A Preliminary Report of the Ants of West Ship Island: Mississippi Entomological Museum Report #2015-02

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Introduction

The Tawny crazy ant, *Nylanderia fulva* (Mayr), native to South America, has become a serious invasive nuisance and ecological pest in various counties in eastern Georgia through central Texas in the United States. Since it was first reported in Mississippi in 2009 (MacGown and Layton 2009), it has established large populations in the three Mississippi coastal counties: Hancock, Harrison, and Jackson. In June of 2011, MacGown discovered a small colony of this species nesting beneath leaf litter at the base of a tree in the parking lot of the Gulf Islands National Seashore near the main office in Jackson County, MS. At this time, populations of this species were not abundant at the site. However, since that point in time, enormous populations of the Tawny crazy ant have built up at that inland site, and it has become a serious pest there. Due to the likelihood of negative impacts by this serious ecological pest on ground and tree nesting vertebrates, as well as invertebrates, biological staff for the Gulf Island National Seashore were concerned about this species potentially having a presence on the nearby Mississippi Barrier Islands. Various marine birds and sea turtle species utilize these islands to lay their eggs. If an invasive species such as the Tawny crazy ant were to become established on these islands, it could cause serious problems for ground nesting species.

Little information about the ant fauna for the barrier islands is available with the exception of limited collections made on Horn Island by Tim Lockley from 1999-2002, which predated Hurricane Katrina (MacGown and Lockley 2007). During his collections, Lockley found only 20 species of ants including four alien species: *Brachymyrmex patagonicus* (dark rover ant), *Cyphomyrmex rimosus, Pheidole moerens* (Caribbean big-headed ant), and *Solenopsis invicta* (red imported fire ant) (see Appendix 1 for a complete list of species reported from Horn Island). At that time, Tawny crazy ants were not present on Horn Island. MacGown made limited visual observations of ants on West Ship Island in 2012, and noted the presence of *B. patagonicus, Dorymyrmex smithi* (Smith's pyramid ant or dark pyramid ant), and *S. invicta*. At that time, the Tawny crazy ant was not present. Unfortunately, no preliminary ant faunal lists have been reported for the other barrier islands. MacGown and Hill (2007) reported 17 species of ants from coastal dune habitat at the Bon Secour National Wildlife Refuge in Baldwin County, Alabama (see Appendix 2 for list of species). Although Bon Secour is an inland site, it is part of the same coastal dune system and has very similar habitat to that of the Mississippi barrier islands. Not surprisingly, ant species collected at the refuge were

comparable to those reported from Horn Island. One of the most interesting species reported from both Horn Island and Bon Secour was *Nylanderia phantasma,* a pale nocturnal species related to the Tawny crazy ant. Before that time, this species was considered to be endemic to sand ridges in central Florida. This species appears to require relatively pristine and undisturbed habitat.

Horn Island is larger than Ship Island and has numerous trees and other vegetation present, so offers better habitat for ant species than the tree depauperate Ship Island (both East and West Ship Islands). Therefore, despite the relatively meager species total for Horn Island (and the Bon Secour site) one would expect even less species to be present on Ship Island, especially post Hurricane Katrina.

In early fall of 2015, Jolene Williams, a biologist for the Gulf Islands National Park, contacted Mississippi Entomological staff about an unsubstantiated report of Tawny crazy ants on West Ship Island, an island frequented by visitors via a ferry that travels to the island daily. An individual noted erratic movement and large numbers of a reddish brown ant species near a concession area located on the island and speculated that these could be Tawny crazy ants. Williams, the park biologist, made limited collections of ants near the concession stand in the area where Tawny crazy ants were suspected and mailed them to MacGown at the MEM for identification to ascertain if they were Tawny crazy ants.

Specimens collected by Williams were later determined by MacGown to be *S. invicta* and *Dorymyrmex smithi* (Smith's pyramid ant or brown pyramid ant). Both of these species have been misidentified by various people as Tawny crazy ants due to their similar coloration and fast movement, so it was not surprising to have these species sent in as possible suspects. However, workers of *S. invicta,* the imported red fire ant, typically only exhibit frenetic movement indicative of crazy ants when their colonies are disturbed. Additionally, fire ants readily sting, whereas, crazy ant do not possess a stinger and cannot sting. The presence of imported red fire ants was not surprising, given that they have been localized in the region for at least 80 years. Unfortunately, this alien species has been documented to adversely affect wildlife and should be controlled when possible. The pyramid ant is native to the southeast region and nests in habitats with sandy soil. This fast moving, reddish brown species is active during the day, and often is quite abundant in sandy habitats such as is present on West Ship Island. Pyramid ants have potent defensive chemicals, which allows them to defend themselves from and coexist with the aggressive imported fire ants. This native species is not considered to be a pest species.

Methods

Although the specimens mailed in by Williams were not crazy ants, there was still a possibility of this species occurring on the island. Therefore, MacGown and Whitehouse agreed to join Williams on a return trip to West Ship Island to conduct a brief, preliminary survey of the ants present.

MacGown and Whitehouse made observations and collections of representative ant species on West Ship Island from approximately 10:00 AM and 2:15 PM on 15 October 2015. Weather conditions were warm (between 76°F and 87°F) with mostly clear skies making the day suitable for observing ant activity, and we noted workers of

numerous colonies throughout the day. For this preliminary survey, we limited our collecting methods to visual searches, litter sampling (although it was difficult to find litter), some baiting, beating vegetation, and prying apart rotting pieces of wood. We did not employ any type of traps, nor did we bring back soil and litter samples for Berlese funnel extraction. Use of Malaise traps (large tent-like traps designed to capture flying insects) over an extended time period could provide valuable data on potential flying reproductive ants, especially potentially new invasive species. Likewise, pitfall samples, especially baited, may be useful for collections of foraging ants, some of which are minute. Berlese funnel sampling is a useful method for collecting cryptic species that nest in or below leaf litter. In general, there was insufficient litter present on the island with the exception of small quantities present beneath some of the larger bushes. Many of these bushes were in wetland habitat, where ants cannot nest. Although some ant species nest in soil/sand beneath vegetation, we did not conduct any searches for possible ant colonies beneath grasses or other plants, as we did not want to disturb any dune vegetation, which is crucial for dune health. However, based on numerous surveys conducted by MacGown without these methods, we feel confident that at a minimum, we collected the most common ants present on the island.

During our visit to the island we first investigated areas frequented by people, and therefore more likely to have invasive ants present. These searches included the areas near the boardwalk that lead from the north side of the island to the south side, including beach habitat, grassy habitat, and wetland type habitat; in and around the historic brick fort on the north side of island; near all buildings including the ranger office, work sheds, and concession stand; and along the edge of the beach and dune habitats on both north and south sides of the island. In addition to our searches in relatively disturbed areas, we collected at various other parts of the islands including back dunes, foredunes, and in slightly wetter habitat near the wetland portions of the island.

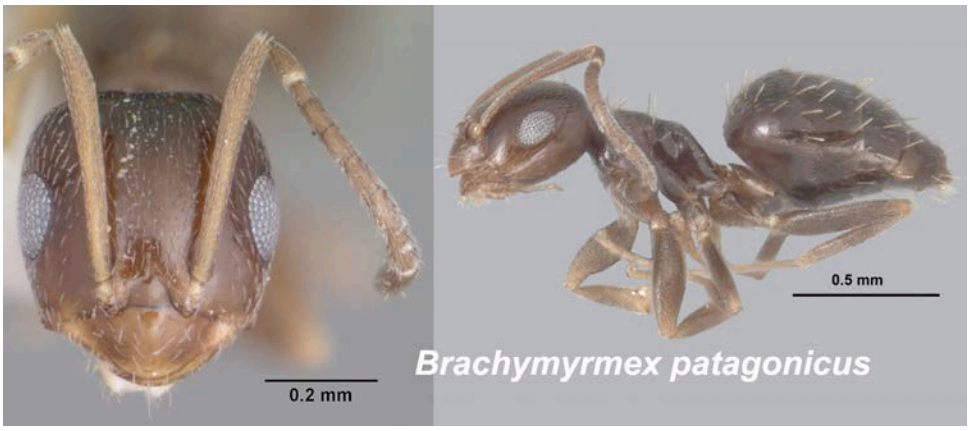
Results/Discussion

Due to the fact that the island had been basically inundated with seawater only a few years earlier from Hurricane Katrina, the relatively limited floral diversity including a lack of any trees, and the general harshness associated with a small island, we did not expect to find many species of ants. We were also skeptical about the possibility of finding Tawny crazy ants on this island. Based on our surveys along the Gulf Coast during the past 5 years, we had not yet discovered the crazy ants nesting in open sand habitats such as beaches.

We were correct in both the assumption that the overall species total would be relatively low and that Tawny crazy ants were not present. We noted the presence of only six ant species: *Brachymyrmex patagonicus, Crematogaster pilosa, Dorymyrmex smithi, Pheidole obscurithorax, Pseudomyrmex pallidus,* and *Solenopsis invicta*. Given the short time period we were there and lack of any type of traps or various other types of collecting equipment, it is possible that a few species were overlooked.

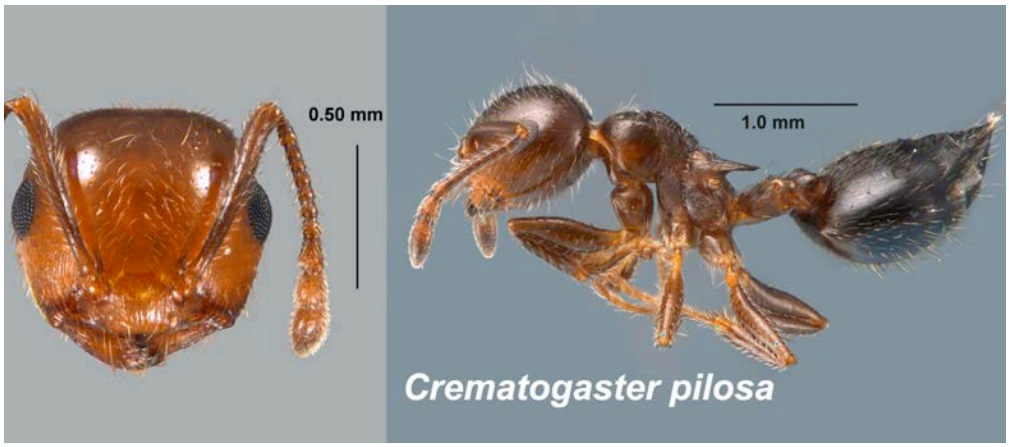
Ant Species found on West Ship Island

Brachymyrmex patagonicus **Mayr (dark rover ant). <u>Alien, Invasive–Native to Argentina.</u>** The dark rover ant can be distinguished from other ants in our region by its minute size, dark brown coloration, nine segmented antennae, large eyes, possession of a few stiff erect setae on the mesosomal dorsum, and relatively shiny appearance. It forms numerous small colonies in a wide variety of habitats where it nests in rotting wood, under debris, in mulch, in soil beneath plants (including beach vegetation), in manmade structures, and numerous other places. This species is native to Argentina, but during the last 20+ years has spread at an alarming rate throughout the southeastern US and westward as far as California. This nuisance pest ant has a fondness for sweet food resources and it is difficult to control. Due to the abundance of this species in both natural and disturbed habitats, it seems likely that it may have some level of negative effects on native species, but this has not been studied in depth. We found this species to be common throughout West Ship Island.



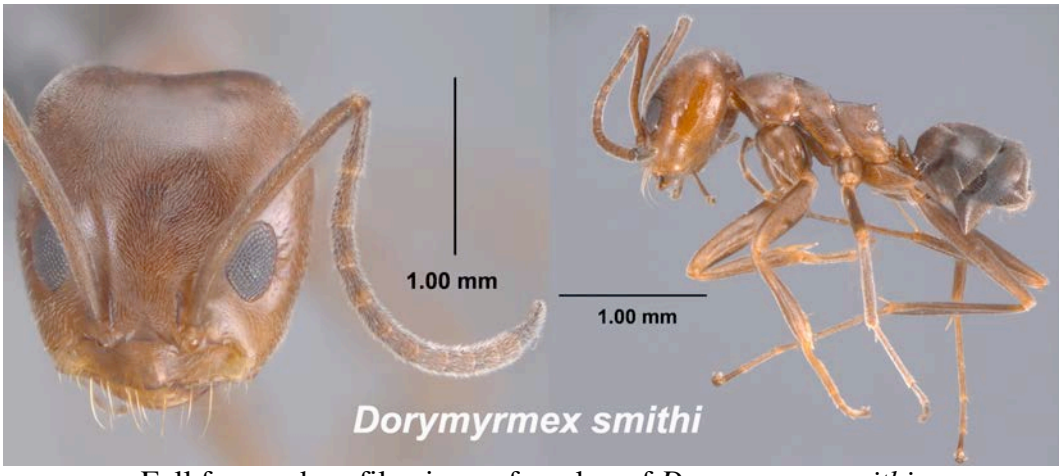
Full face and profile views of worker of *Brachymyrmex patagonicus*.

Crematogaster pilosa **Emery (pilose acrobat ant). <u>Native</u>.** Workers in this genus possess a distinctive heart shaped gaster, which they often curl up over the top of the mesosoma. This characteristic has earned them the nickname of "acrobat ant." *Crematogaster pilosa* workers range in color from reddish-brown to almost black or bicolored reddish brown with the gaster darker (almost black), they have numerous fine erect setae on the head and several on the pronotal dorsum, and this species has elongate propodeal spines that are directed backward toward the gaster. This is an abundant native species in the southeastern region of the US where it nests inside of hollow twigs, grasses, in galls, and other natural cavities. This species is not considered to be a pest, although small colonies occasionally nest in already damaged wood in manmade structures. We found workers of this species crawling on branches of Eastern Baccharis (*Baccharis halimifolia* L.), which was located in the middle portion of the island and along the boardwalk to the beach.



Full face and profile views of worker of *Crematogaster pilosa*.

Dorymyrmex smithi **Cole. (Smith's pyramid ant). Native.** Workers are reddish brown to bicolored with head, mesosoma and appendages reddish brown and gaster blackish. This species is similar to *D. bureni* with elongate appendages and a triangular, dorsal propodeal projection, but differs in being darker in color, the head being wider, and having a distinct declivity between mesonotum and propodeum. This native species is typically only found in sandy soils in the Coastal Plain. Workers are extremely fast moving and active during the warmest parts of the day, when they can easily be observed foraging. Colonies are distinctive and often communal. Colonies can be identified by the low conical mounds that are apically flattened and depressed, with crater-like depressions. This species is thought to start colonies by first taking over colonies of a related species, *D. bureni,* and is considered to be a temporary social parasite of that species. Mixed colonies of these two species are occasionally found. MacGown has observed that large populations of *D. smithi* may be indicative of disturbed habitats; whereas, related species such as *D. bossutus, D. grandulus,* and *D. elegans* require less disturbed habitat to successfully nest in and could be considered indicators of good quality habitat. *Dorymyrmex smithi* was very common on the island, and we found numerous colonies in the sand.



Full face and profile views of worker of *Dorymyrmex smithi*.

Pheidole obscurithorax **Naves. (South American Big Headed Ant). <u>Alien, Invasive–Native to Argentina.</u>** This species, like others in the genus, has a dimorphic worker caste with the major workers being larger and having a proportionately much larger head to body ratio than minor workers. Typically, major workers are more useful for definitive identification. Major workers of *P. obscurithorax* are relatively large for the genus (head length 1.62–1.84 mm), are dark reddish brown with the head often a lighter reddish brown, have strong rugoreticulate sculpture on the head, and have numerous erect setae present on the head and body. This species nests in the soil in disturbed, usually grassy areas. Colonies are mostly underground, but with a mound of soil above ground (approximately 5.0–10.0 cm in height and about 15.0–20.0 cm in greatest diameter) topped by a crater. Generally, these mounds can be easily seen, unless vegetation is higher than mounds or if lawn mowing has reduced the height of mounds. This invasive species is native to Argentina and has shown notable geographic spread during the last 15–20 years and is now common along the Gulf Coast. Potential negative affects of *P. obscurithorax* on our native fauna have not been studied, but MacGown has observed this species to compete well with imported fire ants at baits. A species that can successfully compete against fire ants would likely also have successful competition with at least some native species. Hill (2006) published a report of *P. obscurithorax* workers attacking and killing a hatchling chicken, which shows that this species could potentially be a threat to ground nesting birds. MacGown and Whitehouse found several colonies of *P. obscurithorax* on West Ship Island, but all colonies observed were relegated to being in grassy areas within the Fort.

Full face and profile views of major worker of *Pheidole obscurithorax*.

Pseudomyrmex pallidus **(Smith) (pallid twig ant). <u>Native</u>.** This slender pale yellow species can be easily recognized by its slender body shape and huge eyes. It nests in twigs and cavities of a wide variety of plants in the Southeast. *Pseudomyrmex pallidus* is considered to be native to the Coastal Plain region of the US. We found workers of this species as they foraged on branches of *Sesbania drummondii* (Rydb.) Cory (rattlebox) found along the boardwalk leading to the beach and in the middle of the island in wetter

areas. Based on the ease in which we collected workers, it is likely that this species is abundant on the island. Twig ants, including this species, can inflict a painful sting and are considered a pest species.

Full face and profile views of worker of *Pseudomyrmex pallidus*.

***Solenopsis invicta* Buren. (Red imported fire ant). <u>Alien, Invasive–Native to Brazil</u>.** Workers of *S. invicta* range in size from 1.0 to over 4.0 mm in overall length. The head mesosoma, waist and appendages are reddish brown and the gaster is dark brownish black and often with large reddish brown spots on the first tergite. This species, like others in the genus, has 10 segmented antennae, is overall shiny in appearance, has numerous erect setae on the entire body, the propodeum lack any type of spines or protuberances, and a stinger is present. Fire ant colonies are mostly underground, although in the right situation they may build large mounds above the subterranean colonies. However, in sandy soils, *S. invicta* often does not build mounds and their presence may be noted by small crater-like entrances; low piles of excavated soil between bricks or against curbs, wood, or other debris; inside of rotting wood; and under various debris. *Solenopsis invicta* is an invasive species native to Brazil, but is thought to have been introduced into the US in the mid 1930s in Mobile, AL, possible in ship ballast. Since then, it has steadily spread throughout the Southeast as far north as Virginia, west to Texas, and has large populations in California. The red imported fire ant, along with the related *S. richteri* Forel (black imported fire ant), and *S. invicta* X *richteri* (hybrid imported fire ant), are considered to be among the worst pest species of ants in the world Fire ants have a serious sting, which causes potentially lethal harm in some people, and at a minimum, pain in others. This aggressive invasive species has also been reported to have negative affects on ground nesting reptiles and birds, and mammals (Wilcox and Giuliano 2002). Numerous colonies of *S. invicta* were discovered throughout the island including near all structures, nesting inside of rotting driftwood, and under various types of debris on the island.

Full face and profile views of worker of *Solenopsis invicta*.

Acknowledgments

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Appendix 1. Ant species reported from Horn Island, Harrison County, Mississippi.

Aphaenogaster ashmeadi Emery
Brachymyrmex depilis Emery
Brachymyrmex patagonicus Mayr (Alien)
Camponotus castaneus (Latreille)
Camponotus floridanus (Buckley)
Camponotus nearcticus Emery
Crematogaster pilosa Emery
Cyphomyrmex rimosus (Spinola) (Alien)
Dorymyrmex bureni (Trager)
Dorymyrmex flavus McCook
Dorymyrmex grandulus (Forel)
Forelius pruinosus Roger
Hypoponera opacior (Forel)
*Nylanderia phantasma (*Trager)
Pheidole moerens Wheeler (Alien)
Pogonomyrmex badius (Latreille)
Solenopsis carolinensis Forel
Solenopsis globularia littoralis Creighton
Solenopsis invicta Buren (Alien)
Trachymyrmex septentrionalis (McCook)

Appendix 2. Ant species reported from Bon Secour National Wildlife Refuge, Baldwin County, Alabama.

Brachymyrmex depilis Emery
Brachymyrmex patagonicus Mayr (Alien)
Camponotus floridanus (Buckley)
Dorymyrmex bureni (Trager)
Dorymyrmex grandulus (Forel)
Forelius pruinosus Roger
Hypoponera opacior (Forel)
Nylanderia phantasma (Trager)
Odontomachus haematodus (Linnaeus) (Alien)
Pheidole dentata Mayr
Pheidole floridana Emery
Pheidole moerens Wheeler (Alien)
Pheidole obscurithorax Naves (Alien)
Pogonomyrmex badius (Latreille)
Solenopsis carolinensis Forel
Solenopsis invicta Buren (Alien)
Trachymyrmex septentrionalis (McCook)