Description of Entaphelenchidae fam. n., *Roveaphelenchus jonesi* gen. n., sp. n., and *Sheraphelenchus entomophagus* gen. n., sp. n. (Nematoda : Aphelenchoidea)

W. R. Nickle

Reprinted from Proceedings of The Helminthological Society of Washington
Vol. 37, No. 1, January 1970
p. 105–109
Made in United States of America

Description of Entaphelenchidae fam. n., *Roveaphelenchus jonesi* gen. n., sp. n., and *Sheraphelenchus entomophagus* gen. n., sp. n. (Nematoda : Aphelenchoidea)

W. R. NICKLE[1]
Nematologist, Crops Research Division, Agricultural Research Service, U. S. Department of Agriculture, Beltsville, Maryland

ABSTRACT: Two new nematode genera and one new family are established in the Aphelenchoidea with descriptions of two new species. *Roveaphelenchus jonesi* gen. n., sp. n., a parasite of the rove beetle, *Aleochara tristis*, is placed, together with the genera *Entaphelenchus*, *Peraphelenchus*, and *Praecocilenchus*, into the Entaphelenchidae fam. n. *Sheraphelenchus entomophagus* gen. n., sp. n., is described from two nematode populations, one from decaying oranges and the other associated with nitidulid beetles. This genus is placed temporarily in the Aphelenchoididae.

The nematode superfamily Aphelenchoidea contains four ecological groupings, which may be classified as plant parasites, fungus feeders, predators, and obligate parasites of insects. Phenetically, the superfamily is recognized by the dorsal esophageal gland emptying into the lumen of the esophagus within the median muscular bulb anterior to the crescentic valve plates. Also, though rudimentary in the genus *Aphelenchus*, the spicule is rosethorn shaped. Recently I have studied two interesting populations of aphelenchs which are described herein. They are of particular interest because of their unique morphology and value in understanding the phylogeny of this major group of nematodes. A collection of nematode specimens, parasitic in the body cavity of the rove beetle, *Aleochara tristis* Gravenhorst, was received from Dr. Calvin M. Jones, Lincoln, Nebraska. This predaceous rove beetle was imported from Europe to control the face fly, *Musca autumnalis* De Geer.

The literature dealing with the endoparasitic aphelenchoid parasites of insects is rather brief, and began when Wachek (1955) described two insect-parasitic genera, *Entaphelenchus* and *Peraphelenchus*. Nickle (1967) moved the sphaerulariids out of the Aphelenchoidea and Poinar (1969) described *Praecocilenchus*, an aphelenchoid genus, in which the young reach sexual maturity within the adult parasitic female. After studying specimens of these four genera, a new family category is proposed here to include all the described aphelenchoid insect parasites.

[1] The author gratefully acknowledges the technical assistance of Mrs. Patricia A. Pilitt on this project.

Entaphelenchidae fam. n.

DIAGNOSIS: Aphelenchoidea. With at least three distinct adult forms, including a vermiform male and female, and a swollen endoparasitic female. Stylet present, with or without small basal flanges. Esophagus with a large median bulb and overlapping glands. Male without caudal alae. Spicules rosethorn shaped. Gubernaculum absent. Obligate insect parasites.

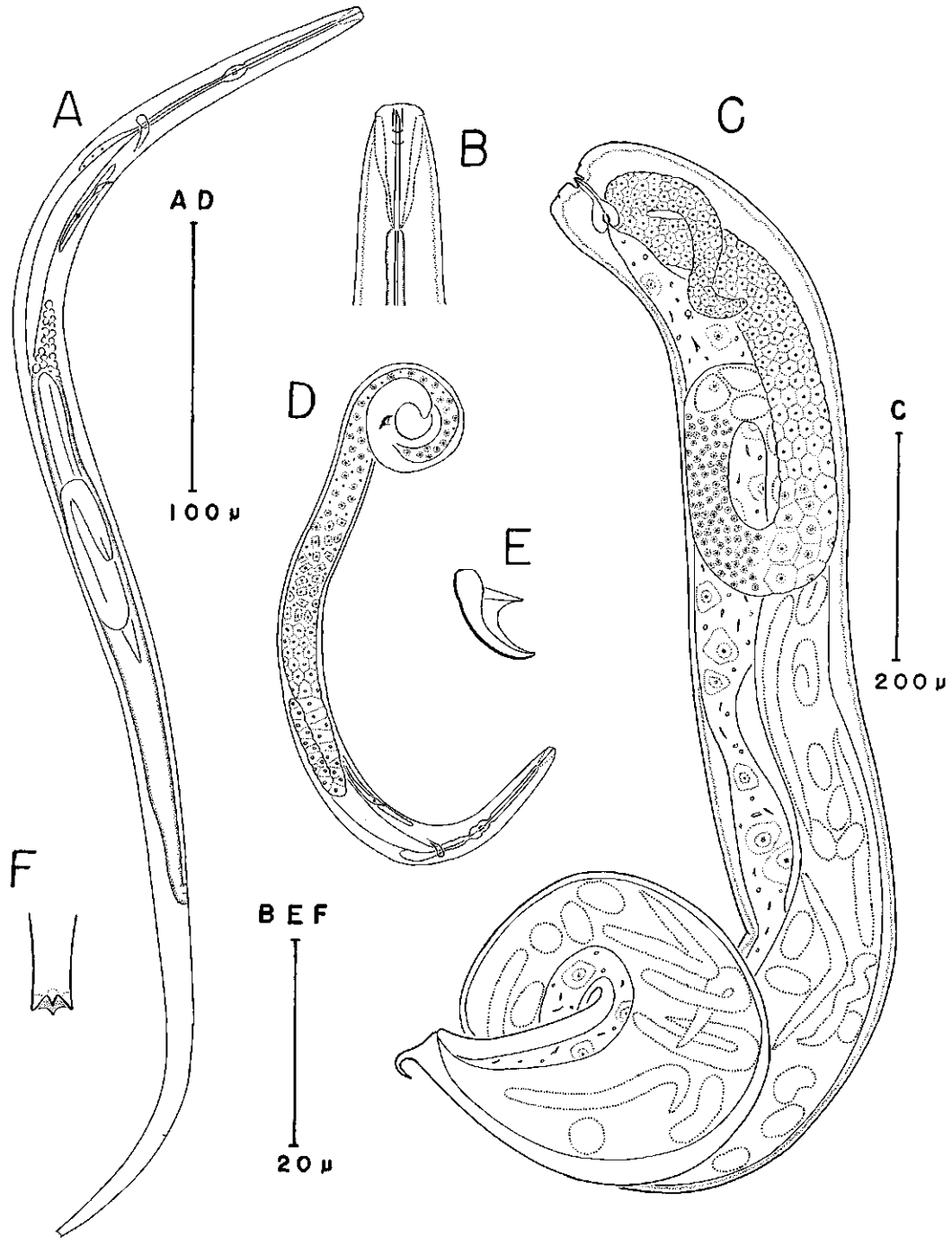
TYPE GENUS: *Entaphelenchus* Wachek, 1955.

OTHER GENERA: *Peraphelenchus* Wachek, 1955, *Praecocilenchus* Poinar, 1969, *Roveaphelenchus* gen. n.

This family Entaphelenchidae can be separated from the Aphelenchidae because it is parasitic in insects and lacks a gubernaculum, caudal alae, and caudal rays. It can be distinguished from the Aphelenchoididae on the basis that the Entaphelenchidae is parasitic in insects, and the female is swollen and found in the body cavity of insects. The Entaphelenchidae of the Aphelenchoidea has a status similar to that of the Sphaerulariidae of the Tylenchoidea; both are ecologically and morphologically distinct from other families.

Genus: *Roveaphelenchus* gen. n.

DEFINITION: Entaphelenchidae. With three adult forms found in body cavity of the adult rove beetle. Stylet without knobs. Males die with only tail in tight coil, not corkscrew shaped. Spicules not fused. Caudal alae and gubernaculum absent. Median esophageal bulb may be constricted, violin-like. Vermiform female with only a single larva or single embryo


A
B
C
AD
100 µ
D
E
C
200 µ
F
BEF
20 µ

in uterus, postuterine sac absent. Large adult parasitic female ovoviviparous.

TYPE SPECIES: *Roveaphelenchus jonesi* sp. n.

Roveaphelenchus jonesi gen. n., sp. n. (Fig. 1, A–F)

FEMALES (5): L = 0.542 mm (0.508–0.583); W = 19.7 μ (19.0–20.6); a = 27.5 (26.0–27.9); b = 5.7 (5.4–5.9); c = 9.9 (8.6–11.1); V = 71.6% (67.7–72.5); stylet = 12.6 μ (11.7–13.4).

HOLOTYPE ♀: L = 0.540 mm; W = 19.3 μ; a = 27.9; b = 5.7; c = 10.3; V = 67.7%; stylet = 13.4 μ.

MALES (5): L = 0.354 mm (0.341–0.364); W = 12.8 μ (10.9–14.7); a = 28.1 (24.2–32.5); b = 5.1 (4.7–5.2); c = 13.2 (10.7–17.2); spicule L = 11.6 μ (10.9–12.6); stylet = 10.8 μ (10.1–11.8).

ALLOTYPE MALE: L = 0.354 mm; W = 14.3 μ; a = 25.0; b = 5.1; c = 13.1; spicule L = 11.3 μ; stylet = 11.1 μ.

ADULT PARASITIC FEMALES (5): L = 1.76 mm (1.54–2.22); W = 0.156 mm (0.130–0.182); a = 11.2 (9.9–11.8); V = 96.4% (95.9–96.8); stylet = 12.7 μ (11.3–14.7).

Description

Three adult forms occur in the body cavity of the adult beetle along with numerous larvae.

MALE: Cuticle with fine annulation. Cephalic framework faint. Lips not set off. Excretory canal well developed. Testis single, flexed, extending almost to end of esophageal glands. Spicule with prominent pointed rostrum, apex continuing less strongly along the curve of the shaft (Fig. 1E). Tail bluntly rounded.

FEMALE: Body tends to relax in an arcuate or S-shape. Cuticle with fine annulation. Cephalic framework and stylet (Fig. 1B) better developed than in male. Excretory canal well developed. Gonad with small degenerate ovary and with single larva in uterus (Fig. 1A). Vulva not protruding. Tail attenuated, with 4 points on tip.

ADULT PARASITIC FEMALE: Swollen, milky white. Median esophageal bulb large, overlapping glands degenerate. Gonad almost fills body, often doubly flexed. Vulva far posterior. Tail tip acute, conical, often bent dorsad.

HOLOTYPE: Female, collected by C. M. Jones, 25 August 1968. Slide T-147t. USDA Nematode Collection, Beltsville, Maryland.

ALLOTYPE: Male, same data as holotype. Slide T-148t. USDA Nematode Collection, Beltsville, Maryland.

PARATYPES: Several males, females, and adult parasitic females deposited in the USDA Nematode Collection, Beltsville, Maryland, and the University of California Nematode Survey Collection, Davis, California, U.S.A.

TYPE HOST: *Aleochara tristis* Gravenhorst.

TYPE LOCALITY: Lincoln, Nebraska, U.S.A.

This species is named after Dr. Calvin M. Jones, Lincoln, Nebraska, who first found this nematode.

Genus *Sheraphelenchus* gen. n.

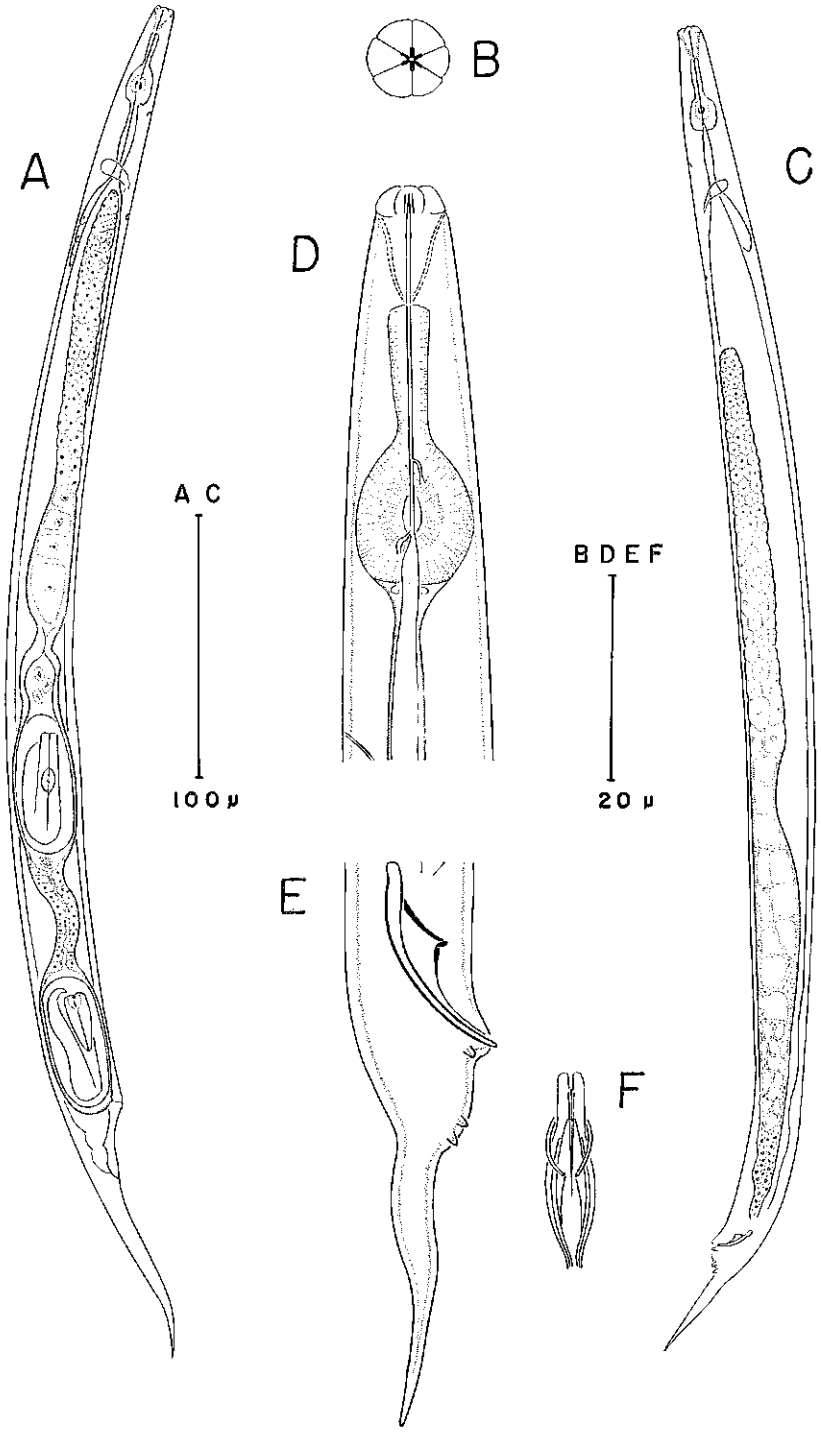
DEFINITION: Aphelenchoididae. Stylet without knobs. Esophageal valve in center of median bulb. Anterior part of gonad in both sexes usually with three cells across. Tail without mucrons. Male tail characteristically narrows abruptly just posterior to spicule, then attenuates conically to rounded terminus. Spicules partially fused, with curved narrow rostrum, apex continuing less strongly along the curve of the shaft (Fig. 2E). One anal pair and two postanal pairs of papillae. Caudal alae and gubernaculum absent. Female tail attenuates conically posterior to vulva. Uterus often contains two or more eggs with embryos. Postuterine sac absent.

TYPE SPECIES: *Sheraphelenchus entomophagus* sp. n.

The genus has no known close relatives, but is near *Parasitaphelenchus* because of the fused spicules. It differs from *Parasitaphelenchus* in the shape of the spicules, the length of postuterine sac, and the shape of the tail in both sexes.

←

Figure 1 A–F. ***Roveaphelenchus jonesi*** **gen. n., sp. n., parasitic in the rove beetle,** ***Aleochara tristis*****. A. Female, full body, lateral view. B. Female, anterior end, lateral view. C. Adult Parasitic Female, full body, lateral view. D. Male, full body, lateral view, showing coiled tail. E. Spicule, lateral view. F. Tail tip of sexual female.**


A
B
C
D
E
F
A C
100 µ
B D E F
20 µ

Professor S. A. Sher, Riverside, California, collected a population of this nematode in 1952 from decaying oranges in Pahoa, Hawaii. In addition, the author has received this nematode, though smaller in size, from a fig culture of the nitidulid beetle, *Haptonchus luteolus* (Erichson) from Dr. W. R. Kellen, Fresno, California. The nematode has a phoretic relationship with nitidulid beetles and is probably mycophagous. Originally the Kellen nematode population came from Brazo County, Texas, from the nitidulids *Carpophilus* (*Urophorus*) *humeralis* (Fabricius) and *Carpophilus mutilatus* Erichson.

This genus is named after Dr. S. A. Sher, Riverside, California, who was first to collect this nematode and also in recognition of his outstanding contributions to the systematics of the Tylenchoidea.

Sheraphelenchus entomophagus gen. n., sp. n. (Fig. 2, A–F)

MALES (12): L = 0.682 mm (0.478–1.186); W = 28.4 μ (21.4–53.3); a = 24.1 (20.5–27.3); b = 8.6 (7.0–10.3); c = 14.4 (10.7–22.6); spicule L = 21.9 μ (18.9–25.2); stylet = 12.3 μ (11.3–13.0); excretory pore = 59.2 μ (39.9–71.4); hemizonid = 104.4 μ (80.2–130.2).

HOLOTYPE MALE: L = 0.706 mm; W = 27.3 μ; a = 25.9; b = 8.8; c = 16.8; spicule L = 21.5 μ; stylet = 12.6 μ; excretory pore = 65.9 μ; hemizonid = 101.6 μ.

FEMALES (12): L = 0.697 mm (0.532–0.975); W = 29.9 μ (22.8–45.4); a = 23.3 (19.7–26.3); b = 9.6 (7.8–12.2); c = 8.7 (7.5–10.2); V = 82.9% (77.8–88.1); stylet = 12.0 μ (11.3–13.0); excretory pore = 57.2 μ (39.9–72.7); hemizonid = 98.9 μ (86.1–113.4).

ALLOTYPE FEMALE: L = 0.706 mm; W = 29.4 μ; a = 24.0; b = 9.9; c = 9.3; V = 84.0%; stylet = 13.0 μ; excretory pore = 64.7 μ; hemizonid = 99.5 μ.

Description

Both sexes slightly arcuate when relaxed. Excretory pore position variable but always posterior to median esophageal bulb and about equidistant between hemizonid and front end of nematode.

MALE: Cuticle with fine annulation. Six lips, not set off. Stylet present, without basal flanges. Testis single, outstretched, not flexed.

FEMALE: Cuticle with fine annulation. Stylet well developed, without basal flanges or knobs. Gonad single, outstretched, not flexed, usually with two or more ova in uterus. Vulva lips protruding. Postvulval sac absent.

HOLOTYPE: Male, collected by S. A. Sher, 29 November 1952. Slide T-149t. USDA Nematode Collection, Beltsville, Maryland.

ALLOTYPE: Female, same data as holotype. Slide T-150t. USDA Nematode Collection, Beltsville, Maryland.

PARATYPES: Several males and females deposited in USDA Nematode Collection, Beltsville, Maryland, University of California Nematode Survey Collection, Davis, California, University of California Survey Collection, Riverside, California, USA, and Canadian National Collection, Ottawa, Canada.

TYPE HOST: Found associated with decaying oranges.

TYPE LOCALITY: Pahoa, Hawaii, USA.

Literature Cited

Nickle, W. R. 1967. On the classification of the insect parasitic nematodes of the Sphaerulariidae Lubbock, 1861 (Tylenchoidea: Nematoda). Proc. Helm. Soc. Wash. 34(1): 72–94.

Poinar, G. O. 1969. *Praecocilenchus rhaphidophorus* n. gen., n. sp. (Nematoda: Aphelenchoidea) parasitizing *Rhyncophorus bilineatus* (Montrouzier) (Coleoptera: Curculionidae) in New Britain. Jour. Nematology 1(3): 227–231.

Wachek, F. 1955. Die entoparasitischen Tylenchiden. Parasitolog. Schriftenreihe 3: 1–119, Fischer, Jena.

←

Figure 2 A–F. ***Sheraphelenchus entomophagus*** **gen. n., sp. n. Drawing of the Kellen fig cultured population, phoretic on** ***Haptonchus luteolus*****. A. Female, full body, lateral view. B. An** ***en face*** **view of female. C. Male, full body, lateral view. D. Female, anterior end, lateral view. E. Male tail, lateral view, showing spicule. F. Spicule, ventral view.**