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1987

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Wojcik, Daniel P.; Jouvenaz, D. P.; and Lofgren, C. S., "First Report of a Parasitic Fly from a Red Imported Fire Ant Alate Female" (1987). *Entomology Papers from Other Sources*. 36.  
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FIRST REPORT OF A PARASITIC FLY (DIPTERA: PHORIDAE)  
FROM A RED IMPORTED FIRE ANT (*SOLENOPSIS INVICTA*)  
ALATE FEMALE (HYMENOPTERA: FORMICIDAE)

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A number of phorid flies are known to parasitize various life stages of bees and wasps, including reproductives (Kistner 1982). Several genera of phorids are known or assumed to be parasitic on worker ants but not on reproductives (Borgmeier 1963; Borgmeier and Prado 1975). Williams (1980) summarized the known data on phorids attacking and parasitizing fire ants *sens. str.*, *Solenopsis* (*Solenopsis*) spp., in South America. To date, only one species is definitely known to parasitize fire ant workers, although other species are assumed to be parasitic on fire ants (Williams 1980). None of these species are present in the United States (Borgmeier 1963).

Fire ant colonies collected as part of our continuing survey for biological control agents of fire ants were processed by the methods given in Jouvenaz et al. (in press). One colony of *Solenopsis invicta* Buren, collected 5-Feb-85 on the road shoulder of BR-070, km 616, ca. 1/2 way between Caceres and Cuiaba, Mato Grosso, Brasil, in disturbed cerrado (arid tropical savanna), was found to contain an unidentified nematode (Jouvenaz et al. in press). During studies of the nematode, 200 adult workers, 200 worker pupae, 200 adult males, and 65 alate females (all that were present in the collection) were dissected, yielding one puparium of a phorid fly (identified by D. H. Habeck, Dept. Entomology and Nematology, University of Florida, Gainesville, FL) from one alate female (virgin queen). The first two body segments of the puparium were darkened and heavily sclerotized. Two large conspicuous horn-like structures were noted on the prothoracic segment, probably the prothoracic spiracles. The remainder of the puparium was white and unmelanized. No gross morphological alterations were noticed in the alate ant before dissection. After several months preservation in 70% ethanol, the unmelanized portion of the puparium cleared, revealing the partially developed pupa inside. The pupa had developed to the point of eye facet coloration but no other parts were melanized.

Since fire ants are not routinely dissected as part of our survey in Brazil, a special effort was made to collect alate females from fire ant nests on a subsequent trip (February to March 1986). Alate females were found in 93 colonies. These were preserved in alcohol and dissected in the United States. Up to 20 alate females were dissected from each colony (total of 1,561). No fly puparia were found although an unidentified microsporidian disease and nematodes were found.

This is the first report of a phorid fly parasitizing alate female ants of any species. This find raises the possibility that a species of phorid exists that may be good biological control agents for queens and alate females of fire ants, not just workers. The success of a biological control program for fire ants using parasitoids which affect only worker ants would not seem to hold much promise, because of the large numbers of workers in fire ant colonies (Markin et al. 1973).

The possibility exists that this is an instance of mistaken parasitism by the fly. During mating flights, activity on the surface of fire ant mounds becomes very hectic and a phorid could attack an alate by mistake. All reported cases of attack on worker ants describe the ant as "stunned" (Williams 1980; Kistner 1982). An alate female which

was stunned would not fly with the rest of that mating flight and could return to the nest. Smith (1928) reported an instance of phorids attacking workers during a mating flight of *S. geminata* (F.). He was not able to detect if alates were attacked by the flies. Further studies of these parasites of fire ants in Brazil must be conducted to determine if this record represents a mistake by the fly or is a case of true parasitism of the reproductive caste. A parasite of queens or of alate females could have a great potential in reducing reinfestations of imported fire ants in infested areas or slowing down the rate of infestation in fringe or lightly infested areas in the United States. This aspect of the study of natural enemies of imported fire ants will be pursued as the opportunity arises when new specimens are discovered during future trips to Brazil.

This work was conducted under a cooperative agreement on biology and control of fire ants in Brazil between the USDA, ARS, IAMARL and EMBRAPA, Brasilia, Brasil.

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