

INTRA-COLONY TRANSMISSION AND THE DISCOVERY OF A NEW SPORE TYPE FOR *THELOHANIA SOLENOPSÆ* IN RED IMPORTED FIRE ANTS

David H. Oi, David F. Williams, and James J. Becnel
USDA-ARS Center for Medical, Agricultural, and Veterinary Entomology
1600 SW 23rd Drive, Gainesville, FL 32608

Thelohania solenopsæ is a microsporidian pathogen of imported fire ants. Transovarial transmission has been documented from infected queens, however the horizontal transmission pathway of *T. solenopsæ* within a colony is unknown. Red imported fire ant, *Solenopsis invicta*, colonies can be infected by introducing live brood (mainly larvae and pupae) infected with *T. solenopsæ*. Live, infected brood introduced into uninfected colonies were adopted and raised to adulthood instead of being executed by the recipient colony. Various combinations of infected larvae and pupae were introduced into red imported fire ant colonies to determine which stage(s) of brood result in infections. Introductions of infected larvae with uninfected pupae which eclose into adult worker caste fire ants resulted in an 80% infection rate of the inoculated colonies. Infections from introductions of infected pupae with uninfected larvae resulted in a 37.5% infection. Infections were also detected in 11.6 and 3.7% of the adult worker caste ants that eclosed from uninfected large larvae and pupae, respectively, that were held with infected adults workers. Microscopic examination of infected brood revealed binucleate sporoblasts and a new spore type of *T. solenopsæ* in *S. invicta* pupae.

Update on field releases: Inoculations of the microsporidium *T. solenopsæ* made in 1998 - 2000 in 10 southern states [AL, AR, FL, GA, LA, MS, NC, OK, SC, & TN] were monitored to assess the impact of *T. solenopsæ* on fire ants in different geographic locations. In 1999, infections were detected in 7 of these states [AR, AL, FL, GA, LA, MS, NC], but infections were not maintained in 2000 at two sites [AL, NC]. Infections were detected from new inoculation sites in OK and SC in 2000. Multiple-queen imported fire ant populations seem to maintain infections longer than single-queen populations. Newly-mated fire ant queens that were naturally infected with *T. solenopsæ* could initiate new colonies, however these colonies died after an average of 113 days (range 33-445, n=10) in contrast to healthy queens which can live 5-7 years.