

RESEARCH NOTES

Labial Morphology of *Belonolaimus longicaudatus* as Revealed by the Scanning Electron Microscope¹

GROVER C. SMART, JR., ROBERT D. HARTMAN, and THELMA C. CARLYSLE²

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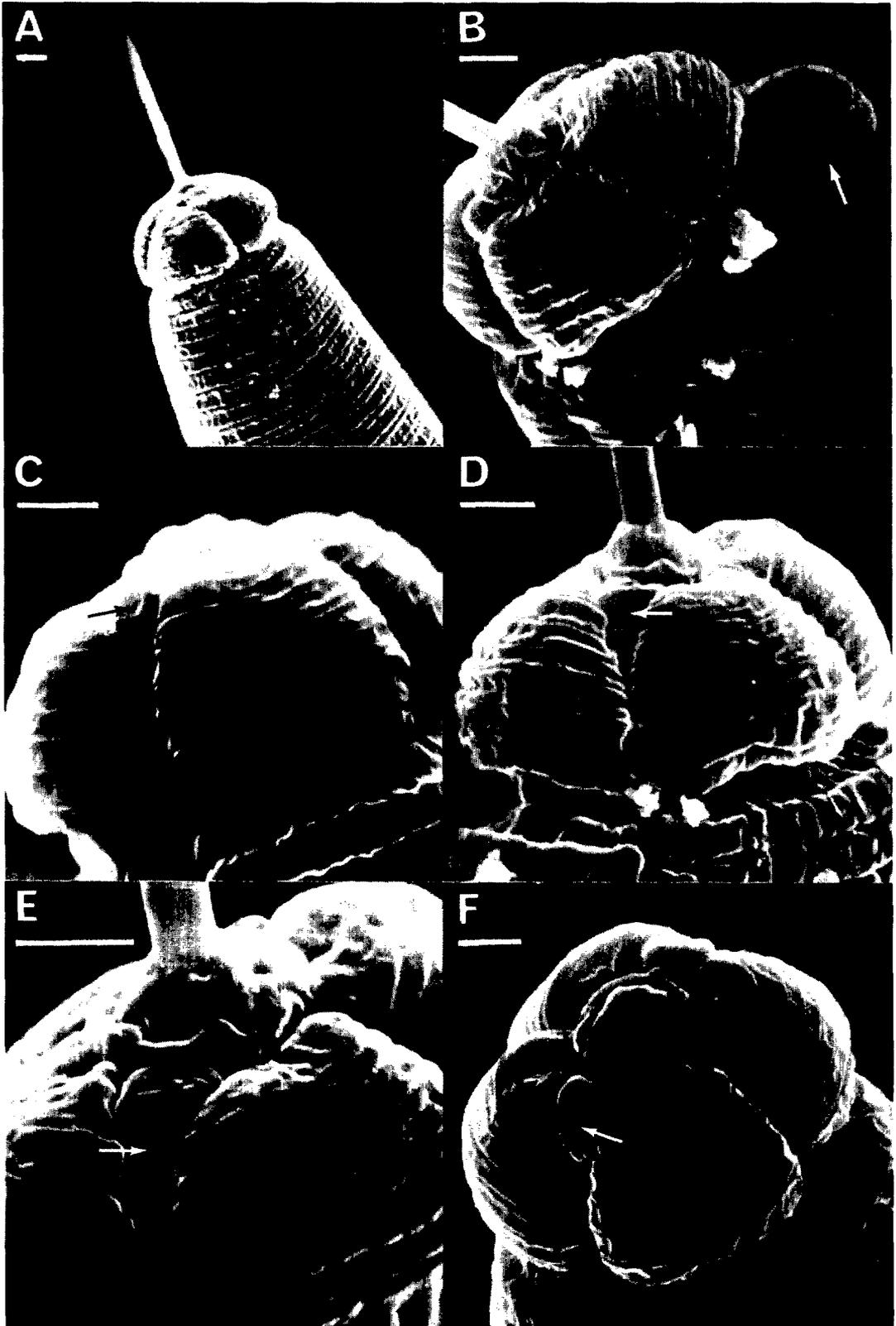
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²Respectively, Associate Nematologist, Department of Entomology and Nematology and NDEA Title IV Fellow, Department of Plant Pathology, University of Florida, Gainesville 32601; and Research Technician, Insect Attractants, Behavior and Basic Biology Research Laboratory, Entomology Research Division, USDA, ARS, Gainesville, Florida 32601. We thank Dr. Philip S. Callahan, Entomologist, Insect Attractants, Behavior and Basic Biology Research Laboratory, Entomology Research Division, USDA, ARS, Gainesville, Florida 32601, for the use of the scanning electron microscope.

The sting nematode, *Belonolaimus longicaudatus*, was described by Rau (3). He illustrated an *en face* view showing two large subventral, two large subdorsal, and two small lateral lobes (lips) with amphids on the outer margins of the lateral lobes. Steiner (5) earlier described *B. gracilis*. He stated that the head was four-lobed, but neither illustrated nor described an *en face* view. Goodey (2) synonymized *B. longicaudatus* with *B. gracilis*, but Rau (3, 4) and Thorne (7) considered them



FIG. 1. Photographs of the labial region of *Belonolaimus longicaudatus* as revealed by the scanning electron microscope. Debris on the specimens appears in the photographs as amorphous white areas. Stylet diameter is calculated as 1.18 μ . Bar in each photograph equals 2 μ . A, lateral view showing labial morphology with extended stylet and the single lateral line; B, latero-ventral or latero-dorsal view showing labial morphology. Note (arrow) the parasite believed to be the sporozoan parasite, *Duboscqia*; C, sublateral view, with stylet retracted, showing amphid aperture (arrow) in cleft lateral lobe and the two-part labial disc; D, sublateral view, with stylet extended, showing amphid aperture (arrow) in cleft lateral lobe and the two-part labial disc; E, lateral view showing the cleft lateral lobe, amphid aperture (arrow), and the two-part labial disc; F, *en face* showing the amphid aperture (arrow); the two-part labial disc; and the two large subdorsal, two large subventral, and two small lateral lobes.



to be distinct species based primarily on tail and spear length and relative body width. Goodey's description and illustration of the *en face* view of *B. gracilis* differs from that of Thorne for this species in that lateral lobes are shown by Goodey but not by Thorne (we do not know whether Goodey illustrated *B. gracilis* or *B. longicaudatus*, however, since he synonymized the two species).

Descriptions of these nematodes were documented by drawings based on observations through the light microscope. The resolution and depth of focus of the light microscope is relatively limited. The scanning electron microscope (SEM), however, can resolve to 10-20 nm and has a depth of focus several hundred times that of the light microscope. In addition, observations can be readily documented photographically with the SEM.

Belonolaimus longicaudatus used in our study was collected originally by Abu-Gharbieh and Perry (1) from corn (*Zea mays*) growing near Gainesville, Fla., and referred to as the "Gainesville population of *B. longicaudatus*". It has been maintained on 'Rutgers' tomato (*Lycopersicon esculentum*).

Specimens used were either mounted live (Fig. 1C, F) or killed in a water bath at 50 C for 12 min, fixed in 2% Formalin (Fig. 1A, B, D, E), then mounted on a 12-mm-diam aluminum stub which was first covered with a thin layer of silver base paint. A 20- to 30-nm layer of gold paladium was evaporated onto the surface of the specimens with a Denton DV-502 high vacuum evaporator operating at 5×10^{-5} Torr. Specimens were examined with a Mark 11A Cambridge Stereoscan electron microscope using an accelerating voltage of 10-20 kv. Photographs were made with a Polaroid camera on Kodak type 55 P/N film.

The scanning electron micrographs (Fig. 1) reveal that *B. longicaudatus* has two large subdorsal, two large subventral, and two small lateral lobes. The amphid apertures are located in the lateral lobes (Fig. 1C-F [arrows]). The lateral lobe is cleft posteriorly beyond the amphidial opening. The labial disc appears as a two-part structure with posterior disc-like and

anterior cone-like portions. The conical part of the labial disc is more prominent when the stylet is extended (Fig. 1D, E) than when retracted (Fig. 1C, F). When the stylet is retracted, the oral aperture does not close completely, but closes to about one-half its diameter as when the stylet is extended (compare Fig. 1E and F). The rugosity of the labial disc is presumed due to dehydration under vacuum. Labial papillae were not observed, thus indicating that they are subcuticular. The lateral line (Fig. 1A) is single throughout the body. A sporozoan parasite, presumably a species of *Duboscqia* (6), is seen in Fig. 1B (arrow).

The labial morphology of *B. longicaudatus* is essentially as illustrated by Rau for *B. longicaudatus* and by Goodey for *B. gracilis*. It differs, however, from Thorne's illustration and description of *B. gracilis* and description of *B. longicaudatus*. Thorne did not illustrate lateral lobes, and stated that the amphid apertures for both species are located in deep lateral grooves. Our findings for *B. longicaudatus* show that the amphids are located in the lateral lobes.

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