New Records of Nematodes from Korea, Including Paratylenchus pandus n.sp. (Paratylenchidae: Nematoda)

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Abstract: Five new records of *Paratylenchus*, including *P. pandus* n.sp., are reported from Korea. An amended key to the genus is included on the basis of these findings. *Macroposthonia tulagonovi* is also reported with additional descriptions and illustrations. *Key Words:* taxonomy, *Macroposthonia tulagonovi*.

In 1975, a number of slides of nematodes from Korea were forwarded by Dr. S. A. Sher to the University of California at Davis for identification. One slide given to Dr. Sher by Mr. Han (Laboratory of Nematology, Institute of Agricultural Science, Office of Rural Development, Suweon, Korea) held speciments of a criconematid. The rest of the slides, given by Dr. Y. E. Choi (Department of Horticulture, Kyung-Pook National University, Taegu, Korea), held various species of *Paratylenchus*. The following records are made from those preserved specimens.

Paratylenchus aquaticus Merny, 1966

A single slide labelled Suweon, Korea, #65, collected about roots of Chinese sumac, *Rhus javanica* Thunb., on 8 July 1975 held 7 females and 1 male of *P. aquaticus*. These specimens differed from the original description of Merny (7) only in a slightly smaller stylet (16 μm (15-17) vs 16-20 μm for *P. aquaticus*).

Paratylenchus projectus Jenkins, 1956

Two collections of specimens of *P. projectus* were on slides labelled as follows: 1) #75-132 with 5 females and 1 juvenile collected 18 July 1976 from soil about roots of sunflower, *Helianthus anuus* L., near Suweon, South Korea; 2) #72-67 with 11 females and 1 juvenile collected from soil about roots of apple.

Paratylenchus elachistus Steiner, 1949

A collection of soil from potato, *Solanum tuberosa* L., made on 8 November 1973 near Goseong, Korea held 10 females that are identified as *P. elachistus*. No males were included.

Paratylenchus pandus n. sp.
(Fig. 1, F-H)

Paratypes (8 females): L = .29 mm (.26-.34); a = 25 (22-29); b = 4.1 (3.6-4.7); c = 13 (11-16); V = 78 (76-79); stylet = 24 μm (22-26); prorhabdion = 16 μm (14-17); excretory pore = 63 μm (60-66).

Holotype (female): L = .30 mm; a = 29; b = 4.2; c = 12; V = 77; stylet = 23 μm; prorhabdion = 15 μm; excretory pore = 63 μm. Body curved tightly ventrad after fixation, almost 'C' shaped. Body narrows gradually anteriad; head rounded, not set off. Stylet slender; knobs well developed. Excretory pore at level of hemizonid in region of posterior bulb. Deirids prominent, in region of posterior bulb. Esophageal-intestinal valve lobate. Ovary outstretched. Spermatheca circular (slightly ovate in

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some paratypes), prominent, with distinct spermatozoa about 1 μm in diameter. Vulvar flaps distinct, slightly flattened in outline. Tail slender-conoid, tapers gradually, terminus finely rounded, almost acute. Lateral field with 3 incisures, outer two very distinct, inner one faint.

Male: Unknown.

Holotype: Female, collected 29 September 1972 by Y. E. Choi, slide number 1562, University of California Nematode Survey Collection (UCNS), Davis, California.

Paratypes: 8 females, same data as holotype, deposited as follows: 2 females each at UCNS Collection, Davis, California and Collection of the Department of Horticulture, College of Agriculture, Kyung-Pook National University, Taegu, Korea; 1 female each at USDA Nematode Collection, Beltsville, Maryland; National Nematode Collection, Indian Agricultural Research Institute, New Delhi, India; Nematology Department, Rothamsted Experimental Station, Harpenden, England; Plantenziektenkundige Dienst, Wageningen, The Netherlands.

Type host: Soybean, *Glycine max* L.

Type locality: Taegu, South Korea.

Diagnosis: This species is most closely related to *Paratylenchus aquaticus* Merny, 1966 from which it differs in its longer stylet (15-20 μm for *P. aquaticus*) and lower V-value (V = 79-84 for *P. aquaticus*). This species also keys near *P. vandenbrandei* De Grisse, 1962 (3) from which it differs by its shorter stylet [31 μm (28-33) for *P. vandenbrandei*] and lower V-value [V = 82 (81-86) for *P. vandenbrandei*].

Paratylenchus lepidus Raski, 1975

Ten females and one male identified as *P. lepidus* were found on one slide labelled #72-70. The collection was made on 20 September 1972 from soil about roots of grape near Suweon, Korea. This is the first record of the male of *P. lepidus*. These specimens had the following dimensions.

10 *females:* L = .29 mm (.27-.32); a = 23 (20-25); b = 4.1 (3.8-4.3); V = 80 (79-81); stylet = 25 μm (24-26); (prorhabdion = 16 μm (14-17); excretory pore = 66 μm (62-71).

1 *male:* L = .30 mm; a = 26; b = 4.1; c = 10; T = 33; excretory pore = 69 μm; spicules = 17 μm; gubernaculum = 4 μm. Body curved slightly ventrad after fixation, narrowing gradually anteriad to rounded head. Stylet lacking. Outline of reduced esophagus clearly visible. Hemizonid prominent, immediately posterior to excretory pore. Testicular glands surround posterior end of testis. Spicules curved; anal sheath prominent with projecting posterior lip. Tail slender conoid with finely rounded terminus. Lateral field very narrow, outer two lines distinct, inner two lines very faint.

The presence of a male of *P. lepidus* in this collection and the report of males of *P. bukowinensis* (1) require a change in part of the key to *Paratylenchus* proposed by Raski (8) as follows:

32. Males with stylet . . . . . 33.
    Males without stylet . . . . . 36.
33. Female stylet = 13 μm (12-14) . . . . . *veruculatus* Wu, 1962.
    Female stylet = 17 μm . . . . . *besoekianus* Bally & Reydon, 1931.
    Female stylet = 22 μm (21-23) . . . . . *holdemani* Raski, 1975.
    Female stylet = >23 μm . . . . 34.
34. Tail of male and female sharply conoid . . . . *baldaccii* Raski, 1975.
    Tail of male and female conoid-rounded . . . . . 35.
35. Average length of female stylet = 30 μm; total range = 27-34 μm . . . . *hamatus* Thorne & Allen, 1950.
    Average length of female stylet = 24-25 μm; total range = 23-29 μm . . . *bukowinensis* Micoletzky, 1922.
36. Male tail sharply pointed . . . . 37.
    Male tail conoid-rounded . . . 38.
37. Female stylet = 15-16 μm . . . . . *vexans* Thorne & Malek, 1968.
    Female stylet = 31 μm (27-34) . . . . . *ciccaronei* Raski, 1975.
38. Average length of female stylet = <22 μm . . . . . 39.
    Average length of female stylet = >24 μm . . . . . 42.
39. Average V = 78 (76-80) . . . . . *longicaudatus* Raski, 1975.
    Average V = >81 (total range = 79-89) . . . . . 40.
40. Average length of female = >.32 mm . . . *microdorus* Andrássy, 1959.
    Average length of female = <.30 mm . . . . . 41.
41. Female stylet averages 16-18 μm (total range = 14-21); tail evenly

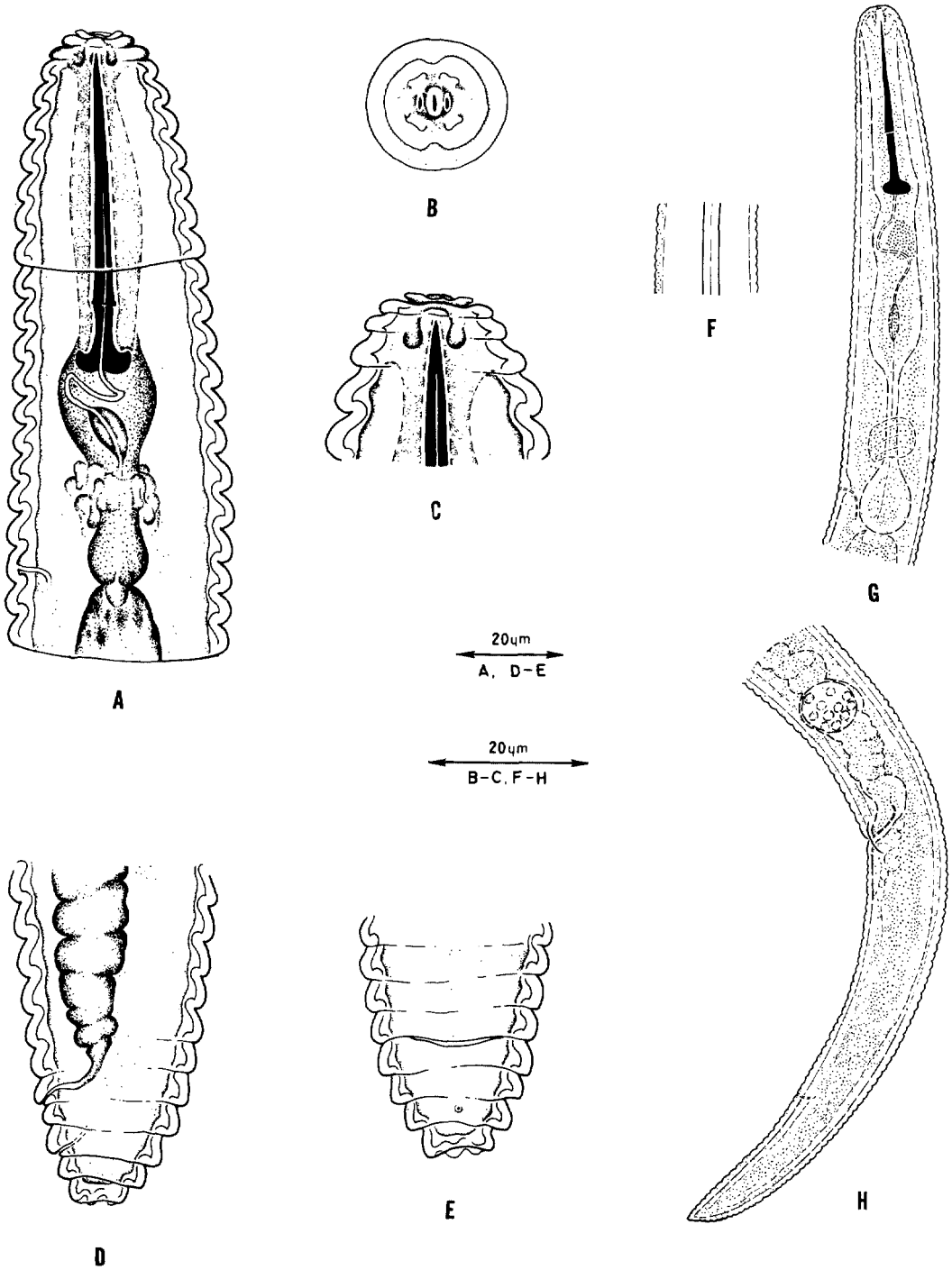

FIG. 1-(A-H). *Macroposthonia tulaganovi* female (A-E): *A)* anterior end; *B) en face* view; *C)* anterior end; *D)* posterior end, lateral view; *E)* posterior end, ventral view. *Paratylenchus pandus* n. sp. (F-H) female: *F)* lateral field about mid-body; *G)* anterior end; *H)* posterior end.

conoid with rounded terminus . . . . . *minutus* Linford, 1949.
Female stylet averages 20-22 μm (total range = 19-24); tail slender conoid, terminus finely rounded to acute . . . *elachistus* Steiner, 1949.

42. Length of female = <.26 mm . . . . . *mimulus* Raski, 1975.
Length of female = >.27 mm . . 43.

43. Average length of female stylet = <25 mm . . . *lepidus* Raski, 1975.
Average length of female stylet = >27 μm . . . . . 44.

44. Female tail subacute . . . . . *nanus* Cobb, 1923.
Female tail slender conoid to finely rounded terminus . . . . . *neoamblycephalus* Geraert, 1965.

Macroposthonia tulaganovi
(Kirjanova, 1948) De Grisse & Loof, 1965
(Fig. 1, A-E)

A collection of 14 females and 2 juveniles identified as *M. tulaganovi* was found on a slide labelled #73-297 and dated 16 October 1973. No further details were given.

Dimension (11 *females*): L = .36 mm (.34-.38); a = 9 (8-9); b = 3.4 (3.3-3.6); c = 36 (34-38); V = 94 (92-95); stylet = 62 μm (55-67); prorhabdion = 48 μm (42-52); R = 62 (59-65); R_{ex} = 19 (17-20); R_v = 6 (5-6); R_a = 3 (2-3); R_{van} = 3. Body curved slightly ventrad after fixation. Body narrows slightly anteriad to bluntly rounded-truncate head. First head annule smaller and more narrow than second, both rounded, nonretrorse. *En face* section shows four submedian lobes, widely separated laterally, nearly contiguous dorsally and ventrally. Submedian lobes fairly wide, two slightly indented on margin. Amphids distinct, oval, adjacent to oral plate. Stylet robust, knobs about 9 μm across, with forward directed processes. Ovary outstretched; spermatheca lacking. Vulva simple, slit-like; closed. Lateral view of body annule bearing vulvar aperture on posterior margin shows outline with rounded, posteriorly-directed margin similar to adjacent body annules. Tail bluntly rounded. Annules smooth; lateral field and anastomoses lacking.

Juvenile–third stage (?): L = .27 mm; a = 8.2; b = 3.1; stylet = 49 μm; prorhabdion = 39 μm; R = 66. General aspect resembles adult female. Body curved slightly ventrad after fixation. Head bluntly rounded-truncate, submedian lobes small, distinct. Developing gonad obscure. Tail bluntly rounded, coarsely lobed. Two anastomoses present. Body annules retrorse, bearing small, distinct cuticular indentations on posterior margin giving beaded appearance.

Juvenile–fourth stage (?): L = .38 mm; a = 8.6; b = 3.7; stylet = 53 um; prorhabdion = 41 μm; R = 64. Body almost straight after fixation. Head rounded, not truncate; labial plate and submedian lobes protrude slightly anteriad. Developing gonad 96 μm long, ends 15 μm from terminus. Tail bluntly rounded. Body annules rounded, not retrorse; bearing cuticular indentations similar to above juvenile.

These specimens are judged to be conspecific with *M. tulaganovi* despite some differences from the original description by Kirjanova (5) based on a single female specimen. The annule count on *M. tulaganovi* was reported as about 70; stylet 53 μm; stylet base (= knobs?) 12 μm across; six barely defined lips surround oral aperture. This last character is based on lateral view only and can be confirmed only by *en face* sections. The other differences are considered intraspecific variations.

These Korean specimens also appear related to *Criconemoides dorsoflexus* Boonduang & Ratanaprapa, 1974 (2). In view of the shorter stylet (47-48 μm in *C. dorsoflexus*) and absence of more detail description of *en face* morphology, it is judged best to recognize the *C. dorsoflexus* as a distinct species.

De Grisse and Loof (4) considered *M. tulaganovi* perhaps identical with *M. rotundicauda* (6). However, males have been described for *rotundicauda* and the females have a distinct spermatheca and anterior lip of vulva bearing two points. Besides, the female terminus of *M. tulaganovi* bears coarser cuticular convolutions than the finer, more complex, convolutions of *M. rotundicauda*. Therefore, *M. tulaganovi* is judged to have a specific identity distinct from *M. rotundicauda*.

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