Cephalids in the taxonomy of *Scutellonema* Andrássy, 1958 and the description of *Scutellonema cephalidum* n. sp. (Nematoda: Hoplolaimidae)

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Scutellonema cephalidum n. sp., a parasite of the rubber plant, *Ficus elastica* 'Decora,' is described and illustrated. Its primary distinguishing characters are the irregular size and shape of four to nine segments of the basal head annule, parthenogenetic females which lack a spermatheca, and distinctiveness of the cephalids, hemizonid, and hemizonion in permanent glycerine and temporary 4% Formalin totomounts. The absence of cephalids in *S. brachyurum* (Steiner, 1938) Andrássy, 1958, demonstrated experimentally, proved a reliable character for separating these closely related species. The importance of cephalids in the taxonomy of *Scutellonema* is discussed.

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On trouvera ici la description illustrée de ***Scutellonema cephalidum*** n. sp., parasite du figuier *Ficus elastica* "Decora". L'espèce se distingue par les caractéristiques suivantes: les quatre à neuf premiers segments de l'anneau céphalique basal ont une taille et une forme irrégulières, les femelles sont parthénogénétiques et ne possèdent pas de spermathèque, les céphalides, l'hémizonide et l'hémozonion ont une forme particulière sur des montages permanents de nématodes entiers dans la glycérine et des montages temporaires dans de la formaline 4%. L'absence de céphalides chez *S. brachyurum* (Steiner, 1938) Andrássy, 1958, démontrée expérimentalement, est un bon caractère diagnostique pour séparer ces deux espèces proches. L'importance des céphalides dans la taxonomie de *Scutellonema* fait l'objet de la discussion.

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Descriptive data on species of *Scutellonema* Andrássy, 1958, suggest that the presence or absence of cephalids are diagnostic. For example, van den Berg and Heyns (1973) in a taxonomic study of 12 species, using the same methods of killing, fixing (TAF), and processing to glycerine, observed that one-third of the species lacked cephalids, whereas they were present in the others. Those species which lacked cephalids had a hemizonid and also a hemizonion with one exception. Of the 43 known species of *Scutellonema* the absence of cephalids has been reported in no more than 10 and are unknown in about 5 species.

We recently studied a parthenogenetic species in Canada closely related to *S. brachyurum* (Steiner, 1938) Andrássy, 1958, which in glycerine totomounts has unusually conspicuous anterior (particularly) and posterior cephalids. These specimens had been slowly killed by heat, fixed in 4% Formalin, and processed through an ethanol–glycerine series to glycerine. If cephalids are present in *S. brachyurum* they apparently are rare and indistinct. Of the 90 *S. brachyurum* females we compared from 11 geographical regions in the United States, Canada, and Brazil, indistinct cephalids were observed in 1 female only from Maryland and posterior cephalids in two from Salinas, California. No cephalids were discernible in the types housed in the Beltsville Nematode Collection. This agrees with Siddiqi (1974) who reported that cephalids, as well as the hemizonid and hemizonion, are indistinct in this species.

To verify these observations, a minimum of 25 females each from a population of *S. brachyurum* from North Carolina and the one from Canada were compared in temporary mounts when living, when killed by slowly heating, and when subsequently fixed immediately in 3 or 4% Formalin. Although cephalids were not discernible in living or heat-relaxed females, the anterior ones particularly became distinct in Canadian specimens after as little as 30 min in Formalin. By contrast, those few cephalids observed in only 3 of 25 females from the North Carolina population were comparatively small, indistinct, and not visible until after at least 12 h in Formalin. These results support the distinctiveness of the Canadian culture of *Scutellonema*, which is described herein as a new species.

Scutellonema cephalidum n. sp.
(Figs. 1 and 2)

HOLOTYPE (female): L = 733 μm; a = 27; b = 6.1; b' = 5.1; c = 61; c' = 0.6; V = 59. Stylet length = 28 μm; m = 47; O = 26.

PARATYPES (44 females, 20 measured): L = 610–807 μm (732 μm; SD 50); a = 20–27 (25; SD 1.8); b = 5.2–6.6 (6.1; SD 0.3); b' = 4.5–6.3 (5.2; SD 0.4); c = 62–122 (78; SD 14.8); c' = 0.4–0.7 (0.5). V = 55–62 (59; SD 1.5). Stylet length = 26–29 μm (28 μm; SD 0.8); m = 45–49; O = 26–33.

Body posture an open spiral or C-shaped, width 25–31 μm (29 μm; SD 1.5), annule width 1.0–1.5 μm. Lateral field 6–8 μm wide, with four incisures, areolated only at phasmid level and esophageal region. Head set off from body, hemispherical, width 9–11 μm, height 5 μm, with three or sometimes four transverse annules. Basal head annule divided into 4–9 sectors

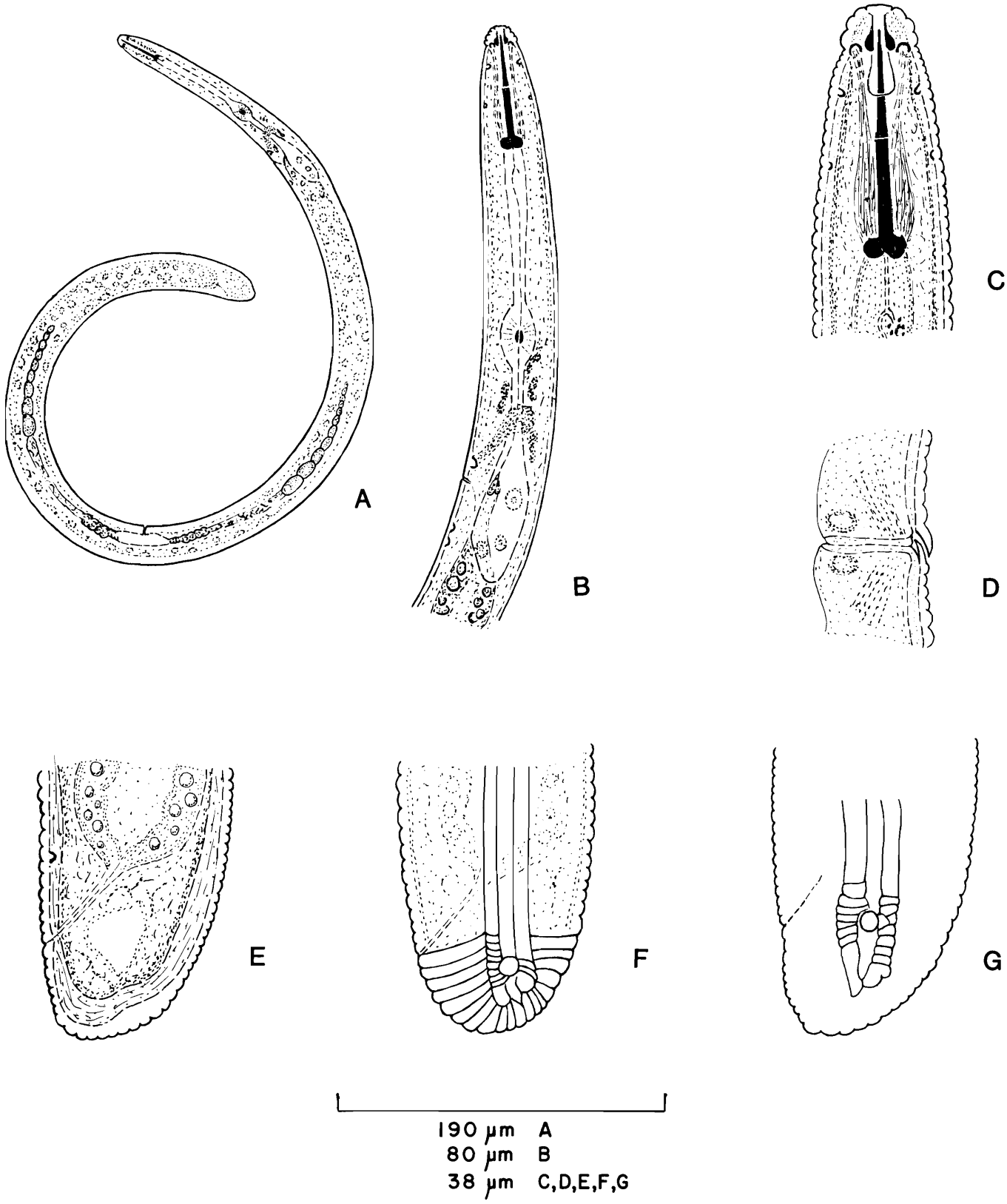

FIG. 1. *Scutellonema cephalidum* n. sp. (A) Adult female in a relaxed posture. (B) Esophageal region. Note the conspicuous hemizonid and paired hemizonion, which is characteristic for this species. (C) Head end. Presence of cephalids in this species is diagnostic. (D) Vulva with double epiptygma. (E, F, and G) Adult tail showing typical patterns of areolation at the phasmid.

by longitudinal or oblique striae (Figs. 2C and 2D), other annules divided into 6 sectors by longitudinal striae, the lateral being smaller than the subdorsal and subventral. Cephalids conspicuous with rare exceptions (indistinct and absent in part in 3 of 44 females), anterior ones always larger than posterior, located 9–10 µm and 18–20 µm from head end. Hemizonid 2–5 (3) body annules anterior to excretory pore, in lateral view very large and triangular, linear or indistinct in 5 of 44 females.

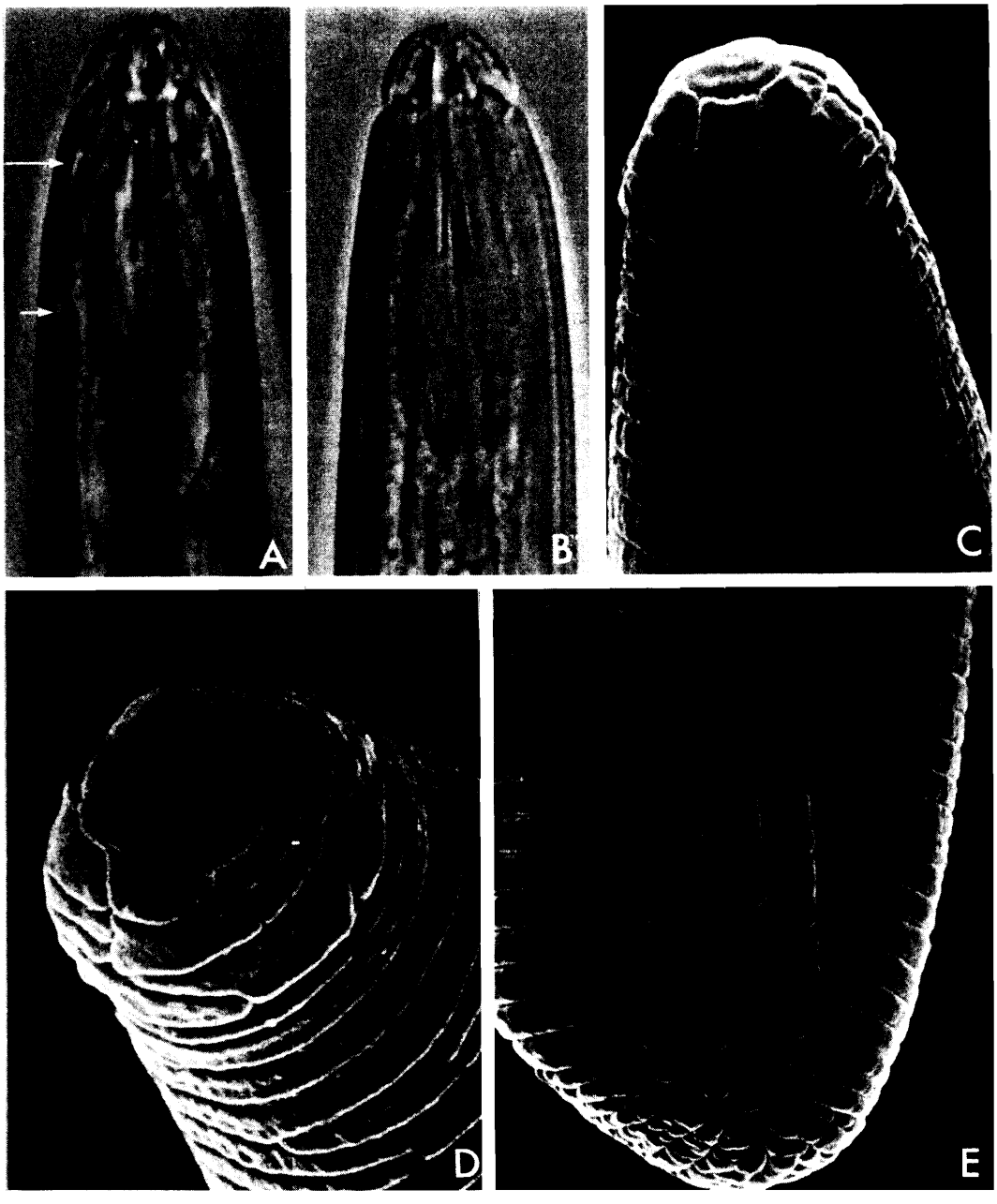

FIG. 2. *Scutellonema cephalidum* n. sp. (A) Head end showing its typical well developed cephalids (arrows, opposite cephalids not in focus at this plane). (B) For comparison, head end of *S. brachyurum*, a species which generally lacks discernible cephalids. (C and D) Scanning micrographs of head. Note the irregularly divided segments of the basal head annule in contrast to other head annules. (E) Tail showing a typical areolation pattern of the incisures at the phasmid.

Hemizonion double, spaced 1–8 μm apart, at 14–26 (19) μm posterior to hemizonid, a second pair of commissures observed in some specimens about a body width more posterior. Stylet knobs rounded, anterior surfaces each bearing a pair of small rounded protuberances (seen only in heat killed specimens). Dorsal esophageal gland orifice 7–9 μm posterior to stylet. Excretory pore 110–130 μm (122 μm; SD 6.5) from head end, at or slightly below level of esophagointestinal valve. Esophagus 133–154 μm (141 μm; SD 5.4) long, 77–86 μm (81; SD 2.5) to metacorpal valve, 109–130 μm (121 μm; SD 5.2) to esophagointestinal valve. Basal esophageal bulb with 3 nuclei, 15–26 (19) μm long, overlapping intestine dorsally or dorsolaterally. Vulval epiptygma single or double, overlapping [illegible]a not observed. Intestine densely globular, not overlapping rectum. Rectum 13–19 (15) μm long. Tail broadly rounded, 6–13 μm long (10 μm; SD 1.8) with 8–15 (12) annules on ventral surface to midterminus. Phasmids 2–4 (3) μm in diameter, located posterior to anus level in 60% of females, at anus level in 15% and anterior to anus in 25%, and ranging from immediately anterior level of anus to 7 annules posterior.

Male unknown.

DIAGNOSIS: *Scutellonema cephalidum* n. sp. is most closely similar to *S. brachyurum* (Steiner, 1938) Andrássy, 1958, from which it is readily differentiated by having well-developed cephalids, a hemizonid, and hemizonion which, if present (rarely) in *S. brachyurum* are indistinct. In addition, the basal head annule of *S. cephalidum* differs in having sectors of irreg-

ular number and size versus six equal sectors in *S. brachyurum*. Of those parthenogenetic species with typically 3 or 4 head annules, and which have cephalids, or in which cephalids are unknown, *S. cephalidum* is most closely related to *S. ramai* Verma, 1972, *S. orientale* Rashid & Khan, 1974 and *S. conicephalum* Sivakamar & Selvasekarum, 1982. *Scutellonema ramai* and *S. orientale*, for which the male is unknown, differ most conspicuously from *S. cephalidum* in having a spermatheca. The character of the basal head annule and status of cephalids for these species is unknown. *Scutellonema conicephalum* is most distinctive by the absence of longitudinal striae on the basal head annule, a character of several species. The head of this species is reportedly truncated, apparently because of a large, flattened labial disc.

TYPE HOST AND LOCALITY: Collected by J. L. Townshend from a potted rubber plant, *Ficus elastica* 'Decora.' Origin unknown. The host plant apparently was exported from the Pensacola area of Florida to a commercial greenhouse in Dundas, Ontario.

TYPE DESIGNATIONS: Holotype (female) type slide No. 277. Paratype (44 females) type slide Nos. 277, 277 a–f. Deposited in the Canadian National Collection of Nematodes, Ottawa, Ontario. Seven paratypes deposited in the United States Department of Agriculture Nematode Collection, Beltsville, MD. Five paratypes deposited in the University of California Davis Nematode Collection.

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