

Nematode parasites of fire ants from South America.

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The search for biological control agents of fire ant in South America has resulted in the discovery or re-discovery of many organisms associated with fire ants in South America (Wojcik 1988, 1990). Among these are three previously unknown nematodes. One, Tetradonema solenopsis, has subsequently been described, but the other two remain undescribed. The information known about these three nematodes is summarized here to document their discoveries.

Thelohania solenopsae:

Tetradonema solenopsis Nickle & Jouvenaz was described from material found in Solenopsis invicta Buren workers, collected along the roadside of BR-070, Km-616, between Cáceres and Cuiabá, Mato Grosso, Brazil (Nickle & Jouvenaz 1987). Subsequent collections have extended the range of the nematode over large areas of Mato Grosso and Mato Grosso do Sul, in central-western Brazil. Over 2250 fire ant colonies have been examined for this nematode from the states of Amazonas, Rondônia, Mato Grosso, and Mato Grosso do Sul. T. solenopsis was found in 67 or 2.9% of the fire ant colonies.

Eggs, juveniles, males, and egg-laying adult females were found in S. invicta workers and males. The large sausage-shaped female is essentially an enlarged uterus filled with developing eggs; juveniles occur free in the hemolymph. Large worker ants contained 17 to 35 females. At least 1,000 eggs and juveniles (total) were present in large workers (Jouvenaz et al. 1988).

Living ants parasitized by these nematodes may be recognized by their slightly enlarged gasters, the dorsal plates of which have a scalloped appearance. There are no other morphological signs of infection, nor are there any observable changes in behavior. T. solenopsae stresses its host severely. Under the additional stresses of collection, separation from the soil, and laboratory culture, infected ants die rapidly, making it difficult to maintain the parasite in laboratory colonies. Attempts to transmit the infection to Floridan S. invicta in the laboratory were not successful.

Mermithid:

In 1987, during a survey for natural enemies of fire ants in Argentina, a nematode was collected in 2 colonies of the black imported fire ant, S. richteri Forel. The first colony was on the premises of the Instituto Nacional de Tecnologia Agropecuaria, Hurlingham, Buenos Aires Province, and the second on the roadside of RN-12 at Sagastume, Entre Rios Province (Fig. 2). The nematodes were identified as belonging to the Mermithoidea, based on the morphological modification of the hosts, their large size, and the presence of one worm per host.

Larval mermithids are unidentifiable to genus (W.R. Nickle, USDA, ARS, Beltsville, MD). These colonies were hand-carried (under USDA, APHIS permits) to our laboratory in Gainesville, FL, where they were maintained in local soil.

The ants were parasitized by one large, ca. 15 mm long, larval nematode per host. The intracolony infection rates were substantially less than one per cent. The parasitized workers were diagnosed by their enlarged gaster and highly modified thorax (Fig. 3). The heads and thoraces of the parasitized major workers were modified to resemble minor workers. However, these S. richteri workers did not have rudimentary ocelli, as has been reported in other cases of mermithid parasitism (Wheeler 1910). Several parasitized workers were removed from the colonies and held in groups of 3-5 on moist sand in plastic petri dishes. Although nematodes emerged from several of these ants, they did not survive in the sand. Three nematodes were observed during emergence; they exited their hosts via the anus. After emergence by the nematodes, the host ants died. We were unable to propagate the nematode in the laboratory.

We have examined 427 fire ant colonies for pathogens and inquilines in detail from Argentina, including 22 colonies from the field in which the first infected colony was found. Only the 2 colonies collected on the first trip were found to be parasitized by mermithid nematodes. We have not observed nematodes of this type in our extensive survey for natural enemies of fire ants in Brazil.

New nematode:

In February, 1990, samples from 600 fire ant colonies were collected in Argentina, southern Brazil, and Uruguay. The samples were preserved in the field in a pathology sample preservative: 3% formalin and 2% glycerine in water. In the United States, the samples were macerated with a tissue grinder, and examined by phase-contrast microscopy. Nematode juveniles and eggs were found in 26 samples (4.3%) from all 3 countries (Fig. 2). The developing juvenile nematode could be seen in some of the eggs. This nematode is not the same as the other 2 nematodes known from fire ants in South America.

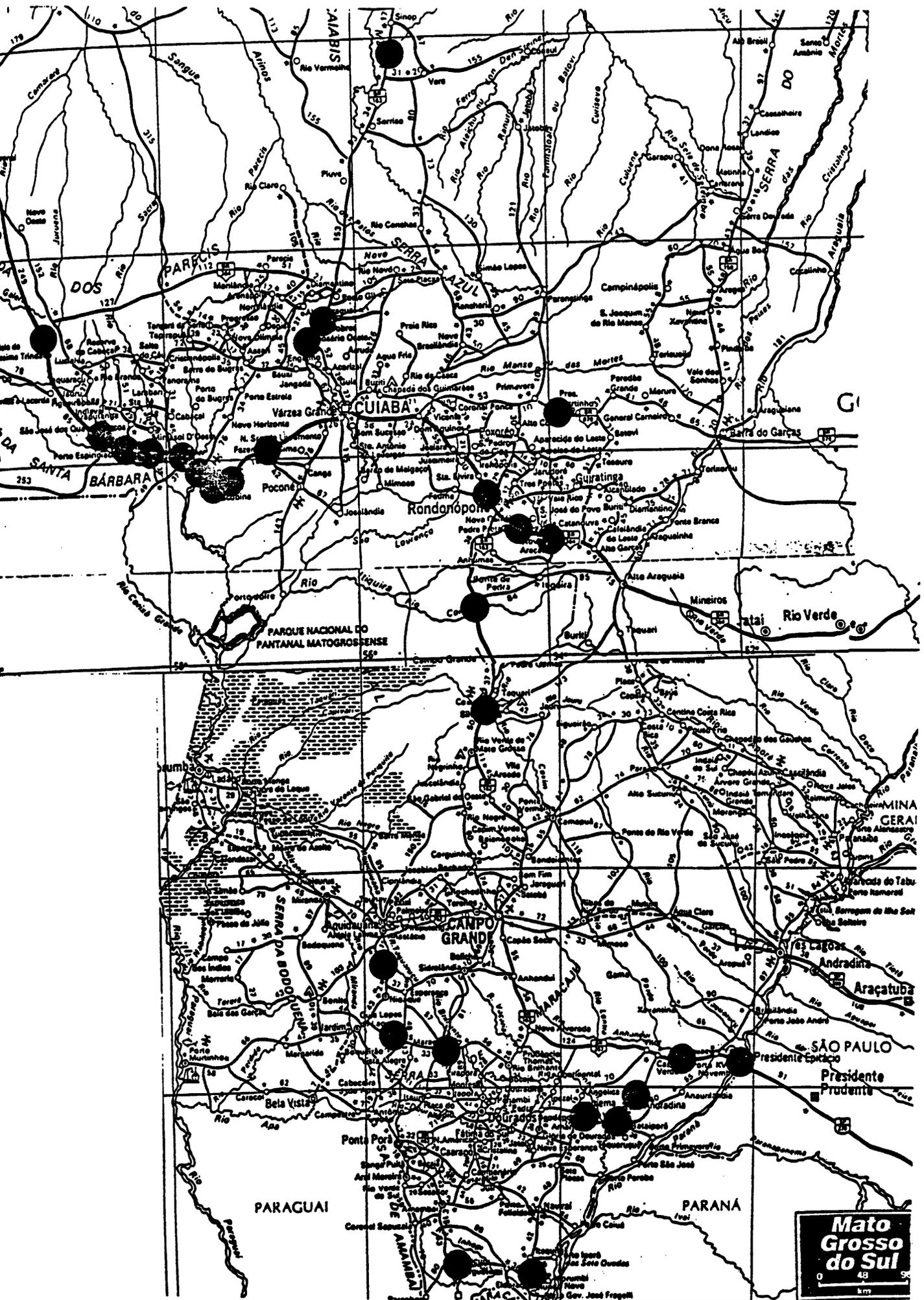
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Figure 1. Known distribution of Tetradonema solenopsis in the States of Mato Grosso and Mato Grosso do Sul in central-western Brazil.

Figure 2. Known distribution of unidentified mermithid nematode (squares) and new unidentified nematode (dots) in central Argentina, southern Brazil, and Uruguay.

Figure 3. Solenopsis richteri worker parasitized by a mermithid nematode, which is visible through the cuticle of the enlarged gaster. The morphology of the head and thorax is modified, as is common in ants parasitized by mermithids.



Mato Grosso do Sul
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