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THELOHANIA SOLENOPSAE, A MICROSPORIDIAN OF FIRE ANTS : ITS EFFECT ON INDIGENOUS POPULATIONS IN ARGENTINA

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Based on the number of active fire ant mounds in pastures, the density of fire ants in Argentina is similar to that in the United States.. Over 75% of the fire ant nests moved from their original site during a six month period - spring to fall in Argentina. Infection with Thelohania solenopsae did not greatly increase the demise of fire ant colonies. There was a 25% loss of healthy colonies over a six month period. Numerous surveys of pathogens and parasites of fire ants have been made in South America (Jouvenaz 1986), but the fate of individual colonies infected with a single pathogen has not been studied. Beyond a personal communication by Dr. Jerry Stimac, University of Florida, to Carruthers and Hural (1989) that the fungus Beauveria bassiana kills up to 50% of the colonies annually in Brazil, nothing is known about the impact of pathogens in nature. Dr. Stimac is currently evaluating B. bassiana as a microbial formicide.

We began monitoring field populations of fire ants, Solenopsis richteri Forel and Solenopsis quinquecuspis Forel, infected by the microsporidian Thelohania solenopsae Knell et al., in Argentina in October 1988. The data reported herein are complete as of March 1990. Our purpose is to assess the potential of this particular pathogen as a biocontrol agent for importation into the U.S.A. Specifically, we are investigating 1) the pattern of intercolonial transmission of the infection; 2) mortality rates of infected vs. healthy colonies; and 3) stimulation of colony movement with possible elimination of the disease.

Thelohania solenopsae was selected because it is the most common pathogen in fire ant colonies in Argentina. It does not destroy colonies quickly; however, we do not know the fate of individual infected colonies, much less understand fire ant population dynamics in the host county. We established six circular (40 m diameter) plots in unimproved pastures containing cattle and hogs in the vicinity of Saladillo, Buenos Aires Province. Each active fire ant colony was plotted on a map by measuring from a central stake using a compass. The plots were checked monthly for mound numbers and movement. Each colony was examined for the number of major and minor workers present, and for the presence of sexual forms, brood, and disease. The height, width, internal temperature and moisture of the soil (the first 6 inches) of each mound were also recorded. The climate of the test area is similar to that of southeastern United States.

The average number of active colonies/ha was 198 in the six plots. Three of the plots initially had disease rates of 35%; the other three were relatively free of the disease with only 3% of the colonies being infected.

The number of active fire ant colonies/ha in a short grass pasture habitat of the Saladillo area was almost the same as in the southeastern U.S. Adams (1986) reported 60-150 colonies/ha as heavy densities of S. invicta in Florida and Georgia. There was a 25% loss of active fire ant colonies in plots in Argentina from October to March (spring to early fall). This is similar to S. invicta losses in the Southern U.S.A. (Hayes et al. 1982).

Of the active colonies in the six plots, 75% left their original nest and moved to a new location in the plot, usually within a meter of the original site. This also is similar to observations observed in the U.S. for S. invicta and S. richteri (Hayes et al. 1982). There was 10% more movement of colonies infected with Thelohania than non-infected colonies. However, statistically this is not a valid difference.

There was greater loss of colonies with Thelohania, (45%, versus 25%) than of non-infected colonies. In the plots which initially avaraged a 3% infection rate, all colonies were free of the disease after 6 months. However, once a colony was infected and it did not move, it remained infected. We observed no colonies losing their infection. However this is difficult to verify at this time because of colony movement and we were not always sure of the origin of each new colony. We are now using oil-soluble food dyes to follow movement.

T. solenopsae appears to have little potential to suppress fire ants in the field quickly. However, it's long term effect on colony survival and it's interactions in the natural enemy complex of fire ants is currently being examined.

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