JOURNAL OF NEMATOLOGY

VOLUME 19 APRIL 1987 NUMBER 2

Journal of Nematology 19(2):147–151. 1987.

Hirschmanniella pomponiensis n. sp. (Nemata: Pratylenchidae), Parasitic on Bulrush, *Scirpus robustus* Pursh[1]

FAWZIA ABDEL-RAHMAN AND A. R. MAGGENTI[2]

Abstract: A new species of *Hirschmanniella* was found in bulrush roots; LM and SEM morphological studies revealed that it is distinct from other species in the genus. Therefore, it is designated *Hirschmanniella pomponiensis* n. sp. Six lips are fused to form a hexagonal labial plate, six inner sensilla encircle the stoma opening, and four cephalic sensilla open in the corners of subdorsal and subventral lips. Cephalic lip region consists of six or seven annuli. The female has incomplete areolation in the lateral field, the intestine overlaps the rectum, the tail tip is pointed and without annulation.

Key words: Hirschmanniella, morphology, taxonomy.

Hirschmanniella sp. was frequently recovered from root-knot nematode galls on bulrush roots (*Scirpus robustus* Pursh) collected from Pomponio State Beach, California. Morphological studies revealed that it is distinct from all other known species of *Hirschmanniella,* and it is therefore designated as a new species.

Hirschmannia Luc & Goodey, 1962 was proposed for nematodes in the genus *Radopholus* Thorne, 1949 which differed significantly from the type species of *Radopholus* (2). In 1963, Luc & Goodey (3) proposed the name *Hirschmanniella* for *Hirschmannia* Luc & Goodey, 1962, as the latter name was preoccupied by a crustacean (1). Sher (4), in his revision of the genus *Hirschmanniella,* recognized 15 species (seven nominal redescribed and eight new described species), proposed one new combination (*H. mexicana* Chitwood, 1951), and synonymized two species (*H. nana* Siddiqi, 1966 and *H. magna* Siddiqi, 1966). The genus *Hirschmanniella* contains some of the largest tylenchoid nematodes. Thirty nominal species have been described in the genus.

Received for publication 30 August 1985.

[1] Portion of a Ph.D. dissertation by the first author, University of California, Davis.

[2] Postdoctoral Fellow and Nematologist, Division of Nematology, University of California, Davis, CA 95616.

MATERIALS AND METHODS

Hirschmanniella pomponiensis male and female specimens used in this study were obtained from cultures on bulrush (*Scirpus robustus*) maintained in the greenhouse from collections that came originally from the type locality. Specimens (females and males) used in the morphological study were obtained by incubating infected bulrush roots in the mist chamber. After 24 hours in the mist chamber, nematodes were collected, hand picked, and prepared for temporary water or permanent glycerin mounts.

Specimens (males and females) used in SEM studies were prepared in the following manner: Freshly collected specimens were heat killed in a glass cavity slide and then fixed in F.A.A. for 10 days. Dehydration was carried out through an ethanol series starting with 10% and 20% ethanol-water, each for 30 minutes. Specimens were then transferred to 30% ethanol and left overnight. Subsequently, specimens were passed through 40%, 50%, and 60% ethanol, each for 30 minutes. Specimens were left in the 60% ethanol solution overnight. The following day they were transferred through 75%, 80%, 95%, and 100% ethanol; the last step was repeated twice. Specimens remained in each solution for 30

minutes. This slow dehydration maintained the nematode's body shape without distortion. Specimens were then processed from 100% ethanol to 100% amyl acetate. The dilution series of amyl acetate in absolute ethanol were 25%, 50%, 70%, 90%, and finally to 100% amyl acetate. Nematodes were processed by critical point drying, mounted on stubs with an aluminum foil support using a small drop of glue obtained from the residue of scotch tape soaked in benzene. Specimens were coated with 400–500 Å of gold and viewed with a Cambridge Mark II scanning electron microscope using an accelerating voltage of 10 kV.

In the description, m is anterior part of spear as a percentage of the total spear length.

All measurements are in micrometers (μm) unless otherwise designated. Parenthetic numbers in the descriptions refer to population mean.

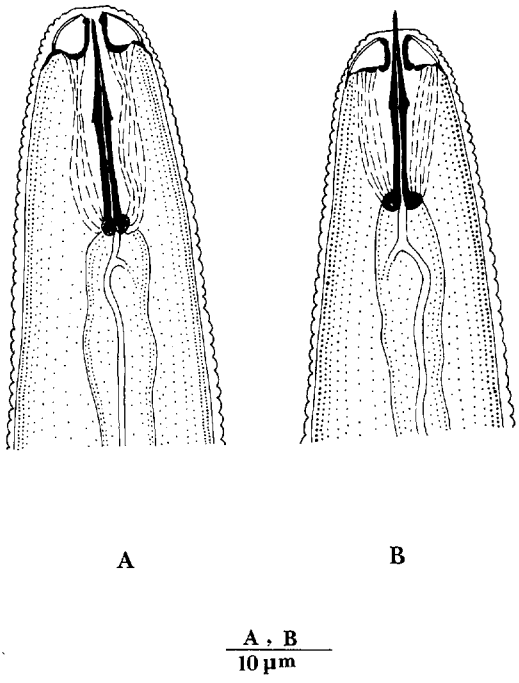

FIG. 1. *Hirschmanniella pomponiensis* n. sp. anterior body region. A) Female. B) Male.

SYSTEMATICS

Hirschmanniella pomponiensis n. sp. (Figs. 1–3)

Dimensions (32 females in glycerin): Body length (L) 1.9 mm (1.7–2.2) SD 151; stylet length 20 (17–23) SD 1.59; a = 66 (52–77) SD 7; b = 14 (12–16) SD 1.05; b′ = 6 (5–8) SD 1.11; c = 17 (15–22) SD 2.03; c′ = 5 (4–7) SD 0.80; V% = 52 (48–54) SD 1.82; m = 48 (42–52) SD 3; O% = 16 (13–23) SD 2.9; dorsal esophageal gland orifice (DEGO) from stylet base 3.5 (3–5) SD 0.54; anterior extremity to esophago-intestinal valve 138 (125–151) SD 7.2; anterior extremity to esophageal gland end 309 (243–376) SD 46.9; anterior extremity to excretory pore 141 (122–155) SD 8.39; body width 30 (25–37) SD 3.62; tail 113 (99–136) SD 13; anal body width 23 (17–26) SD 6.50; phasmids to tail tip 45 (41–55) SD 5; conical part of spear 10 (8–12) SD 1.08.

Holotype (female) in glycerin: Body length (L) 2.2 mm, stylet 18, conical part of spear 8.5, a = 75.86, b = 16.17, b′ = 6.75, c = 21.67, c′ = 4.61, m = 47.22, greatest body width 29, excretory pore 141 from anterior extremity, esophago-intestinal valve 136 from anterior extremity, terminus of esophageal gland 305 from anterior extremity, tail length 101, V 52%, anal body width 22.

Description: Lip region anteriorly flattened, edges rounded, not offset from body, six or seven annuli comprise lip region. As seen with SEM, oral opening oval, located centrally on hexagonal labial plate surrounded with six coeloconica (pore-like sensilla). Short slit-like amphidial openings located between lateral angles at margin of labial plate. Lip region (region covering labial framework) posterior to hexagonal plate consists of six annuli (Fig. 2). First annulus posterior to lip lobes marked by one incomplete annulus. Labial framework extends posteriorly about two body annuli. Stylet short, robust; knobs prominent, rounded. Procorpus cylindrical 64 (60–70); metacorpus fusiform 21 × 15 (17–25 × 14–16); isthmus cylindrical length from metacorpus to esophago-intestinal valve 43 (30–52) esophageal glands extensively overlap anterior intestine ventrally, length from esophago-intestinal valve to end of

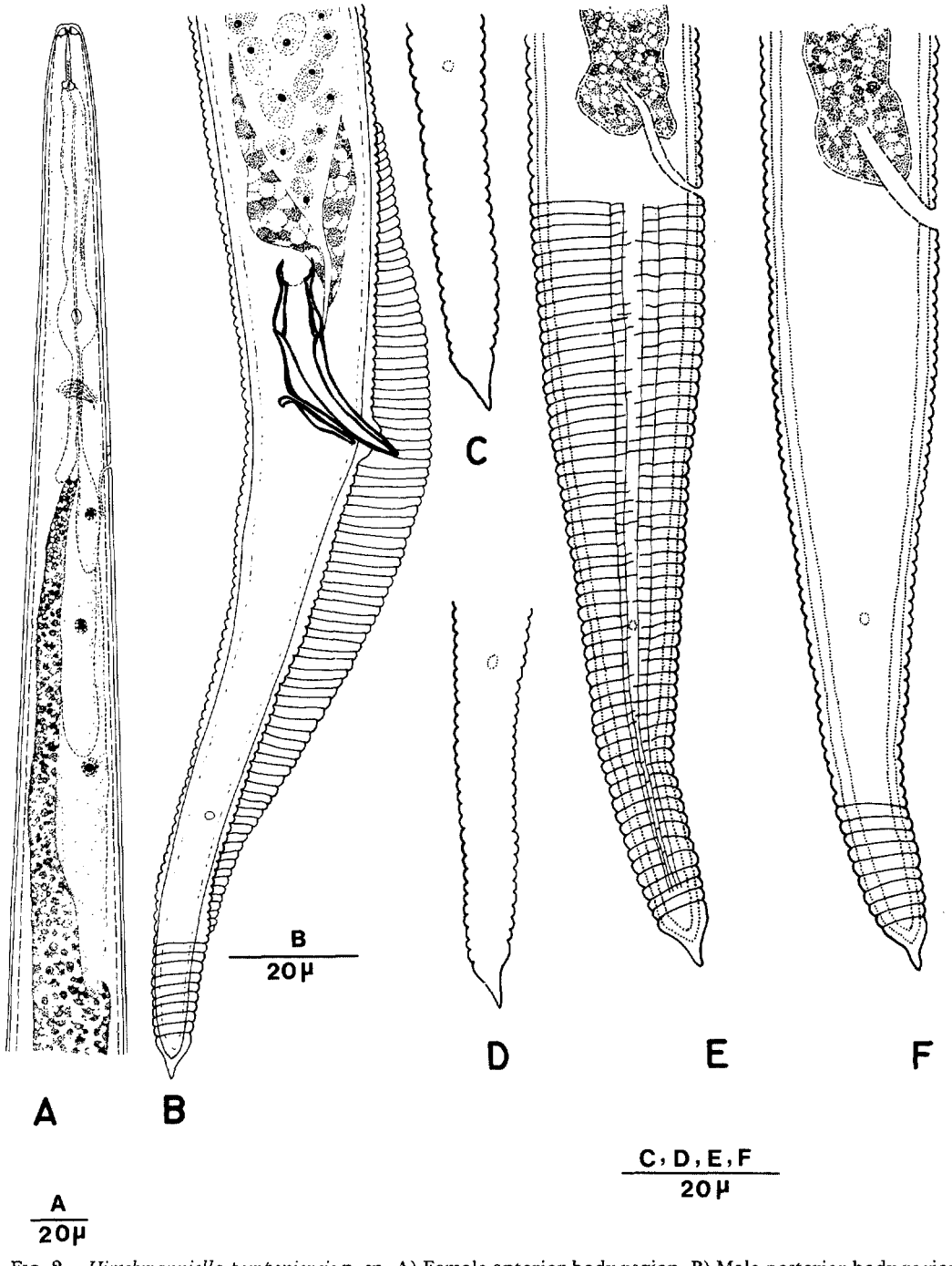

FIG. 2. *Hirschmanniella pomponiensis* n. sp. A) Female anterior body region. B) Male posterior body region (tail). C–F) Female posterior body region.

esophageal glands 174 (106–229). Esophageal glands narrow and cylindrical posterior to the esophago-intestinal valve, as they extend they increase in size posteriorly and occupy about one-third of body cavity (width). Esophago-intestinal valve conspicuous and large, at level of, or just anterior to, excretory pore. Hemizonid anterior to excretory pore. Four incisures in lateral field, incomplete areolation, best

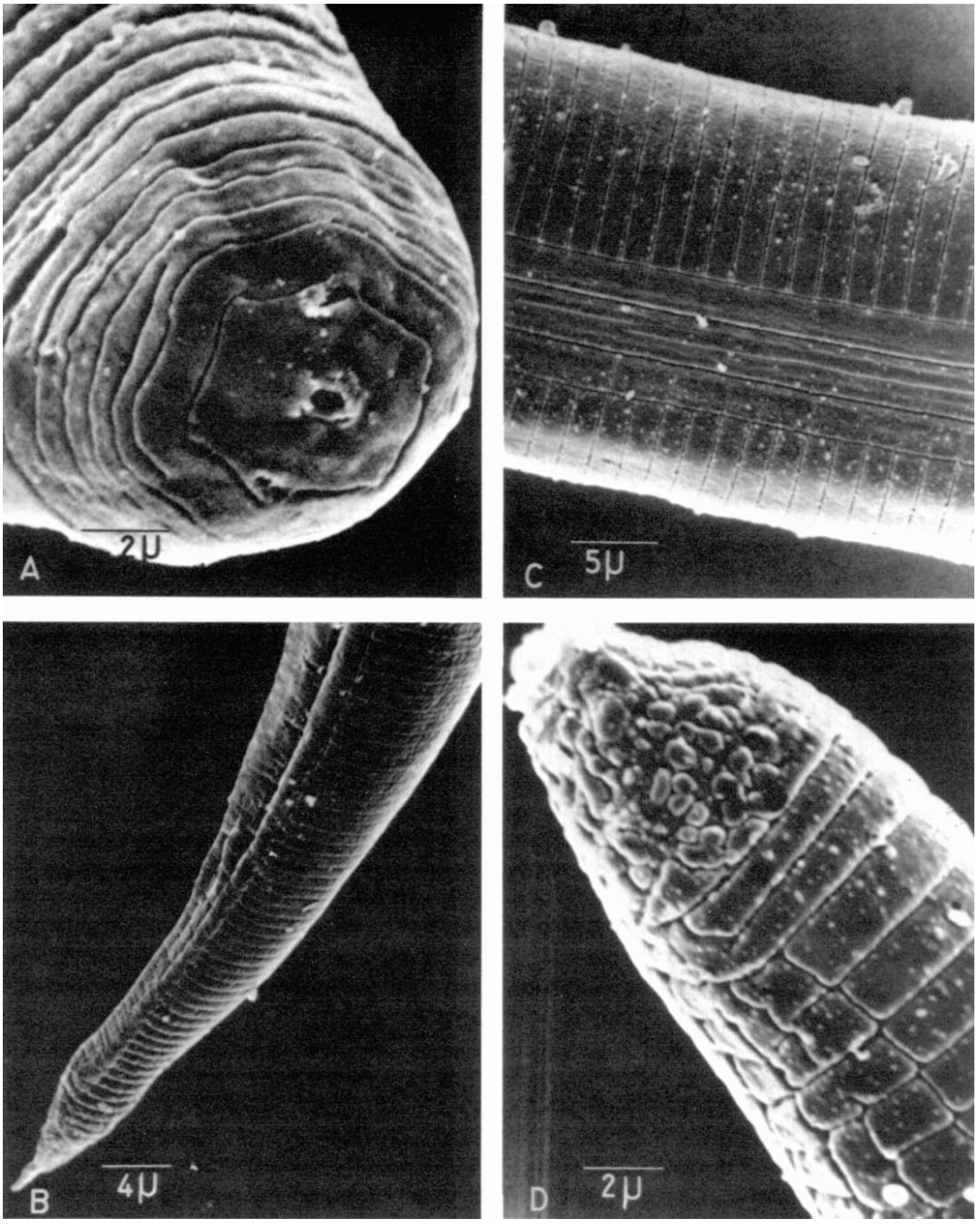

FIG. 3. Scanning electron micrographs of *H. pomponiensis* n. sp. A) Female face view. B) Male posterior body region. C) Lateral field at midbody (male). D) Female tail terminus, showing lack of annulation near tail terminus and the areolated lateral field extending to last body annulus.

seen in freshly killed specimens. As seen with SEM lateral field starts 20 annuli posterior to lip region and extends posterior to phasmids to last body annulus near tail terminus. Spermatheca large, elongate, filled with oval sperm. Gonads paired, uteri opposed, amphidelphic, with outstretched ovaries. Intestine overlaps rectum. Tail length 113 (99–136). Phasmids located 25–28 annuli from tail tip. Body annulation

ends about four body annuli from tail terminus. Tail tip pointed without ventral notch.

Dimensions (16 males in glycerin): Body length (L) 1.9 mm (1.7–2.1) SD 147; stylet length 19 (17–21) SD 1.13; conical part of spear 9 (7–10) SD 0.70; a = 55 (47–66) SD 5.73; b = 14 (12–16) SD 1.23; b′ = 6 (4–9) SD 1.36; c = 18 (16–20) SD 0.78; c′ = 5 (4–6) SD 0.36; m = 49 (42–51) SD 2.13; O% = 15 (10–21) SD 2.99; dorsal esophageal gland orifice (DEGO) from stylet base 3 (2–4) SD 0.57; anterior extremity to esophago-intestinal valve 135 (120–146) SD 6.4; anterior extremity to esophageal glands end 301 (213–397) SD 54; anterior extremity to excretory pore 140 (128–153) SD 7.4; body width 34 (26–40) SD 3.3; tail 103 (89–117) SD 7; anal body width 20 (19–23) SD 4.0; phasmids to tail tip 40 (34–52) SD 5; spicule length 35 (28–39) SD 2.95; gubernaculum length 10 (8–12) SD 1.33.

Allotype (male) in glycerin: Body length (L) 1.9 mm, a = 54.55, b = 14.33, b′ = 6.86, c = 18.88, c′ = 5.1, m = 51.28, O% = 15.38; stylet length 19, conical part of spear 10, dorsal esophageal gland orifice 3 from stylet base, greatest body width 36, excretory pore 147 from anterior extremity, esophago-intestinal valve 137 from anterior extremity, end of esophageal gland 286 from anterior extremity. Tail length 104, spicule length 37, gubernaculum length 8, anal body width 21, distance from phasmids to tail tip 34.

Description: Similar to female except for secondary sexual characteristics. Spicule and gubernaculum shape as illustrated.

Type host: Bulrush (*Scirpus robustus* Pursh), collected by Dr. T. Watson of the California Department of Food and Agriculture on 11 April 1979. Mostly associated with *Meloidogyne* sp. galls.

Type locality: Pomponio Beach (Half Moon Bay), California, from edge of a fresh water stream 25 yards from Highway 1.

Holotype (female): Collected from the type locality, deposited at University of California, Davis, Nematode Collection (UCDNC), Slide UCNC 1994.

Allotype (male): Same data as holotype, Slide UCNC 1995.

Paratypes (13 females and 8 males): Same data as holotype, nine females and four males deposited at University of California, Davis, Nematode Collection; one female and one male deposited in each of the following collections: USDA Nematode Collection, Beltsville, Maryland; Nematode Collection, Agriculture University, Wageningen, The Netherlands; Nematode Collection, Rothamsted Experimental Station, Harpenden, Herts., England; Nematode Collection, Museum Nationale d'Histoire Naturelle, Paris, France.

Diagnosis: Hirschmanniella pomponiensis is closely related to *H. gracilis* (De Man, 1880) Luc and Goodey, 1963. *H. pomponiensis* can be distinguished from *H. gracilis* by six or seven distinct annuli in the cephalic region; shorter stylet, 19 (17–21) in *H. pomponiensis* versus 23 (21–24) in *H. gracilis*; longer body, 1,900 (1,700–2,120) in *H. pomponiensis* versus 1,810 (1,480–1,920) in *H. gracilis*; smaller, rounded spear knobs; incomplete areolation in lateral field; intestine overlapping rectum; and by differences in shape of the male spicules and gubernaculum.

This species of *Hirschmanniella* was found mostly associated with a root-knot nematode: galls, adults, and larvae. Sometimes up to 30 were found in one gall. *Hirschmanniella pomponiensis* n. sp. was also recovered from roots without galls.

Literature Cited

1. Elofson, O. 1941. Zur Kenntnis der marinen Ostracoden Schwedens mit besonderer Berucksichtigung des Skageraks. Zooloologica Bidrag Fran Uppsala 19:215–234.

2. Luc, M., and J. B. Goodey. 1962. *Hirschmannia* n. g. differentiated from *Radopholus* Thorne, 1949 (Nematoda: Tylenchoidea). Nematologica 7:197–202.

3. Luc, M., and J. B. Goodey. 1963. *Hirschmanniella* nom. nov. for *Hirschmannia*. Nematologica 9: 471.

4. Sher, S. A. 1968. Revision of the genus *Hirschmanniella* Luc & Goodey, 1963 (Nematoda: Tylenchoidea). Nematologica 14:243–275.