

Host Specificity of *Burenella dimorpha* (Microspora: Microsporida)

The microsporidium *Burenella dimorpha*, first described by D. P. Jouvenaz and E. I. Hazard (*J. Protozool.* 25, 24-29, 1978), is a natural parasite of the tropical fire ant, *Solenopsis geminata*. It has been transmitted experimentally to the red and black imported fire ants, *Solenopsis invicta* and *Solenopsis richteri*, and the southern fire ant, *Solenopsis xyloni*. Infected pupae develop clear, blisterlike areas in the petiole and vertex of the head, and the facets of the developing eyes are deranged. These pupae eventually rupture and are cannibalized by their nurses, who mechanically vector the infection to fourth instar larvae (D. P. Jouvenaz, C. S. Lofgren, and G. E. Allen *J. Invertebr. Pathol.* 37, 265-8, 1981). D. P. Jouvenaz and E. I. Hazard reported the course of infection to be identical in all four ant species. However, subsequent attempts by the present authors to propagate the parasite in *S. invicta* were unsuccessful. We infected eight colonies of *S. invicta* perorally, but within 3 months they were free of infection. It appeared, then, that *B. dimorpha* could not propagate itself indefinitely in this factitious host.

To confirm this observation, we infected three small colonies of *S. invicta* (ca. 500 workers) and our only colony of *S. richteri* (ca. 10,000 workers) with *B. dimorpha* by allowing them to consume diseased pupae of *S. geminata*. Three weeks later, and at monthly intervals thereafter, all or a maximum of 1000 pupae of appropriate age from each colony were removed, inspected for pathognomonic signs, and returned to their colony unharmed. Our results confirm that *B. dimorpha* infection is transient in colonies of these species (Table 1).

In contrast, we have propagated *B. dimorpha* continuously in our laboratory for over 7 years, in multiple, often long-lived

colonies of *S. geminata*. We have not observed abortive infection in this species. The source colony of spores (diseased pupae) used in these tests, for example, maintained an infection rate of ca. 50% for at least 15 months before the queen died.

Diseased pupae plus spores mixed in diet were also fed to ants of nine other species: *Pheidole morrisoni*, *Monomorium minimum*, *M. floricola*, *Crematogaster clara*, *Aphenogaster ashmeadi*, *Wasmannia auropunctata* (Myrmicinae), *Pseudomyrmex elongata* (Pseudomyrmecinae), *Paratrechina longicornis* and *Camponotus floridana* (Formicinae). No infections were detected in these species either by stereoscopic examination of individual pupae or by phase-contrast microscopical examination of mass extracts of brood for spores. Larvae of the corn earworm, *Heliothis zea* (Lepidoptera), that were fed diseased pupae or injected with spores were also refractory to infection.

In the sense of indefinite survival, *B. dimorpha* appears to be host specific for *S. geminata*. (We have not been able to study *S. xyloni*.) With respect to the colony, infections in *S. invicta* and *S. richteri* are abortive. A parasite that cannot maintain itself in sibling species of its host would seem unlikely to do so in species of other genera, and indeed, the nine species of other genera that were tested proved refractory to infection.

The distinctive signs of *B. dimorpha* infections are observable in pupae of *S. invicta* and *S. richteri* infected with spores obtained from *S. geminata*. However, the pathognomonic clearings in the head and petiole become faint in subsequent passages through siblings. The eye teratology typical of *B. dimorpha* infection is more persistent, however. D. P. Jouvenaz and

TABLE 1
Burenella dimorpha INFECTION RATES IN COLONIES
 OF *S. invicta* AND *S. richteri*

Number of days after ingestion of spores	Percent of pupae exhibiting pathognomonic signs			
	<i>S. richteri</i>	<i>S. invicta</i> (colony No.)		
		(1)	(2)	(3)
21	5	6	44	4
49	0	0	8.5	0
80	0	0	<1 ^a	0
110	—	—	0	—
140	—	—	0	—

^a One pupa in the nest population of 786 was infected.

E. I. Hazard were premature in stating that the disease manifested itself identically in all four species; they had examined only pupae infected by spores from *S. geminata*.

KEY WORDS: *Burenella*; *Solenopsis*; Microsporida; spore dimorphism.

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