OCCURRENCE OF MICROSPORIDA IN *SOLENOPSIS RICHTERI* AND *SOLENOPSIS* SP. IN URUGUAY AND ARGENTINA[1]

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ABSTRACT

A microsporidan, *Thelohania* sp., was isolated from workers of the black imported fire ant, *Solenopsis richteri* Forel, in Montevideo, Uruguay, and Las Flores, Argentina, and from a *Solenopsis* sp. in Montevideo, in March and May of 1974. Many of the colonies exhibiting high levels of infection in March were abandoned or drastically reduced in size when re-examined in May. No disease was observed in populations of *S. blumi* Buren or *S. quinquecuspis* Forel.

New methods to control the imported fire ants, *Solenopsis invicta* Buren and *S. richteri* Forel, have been the target of extensive research programs in the southeastern United States in recent years. As a result of an emphasis on reduction of chemical pesticide use, the University of Florida initiated a research program in 1971 to isolate and investigate the potential of biotic factors as control agents of imported fire ants.

Buren (1972) clarified the taxonomic status of the imported fire ants and suggested that *S. invicta* was native to Brazil and *S. richteri* to Uruguay and Argentina. Allen et al. (1974) established the general homeland of *S. invicta* as the areas surrounding the city of Cuiabia and the northern Pantanal flood plain in Mato Grosso, Brazil. Recently, Allen and Buren (1974) isolated a *Thelohania* sp. from *S. invicta* and several other species of the *S. saevissima* (F. Smith) complex in Mato Grosso.

The discovery of Microsporida involvement in the *S. saevissima* complex in Brazil prompted the senior author to search for diseases in other species of the complex in Uruguay and Argentina.

METHODS AND MATERIALS

Four *Solenopsis* species were examined for disease involvement. *Solenopsis richteri* collections were made in Montevideo, Uruguay, and Las Flores, Argentina; *S. blumi* Buren in Buenos Aires, Argentina, and Montevideo; *S. quinquecuspis* Forel and an unknown *Solenopsis* sp. in Montevideo. Specimens were collected in the manner described by Allen et al. (1974). Samples from each colony were preserved in 70% alcohol for diagnostic purposes, and living collections were retained to obtain fresh tissue for fixation and future study. Specimens preserved in alcohol were examined to detect the gross pathological characteristics described by Allen and Buren (1974). The gasters of workers preserved in alcohol readily inflated, permitting easy observation of the characteristic "cysts". Living ants were examined to detect

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specimens exhibiting enlarged gasters. Infected tissues were prepared in 4% gluteraldehyde for electron microscopy, Carnoy's fixative for paraffin sectioning, or smears for Giemsa staining.

Results and Discussion

Microsporida were isolated from living workers of *S. richteri* from Las Flores and Montevideo and an unknown *Solenopsis* sp. from Montevideo. Both *S. richteri* and *Solenopsis* sp. were infected with a species of *Thelohania*. The *Solenopsis* sp. occurs in limited stands in Montevideo, usually in close proximity to *S. blumi* and *S. quinquecuspis* populations. The largest population observed consisted of only 3 nests, all of which were heavily infected with *Thelohania*. No diseases were observed in collections of *S. blumi* from Argentina and Montevideo or *S. quinquecuspis* from Montevideo.

Octonucleate sporonts producing 8 spores, enclosed in a sporont membrane, were present in Giemsa-stained smears (Fig. 1). Spores were pyriform, and the primary site of infection was the fat body.

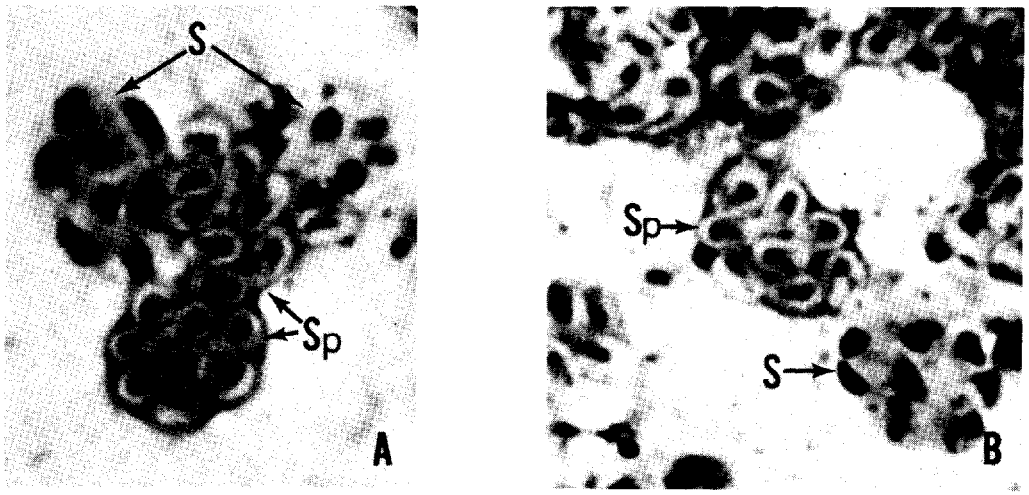

Fig. 1. Octonucleate sporonts (S) and spores enclosed in a sporont membrane (Sp) of a *Thelohania* sp. in (A) *S. richteri* and (B) *Solenopsis* sp. Giemsa smears, X 2,200.

Although a high percentage of *S. richteri* workers from both locations were infected, the number of vegetative stages and sporonts were far less than those usually observed in *Solenopsis*. Preliminary indications are that the specimens examined were also infected with a possible virus disease. Pending electron microscopy studies should clarify this point.

The technique of detecting the characteristic "cysts" in alcohol-preserved specimens proved to be an unreliable diagnostic method. Upon dissection of infected workers, whitish, subspherical bodies were readily observed. Examination of the bodies showed them to be masses of spores of *Thelohania* enclosed in fat cell membranes. Apparently, these bodies become dehydrated after a period in alcohol and later exhibit "cyst-like" bodies in the gaster. The best procedure proved to be the detection of enlarged gasters in living in-

dividuals. All sizes of both *Solenopsis* species were found to be infected with *Thelohania.*

Although several biotic factors are probably involved in regulating *Solenopsis* populations, it now seems possible that diseases may be an important part of such a complex. Leston (1973) mentions H. C. Evans' belief that the role of fungal epizootics in controlling ant populations has been underestimated. The fact that some species of dominant ants can have heavy mortality from apparently host specific fungal diseases has also been recorded by Leston (1972).

Based on our present knowledge of *S. invicta* and its microsporidan parasite, there is a strong indication that some degree of natural control is involved. Infestations of this species outside of its homeland in South America are comparable to those experienced in the southeastern United States. Whereas mounds of *S. invicta* are sparse and inconspicuous in its native area of Mato Grosso, Brazil, they are numerous and large in unprotected areas in the State of Formosa, Argentina, and the southeastern United States. Although Microsporida are readily detected in colonies residing within the homeland of *S. invicta* and border areas, to date no diseases have been associated with populations of this ant in Argentina and the United States.

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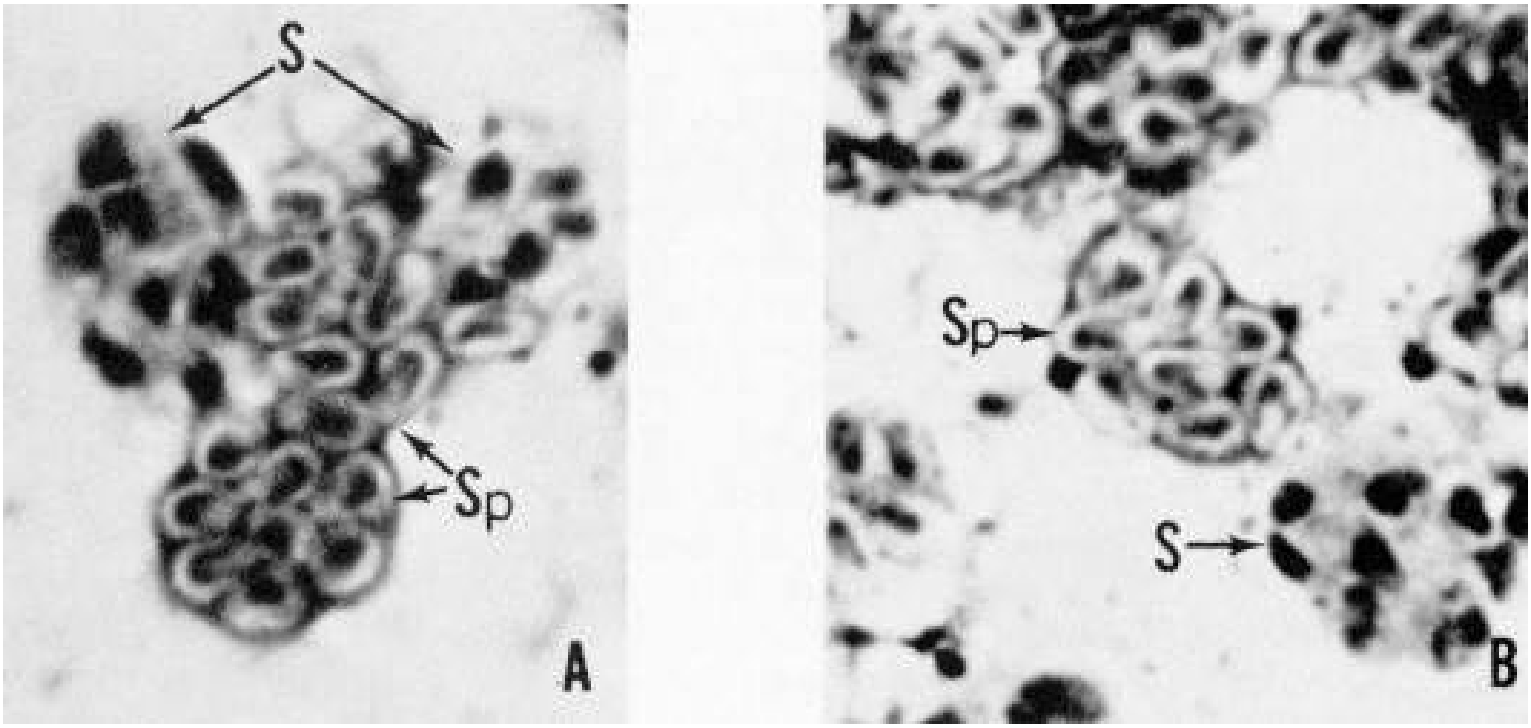
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