

Nematodes of northern areas in Pakistan. Description of *Neothada major* n. sp. and *Pratylenchoides maqsoodi* n. sp. (Nematoda : Tylenchina)

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Neothada major n. sp. and *Pratylenchoides maqsoodi* n. sp. found from soil around the roots of Alpine meadow plants growing near Lake Saiful Muluk, are described and illustrated. *Neothada major* n. sp. differs from all known species of the genus by having a greater body and stylet length, greater number of longitudinal lines, and longer tail. *Pratylenchoides maqsoodi* n. sp. is similar to *P. utahensis* and *P. alkani*, but differs from *P. utahensis* by having variable positions of nuclei in the subventral oesophageal glands, smaller body size, shorter tail, deirid at excretory pore level, lateral field not areolated on tail, and male head high, not similar to female. It differs from *P. alkani* by having a shorter body, stylet knobs anteriorly directed, a lateral field without punctuation or spots and areolation, different position of the oesophageal glands nuclei, and phasmids at mid-tail. Representatives of these two genera are reported for the first time in Pakistan.

RÉSUMÉ

Nématodes des régions nord du Pakistan. Description de Neothada major n. sp. et Pratylenchoides maqsoodi n. sp. (Nematoda : Tylenchina)

Description et illustration sont données de *Neothada major* n. sp. et *Pratylenchoides maqsoodi* n. sp. provenant de sol de rhizosphère de plantes de prairies alpines, près du Lac Saiful Muluk. *Neothada major* n. sp. diffère de toutes les espèces décrites dans le genre par la plus grande longueur du corps et du stylet, le plus grand nombre de lignes longitudinales et une queue plus longue. *Pratylenchoides maqsoodi* n. sp. ressemble à *P. utahensis* et *P. alkani*; il diffère du premier par la disposition des noyaux des glandes oesophagiennes subventrales, un corps et une queue plus courts, les déirides situées au niveau du pore excréteur, le champ latéral non aréolé sur la queue, et la tête du mâle, plus haute, différant de celle de la femelle. *P. maqsoodi* n. sp. se sépare de *P. alkani* par un corps plus court, les boutons du stylet dirigés vers l'avant, le champ latéral dépourvu de ponctuations, marques ou aréolations, une disposition différente des noyaux des glandes oesophagiennes et les phasmides situées à mi-queue. C'est la première fois que les représentants de ces deux genres sont signalés au Pakistan.

This paper is one of a series in which nematodes from high altitudes in Pakistan are described. Specimens of *Neothada major* n. sp. and *Pratylenchoides maqsoodi* n. sp. were found in abundance in many of the samples collected during the summers of 1985-86 from soil around the roots of Alpine meadow plants near Lake Saiful Muluk. These new species are described and illustrated herein.

Specimens were killed in hot water, preserved in TAF, processed slowly to glycerine containing traces of picric acid and mounted on slides in absolute glycerine. Measurements and drawings were made with an ocular micrometer and drawing tube, respectively.

Abbreviations used are defined as follows : MB = distance from anterior end to center of metacorpval valve expressed as a percentage of total oesophageal length; N' = length of oesophagus posterior to the oesophago-intestinal valve expressed as a percentage of distance

from center of metacorpval valve to posterior end of oesophagus; h = length of hyaline portion of tail tip; P = distance from phasmid to anus or cloaca.

Neothada major n. sp. (Fig. 1)

MEASUREMENTS

Females (paratypes; n = 15) : L = 0.70 mm \pm 0.05 (0.64-0.80); a = 37 \pm 2.17 (34-39); b = 6.00 \pm 0.16 (5.9-6.3); c = 9.7 \pm 0.45 (9.0-10.2); c' = 5.7 \pm 0.21 (5.5-6.0); V = 71 \pm 1.22 (70-73); stylet = 13 μ m \pm 0.93 (12.0-14.4).

Males (n = 5) : L = 0.65 mm \pm 0.03 (0.64-0.70); a = 32.7 \pm 1.17 (32-34); b = 5.7 \pm 0.05 (5.6-5.7); c = 8.3 \pm 0.39 (8.2-9.0); c' = 5.4 \pm 0.08 (5.0-5.8);

T = 44 ± 1.32 (44-47); stylet = $14.4 \mu\text{m} \pm 0.72$ (12.5-14.5); spicules = $21.5 \mu\text{m} \pm 1.30$ (20-23); gubernaculum = $5.2 \mu\text{m} \pm 0.20$ (5.0-5.6).

Holotype (female) : L = 0.70 mm; a = 34; b = 5.9; c = 9.3; c' = 5.9; V = 70; stylet = 12 μm .

DESCRIPTION

Female : Body almost straight, curving slightly in posterior half; maximum body width 20 μm (16.8-22.4). Cuticular annules prominent 3.5 μm (3.2-4.0) wide; total number of body annules (= R) 215-245, from head to posterior end of oesophagus (= ROes) 45-50, from head to vulva (= RHV) 154-156, from vulva to anus (= RVan) 36-42, from anus to tail tip (= Ran) 24-34. Longitudinal ridges 20; lateral fields bearing four incisures, two starting at the middle of procorpus and then becoming four just behind the median bulb. Head flattened anteriorly, 3.2 μm (3-4) high and 8.0 μm (8-9) wide with two annules; amphid aperture a longitudinal slit. Cephalic framework lightly sclerotized. Stylet delicate without flange like basal swellings, anterior conical part 4.5 μm (4-5) long. Dorsal oesophageal gland opening about 3 μm posterior to stylet. Oesophagus 120 μm (108-133) long; median bulb weakly developed, fusiform, weakly muscular, valve absent; isthmus slender; basal bulb saccate, elongated. Cardia large, discoidal. Excretory pore at mid-level of basal bulb, 103 μm (96-125) from anterior end. Hermizonid distinct, one annule width long, two annules anterior to excretory pore, deirids prominent 105 μm (102-108) from anterior end. Vulva a transverse slit; vulval lips slightly protruding without vulval membrane. Vagina about half body diameter. Postuterine sac less than one body width long. Quadricolumella present, spermatheca very long, saccate, filled with rounded sperms. Ovary single, outstretched. Oocytes in single row. Tail elongate conoid, 76 μm (67-80) long, coarsely annulated with narrowly rounded tip.

Male : Similar to female in body shape, lip region, stylet, cuticle, longitudinal striae, and oesophageal region. Cuticular annules prominent, 3.2 μm (3-4) wide, R = 220-232, ROes = 38-43, RVan = 185-198, Ran = 30-40 annules. Testis single, outstretched, sperms small, spicules slightly arcuate. Gubernaculum simple. Bursa not annulated, starting one spicular length above the cloaca, 44 μm (40-48) long. Cloacal lips protruding. Tail elongate conoid slightly arcuate, 78.4 μm (75-82) long, tip narrowly rounded.

TYPE HABITAT AND LOCALITY

Specimens collected in October 1985 and June 1986 from soil around the roots of Alpine meadow plants near Lake Saiful Muluk, North West Frontier Province, Pakistan.

TYPE SPECIMENS

Holotype, female (slide No. NNRC/65-1) deposited in the National Nematode Collection, National Nematological Research Centre, University of Karachi.

Paratypes : thirteen females and four males (slide Nos. NNRC/65.2-4) deposited in the same collection; two females and one male deposited in United States Department of Agriculture Nematode Collection, Beltsville, Maryland, USA.

DIAGNOSIS AND RELATIONSHIP

Neothada major n. sp. can be separated from all the known species of the genus (both in males and females) by the presence of longer body, greater "a" value, longer stylet, smaller DGO, greater tail length, more number of longitudinal lines and larger spicules in male.

Neothada major n. sp. can be distinguished from *N. cancellata* (Thorne, 1941) Khan, 1973 by the following characters; posterior vulva, greater R, ROes, RHV, RVan and Ran values and narrowly rounded tail tip (in *N. cancellata* V = 66-69; R = 195-203; ROes = 36-40; RHV = 140-142; RVan = 33-37; Ran = 20-24 and broadly rounded tail tip). It differs from *N. geraerti* (Andrássy, 1982) Siddiqi, 1986 by having narrowly rounded tail tip and male can be distinguished by having longer body larger stylet wider body annules and greater spicule length (In *N. geraerti* pointed tail tip. Male : L = 465-500 μm ; stylet = 8.5-10 μm ; annules = 2.7 μm wide; spicule = 13-17 μm) from *N. tatra* (Thorne & Malek, 1968) Khan, 1973 it can be distinguished by having above character and narrowly rounded tail tip (in *N. tatra* bluntly rounded tail tip).

Pratylenchoides maqsoodi n. sp.

(Fig. 2)

MEASUREMENTS

Females (paratypes; n = 32); L = 0.64 mm \pm 0.01 (0.60-0.72); width = 22 $\mu\text{m} \pm$ 1.92 (19-24); a = 29 \pm 1.77 (27-32); b = 3.6 \pm 0.65 μm (3.2-4.6); b' = 4.5 \pm 0.33 (4.1-5.0); MB = 42 \pm 1.85 (39-44); N' = 32 \pm 5.84 (28-45); tail length = 42 \pm 3.75 (36-46); ABW = 16 \pm 1.17 (14.4-17.0); c = 16.2 \pm 1.31 (14.5-17.5); c' = 2.6 \pm 0.24 (2.3-3.0); h = 12 \pm 1.22 (11-14); V = 59 \pm 2.20 (57-63); stylet = 20.8 $\mu\text{m} \pm$ 1.11 (19.2-22.4); DGO = 3.5 \pm 0.46 (3.2-4.0); O = 50 \pm 1.25 (50-54); P = 20 \pm 3.21 (14.4-22.4).

Male (n = 6) : L = 0.55 mm \pm 0.01 (0.50-0.56); width = 16 \pm 1.52 (15-18); a = 31.5 \pm 1.25 (30-32); b = 3.4 \pm 0.51 (3.2-3.6); b' = 4.4 \pm 0.21 (4.0-4.5); MB = 41 \pm 0.65 (40-42); N' = 43 \pm 2.21 (40-46); tail length = 40 \pm 1.85 (38-43); ABW = 13.6 \pm 1.05 (13.0-16.0); c = 13.7 \pm 1.31 (13-15);

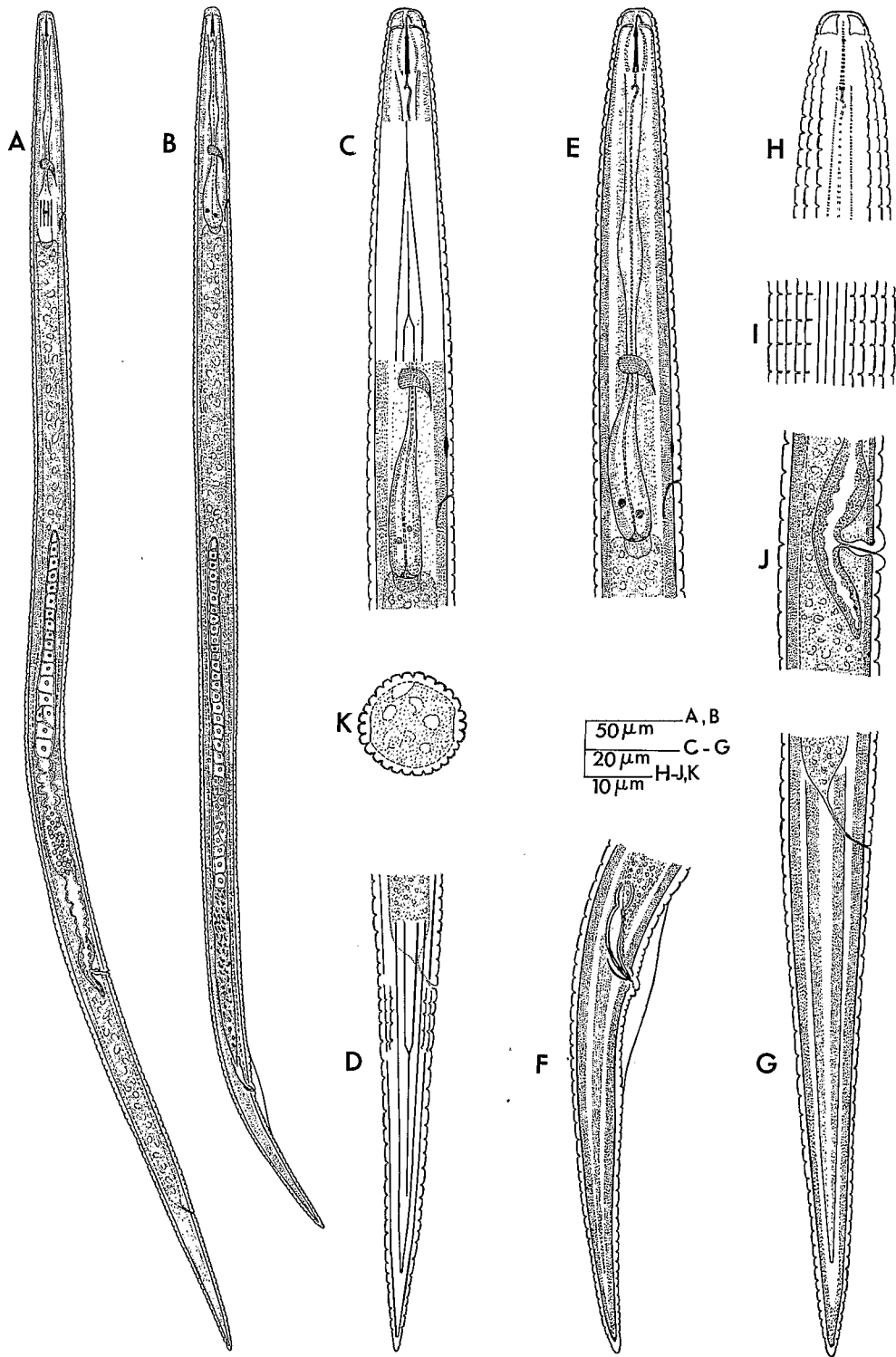


Fig. 1. *Neothada major* n. sp. — A : Female; B : Male; C : Oesophageal region of female; D : Female tail; E : Oesophageal region of male; F : Male tail; G : Female tail showing variations in tail size and annules; H : Female neck region showing beginning of longitudinal striae; I : Female cuticular pattern, at midbody; J : Vulval region; K : Transverse section about midbody.

$c' = 2.7 + 0.25$ (2.5-3.0); $h = 9.6 \pm 0.12$ (9-10); $T = 37 \pm 0.89$ (36-38); stylet = $19.5 \mu\text{m} \pm 0.26$ (19.2-20.0); DGO = 3.5 ± 0.02 (3.2-4.0); $O = 53 \pm 0.28$ (52-54); $P = 20 \pm 2.00$ (18-21); spicule = $20.8 \mu\text{m} \pm 1.24$ (20.0-22.4); gubernaculum = $8 \mu\text{m} \pm 0.09$ (7-8).

Holotype (female) : L = 0.66 mm; width = 24 μm ; a = 28; b = 3.7; b' = 4.6; MB = 42; N' = 32; tail length = 38.4; ABW = 14.4; c = 17.2; c' = 2.6; h = 12; V = 57; stylet = 20.8 μm ; DGO = 4; O = 53; P = 17.6.

DESCRIPTION

Female : Body slightly arcuate ventrally. Cuticular annulations fine, about 1.0-1.5 μm wide, generally much coarser on tail tip. Lateral field 8-9 μm wide at midbody marked by six lines, four beginning from middle of stylet region, two joining just below deirids, outer incisures crenate posterior to vulva. Head with two or three annules, flattened anteriorly, continuous with body contour. Lip region 3.2 μm (3-4) high and 10.4 μm (10-11) wide at base. Labial framework strongly sclerotized. Stylet strong, basal knobs rounded, anterior surfaces slightly indented, diameter 6.4 μm (6-7). Procorpus slender, median bulb fusiform 19-21 \times 12-14 μm valve distinct, surrounded by muscle fibers. Isthmus long, slender. Excretory pore 116 μm (110-122) from anterior end. Hemizonid three annule widths long, just anterior to excretory pore. Oesophago-intestinal valve near middle of oesophageal gland. Subventral gland nuclei both posterior to oesophago-intestinal valve. Dorsal and right subventral lobe long, overlapping intestine dorsally, left subventral lobe short. Deirids prominent, about 104 μm (100-109) from anterior end. Vulva a transverse slit. Vagina perpendicular. Gonads paired, opposed, outstretched, oogonia in single row. Spermatheca rounded, filled with sperms. Tail cylindrical, annules 30 (28-32), terminus rounded, coarsely annulated. Phasmid at mid-tail.

Male : Body shorter and more curved than female. Lip region narrower and higher than female, hemispherical, with three very fine annules. Oesophageal region and gland lobes reduced, nuclei generally not observed. Sperm small, rounded to oval. Fasciculi not observed. Testis single, outstretched, spermatocytes in a single row; spicules slightly curved; gubernaculum simple. Tail tip narrow. Bursa enveloping tail, striations fine. Phasmids at mid-tail.

TYPE HABITAT AND LOCALITY

Specimens collected in October 1985 and June 1986 from soil around the roots of Alpine meadow plants near Lake Saiful Muluk, North West Frontier Province, Pakistan.

TYPE SPECIMENS

Holotype (female), slide No. NNRC/80-1, deposited in the National Nematode Collection, National Nematological Research Centre, Karachi, Pakistan.

Paratypes, twenty-seven females and five males, slide Nos. NNRC/80-2-8 deposited in the same collection. Five females and one male, slide No. NNRC/80-9, 10, deposited in United States Department of Agriculture Nematode Collection, Beltsville, Maryland, U.S.A.

DIAGNOSIS AND RELATIONSHIP

On the basis of a combination of characteristics, *Pratylenchoides maqsoodi* n. sp. can be separated from all the species of the genus *Pratylenchoides* by having six incisures in the lateral field, both the subventral gland nuclei posterior to the oesophago-intestinal valve, one near to the valve the other at the end of the elongated glands, and the tail extremity with few coarse annules.

P. maqsoodi n. sp. comes close to *P. utahensis* Baldwin, Luc & Bell, 1983 and *P. alkani* Yüksel, 1977, but differs from the former by having different positions of the gland nuclei; a long and short subventral gland; shorter body and tail; lateral field not areolated on tail; male head unlike that of female. In *P. utahensis* the subventral gland nuclei are close and far posterior, both glands are long; L = 0.74-1.0 mm; tail length = 43.0-64.5 μm ; lateral fields areolated on the tail; male head similar to female. It can be separated from *P. alkani* by its shorter body; anteriorly directed stylet knobs; absence of punctations, spots, and areolation on the lateral fields; different position of nuclei in the subventral glands; one subventral gland short; phasmids at mid-tail; male head hemispherical. In *P. alkani* : L = 0.97 (0.82-1.21) mm; stylet knobs slope posteriorly, punctations or spots present on the lateral field, the outer bands areolated; both subventral glands elongated; nuclei posterior; phasmids anterior to mid-tail; male head truncate.

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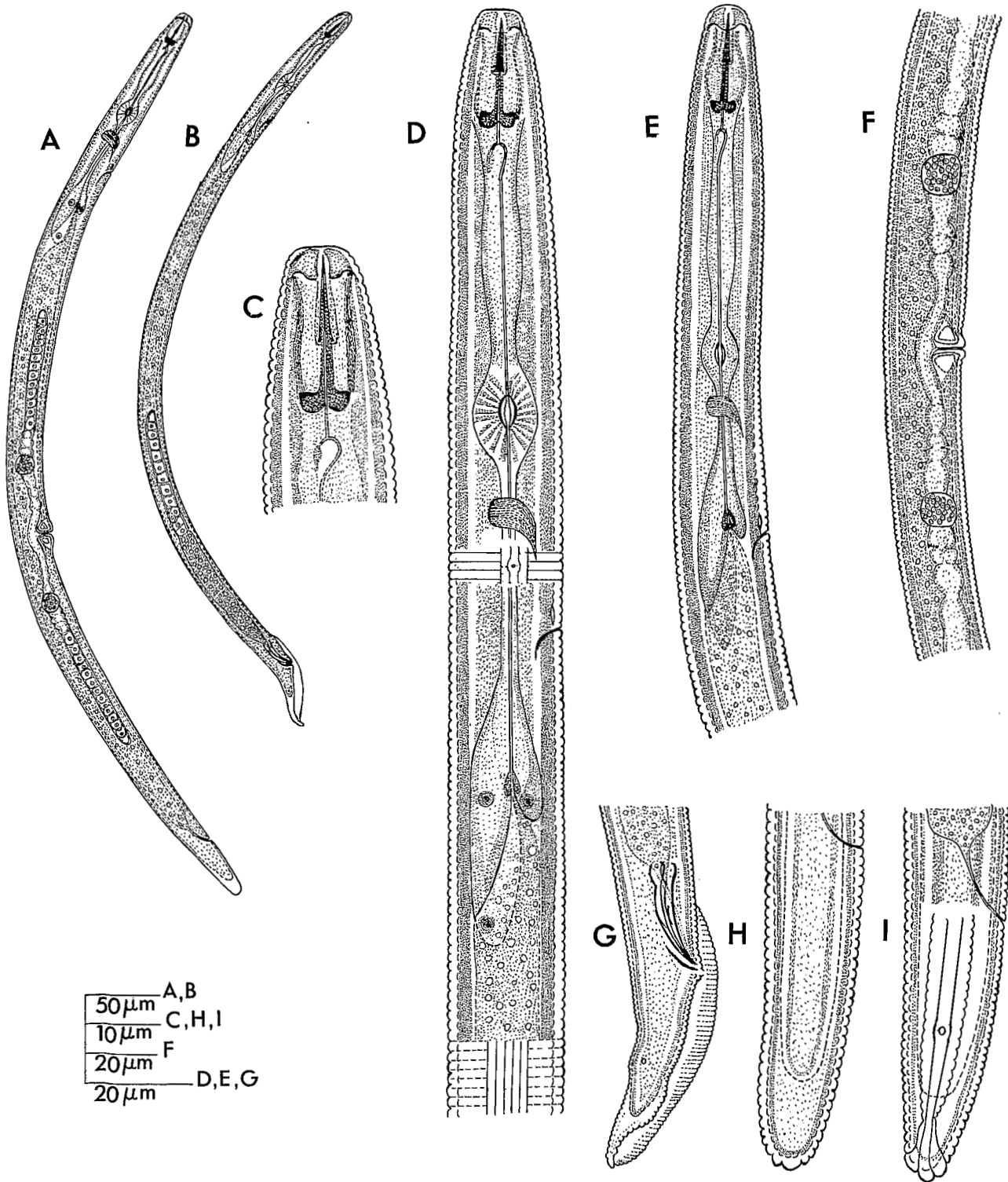


Fig. 2. *Pratylenchoides maqsoodi* n. sp. — A : Female; B : Male; C : Female head; D : Female oesophageal region; E : Male oesophageal region; F : Vulval region; G : Male tail; H, I : Female tails.

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Erratum

In the following publication :

BURROWS, P. R. & PERRY, R. N. Two cloned fragments which differentiate *Globodera pallida* from *G. rostochiensis*. *Revue Nématol.*, 11 (4) : 441-445 (1988), two lines have been erroneously omitted from the "Results" section (p. 443, right column).

The first paragraph of this section should read :

"Cloning the genomic DNA from *G. pallida* (New Leake) into a plasmid vector produced a library containing 206 viable recombinant colonies. Thus, with 46 colonies on each 82 mm nitrocellulose filter, the *in situ* hybridization examination was performed on just five filters and proved particularly useful in the initial screening. Autoradiography revealed two colonies (termed Pa 15 and Pa 16) that failed to hybridize with DNA from the three populations of *G. rostochiensis* but hybridized strongly with both populations of *G. pallida*. The control spots of *E. coli* JM83 DNA did not hybridize with any nematode DNA probes."