

Ants (Hymenoptera: Formicidae) of the Little Ochoopee River Dunes, Emanuel County, Georgia¹

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Abstract Ants were surveyed at the Ochoopee Dunes Natural Area and the Ochoopee Dunes Preserve in Emanuel Co., Georgia. Seventy-seven species were collected from the dunes including a new state record, *Paratrechina phantasma* Trager, and a distinctive species of *Forelius* that appears to be undescribed. Native ants dominated the sites, with exotic species generally being relegated to disturbed areas along the margins of the sites.

Key Words Hymenoptera, Formicidae, Ochoopee, exotic species, native species

The Ochoopee Dunes are a series of elongate-oval sand formations that follow the Ochoopee and Little Ochoopee Rivers in southeast Georgia for approximately 65 km and occupy approximately 16,187 ha. This unique dune system is a relatively recent formation believed to have originated during the late Pleistocene as a result of sand deposition on the eastern and northern banks of the Ochoopee and Little Ochoopee Rivers (Wharton 1989, Schmidt 2004). Several habitat types occur along these rivers, including longleaf pine-turkey oak forests, dwarf oak communities, oak hammocks, cypress ponds, bay swamps, and shrub bogs (Wharton 1989). Although much of this land is private, 5 tracts in Emanuel Co. are now protected: the Ochoopee Dunes Preserve (a Nature Conservancy tract) and the Ochoopee Dunes Natural Area (4 tracts), which is managed by the Georgia Department of Natural Resources.

Sandhills and other sand habitats in Florida have been documented to have highly diverse ant faunas (Lubertazzi and Tschinkel 2003, Van Pelt 1956). However, recent studies in Georgia documenting ant faunas in fall line sandhills (Graham et al. 2004, 2008, MacGown and Hill 2008a) and riverine dunes at Big Hammock Natural Area in Tattnall Co. (MacGown and Hill 2008b) showed much lower diversity. In the case of the fall line sites, this was likely due to high disturbance levels; whereas, minimal sandhill habitat and less sampling at the Tattnall site were possible reasons for lower diversity recorded there. Records of ants from various sand habitats were included as part of a larger study of ground dwelling ants in Georgia (Ipser et al. 2004), but the number of species reported from these habitats was minimal, as this was not the specific goal of that study. Here we document the ant fauna of the relatively undisturbed Ochoopee Dunes Natural Area and Preserve in Emanuel Co.

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Materials and Methods

Survey sites. Collections of ants were made at all 4 Natural Area tracts and the Nature Conservancy tract. All 5 sites are located on the east side of the Little Ohoopsee River in Emanuel Co., GA. Latitude and Longitude coordinates were taken near the entrances to the sites and are not indicative of the entire areas that we surveyed. Site 1 (32°34'31"N 82°26'30"W), the McLeod Bridge Tract, is approxi. 281 ha, bisected by McLeod Road, and is approximately 9.3 km west of Swainsboro. Site 2 (32°34'32"N 82°26'33"W), the Hwy 80 Tract, occupies 321 ha and is located on the north side of US Hwy 80 approxi. 11.1 km west of Swainsboro. Site 3 (32°31'51"N 82°27'23"W), Hall's Bridge Tract, is 412 ha, bisected by Hall's Bridge Road (county road 160), and is approxi. 13.4 km southwest of Swainsboro. Site 4 (32°29'23"N 82°24'41"W), the Covena Tract, occupies approxi. 77 ha and is located approxi. 15 km southwest of Swainsboro on Stagecoach Road just off of Hwy 56. Site 5 (32°31'17"N 82°26'42"W), the Ohoopsee Dunes Preserve, is about 108 ha, adjacent to and just south of site 3. The most intensive collecting was done at Site 3 because it was the most extensive and floristically diverse tract.

Collections were centered on sand dune habitats, primarily evergreen scrub forest and evergreen scrub-lichen forest, although some collecting also was done at the margins of the dunes in transitional zones leading to oak hammocks and longleaf pine forests. Longleaf pine, *Pinus palustris* Miller (Pinaceae); turkey oak, *Quercus laevis* Walter (Fagaceae); bluejack oak, *Quercus incana* Bartram; and dwarf post oak, *Quercus margaretta* Ashe were dominant trees. Woody shrubs included such species as woody goldenrod, *Chrysoma pauciflosculosa* Michaux (Asteraceae); coastal sweet pepperbush, *Clethra alnifolia* L. (Cletraceae); rosemary, *Ceratiola ericoides* Michaux (Empetraceae); blueberry, *Vaccinium* spp. (Ericaceae); and red flowering woody mint, *Clinopodium coccineum* (Nuttall ex Hook) (Lamiaceae). Common herbaceous plants in the natural area included such species as fringed bluestar, *Amsonia ciliata* Walter (Apocynaceae); sand chickweed, *Arenaria* sp. (Caryophyllaceae); nailwort, *Paronychia* sp. (Caryophyllaceae); wire plant, *Stipulicida setacea* Michaux (Caryophyllaceae); gopher apple, *Licania michauxii* Prance (Chrysobalanaceae); treadsoftly, *Cnidioscolus stimulosus* (Michaux) (Euphorbiaceae); *Baptisia* sp. (Fabaceae); goat's rue, *Tephrosia virginiana* L. (Fabaceae); sand spikemoss, *Selaginella arenicola* Underwood (Selaginellaceae); and many others. Various mosses and lichens were abundant, and in some areas they formed a rough carpet on the sandy floor. Numerous gopher tortoise [*Gopherus polyphemus* (Daudin) (Testudinidae)] burrows were also present.

Sampling methods. Collections were made on 5 separate occasions: 16 - 22 June 2002, 15 - 16 May 2007, 17 - 18 July 2007, 5 - 9 October 2007, and 21 and 26 July 2008. Collecting methods included pitfall traps, malaise traps, blacklight traps, baiting, beating and sweeping vegetation, visually searching for ants and their colonies, and Berlese litter sampling.

Results and Discussion

Seventy-seven species of ants (Table 1) were collected at Ohoopsee Dunes. This total is much higher than the 48 species reported for the Fall Line Sandhills by Graham et al. (2004, 2008) and is even higher than the 72 species reported by Lubertazzi and Tschinkel (2003) in longleaf pine flatwoods in north Florida. Voucher specimens

Table 1. List of ant species collected at Ochoopee sites 1 - 5. Site numbers are indicated in parentheses. New state records are indicated with an asterisk (*) and exotic species are indicated by the symbol (#)

<i>Amblyopone pallipes</i> (Haldeman) (3, 4)	# <i>Paratrechina vividula</i> (Nylander) (1)
<i>Aphaenogaster ashmeadi</i> Emery (1, 3, 4)	<i>Pheidole adrianoi</i> Naves (3)
<i>Aphaenogaster carolinensis</i> Wheeler (1, 3)	<i>Pheidole davisii</i> Wheeler (1, 2, 3)
<i>Aphaenogaster floridana</i> Smith (1, 3, 5)	<i>Pheidole dentata</i> Mayr (1, 2, 3, 4, 5)
<i>Aphaenogaster fulva</i> Roger (2)	<i>Pheidole dentigula</i> Smith (3)
<i>Aphaenogaster treatae</i> Forel (1, 3)	<i>Pheidole floridana</i> Emery (1)
<i>Aphaenogaster umphreyi</i> Deyrup & Davis (3)	<i>Pheidole metallescens</i> Emery (2, 3, 4)
<i>Brachymyrmex depilis</i> Emery (1, 3, 4)	<i>Pheidole morrisii</i> Forel (1, 2, 3, 5)
# <i>Brachymyrmex patagonicus</i> Mayr (1, 4, 5)	<i>Pogonomyrmex badius</i> (Latreille) (1, 2, 3, 4)
<i>Camponotus castaneus</i> (Latreille) (3)	<i>Ponera exotica</i> Smith (5)
<i>Camponotus floridanus</i> (Buckley) (5)	<i>Ponera pennsylvanica</i> Buckley (5)
<i>Camponotus impressus</i> (Roger) (3)	<i>Proceratium crassicornis</i> Emery (5)
<i>Camponotus socius</i> Roger (1, 2, 3, 4)	<i>Proceratium pergandei</i> (Emery) (3)
<i>Crematogaster ashmeadi</i> Mayr (1, 3)	<i>Proceratium silaceum</i> (Roger) (2, 3)
<i>Crematogaster cerasi</i> (Fitch) (1, 3)	<i>Pyramica angulata</i> (Smith) (3)
<i>Crematogaster lineolata</i> (Say) (1, 3, 4)	<i>Pyramica bunki</i> (Brown) (3)
<i>Crematogaster minutissima</i> Mayr (4, 5)	<i>Pyramica clypeata</i> (Roger) (3)
<i>Crematogaster pinicola</i> Deyrup & Cover (1, 3, 4)	<i>Pyramica dietrichi</i> (Smith) (4, 5)
<i>Cryptopone gilva</i> (Roger) (5)	# <i>Pyramica membranifera</i> (Emery) (4)
# <i>Cyphomyrmex rimosus</i> (Spinola) (1, 3, 4)	<i>Pyramica missouriensis</i> (Smith) (3)
<i>Discothyrea testacea</i> Roger (3)	<i>Pyramica ornata</i> (Mayr) (4)
<i>Dolichoderus mariae</i> Forel (3)	<i>Pyramica pergandei</i> (Emery) (5)
<i>Dorymyrmex bureni</i> (Trager) (1, 2, 3, 4)	<i>Pyramica rostrata</i> (Emery) (3)
<i>Dorymyrmex grandulus</i> (Forel) (2, 3)	<i>Pyramica talpa</i> (Weber) (3)
<i>Dorymyrmex smithi</i> Cole (1, 4)	<i>Pyramica wrayi</i> (Brown) (5)
* <i>Forelius</i> sp. (3)	<i>Solenopsis abdita</i> Thompson (3, 4)
<i>Forelius pruinosus</i> (Roger) (1, 2, 3, 4, 5)	<i>Solenopsis carolinensis</i> (Say) (1, 2, 3, 4)
<i>Formica biophilica</i> Trager (3)	# <i>Solenopsis invicta</i> Buren (1, 3, 4)
<i>Formica dolosa</i> Buren (3, 4)	<i>Solenopsis pergandei</i> Forel (3)

Table 1. Continued

<i>Formica pallidefulva</i> Latreille (1)	<i>Solenopsis tennesseensis</i> Smith (3)
<i>Hypoponera opacior</i> (Forel) (1, 2, 3, 4, 5)	<i>Strumigenys louisianae</i> Roger (1, 3, 4)
<i>Lasius alienus</i> (Foerster) (3)	<i>Temnothorax curvispinosus</i> Mayr (3, 4)
<i>Monomorium viride</i> Brown (3, 4)	<i>Temnothorax pergandei</i> (Emery) (1, 2, 3, 4)
<i>Myrmecina americana</i> Emery (3, 4)	<i>Temnothorax schaumii</i> Roger (3)
<i>Myrmica punctiventris</i> Roger (3)	<i>Temnothorax smithi</i> (Baroni Urbani) (1)
<i>Neivamyrmex opacithorax</i> (Emery) (3)	<i>Temnothorax texanus</i> (Wheeler) (1, 3)
<i>Paratrechina faisonensis</i> (Forel) (3)	# <i>Tetramorium bicarinatum</i> (Nylander) (5)
<i>Paratrechina parvula</i> (Mayr) (1, 2, 3, 4)	<i>Trachymyrmex septentrionalis</i> (McCook) (1, 2, 3, 4, 5)
* <i>Paratrechina phantasma</i> Trager (1, 2, 3, 5)	

were deposited in the Mississippi Entomological Museum at Mississippi State University and Archbold Biological Station in Lake Placid, FL.

The richness of the Ochopee Dunes ant fauna is an example of the importance of these dunes as repositories of biodiversity. The geological history of the dunes suggests that they support a relict fauna. The dunes are wind-blown deposits consisting of 8 - 25 m of silica sand (Markewich and Markewich 1994). According to Markewich and Markewich (1994), these dunes must have formed in episodes during a prolonged dry climatic period between 3,000 and 15,000 years ago when powerful winds blew sand from dry riverine deposits to the east, depositing sand on much older terraces, perhaps dating from the Miocene. One would not expect to find many, if any, species to evolve in situ in such a short time; we did not find any local endemic ants analogous to species, such as *Dorymyrmex elegans* (Trager), which are restricted to the older sand ridges of Florida. One might, however, expect to find ants and other organisms that represent remnants of a local fauna adapted to dry climatic conditions and now restricted to sandy uplands where excessive drainage presents many of the environmental challenges of a semiarid climate. Sixteen species of ants seem to represent species that might have been more widespread in the area during a drier climatic regimen: *Dorymyrmex bureni* (Trager), *D. grandulus* (Forel), *D. smithi* Cole, *Forelius pruinosus* (Roger), *Forelius* sp., *Paratrechina phantasma* Trager, *Camponotus socius* Roger, *Monomorium viride* Brown, *Solenopsis pergandei* Forel, *Pogonomyrmex badius* (Latreille), *Aphaenogaster floridana* Smith, *A. umphreyi* Deyrup and Davis, *Pheidole adrianoi* Naves, *P. davisii* Wheeler, *P. metallescens* Emery, and *P. morrisii* Forel. Two of these species, *P. phantasma* and *Forelius* sp., represent new state records for Georgia. The single specimen of *Forelius* sp. collected is distinctive and likely represents an undescribed species.

Compared with the number of native species collected, few exotics were found, none of them abundant. *Paratrechina vividula* (Nylander) (possibly native) was found only along the edge of the sandhill habitat at Site 1 and was not obviously abundant. Only one dealate queen of *Pyramica membranifera* (Emery) was found at site 4. Several

alate *Cyphomyrmex rimosus* (Spinola) queens were collected in a malaise trap, but otherwise only a few workers were found. *Solenopsis invicta* Buren was found only along powerline right-of-ways and roadsides at edges of sandhill habitat and was not seen in undisturbed areas. Alates of *Brachymyrmex patagonicus* Mayr and *Tetramorium bicarinatum* (Nylander) were collected only at blacklight, but workers were not collected within the dunes themselves.

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