Journal of Nematology 16(3):265–282. 1984.

Description of *Meloidoderita polygoni* n. sp. (Nematoda: Meloidoderitidae) from USA and Observations on *M. kirjanovae* from Israel and USSR[1]

A. Morgan Golden[2] and Zafar A. Handoo[3]

Abstract: Meloidoderita polygoni n. sp. is described and illustrated from roots of smartweed (*Polygonum hydropiperoides*) from Beltsville, Maryland. This new species is similar to *M. kirjanovae* but differs especially in having larger spines on the cystoid bodies, females with the anus much closer to the vulva, and more posterior excretory pore. *M. polygoni* differs from *M. safrica* particularly in having females with a shorter stylet, a DGO much closer to base of stylet, greater distance between vulva and anus, and larger cystoid bodies. LM and SEM observations showed only three incisures in lateral fields of juveniles and males and no bursa in males. Morphometric data and illustrations are given for *M. kirjanovae* from mint (*Mentha longifolia*) in Israel and some details on a limited number of specimens from Armenian SSR. LM examination of juveniles from both these areas indicated only three incisures in lateral fields. Males from Israel had no detectable bursa and appeared to have only three incisures in lateral fields. (Males from Armenian SSR not observed.)

Key words: taxonomy, morphology, new species, SEM ultrastructure, smartweed, *Polygonum hydropiperoides*, mint, *Mentha longifolia*, hosts, distribution.

In 1966 Poghossian (9) established the new genus *Meloidoderita* to accommodate a remarkable new species of nematode found on the roots of mint, *Mentha longifolia* (L.) Huds., in the Megri region of Armenian SSR. She reported this species, *M. kirjanovae* Poghossian, 1966, as having cysts with spines and placed it in the family Heteroderidae. Golden (5) in 1971 recognized the genus as valid but in the same year Wouts and Sher (13) placed it as *genus inquirenda*. In 1972 Wouts (12), after examining limited specimens thought to be *M. kirjanovae* obtained from Dr. E. Krall in Armenian SSR, concluded that *Meloidoderita* represented a valid genus belonging in the family Meloidogynidae. However, as pointed out by Poghossian (10), the material examined by Wouts evidently also contained *Meloidogyne*, as the photomicrographs of the anterior portion of the female and the mint roots with small galls suggested *M. hapla* Chitwood, 1949 and not *M. kirjanovae*. On the basis of new research data, Kirjanova and Poghossian (8) in 1973 redescribed the genus *Meloidoderita* and its single species, established a new family—Meloidoderitidae—to receive it, and placed this new family in Criconematoidea. In 1975, Poghossian (10) described males of *M. kirjanovae* for the first time. Thus, for about 10 years only one species was known in this genus and only in certain locations in USSR.

In the summer of 1975 a *Meloidoderita* sp. was found on a smartweed, *Polygonum hydropiperoides* Michx., at Beltsville, Maryland, and Golden (6) reported its occurrence and some morphological details. In 1981 Andrews et al. (1) gave an extensive report on the bionomics and host range of the nematode from Beltsville. Also in 1981 Cohn and Mordechai (2) reported on the biology of a *Meloidoderita* species on a mint, *Mentha aquatica* L., in Israel. More recently Cohn and Mordechai (3) gave a detailed account of the biology and host–parasite relations of the *Meloidoderita* species from Israel, using as the primary test plant, *Mentha longifolia* (L.) Huds., which is the type host for *M. kirjanovae*. They indicated their nematode was likely conspecific with *M. kirjanovae*, and also mentioned that in their earlier report (2) *M. longifolia* was erroneously reported as *M. aquatica*. In 1983 Cohn and Mordechai (4), presenting some

Received for publication 5 October 1983.

[1] Scientific Article A-3680, Contribution 6656 of the Maryland Agricultural Experiment Station. This research was done at USDA, Beltsville, Maryland, and was supported in part through a USDA Cooperative Agreement with the University of Maryland, College Park. The authors thank Dr. Lorin Krusberg for his assistance and cooperation. Appreciation for technical assistance is extended to Donna M. S. Ellington, support scientist, and Paula Crowley, laboratory technician, Nematology Laboratory, and to Norita Chaney, laboratory technician, Electron Microscopy Laboratory, USDA ARS, Beltsville, MD 20705, for SEM technical assistance.

[2] Nematologist, Nematology Laboratory, Plant Protection Institute, USDA ARS, Beltsville, MD 20705.

[3] Staff Research Associate, Department of Botany, University of Maryland, College Park, MD 20742.

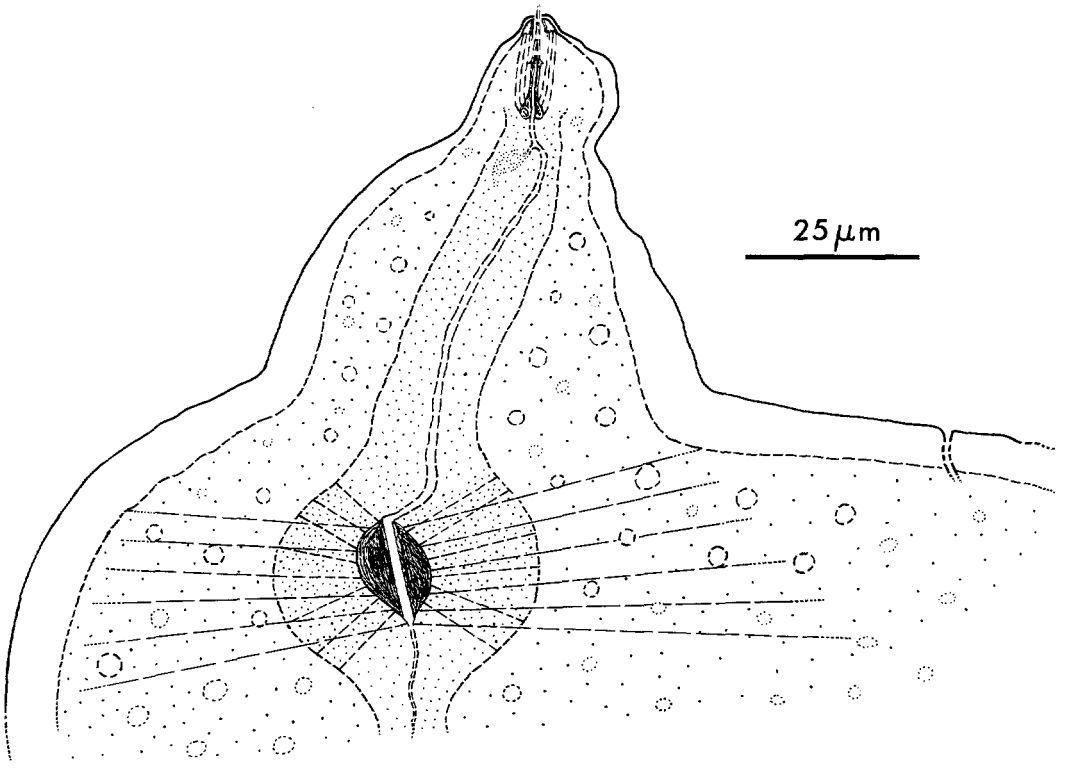


FIG. 1. Drawing of anterior portion of a female of *Meloidoderita polygoni* n. sp.

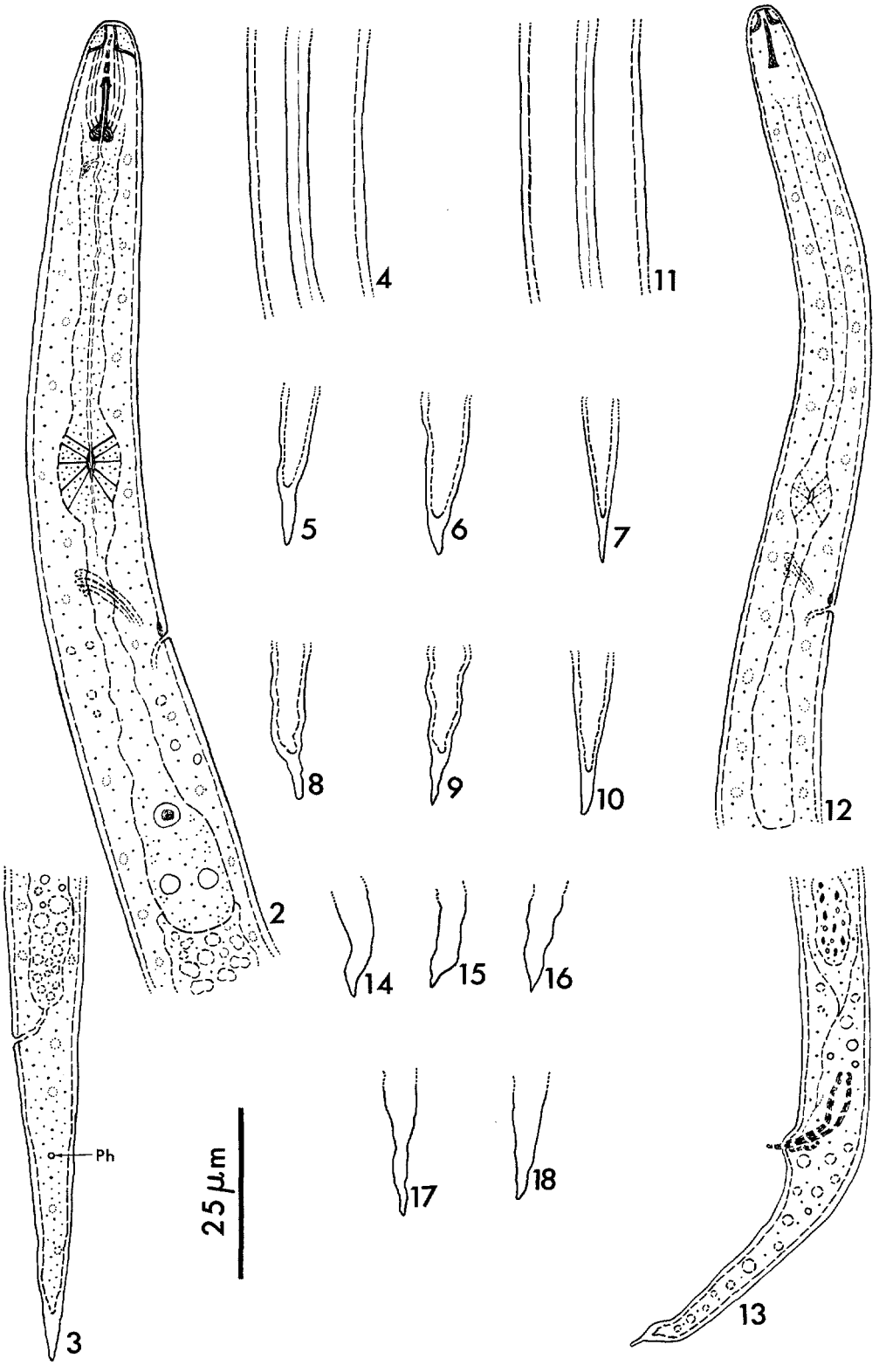
morphological details on the female and cystoid body, referred to their specimens as *M. kirjanovae,* thus establishing Israel as a new country of occurrence for this species.

In 1982 Van Den Berg and Spaull (11) described a new species of *Meloidoderita, M. safrica,* from sugar cane in the Mposa area of Natal. Still another new species of *Meloidoderita* is known on grape in New York State, and is now being described (pers. comm., Dr. M. B. Harrison, Cornell University, Ithaca, N.Y.).

We describe the previously unidentified *Meloidoderita* of Golden (6) and Andrews et al. (1) and present morphometric data and illustrations on *M. kirjanovae* Poghossian, 1966 from Israel plus observations and illustrations on the latter species from Armenian SSR.

MATERIALS AND METHODS

Specimens used in describing this new species were obtained from cultures originating from smartweed, *Polygonum hydropiperoides* Michx., at Beltsville, Maryland, and grown on this plant in a growth chamber and in the greenhouse. Juveniles for morphological examination were generally recovered from egg sacs removed from fresh roots and kept in water in watchglasses. Most males were recovered in a similar manner after the egg sacs were kept for several days or up to 2 weeks, although some were obtained by soil sieving followed by Baermann funnel extraction. Females and cystoid bodies were commonly removed from fresh roots after fixation for 12 hours in 3% formaldehyde solution. The procedures used for measuring, drawing, and preparing specimens were essentially the same as those used by Golden and Birchfield (7), except that some fixed females and cystoid bodies were cut and mounted in lactophenol solution. Photomicrographs were made with an automatic 35-mm camera attached to a compound microscope equipped with interference contrast. Photomicrographs of infected roots, whole females, and cystoid bodies were made with a 8.3- × 10.8-cm sheet-film camera attached to a dissecting microscope. For scanning electron micros-



FIGS. 2–18. Drawings of *Meloidoderita polygoni* n. sp. 2–10) Juveniles; consecutively, anterior region, tail region with phasmid, lateral field, and tail terminus outlines. 11–18) Male; lateral field, anterior and posterior regions, and outlines of tail terminus.

copy, living specimens were fixed in 3% glutaraldehyde solution in 0.05 M phosphate buffer (pH 6.8), dehydrated in a graded series of ethanol, critical point dried from liquid CO_2, sputter-coated with a 20–30-nm layer of gold-palladium, and examined with a scanning electron microscope (SEM). (Unfortunately, despite our efforts, distortion of specimens was prevalent.)

Fixed specimens of *M. kirjanovae* from mint, *Mentha longifolia* (L.) Huds., were obtained from Israel through Drs. Eli Cohn and Daniel Orion and from Armenian SSR through Dr. E. Krall. This material was used as above, except none was examined with SEM. Also, for critical LM examination of the lateral field of juveniles and males, body sections were cut and mounted in commercial glycerine jelly.

Meloidoderita polygoni n. sp.
(Figs. 1–76)

Females (45): Length 258–460 μm (mean 356 μm, standard deviation [SD] 48 μm); width 172–387 μm (303 μm, SD 47); a = 1–1.4 (1.2, SD 0.1); thickness of midbody cuticle 4.3–9 μm (6 μm, SD 1.1); stylet 15–17.4 μm (15.3 μm, SD 0.6); dorsal gland orifice (DGO) 4.3–6.4 μm (4.7 μm, SD 0.5) from base of stylet; excretory pore 81–214 μm (112 μm, SD 44) from anterior end; vulva slit length 22–34 μm (27 μm, SD 3.3); vulva "plate" 26 width × 37 μm length–51 width × 67 μm length (38 width × 47 μm length, SD 7 × 9); distance from vulva slit to anus 32–86 μm (52 μm, SD 21).

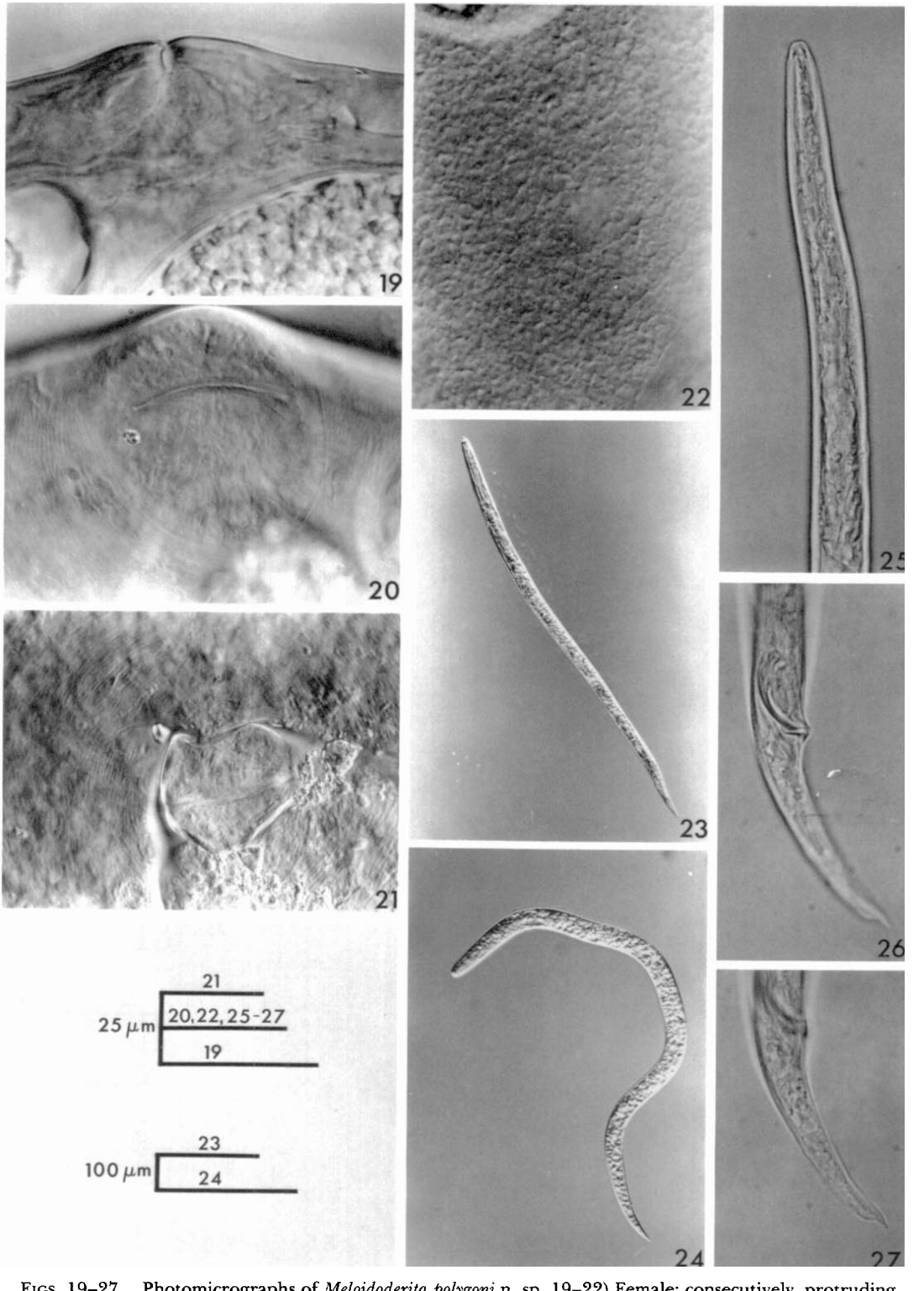
Holotype (female): Length 387 μm; width 305 μm; a = 1.3; thickness of midbody cuticle 6.4 μm; stylet 15.5 μm; DGO 5 μm from base of stylet; excretory pore 114 μm from anterior end; vulval slit length 30 μm; vulval "plate" 32 × 41 μm.

Females: Body pearly white, oval to pear shaped, with small posterior protuberance, and with distinct but irregularly shaped small neck situated anteriorly on median plane with terminal vulva. Body protrudes from root surface and is completely surrounded by large egg sac which becomes filled with eggs and appears stuck to root surface. Esophageal and anterior region generally appearing as illustrated. Head with weak cephalic framework, variable in shape, without distinct annules, and with small, oval oral disc surrounded by amphidial apertures and flattened labial region. Body annules generally indistinct or not visible with LM, but with SEM may appear as fine wavy lines, especially in middle and posterior portion. Excretory pore distinct, located slightly posterior to base of neck which measures 41–73 μm (51 μm, SD 11) in length. Stylet small but strong, with rounded knobs sloping posteriorly. Median bulb large, with distinct, tri-radiate valve measuring 9 × 13 μm–15 × 20 μm (12 × 17 μm, SD 1.5 × 1.8). Distinct muscle fibers or strands attached to sclerotized outer wall of valve extend outward on both sides and beyond boundary of median bulb toward or to body wall. Vulval lips prominent with protrusion, and overlying vulval "plate" (a thickened, muscular area immediately beneath vulval slit). Anus indistinct, difficult to see. Phasmids not observed. One ovary. Uterus prominent, with large cells, each with a distinct nucleus. After egg deposition in egg sac, the uterus enlarges further, fills with many eggs (and juveniles), and becomes a cystoid body surrounded by body cuticle which in time disappears.

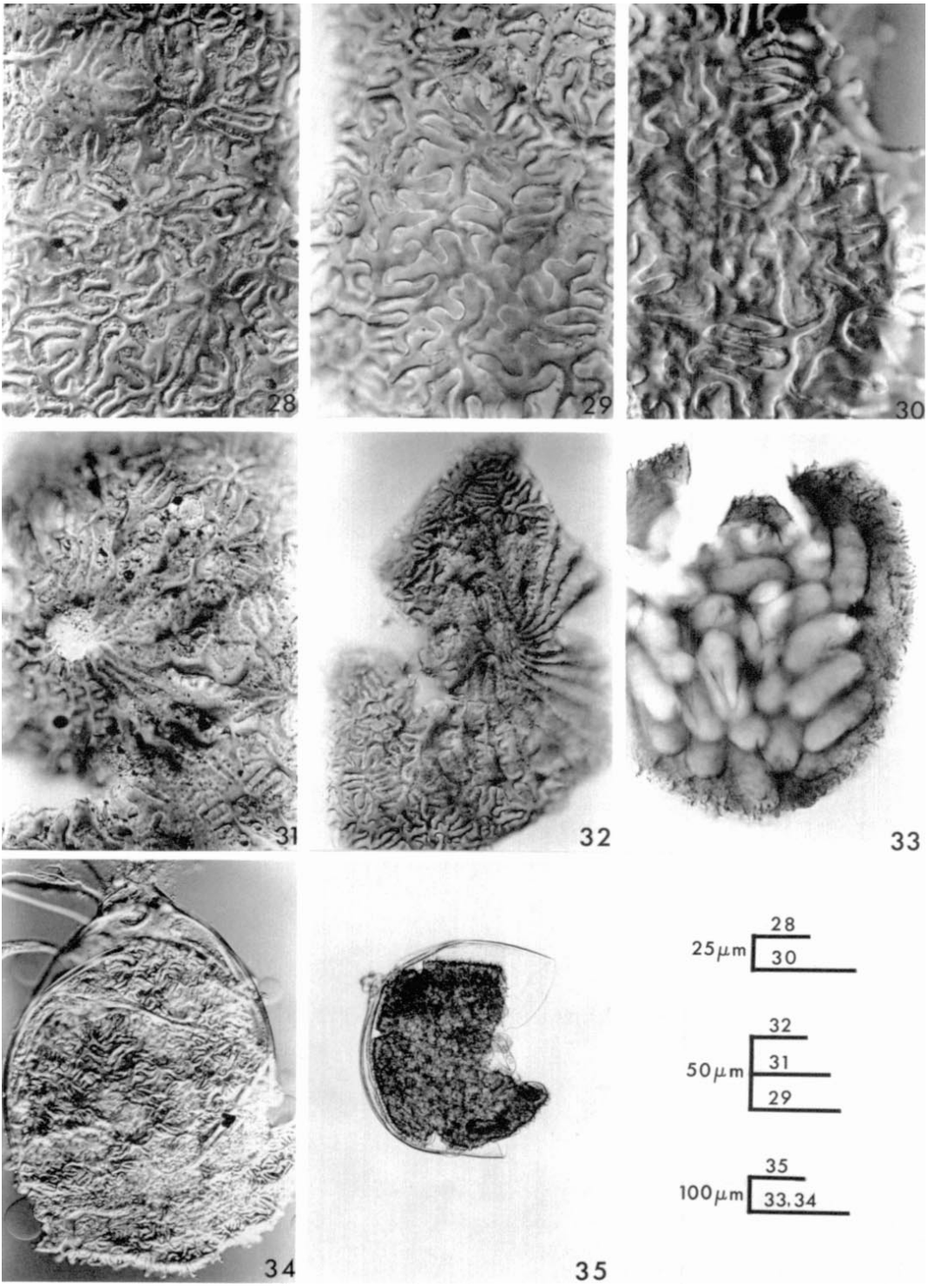
Males (45): Length 387–537 μm (446 μm, SD 29); a = 23.3–38.3 (31.4, SD 4.3); b = 3.4–4.8 (4, SD 0.3); c = 8.2–13.3 (10.2, SD 1.3); anterior portion of stylet 7.3–8.6 μm (7.8 μm, SD 0.4); basal portion of stylet and DGO not visible); excretory pore from anterior end 76–96 μm (86 μm, SD 4.1); spicules 16.3–19.3 μm (17.9 μm, SD 1); gubernaculum 4.7–6 μm (5.1 μm, SD 0.4); tail 32–56 μm (44 μm, SD 5.6).

Allotype (male): Length 440 μm; a = 39; b = 4.3; c = 10; anterior portion of stylet 7.8 μm (basal portion of stylet and DGO not visible); excretory pore from anterior end 87 μm; spicules 17.7 μm; gubernaculum 4.7 μm; tail length 43 μm.

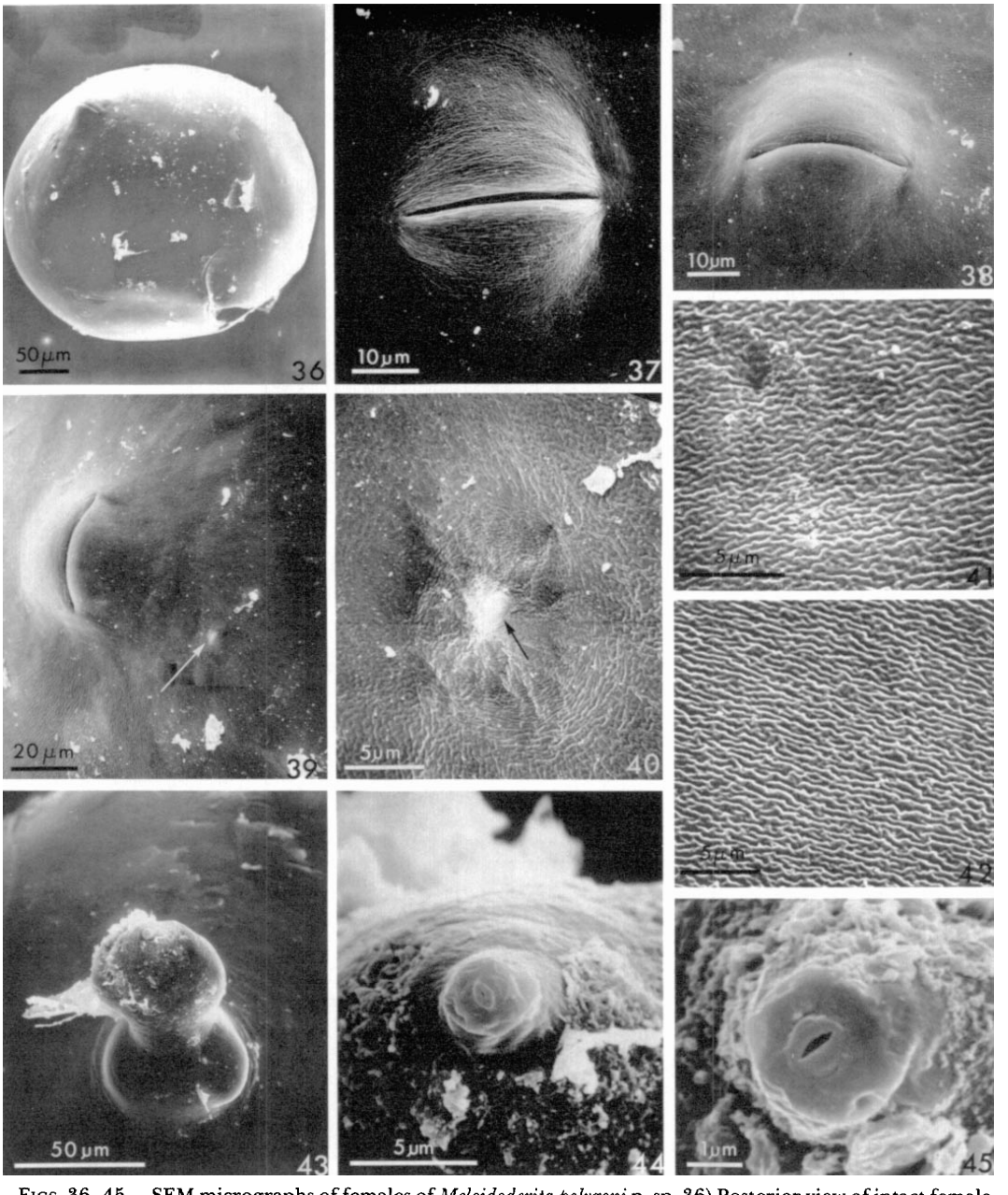
Males: Body slender, vermiform, tapering at both extremities (markedly so posteriorly). Head essentially continuous with body, without annules or separate distinct labial region, but with small oral disc and two open, slit-like amphidial apertures. Esophageal region degenerate, including basal portion of stylet though anterior stylet portion shows clearly. Excretory pore posterior and adjacent to hemizonid. Length from base of esophagus to anterior end 86–120 μm (112 μm, SD 7.4). Midbody width 12–19 μm (14 μm, SD 1.9). Cuticular



FIGS. 19–27. Photomicrographs of *Meloidoderita polygoni* n. sp. 19–22) Female; consecutively, protruding vulva, vulval slit, surface cuticle around vulva, and cuticle at mid-body. 23, 24) Whole juveniles (23 from egg sac; 24 from cystoid body; note disorganized internal contents). 25–27) Male, anterior (note degenerate condition) and posterior regions (one focused on spicules and other on tail terminus).

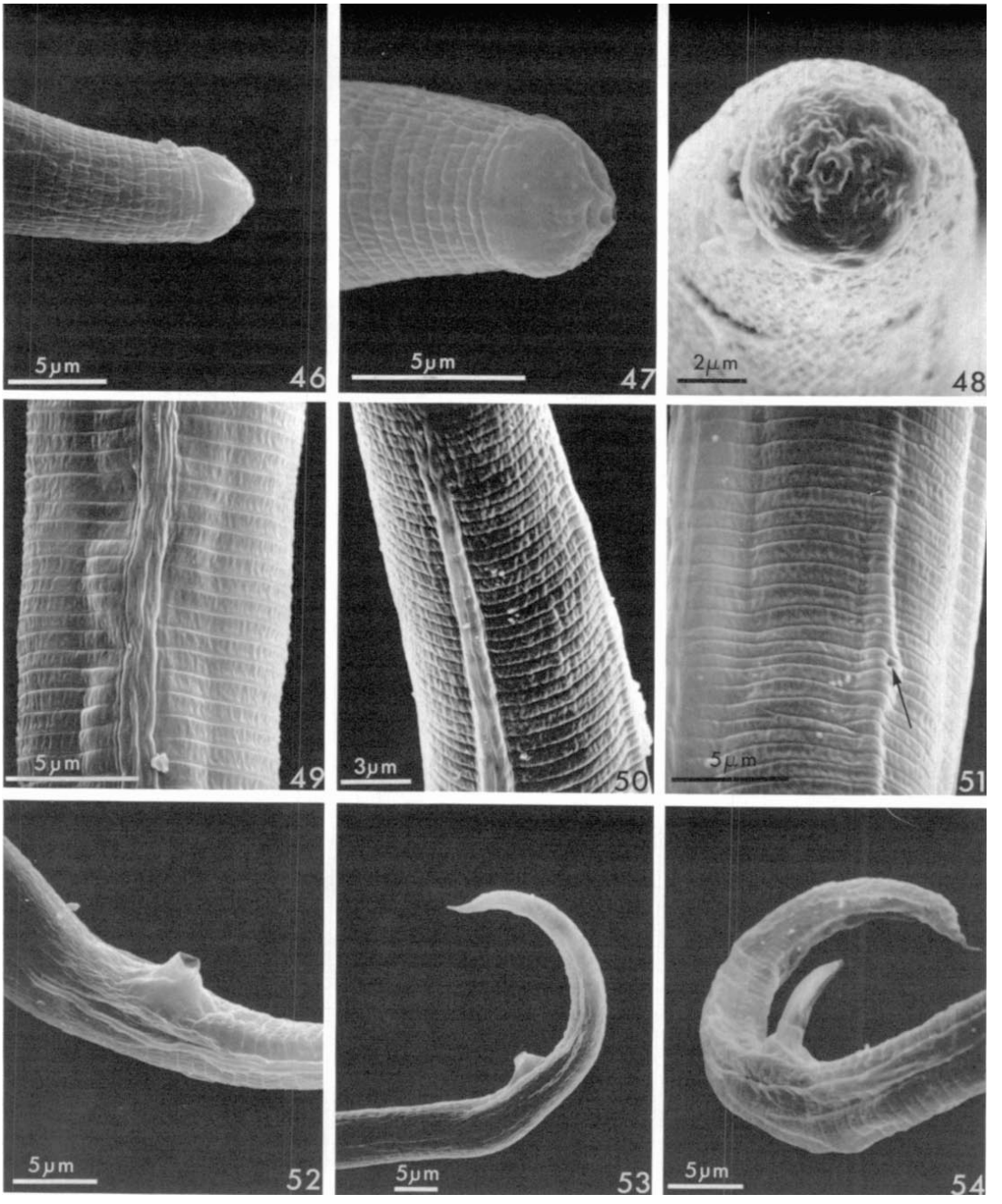


FIGS. 28–35. Photomicrographs of cystoid bodies of *Meloidoderita polygoni* n. sp. 28, 29) Spines on surface and 30) at edge of cystoid body. 31, 32) Small aperture at one end of cystoid body with rope-like striae and regular spines as seen sometimes. 33) Eggs within cystoid body. 34, 35) Cystoid body in female.



FIGS. 36–45. SEM micrographs of females of *Meloidoderita polygoni* n. sp. 36) Posterior view of intact female showing protruding vulva. 37–39) Vulval area and vulval slit. (Note anus at arrow in 39.) 40) Anus (arrow) and surrounding enlarged area from Fig. 39. 41, 42) Body wall markings in posterior area. 43–45) Consecutively, anterior region with neck and head, en face overview, and enlarged en face showing slit-like amphidial apertures adjacent to oral opening.

annules fine, measuring 1 µm. Lateral field narrow, ⅐ body width, not areolated, with three incisures and with center line not always continuous and straight. One testis, well developed. Spicules arcuate, rounded tips. Cloacal opening prominent, protrudes ventrally. Bursa absent (LM and SEM observations). Phasmids seen on only few specimens, located posterior to cloacal opening in anterior third of tail, about 30



FIGS. 46–54. SEM micrographs of males of *Meloidoderita polygoni* n. sp. 46–48) Head region and en face view showing slit-like amphidial apertures (48). 49, 50) Lateral field; consecutively, near mid-body and at beginning anteriorly. 51) Excretory pore (arrow). 52–54) Posterior region.

μm from end. Tail conically tapering to finely pointed terminus and variable in shape.

Second-stage juveniles (50): Length 408–504 μm (447 μm, SD 21); a = 22.1–30 (27, SD 1.6); b = 3–3.7 (3.3, SD 0.2); c = 8.3–13 (11, SD 1.2); stylet 13.7–16.3 μm (15 μm, SD 0.4); DGO 2.1–3 μm (2.5 μm, SD 0.3) from base of stylet; center of median bulb from anterior end 60–80 μm (67 μm, SD 4); excretory pore from anterior end 82–99 μm (90 μm, SD 4.7); head width 6.4–

7.3 μm (6.5 μm, SD 0.2); head height 3–3.8 μm (3.5 μm, SD 0.2); hw/hh ratio 1.7–2.4 (1.9, SD 0.2); tail length 33–53 μm (43 μm, SD 4.8); hyaline tail terminus length 5–9.4 μm (6.9 μm, SD 1.1); caudal ratio A 2–3.9 (3, SD 0.6); caudal ratio B 2.2–7.3 (4, SD 1.2).

Juveniles: Body small, vermiform, 15–20 μm (16.6 μm, SD 0.9) in width at midbody, tapering at both extremities (but more so posteriorly). Head not offset, with distinct cephalic framework, without annules, and with two slit-like amphidial apertures adjacent to slight oral disc surrounding the oral aperture. Lips not defined as distinct entity. Stylet strong, with prominent knobs sloping posteriorly. Excretory pore immediately behind hemizonid. Hemizonion and cephalids not observed. Length from base of esophagus to anterior end 129–146 μm (136 μm, SD 5). Cuticular annulation very fine, about 0.8 μm in width. Lateral field with three incisures, very narrow, and only about ⅐ body width. Phasmids small, difficult to see, located in anterior ⅓ of tail, and averaging about 30 μm from end. Tail conically tapering to finely pointed terminus, varying in shape.

Cystoid bodies (25): Length 301–477 μm (388 μm, SD 55); width 271–460 μm (356 μm, SD 54); L/W ratio 1–1.2 (1.1, SD 0.07); spine length 13–30 μm (22 μm, SD 3.9); spine width at base 3–8.6 μm (5.6 μm, SD 2).

Cystoid bodies: Shape somewhat irregular but basically round to oval. Bodies light to dark brown in color, outer surface covered with prominent spines or spine-like structures, and filled with eggs and juveniles. On one end a small aperture-like structure surrounded by rope-like, flat spines leading to it present in some bodies. Hatched juveniles and those still within eggs have granular, disorganized internal contents and evidently are nonviable.

Eggs from egg sacs. Nonembryonated (30): Length 69–90 μm (80 μm, SD 4.8); width 39–47 μm (42 μm, SD 2); L/W ratio 1.5–2.3 (1.9, SD 0.2).

Embryonated (20): Length 83–94 μm (89 μm, SD 3); width 42–50 μm (47 μm, SD 0.16); L/W ratio 1.8–2.2 (1.9, SD 0.12). Egg shells hyaline, without visible markings when observed by LM and SEM.

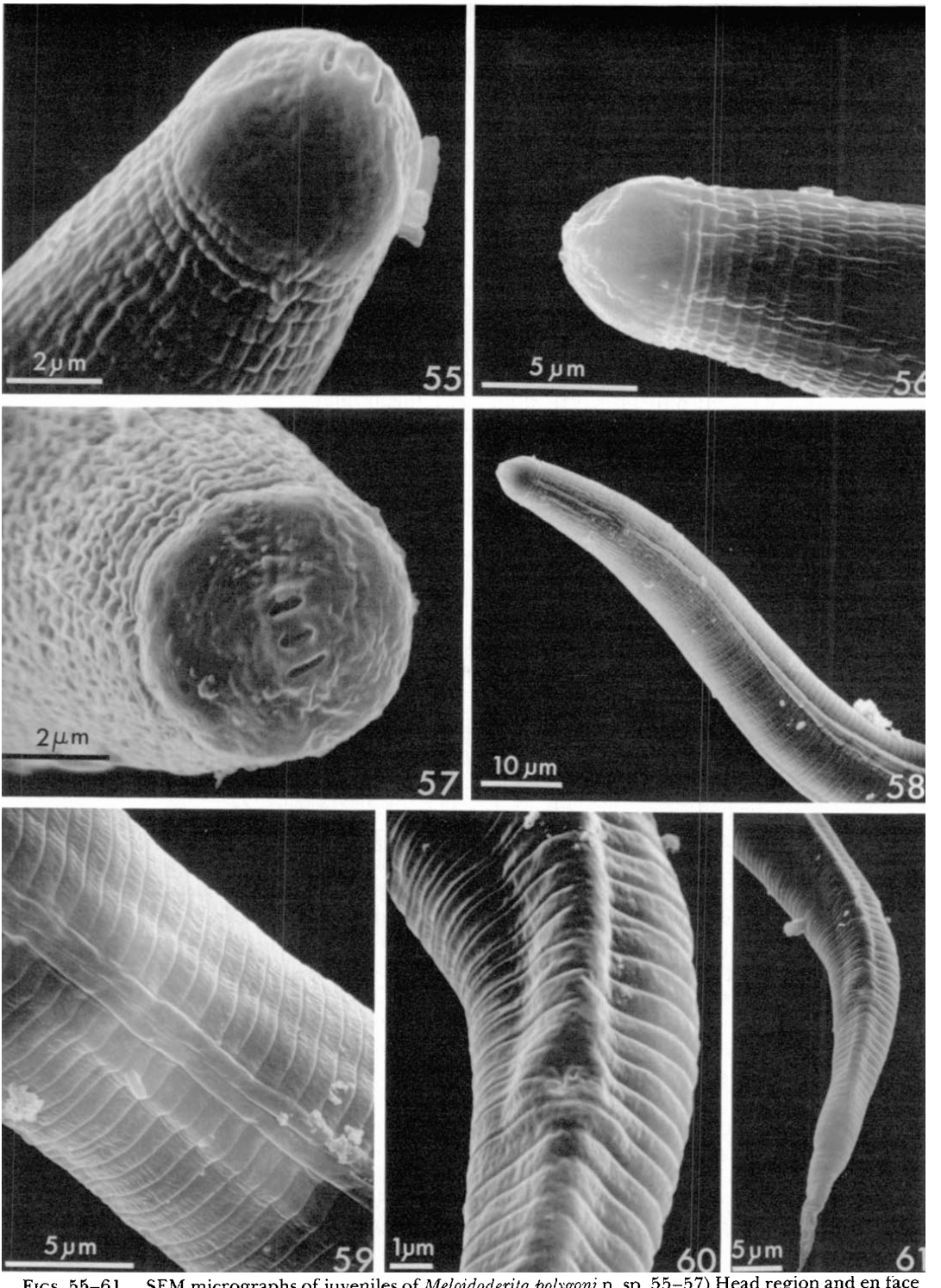
Holotype (female): Isolated from a growth chamber culture grown on the type host and originally collected from the type host and locality 23 July 1975 by A. M. Golden, Donna Ellington, and Paula Crowley. Slide T-372t, USDA Nematode Collection (USDANC), Beltsville, Maryland.

Allotype (male): Slide T-373t. Same data as holotype. USDANC, Beltsville, Maryland.

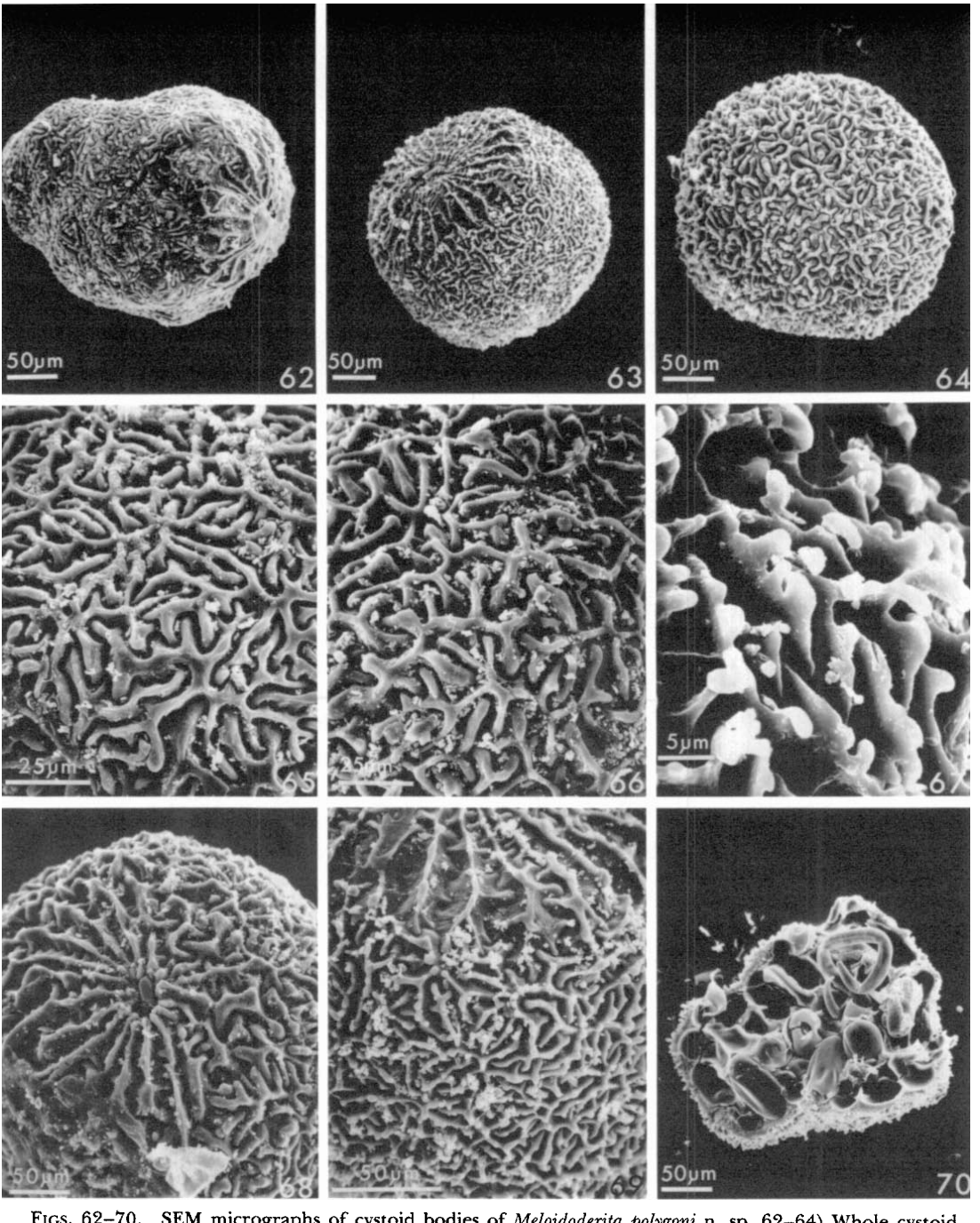
Paratypes (males, females, juveniles, cystoid bodies, eggs): USDANC, Beltsville, Maryland; University of California Nematode Survey Collection (UCNSC), Davis, California; Nematology Department, Rothamsted Experimental Station, Harpenden, Hertfordshire, England; Canadian National Collection of Nematodes, Ottawa, Canada; Laboratoire des Vers, Museum National d'Histoire Naturelle, Paris, France; Institute voor Dierkunde, Laboratorium voor Morfologie en Systematiek der Dieren, Ledeganckst, 35, B-9000, Gent, Belgium; Laboratory voor Nematologie, Binnenhaven 10, Wageningen, Netherlands; Commonwealth Institute of Parasitology Collection, St. Albans, Hertfordshire, England; and National Collection of Nematodes, Plant Protection Research Institute, Pretoria, South Africa.

Type host and locality: Roots of smartweed, *Polygonum hydropiperoides* Michx., near the steam plant at Beltsville Agriculture Research Center–West, Beltsville, Maryland.

Diagnosis: Meloidoderita polygoni n. sp. is most closely related to *M. kirjanovae* Poghossian, 1966 but differs in having (i) larger spines on cystoid bodies (average length 22 μm and width at base 5.6 μm vs. 8.5 μm and 2.3 μm in latter species); (ii) female anus closer to vulva (average 52 μm vs. 112 μm [our measurements] and 90 μm in redescription [8] of *M. kirjanovae*); and (iii) excretory pore located further back from head end, averaging 112 μm vs. 62 μm. This new species differs from *M. safrica* Van Den Berg & Spaull, 1982 especially by females having (i) a shorter stylet (average 15.3 μm vs. 19.2 μm in latter species); (ii) DGO closer to base of stylet (average 4.7 μm vs. 15.2 μm in *M. safrica*); (iii) greater distance between vulva and anus (average 52 μm vs. range of 22.3–24.3 μm [3 ♀♀] in latter species); and (iv) excretory pore further back from head end, averaging 112 μm vs. 74.8 μm. Also, cystoid bodies of *M. polygoni* n. sp. are larger, averaging 388 μm



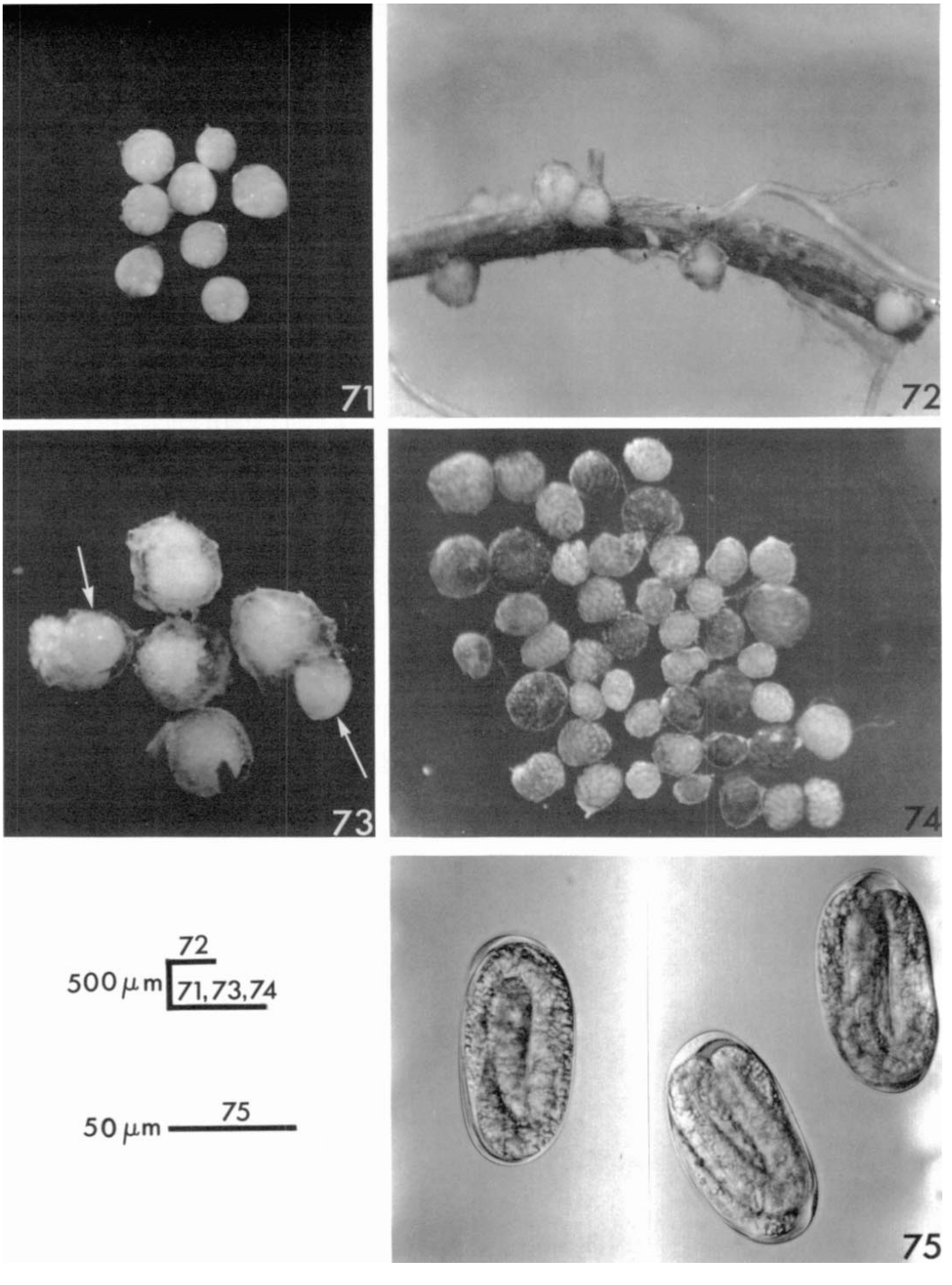
FIGS. 55–61. SEM micrographs of juveniles of *Meloidoderita polygoni* n. sp. 55–57) Head region and en face view showing slit-like amphidial apertures (57). 58, 59) Lateral field, in anterior region and near mid-body. 60) Anus. 61) Posterior region.



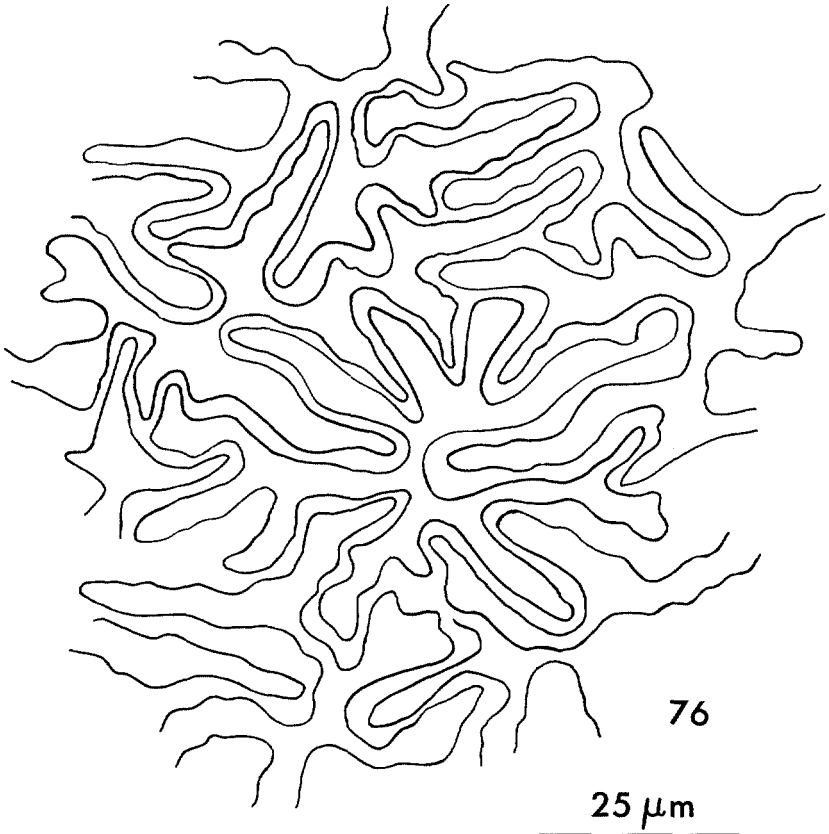
FIGS. 62–70. SEM micrographs of cystoid bodies of *Meloidoderita polygoni* n. sp. 62–64) Whole cystoid bodies. 65–67) Surface spines. 68, 69) Spines and surface markings at one end which shows an aperture-like structure. 70) Cut portion of cystoid body showing a juvenile, eggs, and imprints of eggs.

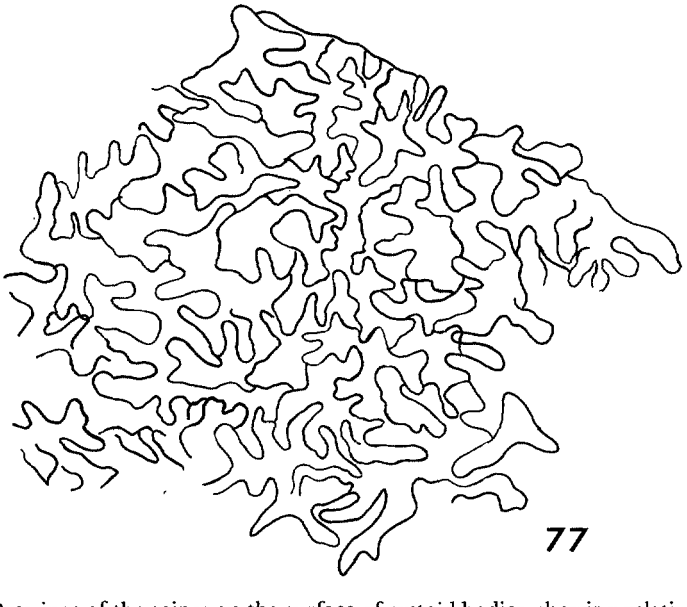
in length and 356 µm in width vs. a length of 256.1 µm and width of 221.9 µm in *M. safrica*; and the spines in *M. safrica* are more dispersed over the cystoid body surface and often have swollen or knob-like tips (spine measurements were not given in description).

Distribution of M. polygoni n. sp.: Beltsville



FIGS. 71–75. Photomicrographs of specimens of *Meloidoderita polygoni* n. sp. 71–73) Females; consecutively, whole specimens, specimens on smartweed root, and specimens (arrows) with large egg sacs attached. 74) Cystoid bodies. 75) Eggs containing juveniles.





FIGS. 76, 77. Drawings of the spines on the surface of cystoid bodies, showing relative size and shape. 76) *Meloidoderita polygoni* n. sp. 77) *M. kirjanovae.*

Agricultural Research Center–West, Beltsville, Maryland, and also found in an isolated sample along the Cacapon River in West Virginia, as previously reported by Andrews et al. (1).

Hosts: As reported by Andrews et al. (1), *M. polygoni* n. sp. developed on a number of plants only in the Polygonaceae, including several species of *Polygonum,* two *Rumex* species, buckwheat (*Fagopyrum esculentum* Moench.), and rhubarb (*Rheum rhabarbarum* L.), the latter two being cultivated plants. Reported as nonhosts were 15 additional cultivated plants and three known hosts for *M. kirjanovae,* including the type host, *Mentha longifolia* (L.) Huds. In our present study we also tested *M. polygoni* n. sp. against *M. longifolia* on three different occasions and in all cases failed to obtain detectable infection.

Morphometrics and Comments on *Meloidoderita kirjanovae* Poghossian, 1966 (Figs. 77–107)

Specimens from Israel

Females (45): Length 245–443 μm (336 μm, SD 42); width 170–305 μm (230 μm, SD 35); a = 1.2–2.1 (1.5, SD 0.2); stylet 14.6–15.1 μm (15 μm, SD 0.2); DGO 2.1–3.4 μm (2.6 μm, SD 0.4) from base of stylet; excretory pore 69–172 μm (125 μm, SD 31) from anterior end; vulval slit length 19–26 μm (24 μm, SD 2.2); vulval plate 28 × 30 μm–43 × 55 μm (37 × 41 μm, SD 6.3 × 5.6); distance from vulval slit to anus 64–172 μm (104 μm, SD 39); thickness of midbody cuticle 3–7.3 μm (5.1 μm, SD 0.7).

Males (13): Length 348–396 μm (377 μm, SD 14); a = 30–38 (35, SD 3); c = 9–13 (11, SD 1.6); anterior portion of stylet 6.4–6.8 μm (6.5 μm, SD 0.2); (basal portion of stylet and DGO not visible); excretory pore from anterior end 76–92 μm (82 μm, SD 4.2); spicules 13.7–16.1 μm (15.1 μm, SD 0.8); gubernaculum 3–5.1 μm (4.3 μm, SD 0.6); tail length 31–44 μm (36 μm, SD 5.4).

Second-stage juveniles (25): Length 357–417 μm (385 μm, SD 16); a = 26–30 (28, SD 1.3); b = 2.4–3.1 (2.6, SD 0.2); c = 7.6–10.1 (8.7, SD 0.6); stylet 12.9–14 μm (13.2 μm, SD 0.3); DGO 1.5–2.1 μm (1.8 μm, SD 0.2) from base of stylet; center of median bulb from anterior end 55–64 μm (59 μm, SD 2.1); excretory pore from anterior end 80–88 μm (84 μm, SD 2.5); head width 5.5–6.4 μm (6.2 μm, SD 0.3); head height 3–3.8 μm (3.4 μm, SD 0.2); hw/hh ratio 1.6–2.1 (1.8, SD 0.1); tail length 38–51 μm (44 μm, SD 3); hyaline tail terminus length 8.1–13.3 μm (10 μm, SD 1.5); caudal ratio A 3–5.1 (4.2, SD 0.8); caudal ratio B 3–10 (7, SD 2); phasmids from tail end 21.5–24.5 μm (23 μm, SD 1.5).

Cystoid bodies (10): Length 202–357 μm (312 μm, SD 44); width 129–280 μm (236 μm, SD 43); L/W ratio 1.1–1.6 (1.4, SD 0.2); spine length 6.4–12.9 μm (8.5 μm, SD 1.6); spine width at base 2.1–4.3 μm (2.3 μm, SD 0.5).

Eggs, embryonated and nonembryonated from egg sacs (20): Length 75.4–83.3 μm (78.3 μm, SD 2.5); width 39–43.1 μm (41 μm, SD 1.3); L/W ratio 1.8–2.1 (1.9, SD 0.1); egg shells hyaline, without visible markings when observed by LM.

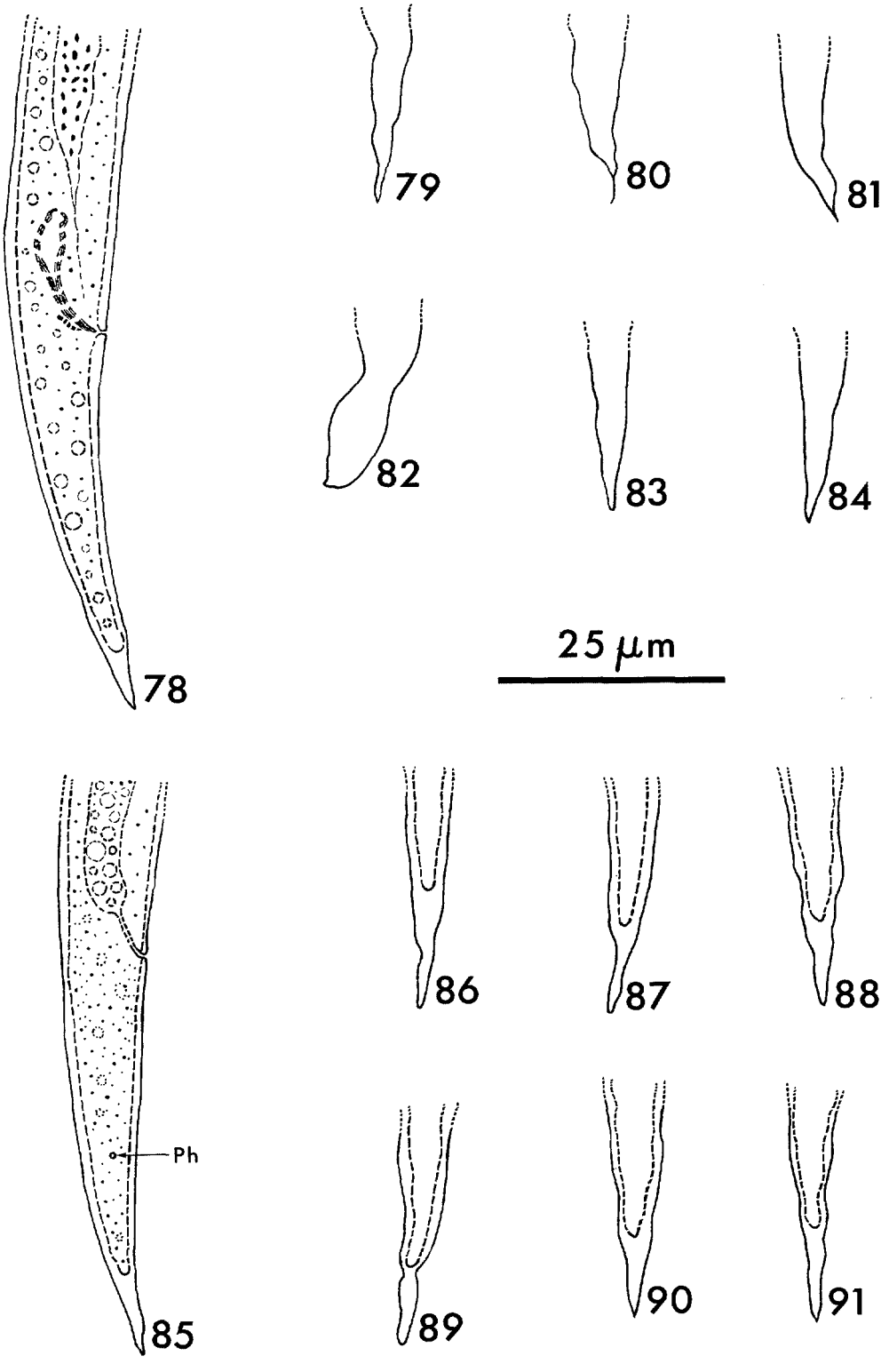
Specimens from Russia (roots with only three females and several cystoid bodies containing eggs and juveniles)

With so few specimens tabulation of detailed morphometric data was not made. However, this material was highly valuable for certain observations and measurements as referred to below as well as for some photomicrographs (Figs. 103–107).

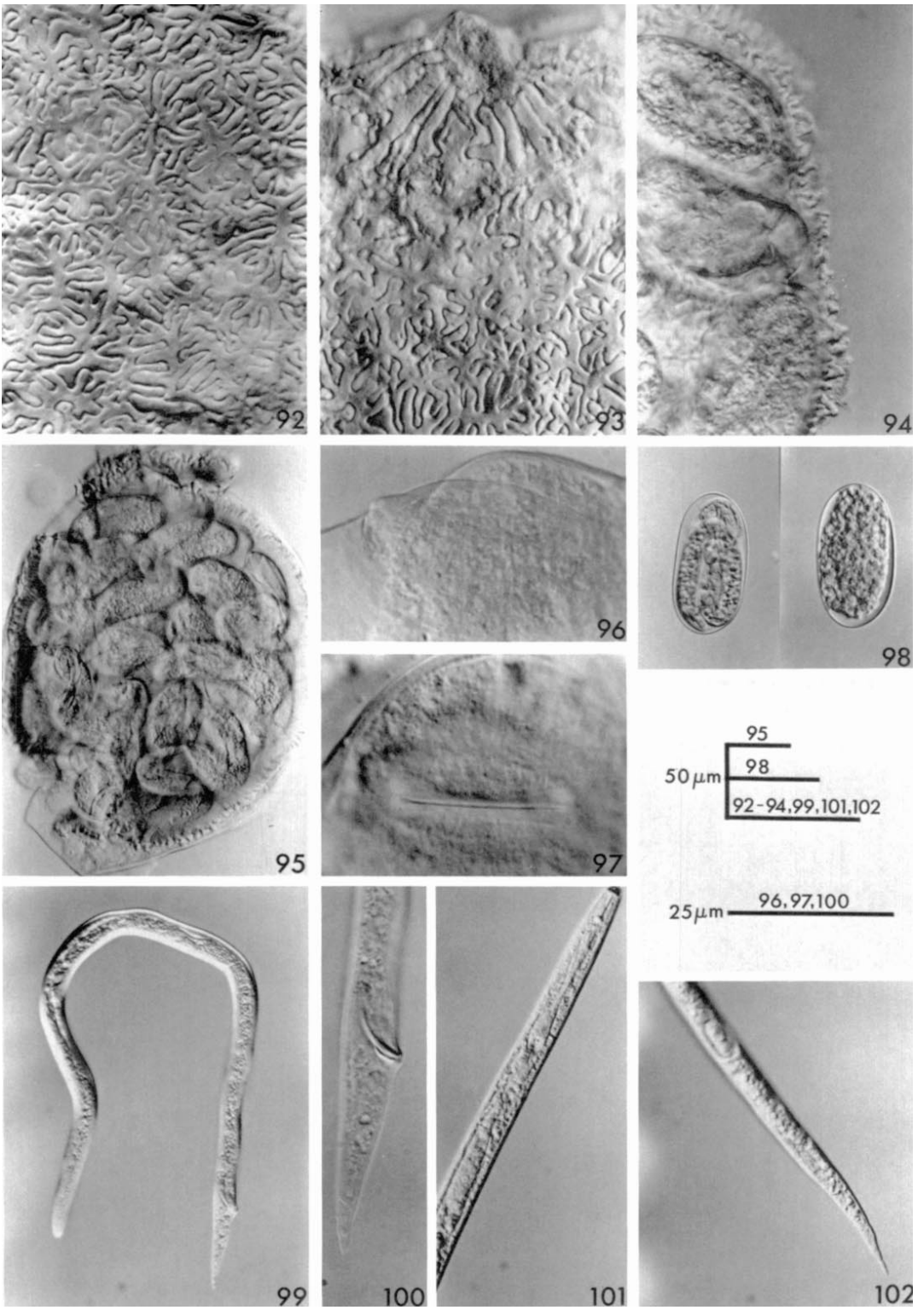
Discussion

The morphology of *M. kirjanovae* from Israel and from the limited number of specimens of this species from USSR was the same and conformed well with description except as noted below. As pointed out in the diagnosis of the description of *M. polygoni* n. sp., *M. kirjanovae* shows a very close morphological relationship to the former species, a major difference being the nature of the cystoid bodies. Also, *M. kirjanovae* was redescribed in detail by Kirjanova and Poghossian (8) in 1973. Under these circumstances, and with the new morphometric data and illustrations of *M. kirjanovae* included here, a full redescription of this species would seem redundant. However, certain points about *M. kirjanovae* should be discussed.

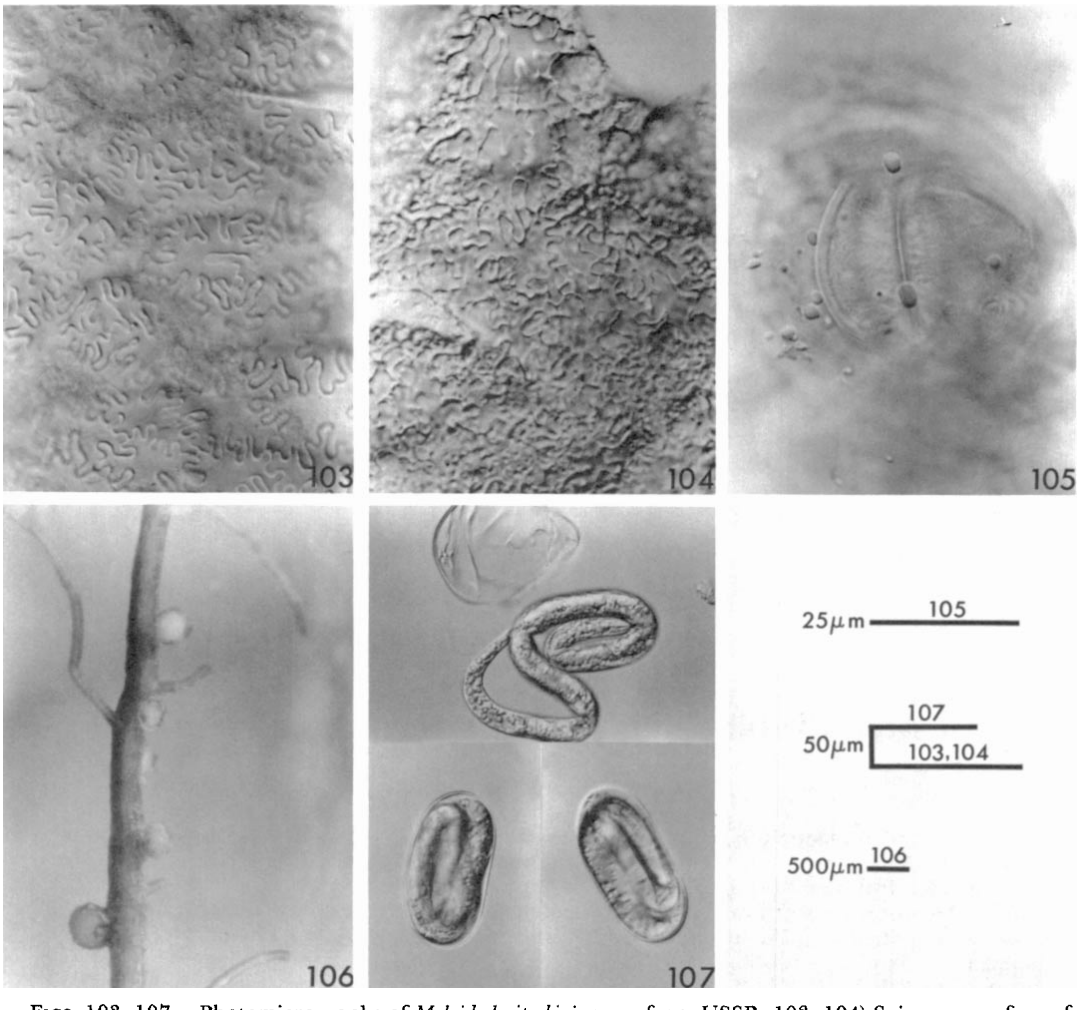
In the redescription (8), *M. kirjanovae* was reported to have four incisures in the lateral field of the juveniles. In our examination of a limited number of juveniles of



FIGS. 78–91. Drawings of posterior regions of males and juveniles of *Meloidoderita kirjanovae* from Israel. 78–84) Male tail with spicules and variations in shape of tail terminus. 85–91) Juvenile tail region showing phasmid (Ph) location and variations in shape of tail terminus.



FIGS. 92–102. Photomicrographs of *Meloidoderita kirjanovae* from Israel. 92–94) Spines on surface of cystoid bodies and in profile (94) at edge of a cystoid body. 95) Eggs within a cystoid body which in turn is enclosed by the female body cuticle. 96, 97) Vulval area showing vulval slit. 98) Eggs. 99, 100) Male, whole specimen and posterior portion. 101, 102) Juvenile, anterior and posterior portions.



FIGS. 103–107. Photomicrographs of *Meloidoderita kirjanovae* from USSR. 103, 104) Spines on surface of cystoid bodies. 105) Vulval area showing vulval slit. 106) Females, with egg sacs, attached to mint root. 107) Two eggs and a juvenile removed from egg.

this species from USSR and many specimens from Israel, using LM with both totomounts and mid-body sections, only three incisures in the lateral field could be seen. Similarly, in juveniles of *M. polygoni* n. sp., only three incisures were seen with LM, and this was confirmed with SEM observations. The lateral field of the male of *M. kirjanovae* was reported to have four incisures and, also, a small obscure bursa was described (10). In our LM examination of males of this species from Israel, we found only three incisures and no bursa. Again, for *M. polygoni* n. sp. and with LM and SEM, three incisures in the lateral field of males were found but no bursa. Unfortunately, males of *M. kirjanovae* from USSR were not available for study. Van Den Berg and Spaull (11) did not observe a bursa on males of *M. safrica*.

The lateral fields of juveniles and males of the described species of *Meloidoderita* are very small, not always well defined, and are difficult to observe.

LITERATURE CITED

1. Andrews, S. W., L. R. Krusberg, and A. M. Golden. 1981. The host range, life-cycle and host-parasite relationships of *Meloidoderita* sp. Nematologica 27:146–159.

2. Cohn, E., and M. Mordechai. 1981. Biology of a species of *Meloidoderita* found in Israel. Nematropica 11:77–78 (Abstr.).

3. Cohn, E., and M. Mordechai. 1982. Biology and host-parasite relations of a species of *Meloidoderita* (Nematoda:Criconematoidea). Revue de Nematologie 5:247–256.

4. Cohn, E., and M. Mordechai. 1983. Wall struc-

ture of the mature female and cystoid body of *Meloidoderita kirjanovae* (Nematoda: Criconematoidea). Journal of Nematology 15:325–327.

5. Golden, A. M. 1971. Classification of the genera and higher categories of the order Tylenchida (Nematoda). Pp. 191–232 *in* B. M. Zuckerman, W. F. Mai, and R. A. Rohde, eds. Plant parasitic nematodes, vol. 1. New York: Academic Press.

6. Golden, A. M. 1976. First occurrence and morphology of a *Meloidoderita* species in the United States. Journal of Nematology 8:286 (Abstr.).

7. Golden, A. M., and W. Birchfield. 1972. *Heterodera graminophila* n.sp. (Nematoda: Heteroderidae) from grass with a key to closely related species. Journal of Nematology 4:147–154.

8. Kirjanova, E. S., and E. E. Poghossian. 1973. A redescription of *Meloidoderita kirjanovae* Poghossian, 1966 (Nematoda; Meloidoderitidae, fam. n.). (Transl. from Russian.) Parazitologiya 7:280–285.

9. Poghossian, E. E. 1966. A new genus and species of nematode of the family Heteroderidae from the Armenian SSR (Nematoda). (Transl. from Russian.) Dan (Reports of the Academy of Sciences) of the Armenian SSR 47:117–123.

10. Poghossian, E. E. 1975. Description of the male of *Meloidoderita kirjanovae* Poghossian, 1966 (Nematoda: Meloidoderitidae). (Transl. from Russian.) Akademi Nauka Armyanskoi SSR 60:252–255.

11. Van Den Berg, E., and V. W. Spaull. 1982. A new *Meloidoderita* species on sugar cane in South Africa (Nematoda:Meloidoderitidae). Phytophylactica 14:205–213.

12. Wouts, W. M. 1972. A revision of the family Heteroderidae (Nematoda:Tylenchoidea). 1. The family Heteroderidae and its subfamilies. Nematologica 18:439–446.

13. Wouts, W. M., and S. A. Sher. 1971. The genera of the subfamily Heteroderinae (Nematoda: Tylenchoidea) with a description of two new genera. Journal of Nematology 3:129–144.