

Description of *Pratylenchoides camachoi* n. sp. (Tylenchida: Pratylenchidae) from Spain

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Abstract: *Pratylenchoides camachoi* n. sp. from rosemary (*Rosmarinus officinalis* L.) in Sierra De Cazorla in southeastern Spain is described and illustrated. *Pratylenchoides camachoi* n. sp. is a bisexual species characterized by a cylindroid, sometimes clavate-shaped, male tail with a uniquely shaped smooth, rounded terminus. Females are characterized by a short esophageal overlap and six lines in the lateral field, which reduce to four in the tail region; not areolated except outer bands in the esophageal and tail regions.

Key words: morphology, new species, *Pratylenchoides camachoi* n. sp., Spain, taxonomy.

Specimens of an undescribed species in the genus *Pratylenchoides* Winslow, 1958 were found in a survey of several natural plant communities in the Sierra de Cazorla in southeastern Spain. This species is unique in the genus because of male tail morphology. The species could be considered as ancestral within the genus *Pratylenchoides* on the basis of the similarity of the tail shape between sexes (4).

MATERIALS AND METHODS

Specimens were killed by gentle heat, fixed in 4% formaldehyde and processed to glycerine for examination with the light microscope. Body length and curved structures were measured with the aid of a precision curvimeter. Straight structures, such as maximum body width, stylet, anal body width, etc., were measured with an ocular micrometer at 1,250× magnification.

For examination under the scanning electron microscope (SEM), specimens were processed to Spurr's low viscosity epoxy resin, coated with gold (3), and examined with a Zeiss DSM 950 scanning electron microscope at accelerating voltages of 10 and 15 kV.

All measurements used are in micrometers (μm) unless otherwise specified. The following abbreviations are used in Table 1:

- b_1 = body length/distance from anterior end to base of median esophageal bulb.
- G_1 = overall length of anterior gonad as percentage of total body length.
- G_2 = overall length of posterior gonad as percentage of total body length.
- M = length of conus as percentage of total stylet length.
- MB = distance between anterior end of body and center of median esophageal bulb as percentage of esophageal length.
- o = distance between stylet base and orifice of dorsal esophageal gland as percentage of stylet length.
- S = stylet length/body width at base of stylet.

SYSTEMATICS

Pratylenchoides camachoi n. sp.

(Figs. 1-3)

Holotype (female in glycerine): L = 844; a = 30.1; b = 4.4; b' = 4.8; V % = 60, G_1 = 24; G_2 = 24; c = 15.3; c' = 2.6; stylet = 24; M = 50; o = 10; MB = 42; no. tail annuli = 19; position of phasmid = 12 annuli posterior to anus; length of hyaline area of tail = 11.

Paratype females (n = 32): Morphometrics are given in Table 1. Body cylindroid, when heat killed straight or slightly curved ventrally. Cuticle 1.8 ± 0.23 (1.6-2) thick. Annuli 1.5-2 wide at mid-body. Lateral field with six longitudinal incisures, four in esophageal and tail regions; outer bands regularly areolated in esophageal and tail regions; 9.1 ± 1.15 (7-12) wide at mid-

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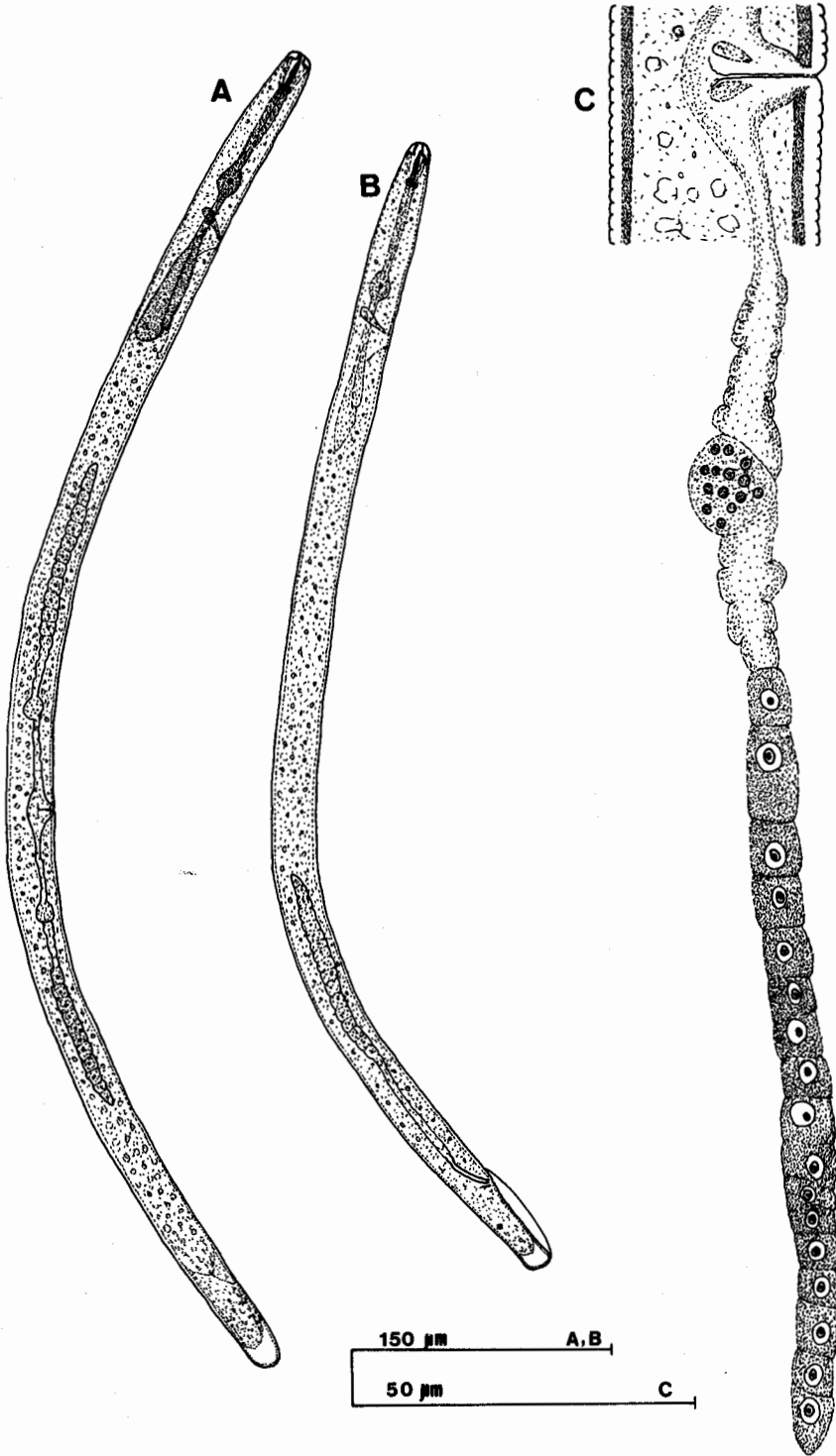


FIG. 1. *Pratylenchoides camacho* n. sp. A) Female. B) Male. C) Vulvar region and posterior genital branch.

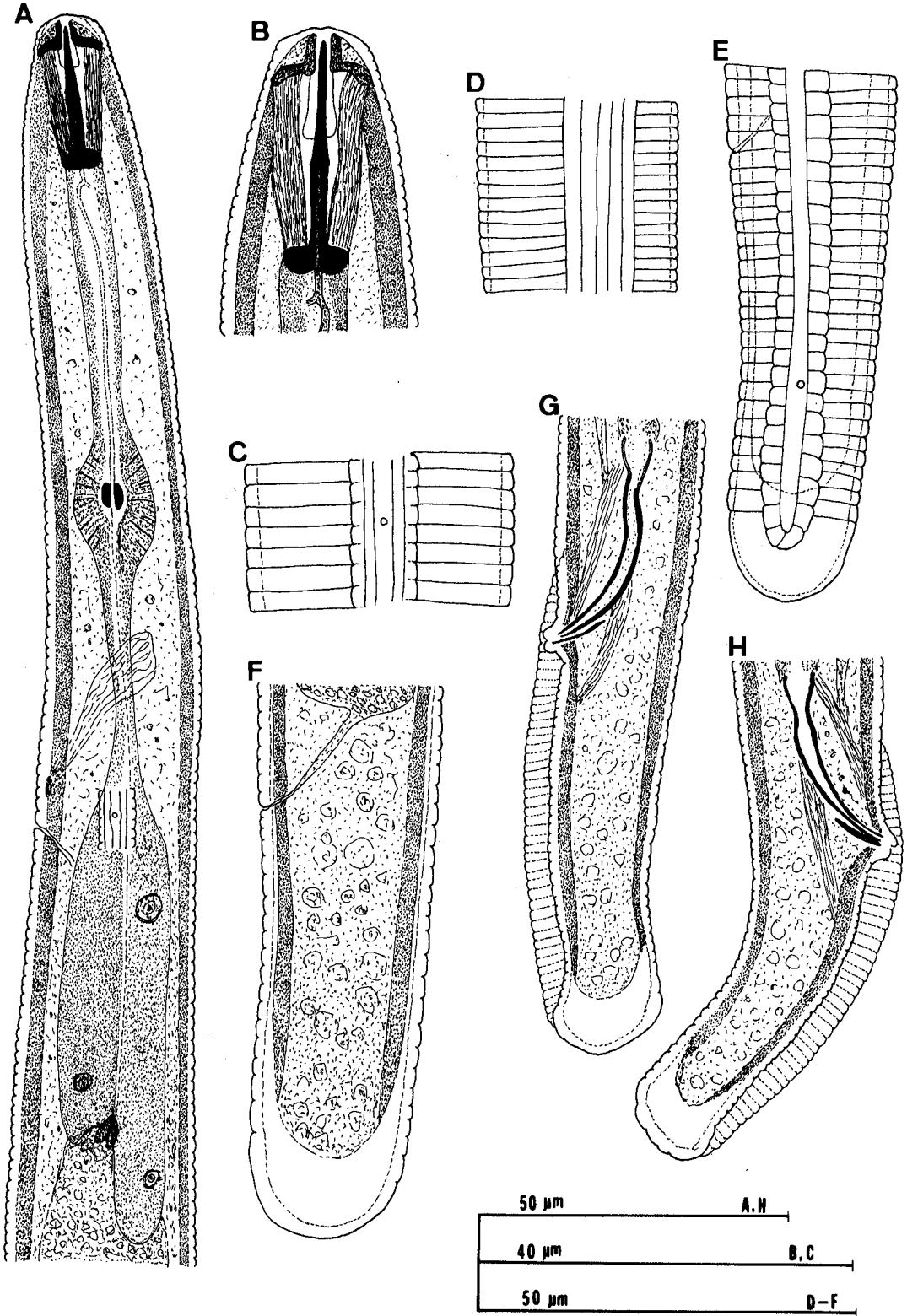


FIG. 2. *Pratylenchoides camachoi* n. sp. A) Anterior region of female. B) Anterior end of female. C) Deirid. D) Lateral field at mid-body. E, F) Female tails. G, H) Male tails.

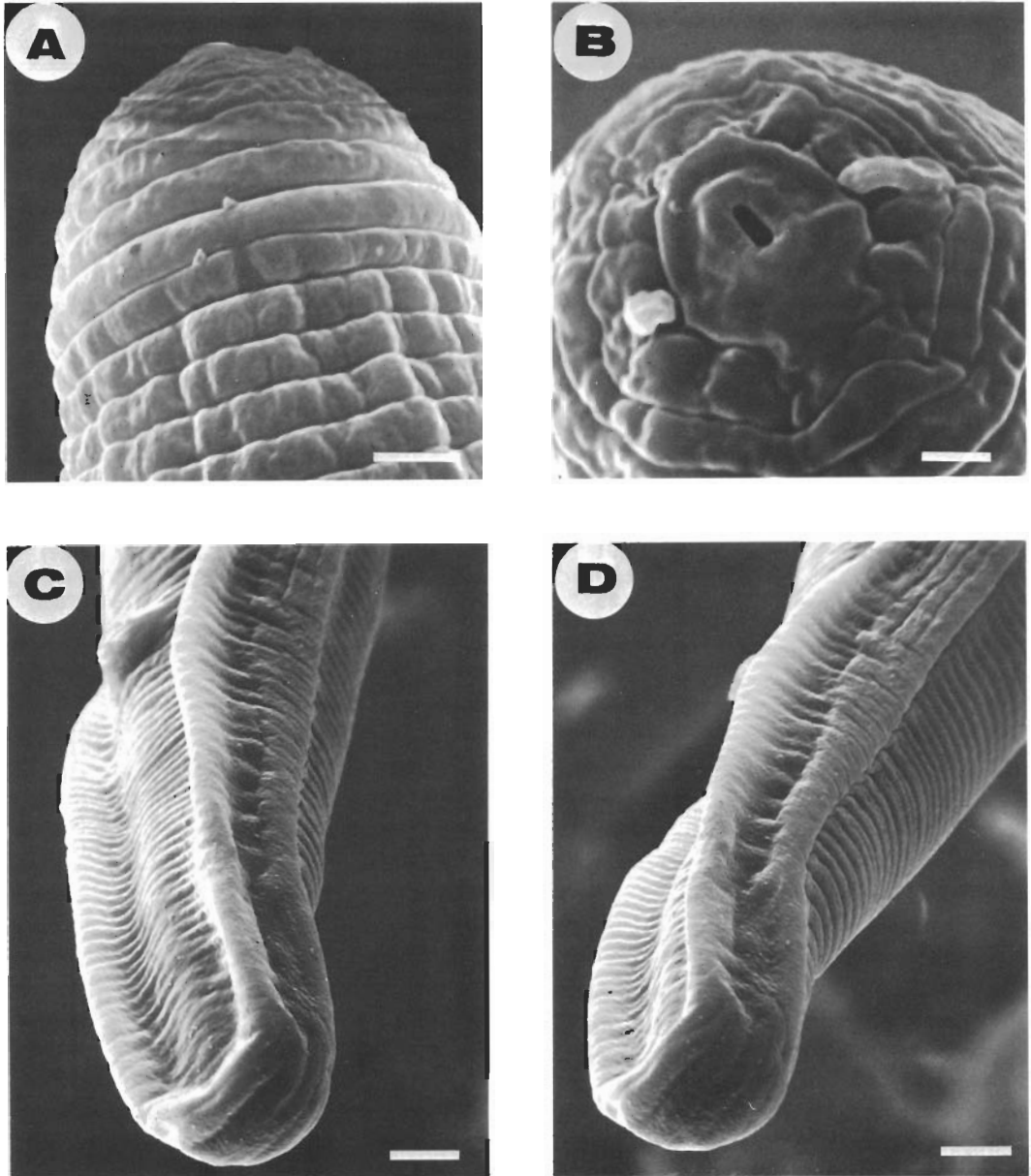


FIG. 3. SEM micrographs of *Pratylenchoides camacho* n. sp. A) Lateral view of lip region. Scale bar = 2 μ m. B) Face view. Scale bar = 1 μ m. C, D) Male tail. Scale bar = 5 μ m.

body. Lip region rounded, continuous with body contour, base 11 ± 0.67 (10–12) wide, 4.4 ± 0.33 (4–5) high, with three or four annuli. SEM lip pattern shows labial disc fused with submedian lips (Fig. 3B). Cephalic framework strongly developed. Stylet stout, 2–2.1 times longer than head diameter. Basal knobs rounded, flattened anteriorly, width 5.9 ± 0.74 (5–7). Dorsal

esophageal gland orifice 2.9 ± 0.35 (2.5–3.5) from stylet base. Procorpus cylindrical, narrowing slightly at junction with median esophageal bulb, 1.4–2.3 times longer than isthmus. Median esophageal bulb oval, 18.4 ± 1.36 (17–21) long, valvular apparatus well developed. Excretory pore just posterior to end of isthmus. Deirids usually near level of hemizonid or two or three

TABLE 1. Morphometric data of *Pratylenchoides camachoi* n. sp. female and male paratypes (measurements in μm).

	Females (n = 32)		Males (n = 14)	
	Average \pm SD	Range (CV)	Average \pm SD	Range (CV)
L	833 \pm 73.61	664-975 (8.8)	668 \pm 111.43	519-914 (16.7)
a	29.1 \pm 1.85	25.2-32.5 (6.0)	28.1 \pm 2.14	25.2-32.3 (7.6)
b	4.4 \pm 0.46	3.5-5.3 (8.1)	4.7 \pm 0.73	3.8-6.4 (16.0)
b'	4.7 \pm 0.50	3.9-6.0 (9.7)	5.7 \pm 0.84	4.6-6.8 (14.9)
b ₁	9.1 \pm 0.74	7.1-10.7 (7.8)	9.0 \pm 1.20	7.5-11.0 (12.8)
V %	59 \pm 1.39	57-61 (2.4)		
T %			28 \pm 3.83	22-35 (13.8)
G ₁	25.7 \pm 3.46	20-36 (13.3)		
G ₂	24.1 \pm 3.28	16-30 (13.4)		
c	15.8 \pm 1.01	14-18.7 (6.2)	14.6 \pm 1.66	11.9-17.9 (11.3)
c'	2.4 \pm 0.22	2-2.8 (8.6)	2.5 \pm 0.21	2.3-2.9 (6.1)
Stylet length	23.5 \pm 0.94	21-25 (3.8)	21.7 \pm 1.25	20-24 (5.7)
M	51 \pm 1.50	50-55 (2.9)	51 \pm 1.21	50-53 (2.4)
o	12.5 \pm 1.25	10-15 (9.8)	12.4 \pm 0.82	11-13 (6.3)
S	1.2 \pm 0.13	1.1-1.4 (6.2)	1.4 \pm 0.22	1.2-1.6 (11.5)
MB	43 \pm 2.02	39-48 (4.7)	50.5 \pm 3.54	45-55 (7.0)
Procorpus length	47 \pm 2.91	43-53 (6.0)	40 \pm 2.34	38-44 (5.7)
Median bulb length	18 \pm 1.30	17-21 (7.1)	14 \pm 1.31	12-15 (9.0)
Isthmus length	29 \pm 4.33	19-37 (14.9)	22 \pm 3.51	18-25 (16.2)
Nerve ring-anterior end	104 \pm 8.35	86-120 (8.0)	93 \pm 7.93	83-112 (8.4)
Excretory pore-anterior end	31 \pm 12.32	110-156 (9.4)	117 \pm 10.40	103-137 (8.9)
Esophagus length	190 \pm 12.83	161-216 (6.8)	144 \pm 18.66	96-173 (12.9)
Maximum body width	28.6 \pm 2.24	23-33 (7.7)	23.8 \pm 3.56	19-31 (14.9)
Anal body width	21.7 \pm 1.92	17-25 (8.8)	18.1 \pm 2.10	14-22 (11.8)
Tail length	52.9 \pm 4.94	43-63 (9.3)	45.9 \pm 5.26	34-53 (11.4)
Tail annuli	22 \pm 2.70	18-28 (12.3)	29 \pm 3.55	27-32 (12.0)
Phasmids†	14 \pm 2.74	8-21 (19.5)	19 \pm 4.93	16-23 (25.4)
Spicule length			25.5 \pm 1.61	23-28 (6.4)
Gubernaculum length			7.3 \pm 0.83	6-8.5 (10.6)

† Number of annuli posterior to anus level.

annuli anterior to excretory pore. Nerve ring surrounds isthmus at middle. Esophageal gland overlaps intestine dorsally, overlap length 15.5 ± 4.42 (11-26). Two subventral gland nuclei posterior to dorsal gland nucleus; dorsal gland nucleus larger than subventral. Esophageal-intestinal junction well developed.

Reproductive system didelphic, amphidelphic, outstretched, equally developed. Vulva a transverse slit, posterior to mid-body. Vagina perpendicular to body, 10-14 long. Spermatheca round, 9-11 wide; contains small, round to oval sperm. Oocytes in a single row, 14-20.

Tail cylindrical, with 18-28 annuli, terminus smooth. Phasmids slightly posterior to mid-tail. Hyaline area of tail 10.6 ± 1.02 (9-13) long.

Allotype (male in glycerine): L = 641; a = 27.9; b = 4.8; b' = 5.2; T % = 31; c = 12.1; c' = 2.6; stylet = 23; M = 51; o = 11; MB = 57; hyaline area of tail = 7; spicules = 30; gubernaculum = 8.

Paratype males (n = 14): Morphometrics are given in Table 1. Males common. Body shape similar to female. Length usually shorter than female. Esophageal glands reduced, poorly developed. Tail cylindroid, sometimes clavate shaped, with a ventral longitudinal depression (Fig. 2C, D); terminus smooth, rarely coarsely annulated. Fasciculi (lateral canal, serpentine) not observed. Testis outstretched, 183 ± 21.09 (150-213) long, spermatogonia in a single row. Phasmids posterior to mid-tail. Cloacal aperture lips well developed. Bursa 68 ± 4.22 (60-75) long. Spicules and guber-

maculum ventrally curved, moderately developed. Hyaline portion of tail distinct, 6.6 ± 2.65 (5–11) long.

Type host and locality

Specimens were collected from the roots and sandy soil in the rhizosphere of rosemary (*Rosmarinus officinalis* L.) from Coto Rios, in Sierra de Cazorla, Jaén, Spain.

Type specimens

Holotype (female): Collected by the authors in November 1986. Slide no. PR-16, deposited in the nematology collection of the Instituto "López-Neyra" de Parasitología, C.S.I.C., Granada, Spain. *Allotype (male)*: Same data as for holotype. Slide no. PR-18, deposited in the same collection as the holotype. *Paratypes (females and males)*: Same data as for holotype, except for additional collections (in October 1987 and December 1988). Paratypes are deposited as follows: two females and two males in C.I.P. Nematode Collection, St. Albans, Herts., England; two females and two males in Collection Nationale de Nématodes du Sol et des Plantes, Muséum national d'Histoire naturelle, Paris, France; two females and two males in University of California Riverside Nematode Collection, Department of Nematology, Riverside, California, USA; one female and one male in Wageningen Agricultural University Nematode Collection, Wageningen, The Netherlands; and one female and one male in Department of Systematic Zoology and Ecology, Eötvös Loránd University, Budapest, Hungary.

Diagnosis

Pratylenchoides camachoi n. sp. differs by a combination of the following characters: a cylindrical male tail, tail terminus smooth; lateral field with six nonareolated lines at

mid-body, reduced to four lines in the tail region where the outer bands are regularly areolated.

Relationships

Pratylenchoides camachoi n. sp. is close to *P. erzurumensis* Yüksel, 1977 (6) but differs by the smooth female tail terminus, presence of males, stylet knobs flattened anteriorly, and longer female body. It differs from *P. laticauda* Braun & Loof, 1966 (2) by the presence of areolation in the female tail region and shape of the male tail. It differs from *P. crenicauda* Winslow, 1958 (5) by the cylindrical female tail with a smooth terminus.

SEM face views of *P. camachoi* n. sp. are quite similar to those of *P. magnicauda* (Thorne, 1935) Baldwin, Luc & Bell, 1983, but *P. camachoi* n. sp. is clearly different in several of the other characters (1).

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