Ricardo Vazquez

Current Research Summary

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There are approximately 9,000 known species of ants in the world (Holldobler and Wilson 1990), of these about 150 invasive ant species have been introduced around the world through help of humans (McGlynn 1999). A large majority of introduced invasive ants will remain confined in human-modified habitats with some species referred to as tramp ants because of their reliance on human-mediated dispersal and close association with humans (Holldobler and Wilson 1990, Passera 1994). Invasive ants differ from other introduced ants in that invasive ants will penetrate the natural ecosystem where they drastically reduce native ant diversity and affect other organisms directly and indirectly (Holway et al. 2002, Moller 1996, Plentovich et al. 2008). In addition to being closely associated with human-modified habitats, tramp ants have these additional characteristics: they are unicolonial, polygynous and reproduce by budding (Holldobler and Wilson 1990).

In Florida, we have two very invasive tramp ant species emerging as a problem, the African big-headed ant (BHA), *Pheidole megacephala* (Fabricius), and the Caribbean crazy ant (CCA), *Paratrechina pubens* (Forel)(Deyrup 2003, Deyrup et al. 2000, Deyrup et al. 1989, Fabricius 1793, Ferster and Prusak 1994, Forel 1893, Frank and McCoy 1992, Klotz et al. 1995, Naves 1985, Smith 1933). The big-headed ant is well known in the Pacific as an indoor and outdoor pest (Hoffman and Parr 2008, Wetterer 2007, Wilson and Taylor 1967). *Pheidole megacephala* is an important agricultural pest on many crops, including pineapple, bananas, and coffee by enhancing populations of plant-feeding Hemiptera such as mealybugs and scale insects (Fowler et al. 1990, Reimer et al. 1990, Wetterer 2007). The big-headed ant is a big problem in buildings in South Africa and in Florida (Deyrup et al. 2000, McGlynn 1999, Prins et al. 1990). Invasive populations of *P. megacephala* form unicolonial supercolonies, i.e., multiple queen aggregations of interconnected nests which act as a single cooperative unit with a lack of intraspecific aggression (Hoffman et al. 1999, Jahn and Beardsley 1994, Lach 2003, Tsutsui et al. 2003, Wetterer 2007). It is believed that the lack of intraspecific aggression is important in attaining high population densities and ecological dominance (Wetterer 2007).

Paratrechina pubens was first described from the St. Vincent, Lesser Antilles (Forel 1893) and has spread to other West Indian Islands including Anguilla, Puerto Rico and the Virgin Islands (Frank and McCoy 1992, Miller 1994, Trager 1984, Warner and Scheffrahn 2003). There is very little known about the life cycle of *P. pubens* (Warner and Scheffrahn 2003). However, from field collections and observations it has been determined that *P. pubens* have polygynous colonies (Trager 1984, Warner and Scheffrahn 2003). *Paratrechina pubens* specimens were first collected in South Florida in the early 1950s (Warner and Scheffrahn 2003) but first publication was by Trager (1984). From1989 to 2000, *P. pubens* was identified as only being present in Dade County, Florida with no indication of spreading (Deyrup et al. 2000, Deyrup et al. 1989). By 2003, *P. pubens* was introduced into Sarasota and Palm Beach County (Deyrup 2003). To date, *P. pubens* has also been found in the following cities in Florida: Jacksonville, Gainesville, Port St. Lucie and Fort Lauderdale (Phil Koehler 2008, personal communication).

There is very little known about the biology of the big-headed ant and the Caribbean crazy ant in relation to their nesting habits and foraging behavior and how these characteristics influence the development of supercolonies. In Malaysia, A few foraging studies with the big-headed ants were conducted on food preferences of the big-headed ant against other tramp ants (Lee 2002, Loke and Lee 2004). By exploring the mechanisms in which the big-headed ant and the Caribbean crazy ant develop supercolonies, we will have a further understanding how these mechanisms contribute to the high population densitities which elevates these ants to pest status. Information on the foraging behavior is essential for the development of efficient baits and baiting strategies for control of these invasive ants. Ant nesting and foraging behaviors are important factors in determining how invasive ants become pestiferous. These behaviors are also extremely important in determining the exposure of the ants to pesticides applied as barrier treatments which are commonly used to control the big-headed, Caribbean crazy, Argentine and other ants (Horwood 1988, Reimer et al. 1994, Silverman and Brightwell 2008, Stanley and Robinson 2007). Understanding the behavioral factors that may influence susceptibility or tolerance to specific pesticides will help the identification of control methods most adequate for each pest ant species.

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