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DISPERAL OF THE FIRE ANT DECAPITATING FLY, PSEUDACTEON CURVATUS (DIPTERA: PHORIDAE) IN NORTHEAST MISSISSIPPI

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Pseudacteon curvatus Borgmeier is one of three species of phorid decapitating flies currently approved for release in the U.S. for the suppression of the red, black, and hybrid imported fire ants, Solenopsis invicta Buren, S. richteri Forel, and S. invicta × richteri, respectively. Two biotypes of P. curvatus are established in the U.S. The Las Flores, Argentina biotype prefers black and hybrid imported fire ants (Porter & Briano 2000) and is established at sites in Alabama, Mississippi, and Tennessee (Graham et al. 2003; Thead et al. 2003; Vogt & Streett 2003; Vail et al. 2004; Ward et al. 2004). The Formosa, Argentina biotype prefers red imported fire ants and is established at sites in Florida (R. J. Vasquez & S. D. Porter, pers. comm.).

This study reports dispersal of flies of the Las Flores biotype, first released in spring, 2002 in a grazed pasture (Knox site) in Clay Co., MS (3.25 ha, 33°40'05.87"N, 88°34'48.02"W) (Fig. 1) (Vogt & Streett 2003). By Sept. 2002, flies had established on a mixture of black and hybrid imported fire ants and had spread up to 600 m from the original release site (Vogt & Streett 2003). Additional releases, with the same protocol, were made during spring 2002 and 2003 in a grazed pasture (Prima site) in Clay Co., MS, about 8.8 km and 149.7° SE of the Knox site (Fig. 1). Fly presence was confirmed at both sites during 2003 (J. T. V. & L. G. T., unpubl. data).

Observations were made outside the release sites on 23 dates from May-Sept. 2004, between 09:25 and 15:45 hours at 134 active fire ant mounds. Sampling areas were randomly selected and located on roadsides that were bordered by forests with overhanging vegetation or by grazed pastures. The presence of P. curvatus was determined by making a round depression (about 4-5 cm wide and 5-10 cm deep) in black and hybrid imported fire ant mounds. Hovering flies were counted within and around the depression. Ants were macerated and dropped into the depression to release semiochemicals that attract the flies (Porter et al. 2004). All sampled areas were georeferenced. Mounds were observed for up to 35 min. If flies were found in an area, we moved and sampled farther from the release sites. An area was re-sampled later unless flies were found farther from the release sites along a similar compass bearing. Average air temperature during sampling was 29.9 ± 2.6°C (±SD), with a mean relative humidity of 66.3 ± 18.5%, and a mean wind speed of 1.2 ± 1.45 km/h.

Fig. 1. Dispersal, as of 2004, of the decapitating fly P. curvatus from 2002 and 2003 releases at two sites in Clay Co., MS.
A total of 130 flies were recorded attacking ants in approximately 33% (44/134) of the stimulated mounds. Each of 44 mounds had from 1 to 14 flies with an average of 3.0 ± 2.7 flies. Time of fly arrival and distance from Knox site is shown in Fig. 1. By spring 2004, the more distant sites (Porter et al. 2004) were occupied by flies. Habitat variation or sampling effort may explain slower dispersal (Porter et al. 2004), the use of the electric livestock prod TheBlueOne™ LMPlus®, (Hot-Shot Products Co., Inc.) in approximately 25% of the mounds. Establishment of fly populations at the Knox and Prima sites had far exceeded predictions by the U.S. Department of Agriculture. A modified electric livestock prod was used randomly to check the effectiveness of electric prod shock. The electric prod worked well in preventing fly attack, but confounding of sampling farther than we were able to observe in this study. A logarithmic regression is plotted (y = 3.18 LN(x) – 1.63, R^2 = 0.30, P < 0.001).

The first ant-decapitating fly Pseudacteon curvatus, first released in Clay County Mississippi (Fig. 1), dispersal was about 11 km in 2½ years. Time restraints prevented sampling beyond Sept. 2004. Fly movement to the west of the release sites may have extended the boundaries of fly expansion to the north, south, and east of the release sites may have extended the boundaries of fly expansion to the north, south, and east of the release sites. Comments by Jason Oliver, Ken Ward, and Harsh for assistance with fly surveys and Jimmy Haun (ed.) Proceedings 30th Annual Meeting Ten.

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