Description of *Gracilacus hamicaudata* sp. n. (Nemata : Criconematidae) with biological and histopathological observations

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SUMMARY

Obese criconematid females and larvae forming colonies were detected under the root cortex attached to the vascular cylinder of redwood roots, *Sequoia sempervirens* (D. Don) Endl. These specimens have been determined to represent a new species of Criconematidae, *Gracilacus hamicaudata* sp. n. Mature females are obese at midbody but posteriorly the body is constricted and hooked shaped with a rounded tail terminus. Annuli are conspicuous only anteriorly and posteriorly. The cephalic region has four submedian lobes and a circular oral disc. The vulval-lips protrude and the lateral field is marked with four lines. Eggs are partially embedded in a mucoid-like substance. There are giant nutritive cells formed in the parenchyma tissue of the vascular cylinder associated with the nematode colonies. These cells have dense cytoplasm with enlarged nuclei. Starch granules were found inside of these abnormal cells.

RÉSUMÉ

Description de Gracilacus hamicaudata *sp. n.*
(Nemata : Criconematidae) et observations sur la biologie et l'histopathologie de cette espèce

Des femelles renflées et des juvéniles d'un Criconematide ont été observés, assemblés en colonies, sous le cortex radiculaire et attachés au cylindre central de racines de *Sequoia sempervirens* (D. Don) Endl. Ils appartiennent à une nouvelle espèce, *Gracilacus hamicaudata* sp. n. Les femelles matures sont renflées dans leur partie centrale, mais la partie postérieure du corps est rétrécie et en forme de crochet, l'extrémité caudale étant arrondie. L'annélation cuticulaire n'est visible que vers l'avant et l'arrière de la femelle.

Co., California. All life stages were killed in water by heating them for a few seconds over a flame, and then they were fixed in Seinhorst's fixative (Seinhorst, 1962), processed into glycerin, and mounted in glycerin. For scanning electron microscope study, the method described by Cid del Prado Vera, Lownsbery and Maggenti (1983) was followed.

By washing redwood roots gently and dissecting carefully, it was possible to observe the presence of colonies of *Gracilacus* living under the cortex of secondary roots. These infected roots were separated and fixed in FAA for one week, dehydrated in an ethanol : buta-

body from vulval aperture to posterior end constricted and " hook " shaped (hamate), with bluntly rounded terminus. Cephalic sclerotization weak, stylet slender, sometimes with a slight curvature; knobs with slight anterior projection, and 3.7-5.8 μm (4.7 ± 0.18) wide. Excretory pore generally at level of esophageal valve, sometimes slightly posterior, but always anterior to isthmus. Hemizonid one annulus posterior to excretory pore. Dorsal esophageal gland orifice 3.7-12.3 μm (7.0 ± 1.3) from base of stylet. Metacorpus greatly enlarged, valve 5.0-10.0 μm (8.0 ± 0.6) long and 2.0-5.0 μm (3.2 ± 0.5) in width. Isthmus slender

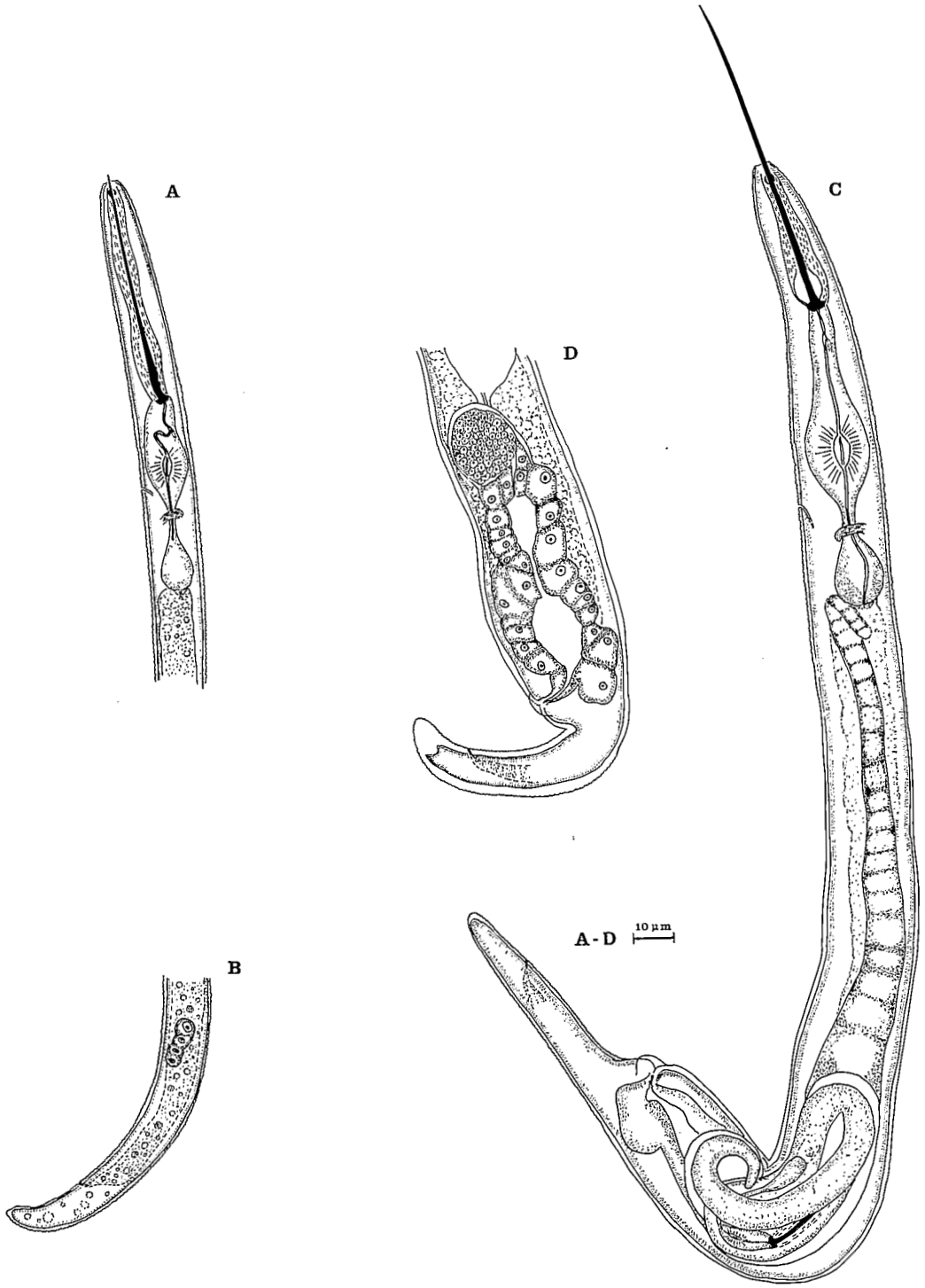
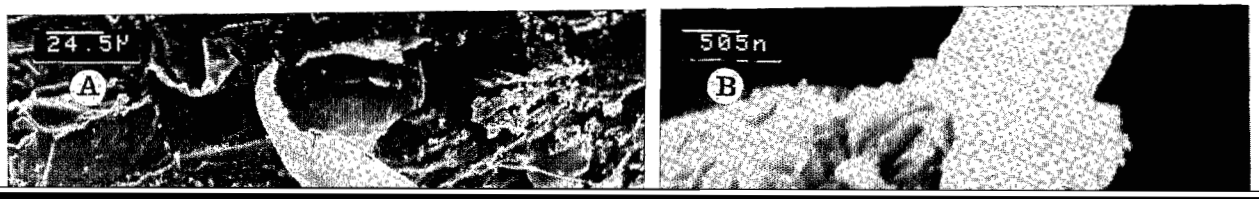


Fig. 1. *Gracilacus hamicaudata* sp. n. A-B : Second-stage larva. A : Esophageal region; B : Posterior part (lateral view) — C-D : Female. C : Female body; D : Posterior part (lateral view).


24.5µ
A
505n
B

Diagnosis

Gracilacus hamicaudata sp. n. can be distinguished from other *Gracilacus* spp. with four lines in the lateral field by the conspicuous annulation on the anterior and posterior regions of the body and the almost complete absence of annulation at midbody (see : Raski, 1962; Huang & Raski, 1986). *G. hamicaudata* sp. n. is closest to *G. epacris* (Allen & Jensen, 1950) Raski, 1962 from which it differs by the thinner cuticle 0.6-2.8 µm *vs* 2.6-4.6 µm in mature females; it further differs by the oval shape of the spermatheca. It can also be distinguished from *G. epacris* by the distance from the anterior extremity to the base of the esophagus, *G. hamicaudata* sp. n. mean 113 µm (90-131) *vs* mean 88 µm (76-110).

of Coast Redwood. These abnormal cells are ovoid or polygonal in shape with dense cytoplasm containing many starch granules. At the site where the colonies are present, the pericycle cells of the vascular cylinder increased in number, collapsed and died. Giant cells in transverse sections were 24-70 µm (35 ± 7.1) long and 13-46 µm (25 ± 4.9) wide. The dimensions of the nuclei were 9-19 µm (14 ± 1.4) long and 9-13 µm (11 ± 1.0) wide. The nucleoli were difficult to distinguish; however, in some cases one to three nucleoli were observed. The cell walls of abnormal cells, were the same thickness as normal cell walls. Normal cells, adjacent to the abnormal cells, did not have dense cytoplasm and were 20-46 µm (29 ± 4.0) long and 12-32 µm (19 ± 2.7) wide