

***Tetradonema solenopsis* n. sp.**  
**(Nematoda: Tetradonematidae) Parasitic on the**  
**Red Imported Fire Ant *Solenopsis invicta* Buren**  
**from Brazil**

W. R. NICKLE<sup>1</sup> AND D. P. JOUVENAZ<sup>2</sup>

*Abstract:* Explorations in Brazil to find parasites of the red imported fire ant, *Solenopsis invicta* Buren, have uncovered a new species of the Tetradonematidae, *Tetradonema solenopsis* n. sp. The nematode parasite was fatal to about 25% of the colony. The female nematodes are large and sausage shaped and the males are small and difficult to find, which is typical of the genus. The ant is a new host record for tetradonematids.

*Key words:* taxonomy, biological control, ant, new species, *Tetradonema solenopsis*, Nematoda, *Solenopsis invicta*.

The family Tetradonematidae includes those mermithoids which have a tetrad of esophageal cells and both larvae and adults in the body cavity of the host insect. Members of four of the five genera are parasites of dipteran insects and those of the other are parasitic in nitidulid beetles. Because the five known species are easily separated morphologically and biologically, their identifications have been straightforward. Ants are parasitized by several species of Mermithidae (1), but there are no known tetradonematid parasites.

MATERIALS AND METHODS

The tetradonematid described herein was first observed in 5 of 14 colonies of *Solenopsis invicta* Buren collected at 616, BR-070 (ca. halfway between Cuiaba and Caceres), Mato Grosso, Brazil, on 5 February 1985. In the most heavily parasitized colony, 12.5% of the adult workers were infected; the infection rate in the remaining four colonies was less than 5 percent. The most heavily parasitized colony was hand carried (under USDA and Brazilian permits) to Gainesville, Florida; however, all of the infected ants died shortly after arrival. A colony from the same location collected 7 November 1985 and taken to

Beltsville, Maryland, was found to be parasitized at the rate of 25%. All adult nematodes available for this study were fully mature or over mature. Body contents were disintegrated, which made detailed drawings impossible. Specimens were mounted in dehydrated glycerine following staining by cotton blue via the Goodey's Rapid Method of preparation. Standard procedures were used for measuring and drawing the nematodes. Measurements are in micrometers ( $\mu\text{m}$ ).

SYSTEMATICS

*Tetradonema solenopsis* n. sp  
(Fig. 1A-F)

*Holotype (female):* Length = 1,600; width = 300; a = 5.16.

*Allotype (male):* Length = 400; width = 32; a = 12.5; c = 11.4; spicule length = 46.4.

*Female (n = 17):* Length = 1,466 (1,120-1,616); width = 211 (144-368); a = 6.37 (4.39-8.61); egg = 27.5 (27.2-28.8).

*Male (n = 7):* Length = 370 (292-440); width = 29 (24-36); a = 13.0 (8.1-18.3); c = 11.0 (8.7-15.2); spicule length = 41.8 (25.6-48.0).

*Larva (n = 10):* Length = 217 (203-229); width = 8.2 (8-9.6); a = 26.5 (23.3-28.6).

*Female:* Body sausage shaped, replete with hundreds of eggs (Fig. 1D). Internal anatomy degenerated and obscured by eggs, including esophagus, tetrad of esophageal cells and vagina. Capsule-like struc-

Received for publication 17 October 1986.

<sup>1</sup> Systematic Botany, Mycology and Nematology Laboratory, Beltsville Agricultural Research Center, USDA, Agricultural Research Service, Beltsville, MD 20705.

<sup>2</sup> Insects Affecting Man and Animals Research Laboratory, USDA, Agricultural Research Service, Gainesville, FL 32604.

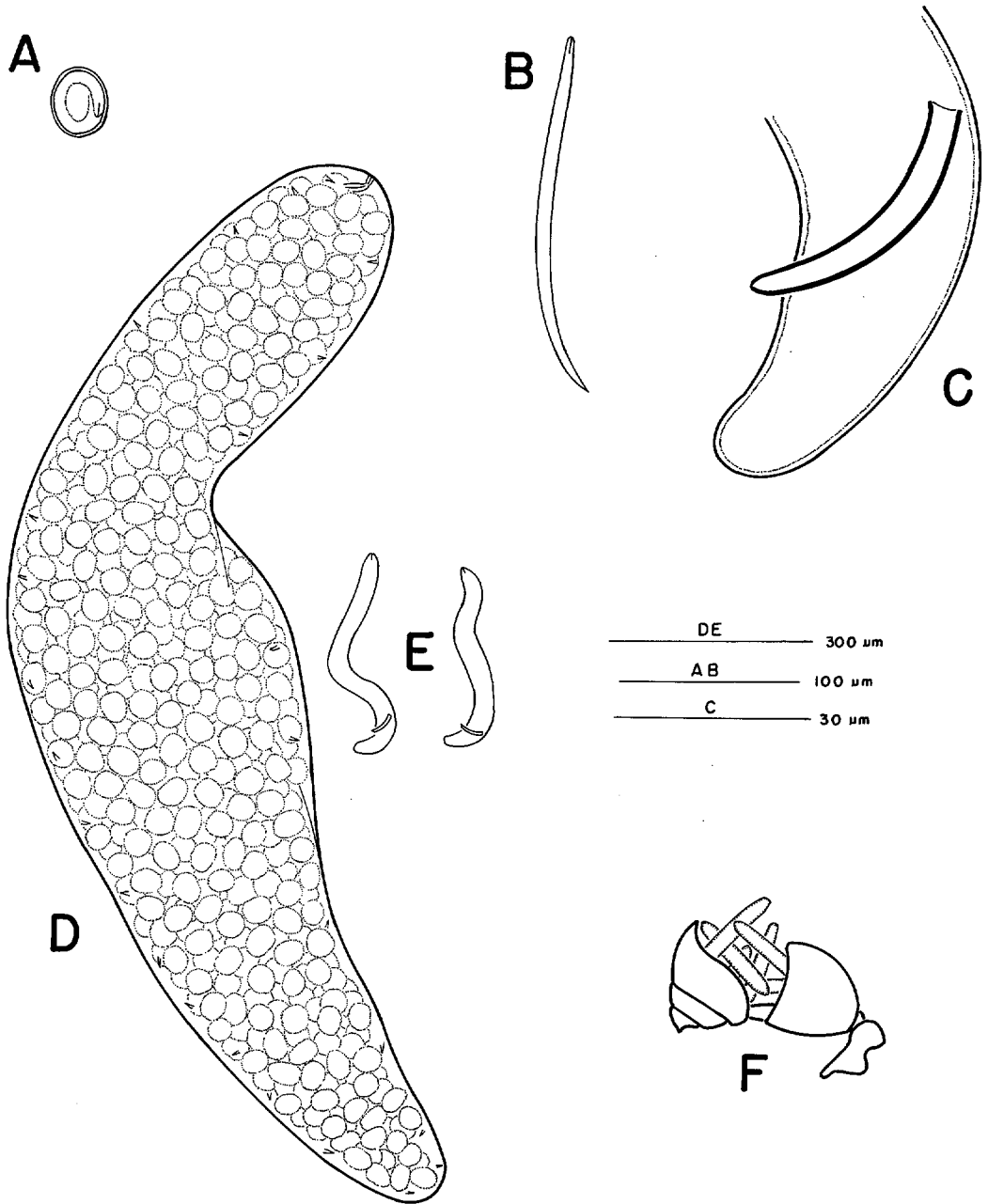


FIG. 1. *Tetradonema solenopsis* n. sp. from *Solenopsis invicta* in Brazil. A) Egg, showing infective-stage larva. B) Infective-stage nematode larva. C) Male, tail with diagnostic spicule. D) Female, replete with eggs. E) Male, same magnification as D, showing sexual dimorphism. F) Gaster of ants showing sausage-shaped nematode.

ture housing excess eggs present in 3 of 20 females (Fig. 1D). Small wedge-shaped crystals present throughout body. Tail bluntly rounded. Egg shell thin and smooth.

*Male:* Body tends to form an open spiral when killed and relaxed by gentle heat.

Cephalic framework faint. Esophagus indistinct. Spicule (Fig. 1C) prominent, single, arcuate, horn-like. Papillae small, indistinct. Tail bluntly rounded, curved ventrad.

*Type specimens:* Holotype: Collected by

D. P. Jouvenaz, 7 November 1985, in Caceres, Mato Grosso, Brazil. Slide deposited in the Museu Zoologico, Universidade de São Paulo, São Paulo, SP, Brazil. Allotype: Male same data as holotype. Slide deposited in the Museu Zoologico, Universidade de São Paulo, São Paulo, SP, Brazil. Paratypes: Male and female specimens deposited in the U.S. Department of Agriculture Nematode Collection, Beltsville, Maryland; University of California Davis Nematode Collection, Davis; and the Canadian National Collection of Nematodes, Ottawa.

*Type host:* *Solenopsis invicta* Buren.

*Type locality:* Caceres, Mato Grosso, Brazil.

*Diagnosis:* The male of *T. solenopsis* is 400 long with a single, arcuate, moderately slim spicule 42 long. The male of *T. plicans* is 800 long (2) with a longer slim spicule 78 long. The female of *T. solenopsis* is small, 1,466 long, and sausage shaped with a bluntly rounded tail, whereas *T. plicans* female is 5,000 long and robustly vermiform in shape with a distinct wedge-shaped tail tip.

#### BIOLOGY AND LIFE HISTORY

All stages occur in the adult ant. Sexes are dimorphic. Usually 6–10 large, sau-

sage-shaped female nematodes are found in the body cavity of each parasitized ant (Fig. 1F) together with a few small males (Fig. 1E) and larvae. The body cavity of an infected ant (Fig. 1F) usually contains several large female nematodes (Fig. 1D) and several much smaller males (Fig. 1E) and larvae (Fig. 1B). When the ant colony was checked, 25% were parasitized. Three days later, all those that were parasitized were dead. Only nonparasitized ants remained alive in the formicaria. Living ants parasitized by these nematodes often may be recognized by their slightly enlarged gasters, the dorsal sclerites of which have a scalloped appearance. There were no other morphological signs of infection, nor were there any observable changes in behavior (3).

#### LITERATURE CITED

1. Bedding, R. A. 1984. Nematode parasites Hymenoptera. Pp. 755–795 in W. R. Nickle, ed. Plant and insect nematodes. New York: Marcel Dekker.
2. Ferris, J. M., and V. R. Ferris. 1966. Observations on *Tetradonema plicans*, an entomoparasitic nematode, with a key to the genera of the family Tetradonematidae (Nematoda: Trichosyringida). *Annals Entomological Society America* 59:964–971.
3. Jouvenaz, D. P., D. P. Wojcik, M. A. Naves, and C. S. Lofgren. 1987. Observations on a parasitic nematode of fire ants. *Solenopsis* spp. from Mato Grosso. *Pesquisa Agropecuaria Brasileira*, in press.