemizonid located above the excretory pore. Spermatheca spherical, offset from the contours of the uterus, and without spermatozooids. Tail without ventral projection, and with a conical or rounded annulated tip. Internal incisures of the lateral field merging in the lower third of the tail. Phasmids located 4-8 cuticular annules above the anus level. There are 10-14 cuticular annules on the ventral side of tail.

The species was earlier known as a parasite of different agricultural cultures in Hungary and Iran (Krall', 1978). It was observed by us on pineapple and orange plantations in the provinces of Kha Nam Nin', Vin' Fu and Nge Tin'.

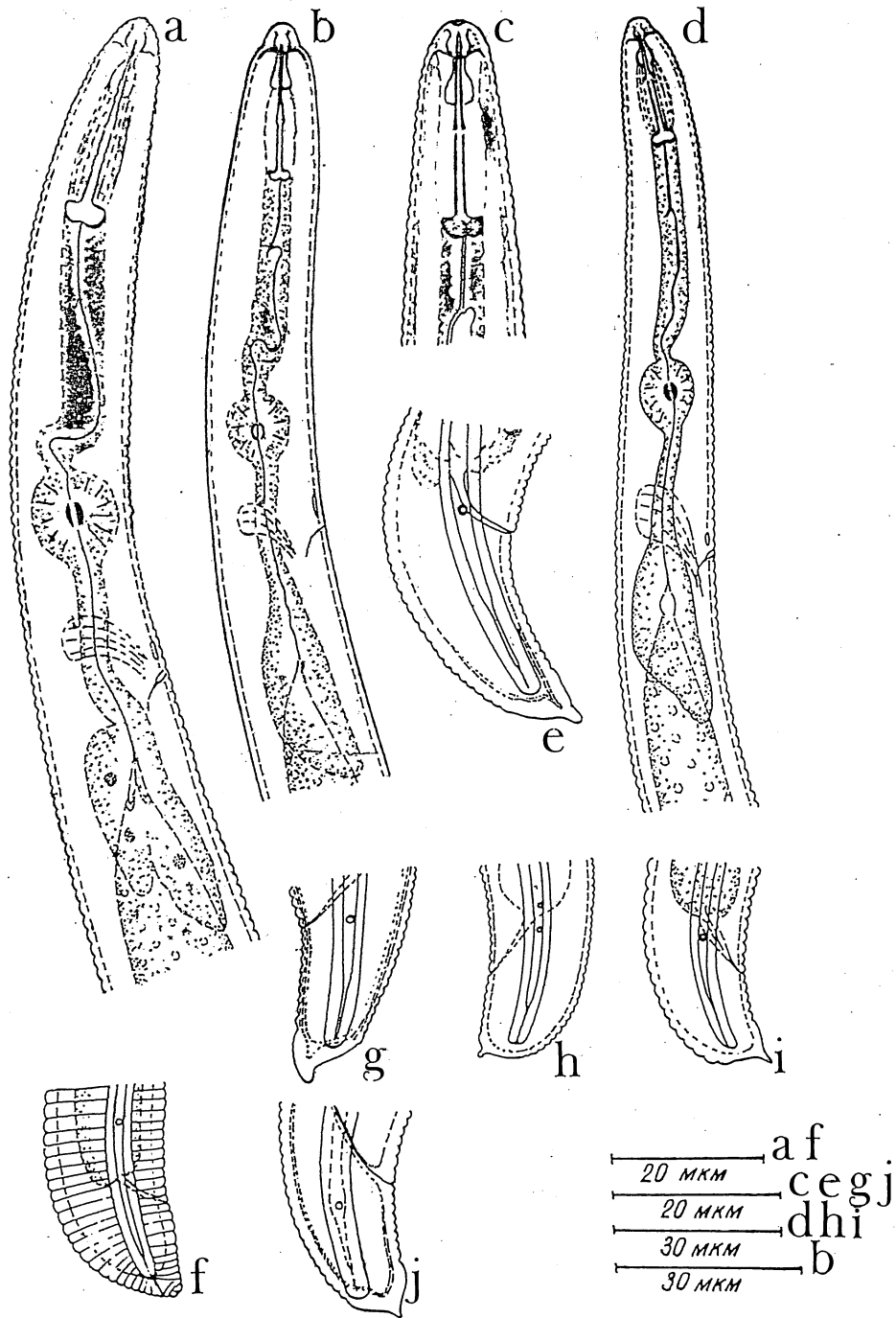


Figure 31. Helicotylenchus cavenessi (A, F), Helicotylenchus laevicaudatus sp. nov. (B, C, E, G, J), and Helicotylenchus notabilis sp. nov. (D, H, I): A-D - Anterior ends of body; E-J - Tails.

Helicotylenchus certus sp. nov.

(Fig. 32)

Holotype ♀: L = 0.59 mm; a = 28; b = 5.4; b' = 4.4; c = 38; V = 64%; stylet 23 μ m; o = 45.

Paratypes ♀♀: L = 0.59-0.65 mm; a = 23-31; b = 4.8-6.0; b' = 3.8-4.8; c = 36-45; V = 61-65%; stylet 23-25 μ m; o = 35-45.

Males not observed.

Body twisted in spiral shape. Labial area hemispherical or faintly flattened, with 4-5 poorly marked annules. Stylet knobs anteriorly flattened, or slightly sloping backwards in various individuals. Dorsal gland duct opening into esophagus lumen at 8.4-10.5 μ m from basal part of stylet. Excretory pore located at level of widening of the esophageal glands; hemizonid immediately above excretory pore. Ovaries symmetrical. Spermatheca not noticeable. Vulva area with a thickened cuticular valve which forms lateral membranes. Tail dorsally bent with pointed tip. Ventral side of tail with 7-10 cuticular annules. The lines of the lateral field do not merge on the end of the tail. Phasmids located at anus level or 1-4 cuticular annules above it.

Differential diagnosis. The species being described is very close to H. erythrinae (Zimmermann, 1904) Golden, 1956, from which it is distinguished by the absence of males and spermatheca, and by the presence of cuticular membranes in the vulva area in females. The new species differs from another close species H. egyptiensis Tarjan, 1964 by the smaller measurement of body and stylet, by the short tail (in H. egyptiensis L = 0.69-0.85; c = 25-33; stylet 24-28 μ m), by the structure of the lateral field in the tail area, and by the presence of vulvar membranes. According to other characteristics, H. certus sp. nov. is close to H. agricola Elmiligy, 1970; H. conicephalus Siddiqi, 1972; H. microcephalus Sher, 1966; and H. craigi Knobloch & Laughlin, 1973. In comparison with these species, the species being described has cuticular lines of the lateral field not merging on tail end; beside this it differs from H. agricola by the low position of the dorsal gland duct opening (in H. agricola o = 30-32), and by the presence of vulvar membranes; from H. conicephalus, by the structure of the head end; from H. microcephalus, by the structure of the stylet knobs and of the labial area, and by the spherical metacorporeal bulb; and from H. craigi, by the short projection on the tail (in H. craigi the outgrowth is thornlike).

Locality. Rhizosphere of pineapple Ananas sativa L. in the province of Shon La.

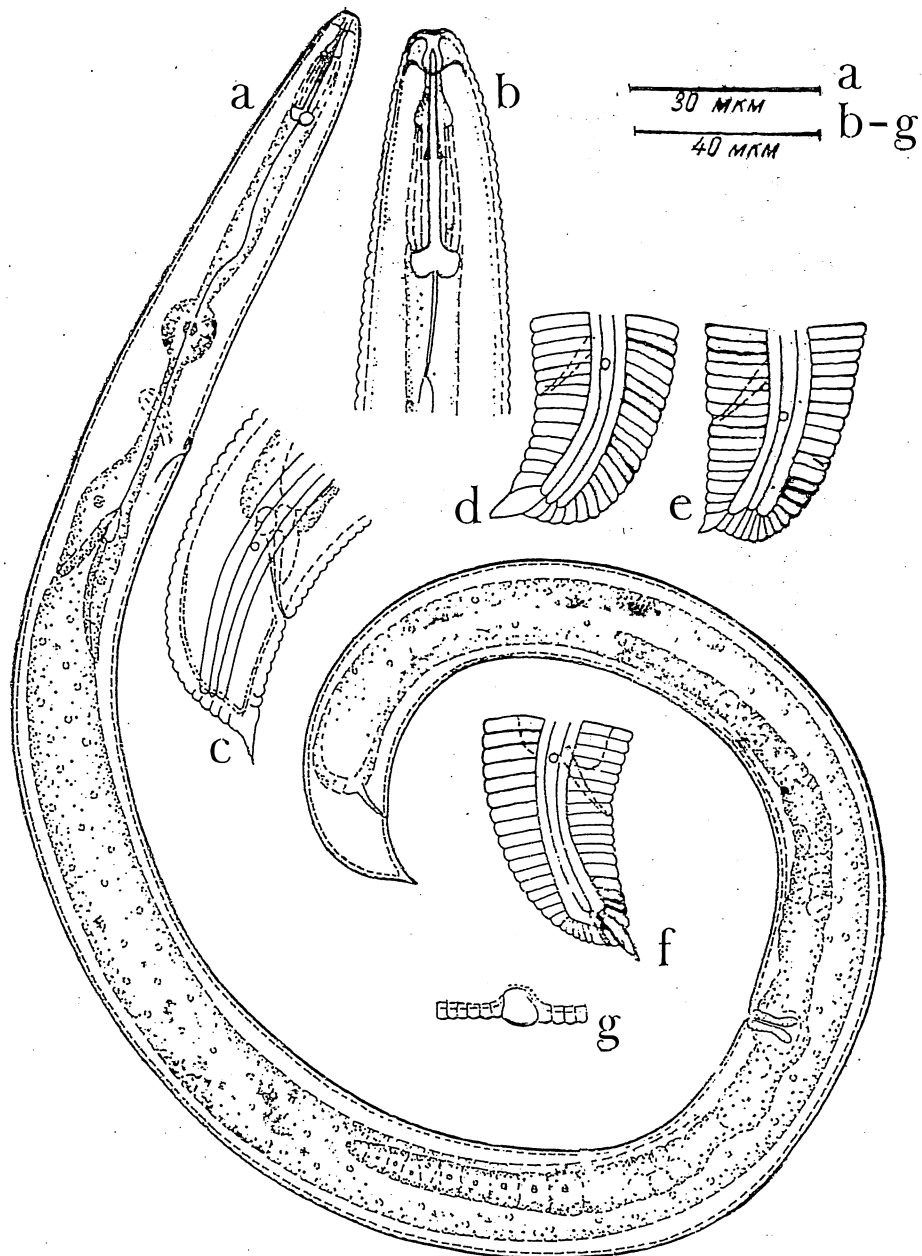


Figure 32. *Helicotylenchus certus* sp. nov.

A - General view of female; B - Head end; C-F - Tail; G - Vulvar membrane.

Helicotylenchus dihystra (Cobb, 1893) Sher, 1961.
(Fig. 33)

♀♀: L = 0.58-0.65 mm; a = 26-32; b = 6-9; b' = 5-6; c = 38-46;
V = 63-65%; stylet 26-27 μ m; o = 40-45.

Body twisted in spiral shape. Head end hemispherical with 4-5 poorly marked cuticular annules. Stylet with concave knobs. Excretory pore located at level of esophageal-intestinal valve. Hemizonid 1-2 cuticular annules above excretory pore. Spermatheca hemispherical, without spermatozooids, axial or dorsally offset. Tail dorsally convex, and with variable structure of the tip: from almost hemispherical to conical, with a bluntly rounded projection or without it. Phasmids located 8-11 cuticular annules above anus. Tail with 6-10 cuticular annules. Internal lines of the lateral field merging at a small distance from the tail tip.

The species is most frequently encountered in the tropics and subtropics. In the territory of Vietnam it is widespread over all agricultural lands.

Among countries contiguous to the Socialist Republic of Vietnam it is known in Japan, South Korea, Indonesia, the Philippines, India, Sri Lanka, Malaysia, Thailand and Kampuchea.

Helicotylenchus laevicaudatus sp. nov.
(Fig. 31, B, C, E, G, J)

Holotype ♀: L = 0.52 mm; a = 27; b = 4.9; b' = 4.3; c = 30; V = 63%;
stylet 23 μ m; o = 40.

Paratypes ♀♀: L = 0.49-0.54 mm; a = 23-27; b = 5-7; b' = 4.2-4.9;
c = 30-35; V = 63-64%; stylet 21-23 μ m; o = 38-47.

Body twisted in spiral shape. Head end hemispherical. Cuticular annulation in the labial area poorly marked. Stylet comparatively thin, with faintly concave knobs. Dorsal gland duct opening into esophageal lumen at 9-10 μ m from basal part of stylet knobs. Metacorporeal bulb round. Excretory pore situated above the level of esophageal-intestinal valve. Hemizonid located above excretory pore. Vulvar membranes present. Spermatheca spherical and axial, without spermatozooids. Tail conical, with 8-9 cuticular annules. Tail tip with smooth cuticle, ending in a terminal or ventral projection bluntly rounded. Internal lines of the lateral field indistinct, tapering or merging at level of lower half of tail. Phasmids located at anus level.

Differential diagnosis. In the dimensions of the body and the structure of the stylet, the species is close to H. delhiensis Khan & Nanjappa, 1972, but differs from it by the much lower location of the excretory pore and phasmids, and by the structure of the tail tip (in H. delhiensis it is smoothly rounded). The species is close to H. pisi Swarup & Sethi, 1968

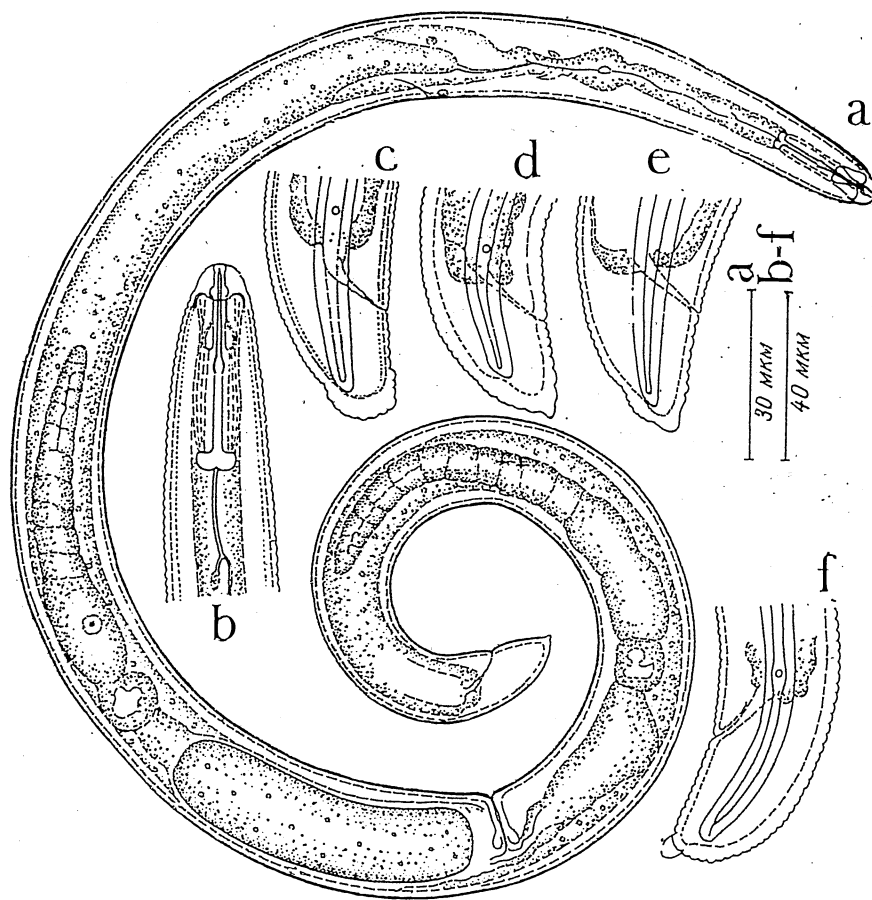


Figure 33. *Helicotylenchus dihystra* (Cobb, 1893) Sher, 1961.

A - General view of female; B - Head end; C-F - Tail.

in the structure of the tail tip (smooth cuticle, with a small ventral projection), and differs from it in the smaller measurements of the body and stylet (in H. pisi L = 0.7-0.2 mm; stylet 26-29 μ m), in the smaller value of "o" (in H. pisi o = 48-55), and in the structure of the lateral field in the tail area.

Locality. It is found on pineapple and orange plantations in the provinces of Kha Nam Nin', Haiphong and Tan'Khoa; the holotype is described from roots of pineapple in the province of Kha Nam Nin' (Dong Zao) in the Socialist Republic of Vietnam.

Helicotylenchus notabilis sp. nov.
(Fig. 31, D, H, I)

Holotype ♀: L = 0.56 mm; a = 23; b = 5.2; b' = 4.4; c = 43; V = 62%; stylet 22.8 μ m; o = 53.

Paratypes ♀♀: L = 0.55-0.65 mm; a = 21-30; b = 4.8-5.8; b' = 3.9-4.9; c = 42-48; V = 62-66%; stylet 21-23 μ m; o = 48-53.

Body twisted in spiral shape. Labial area hemispherical or weakly truncated and with 3 cuticular annules. Stylet knobs flattened or faintly concave. Dorsal gland opening into esophagus lumen at 11-12 μ m from the stylet knobs. Metacorporeal bulb oval. Excretory pore located above esophageal-intestinal valve, at level of widening of esophageal glands. Spermatheca spherical and without spermatozooids. Cuticular membranes absent. Phasmids located 3-4 cuticular annules above anus level. Tail with smooth tip and a thin projection with a bluntly rounded apex. The internal lines of the lateral field merge at level of lower half of tail.

Differential diagnosis. The species being described is differentiated from the close species H. bambesae Elmiligy, 1970, H. conicephalus Siddiqi, 1972 and H. tropicus Román, 1965 by the smooth cuticle on the tail tip. Besides this, in comparison with H. bambesae the new species has fewer annules in the labial area, vulvar membranes are lacking, the internal lines of the lateral field merge, and the location of the phasmids is high with respect to the anus; our species differs from H. conicephalus by the annulation of the labial area and the unexpressed labial disc; and from H. tropicus, by the short tail, the lower location of the phasmids, and the merging lines of the lateral field in the area of the tail.

Location. Rhizosphere of pineapple in the province of Bin' Chi Tkhien.

Scutellonema vietnamiensis sp. nov.
(Fig. 34, C-G, H, J)

Holotype ♀: L = 0.83 mm; a = 21; b = 8.6; b' = 6.6; c = 69; V = 56%; stylet 31 μ m; o = 19.

Paratypes ♀♀: L = 0.81-0.92 mm; a = 19-24; b = 8-9; b' = 6.2-7.6; c = 62-95; V = 52-55%; stylet 31-33 μ m; o = 19-22.

Males not observed.

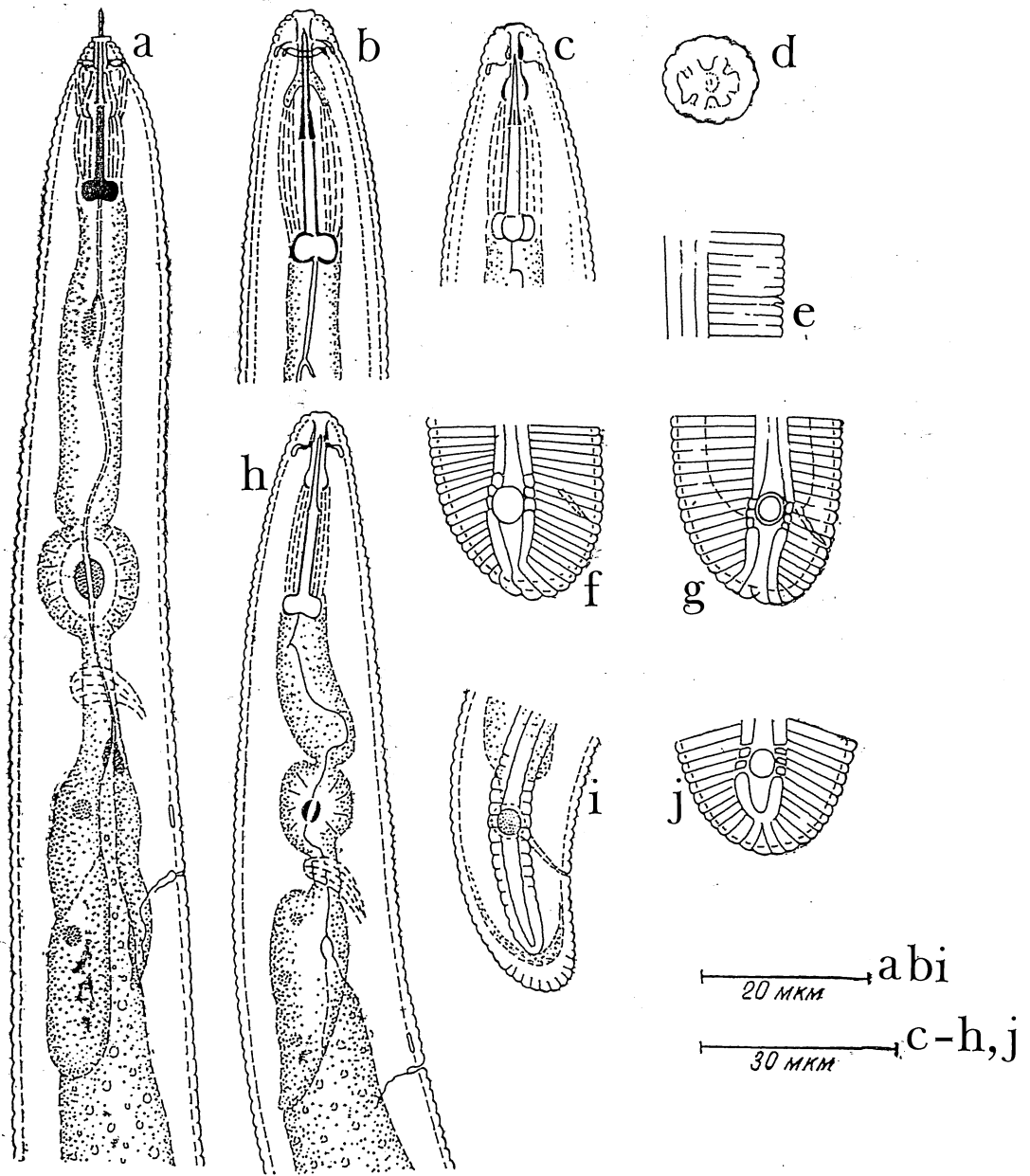


Figure 34. *Scutellonema amabilis* sp. nov. (A, C, I), and *Scutellonema vietnamiensis* sp. nov. (C-H, J): A-C, H - Anterior end of body; D - Basal annule of labial area; E - Epiptygma; F, G, I, J - Tail.

Body shape in the form of an open spiral. Labial area hemispherical, not offset, and with 4 cuticular annules. All annules of the labial area are longitudinally striated; the basal annule has 12 longitudinal lines. Cuticular annules 1.8 μ m in width in central part of body. Lateral field with 4 lines, areolated at level of esophagus and scutellum. Stylet knobs rounded. Dorsal gland duct opening into esophageal lumen at 6-7 μ m from basal part of stylet. Excretory pore located at level of base of esophageal glands. Hemizonid located 1-2 annules above excretory pore. Spermathecae spherical, without spermatozooids. Epiptygma not paired. Scutella 6-7 μ m in diameter, situated at anus level or a little above it. The internal lines of the lateral field do not merge. Tail hemispherical, 9-13 μ m in length, with 8-9 cuticular annules.

Differential diagnosis. It is closest of all to S. brachyurus (Steiner, 1938) Andrásy, 1958, S. clariceps Phillips, 1971 and S. unum Sher, 1963. It differs from the first species by the larger number of transverse lines on the basal annule of the labial area (6 in S. brachyurus), by the higher location of the vulva and by the large scutella. In comparison with S. clariceps the new species has a poorly expressed epiptygma, a lower position of the excretory pore, and a shorter tail (in S. clariceps $c = 48-54$), lines of the lateral field not merging, and males lacking. The species being described is distinguished from S. unum by the larger measurements of the body, by the smaller number of longitudinal lines on the basal part of the labial area (16-22 in S. unum), and by the structure of the lateral field in the tail area.

Location. Observed on pineapple plantations of the plant-growing station Vo Mien in the province of Vin' Fu.

Scutellonema amabilis sp. nov.
(Fig. 34, A, B, I)

Holotype ♀: $L = 0.61$ mm; $a = 26$; $b = 6.9$; $b' = 4.9$; $c = 47$; $V = 62\%$; stylet 23 μ m; $o = 41$.

Paratypes ♀♀: $L = 0.59-0.64$ mm; $a = 19-26$; $b = 7$; $b' = 5$; $c = 40-48$; $V = 56-67\%$; stylet 21-24 μ m; $o = 43-49$.

Upon fixation the body of the nematodes takes the shape of an incomplete spiral or only the posterior end of the body is bent ventrally. Labial area faintly offset from body contour, with a distinct labial disc and 4 cuticular annules. Basal annule without horizontal lines. Stylet knobs rounded. Dorsal gland duct opening into esophagus lumen at 9.5-12 μ m from stylet knobs. Metacorporeal bulb spherical. Excretory pore located at level of center or base of esophageal glands. Hemizonid located 2-3 cuticular annules above excretory pore. Esophageal-intestinal valve situated at base of isthmus. Ovaries with oocytes arranged in a single row with the exception of the zone of multiplication, and with a spherical spermatheca. Epiptygma not observed; a cuticular membrane exists in separate individuals. The intestine does not continue past the beginning of the rectum. Scutella 2.8-3 μ m in diameter. Lateral field areolated at level of esophagus and scutellum. Tail hemispherical.

Differential diagnosis. The species is close to S. orientalis Rashid & Khan, 1974 and S. insulare Phillips, 1971. It is distinguished from S. orientalis by the absence of an epiptygma, by the much longer tail, by the shorter stylet, by the value of "o" (in S. orientalis c = 50-90; o = 30; stylet 27-32 μ m), by the rounded stylet knobs, and by the higher location of the phasmids. In comparison with S. insulare, areolation of the lateral field in the central part of the body is lacking in the new species, there is a larger value of "o", and the scutella are larger (1.8-2.1 μ m in S. insulare).

Locality. Soil and roots of pineapple in the province of Kha Nam Nin'.

Hoplolaimus chambus Jairajpuri & Baqri, 1973.
(Fig. 35, A-F)

♂♂: L = 1.33-1.54 mm; a = 29-34; b = 8-10; b' = 6-7; c = 49-56; V = 53-55%; stylet 42-43 μ m; o = 10-13. Body faintly bent ventrally. Head end offset from body contour, and with 3 cuticular annules. Basal annule of labial area with 9 longitudinal lines. Stylet knobs three-pronged. Metacorpul bulb oval. Esophageal glands with 6 distinct nuclei. Location of excretory pore varying from level of the base of metacorpul bulb to esophageal-intestinal valve. Hemizonid located 6-10 cuticular annules below excretory pore; hemizonion, 11-16 annules below hemizonid. Spermatheca without spermatozooids. Oocytes arranged in 1-2 rows. Epiptygma paired or posterior. Scutella 3.5-4 μ m in diameter. Anterior scutellum situated at 31-38% of the general length of the body from its anterior end; the posterior, correspondingly, at 81-85%. The posterior intestine continues past the beginning of the rectum. Tail broadly rounded and with thickened cuticle on tip. As against the first description (Jairajpuri & Baqri, 1973), the population of this species from Vietnam has a wider metacorpul bulb, and specimens have been found with a paired epiptygma. Observed on pineapple plantations in the province of Nge Tin'.

Hoplolaimus seinhorsti Luc, 1958.
(Fig. 35, G-M)

♂♂: L = 1.2-1.5 mm; a = 27-32; b = 8-10; b' = 6-8; c = 44-63; V = 54-58%; stylet 42-44 μ m; o = 11-14. Labial area well offset from the body contours, with 4 cuticular annules. Basal annule with 9-16 longitudinal lines. Stylet knobs with 2 pointed projections; sometimes between them there are 2 small denticles. Metacorpul bulb almost spherical. Excretory pore placed at level of isthmus. Hemizonid located 5-7 annules below excretory pore; hemizonion, 7-10 annules below hemizonid. Esophageal gland with 6 nuclei. Epiptygma not paired. Oocytes in 1-2 rows; spermatheca spherical and without spermatozooids. Anterior scutellum situated at 30-35% of the general length of the body from its anterior end; the posterior correspondingly at 80-83%. The posterior intestine does not continue past the beginning of the rectum. Lateral field in the form of a broken line, often poorly marked. Tail broadly rounded, with thickened cuticle at tip. The species is encountered on pineapple plantations in the province of Nge Tin'.

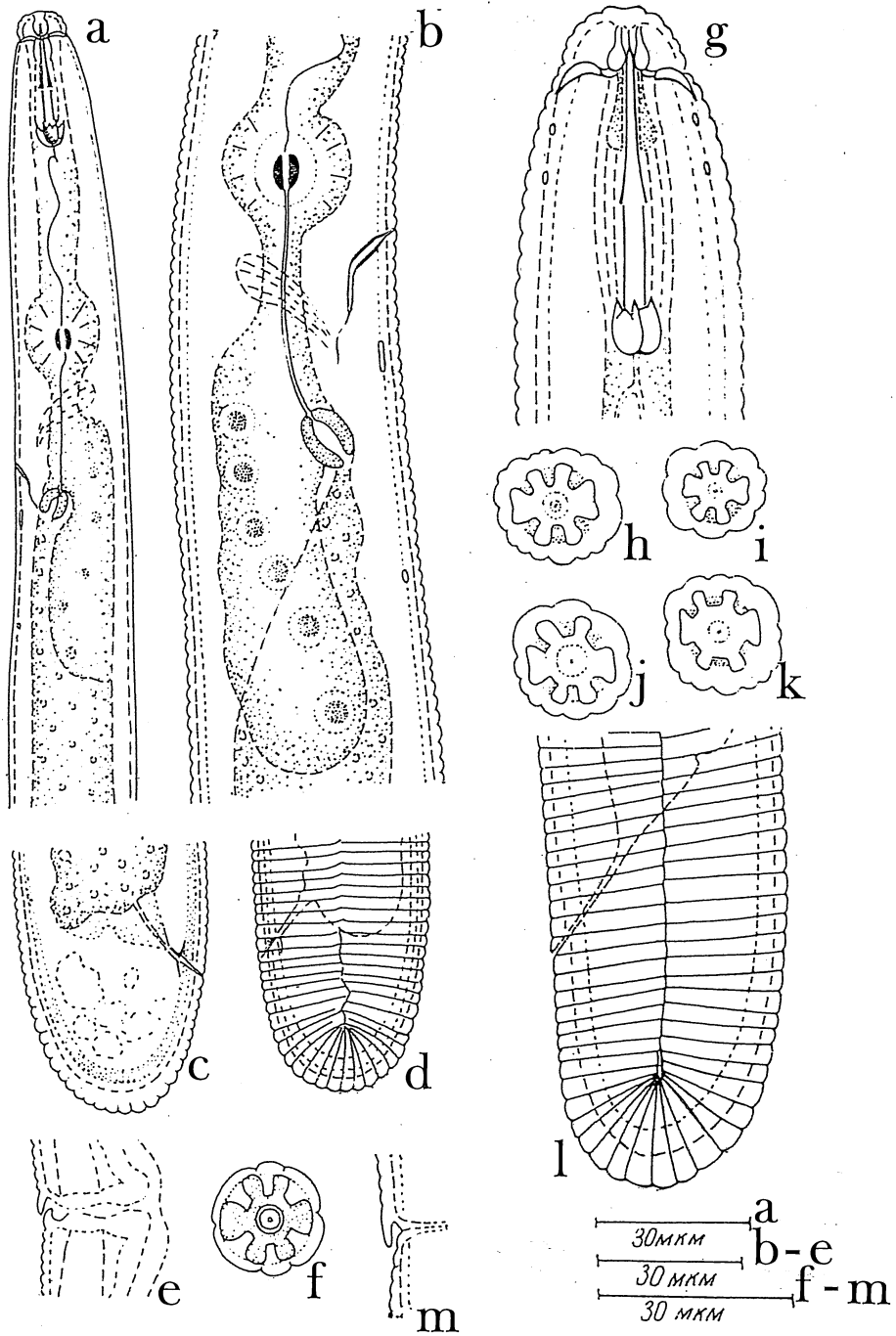


Figure 35. Hoplolaimus chambus (A-F), and Hoplolaimus seinhorsti (G-I):
 A, G - Anterior end of body; B - Area of the exophagus; F, H-K - Basal
 annules of labial area; E, M - Area of vulva; C, D, L - Tail.

Criconemoides helicus sp. nov.
(Fig. 36, A, G-I)

Holotype ♀: L = 0.52 mm; a = 9.6; b = 4.9; c = 16; V = 93%; stylet 56 μ m; R = 134; Rst = 18; Roes = 28; Rex = 28; RV = 9; RVan = 1; Ran = 8.

Paratypes ♀♀: L = 0.44-0.53 mm; a = 9-11; b = 3.9-4.9; c = 16-20; V = 91-94%; stylet 53-59 μ m; R = 120-140; Rst = 18-21; Roes = 28-38; Rex = 28-36; RV = 7-9; RVan = 1-3; Ran = 4-8.

Body crescent-shaped. Head end with 3-4 cuticular annules, the first forwardly directed. Labial disc not elevated. Cuticular annules comparatively fine, beveled posteriorly, 3.5 μ m in width. Edges of the cuticular annules smooth. Anastomoses of annules frequently found. Stylet knobs faintly concave, with tips directed forward. Excretory pore situated at level of cardia or 2-6 cuticular annules in front of it. Ovary short; the germinal zone usually reaches the middle of the body. Spermatheca rounded and without spermatozooids. Vulva of the closed type; its anterior lip without spines. Tail conical. Tail tip with 2-4 lobes and always beveled dorsally.

Differential diagnosis. Of the nine species of the genus known up to the present time (Ivanova, 1976; Ebsary, 1979), the new species is close to C. humilis Raski & Riffle, 1967 and C. morgensis (Hofmann, 1914) Taylor, 1936. It is distinguished from C. humilis by the fat body, the measurement of the stylet (38-46 μ m in C. humilis) and by the conical tail beveled dorsally. In comparison with C. morgensis the new species has smaller measurements of the body and stylet, a smooth edge of the cuticular annules, and a dorsally beveled tip of the tail.

Location. The holotype is described from the rhizosphere of pineapple in the province of Haiphong; the paratypes, from the rhizosphere of pineapple in the province of Vin' Fu.

Macroposthonia magnifica sp. nov.
(Fig. 36, B-F)

Holotype ♀: L = 0.39 mm; a = 10; b = 3.6; c = 22; V = 92%; stylet 53 μ m; R = 82; Rst = 14; Roes = 24; Rex = 23; RV = 7; RVan = 2; Ran = 5.

Paratypes ♀♀: L = 0.37-0.46 mm; a = 9-12; b = 3.5-4.7; c = 21-26; V = 92-94%; stylet 50-54 μ m; R = 86-88; Rst = 13-14; Roes = 22-23; Rex = 24-25; RV = 6; RVan = 2; Ran = 4.

Cuticular annules about 5 μ m in width and with smooth posterior edges; anastomoses rarely found. Posterior edges of cuticular annules of larvae with longitudinal notches. Labial area with high disc and 2 narrow annules, the edges of which are directed forward. Head end with labial plates and submedian lobes distinctly separated from one another. Dorsal gland duct opening into esophagus lumen at 4.2 μ m from basal part of stylet. Excretory pore at level of

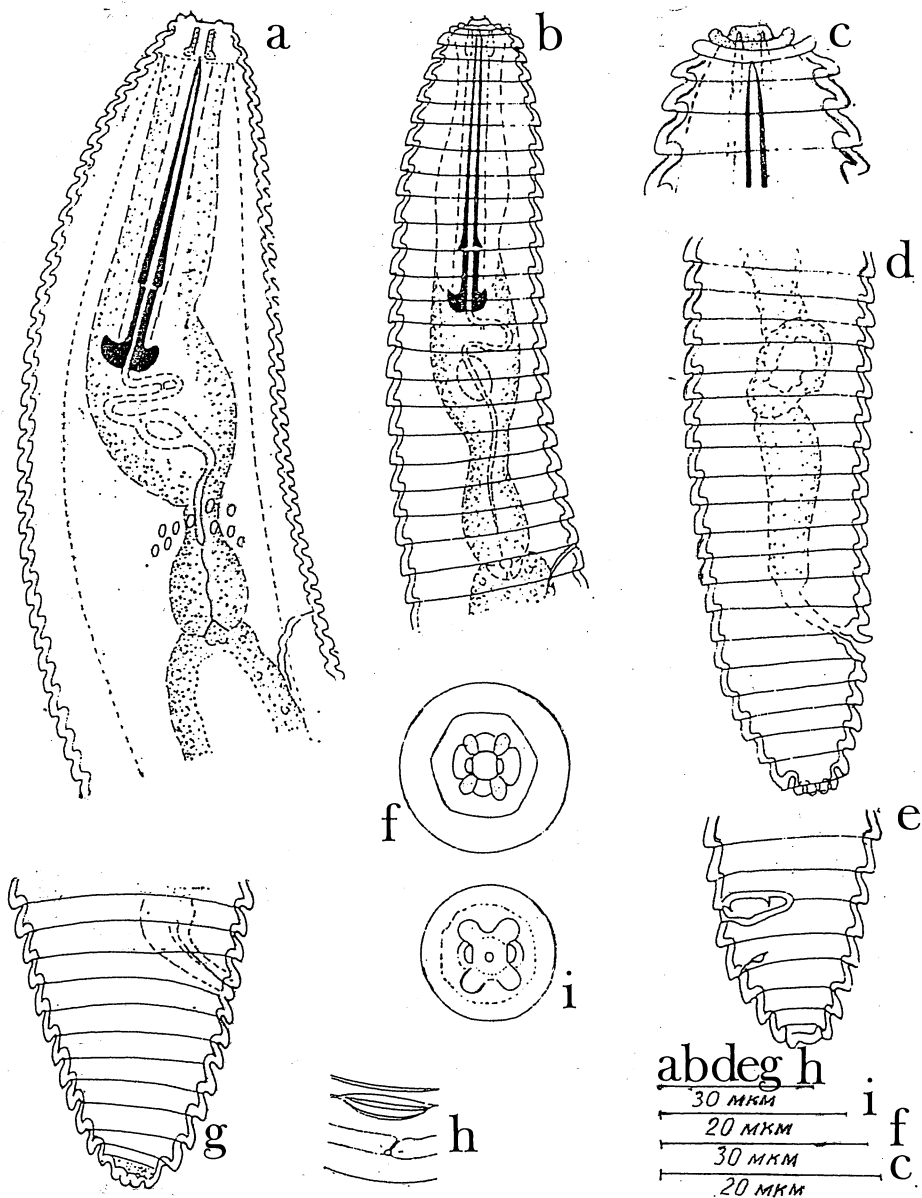


Figure 36. *Criconemoides helicus* (A, G-I), and *Macroposthonia magnifica* (B-F): A, B - Anterior end of body; F, I - Labial area (face view); H - Vulva; D, E, G - Posterior end of body.

basal part of stylet or 1-2 cuticular annules lower. Vulva of the open type; its anterior lip has pointed projections. Spermatheca oval, without spermatozooids. Postvulvar part of tail conical. Tail tip with 1-3 lobe-like cuticular projections.

Differential diagnosis. The species being described is closest to M. onoensis (Luc, 1959) De Grisse & Loof, 1965, from which it differs by the smaller number of cuticular annules (in M. onoensis R = 128-136; RV = 8-11). In general structure and measurement of the body the species is close to M. curvata (Raski, 1952) De Grisse & Loof, 1965, M. ornata (Raski, 1952) De Grisse & Loof, 1967 and M. palustris (Luc, 1952) Loof & De Grisse, 1973. It is differentiated from M. curvata by the more powerful stylet, by the projections always present on the tip of the tail, by the absence of males, and by the longitudinal striation of the lower edge of the cuticular annules in the larvae. In comparison with M. ornata, labial lobes and a high labial disc are present in the new species. In distinction from M. palustris, M. magnifica sp. nov. has a high labial disc with separated submedian lobes, and a lower value of R and RV (in M. palustris R = 117-132; RV = 9-11).

Locality. A widely distributed species in the territory of Vietnam. The holotype is described from the rhizosphere of pineapple in the province of Kha Nam Nin'; the paratypes, from the rhizosphere of pineapple in the provinces of Kha Nam Nin' and Vin' Fu.

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