Biological and Chemical Control of Ants

Project No.: 00-DO-o0

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Objectives

(1) Continue determination of infection and impact of the imported fire ant pathogen, *Thelohania solenopsae*, on southern fire ant and pavement ant colonies.

(2) Determine the time required to reduce or eliminate: a) adult worker caste ants; b) immature ant stages (brood); and c) the queen(s) of individual colonies of the southern fire ant and the pavement ant that are provided access to various imported fire ant baits.

Justification of Objectives

(Obj. 1) In the 1996, red imported fire ants, *Solenopsis invicta*, in Florida were found to be infected with a microsporidium (protozoa), *Thelohania solenopsae*. Field studies in Argentina with this pathogen reported an 83% reduction in black imported fire ant populations and laboratory studies have shown that *T. solenopsae* infects the queen's ovaries so that her egg production is reduced and she eventually dies prematurely. *T. solenopsae* represents a potential, non-chemical, self-sustaining biological control agent for imported fire ants and possibly other ant species. This project is an effort to assess the potential of *T. solenopsae* as an alternative control for pest ants of almonds.

(Obj. 2) Active ingredients used in ant baits have different modes of action that affect the speed and longevity of control. Recent tests with ant baits such as Clinch® (ai: abamectin) and Esteem/Distance® (ai: pyriproxyfen) have shown promising, but variable results. The active ingredients in these baits sterilize the queen and inhibit the development of worker caste larvae and pupae (brood) in the red imported fire ant, respectively, and it is **assumed** that a similar mode of action occurs in the southern fire ant and the pavement ant. Because adult ants that damage the almonds are minimally affected by these active ingredients, the timing of bait applications is critical to ensure that foraging ant populations have been reduced by harvest. Knowledge of the time it takes to reduce or eliminate brood and adults will provide a biological baseline to optimize the timing of ant bait applications to reduce kernel damage and minimize the need for additional ant treatments.

Summary of Progress

(Obj. 1.) Southern fire ant colonies were collected from Fresno Co. and allowed to establish and grow in artificial nests for 8 weeks under laboratory conditions in Gainesville, FL. Three southern fire ant colonies with live queens were inoculated with the pathogen by placing 0.75 grams of *T. solenopsae* infected red imported fire ant brood near each colony. Similarly, three red imported fire ant colonies were inoculated as positive controls. Three other colonies of each species were not inoculated and served as untreated controls. Inoculated southern fire ant colonies did not exhibit drastic reductions in adult populations or brood. Thus, *T. solenopsae* infection and impact was not evident in the three, inoculated colonies. Because the number of southern fire ant colonies was limited, and infections were detected in only one of the three red imported fire ant colonies, more replications are needed to confirm these results. More colonies of southern fire ants were collected in the summer of 2000 and have recently been inoculated.

(Obj. 2.) 40 groups of of southern fire ants were collected in the August 2000, of which 5 large colonies with viable queens were suitable for bait testing. Additional groups need to grow larger before being useable. Result for this objective should be available in the spring.

We were unsuccessful at collecting colonies of pavement ants with viable queens, thus data for both objectives are not available for pavement ants.