



A Survey of Ground-Dwelling Ants (Hymenoptera: Formicidae) in Georgia

Authors: Ipser, Reid M., Brinkman, Mark A., Gardner, Wayne A., and Peeler, Harold B.

Source: Florida Entomologist, 87(3) : 253-260

Published By: Florida Entomological Society

URL: [https://doi.org/10.1653/0015-4040\(2004\)087\[0253:ASOGAH\]2.0.CO;2](https://doi.org/10.1653/0015-4040(2004)087[0253:ASOGAH]2.0.CO;2)

The BioOne Digital Library (<https://bioone.org/>) provides worldwide distribution for more than 580 journals and eBooks from BioOne's community of over 150 nonprofit societies, research institutions, and university presses in the biological, ecological, and environmental sciences. The BioOne Digital Library encompasses the flagship aggregation BioOne Complete (<https://bioone.org/subscribe>), the BioOne Complete Archive (<https://bioone.org/archive>), and the BioOne eBooks program offerings ESA eBook Collection (<https://bioone.org/esa-ebooks>) and CSIRO Publishing BioSelect Collection (<https://bioone.org/csiro-ebooks>).

Your use of this PDF, the BioOne Digital Library, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Digital Library content is strictly limited to personal, educational, and non-commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne is an innovative nonprofit that sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

A SURVEY OF GROUND-DWELLING ANTS (HYMENOPTERA: FORMICIDAE) IN GEORGIA

REID M. IPSER, MARK A. BRINKMAN, WAYNE A. GARDNER AND HAROLD B. PEELER

Department of Entomology, University of Georgia, College of Agricultural and Environmental Sciences
Griffin Campus, 1109 Experiment Street, Griffin, GA 30223-1797, USA

ABSTRACT

Ground-dwelling ants (Hymenoptera: Formicidae) were sampled at 29 sites in 26 counties in Georgia with pitfall traps, leaf litter extraction, visual searching, and bait stations. We found 96 ant taxa including nine species not previously reported from Georgia: *Myrmica americana* Weber, *M. pinetorum* Wheeler, *M. punctiventris* Roger, *M. spatulata* Smith, *Pyramica wrayi* (Brown), *Stenamma brevicorne* (Mayr), *S. diecki* Emery, *S. impar* Forel, and *S. schmitti* Wheeler, as well as three apparently undescribed species (*Myrmica* sp. and two *Stenamma* spp.). Combined with previous published records and museum records, we increased the total number of ground-dwelling ants known from Georgia to 144 taxa.

Key Words: ground-dwelling ants, Formicidae, survey, Georgia, species.

RESUMEN

Hormigas que habitan en el suelo (Hymenoptera: Formicidae) fueron recolectadas en 29 sitios en 26 condados del estado de Georgia con trampas de suelo, extracción de hojarasca, búsqueda visual, y trampas de cebo. Nosotros encontramos 96 taxa de hormigas incluyendo nueve especies no informadas anteriormente en Georgia: *Myrmica americana* Weber, *M. pinetorum* Wheeler, *M. punctiventris* Roger, *M. spatulata* Smith, *Pyramica wrayi* (Brown), *Stenamma brevicorne* (Mayr), *S. diecki* Emery, *S. impar* Forel, y *S. schmitti* Wheeler, además de tres especies aparentemente no descritas (*Myrmica* sp. y dos *Stenamma* spp.). Al juntar estos datos con las publicaciones y registros de museos, nosotros aumentamos el número de hormigas conocidas que habitan el suelo en Georgia a un total de 144 taxa.

The state of Georgia in the southeastern United States is characterized by a relatively wide range of soil, topographic and climatic conditions. The eight Major Land Resource Areas (MLRAs) identified in the state are (1) Atlantic Coast Flatwoods, (2) Southern Coastal Plains, (3) Carolina and Georgia Sand Hills, (4) Black Lands, (5) Southern Piedmont, (6) Southern Appalachian Ridges and Valleys, (7) Sand Mountains, and (8) Blue Ridge (USDA–SCS 1981). Each MLRA is characterized by a unique combination or pattern of soils, climate, water resources, and land use. These factors, in turn, affect the biotic communities and habitats as well as the floral and faunal characteristics of each.

The diversity and abundance of ants (Hymenoptera: Formicidae) in Georgia are relatively unknown. Wheeler (1913) published a list of 72 ant species collected in Georgia by J. C. Bradley and W. T. Davis; taxonomic revisions have since decreased this list to 62 species. Since that publication, museum records and collections have been the primary sources of occurrence and distribution of ant species in the state; these data are limited in scope. With the exception of Florida (Johnson 1986; Deyrup 2003) and South Carolina (Smith 1934), surveys for ant species are also limited from areas bordering Georgia.

The objective of the study reported herein was to collect, identify, and catalog ground-dwelling ant species from representative MLRAs in Georgia. Undisturbed habitats were purposely sampled to avoid high population levels of two invasive ant species—*Solenopsis invicta* Buren and *Linepithema humile* (Mayr)—that occur throughout the state and reportedly compete with and displace other ant species (Porter & Savignano 1990; Holway 1999).

MATERIALS AND METHODS

Sample Methods and Sites

Twenty-nine sites were sampled 1 to 4 times between June 2000 and September 2002 for ground-dwelling ants (Fig. 1). Most sites were located in state parks; others were on state-owned properties. The sites represented six of the eight MLRAs identified in Georgia. Information and characteristics of each collection site are listed in Table 1.

Each site was 600 m² and was located in wooded areas and at least 60 m from any paths, roads, or right-of-ways. Sampling methods employed were pitfall trapping, extraction from leaf litter collections, visual searching, and baiting as described by Agosti & Alonso (2000) and Bestle-

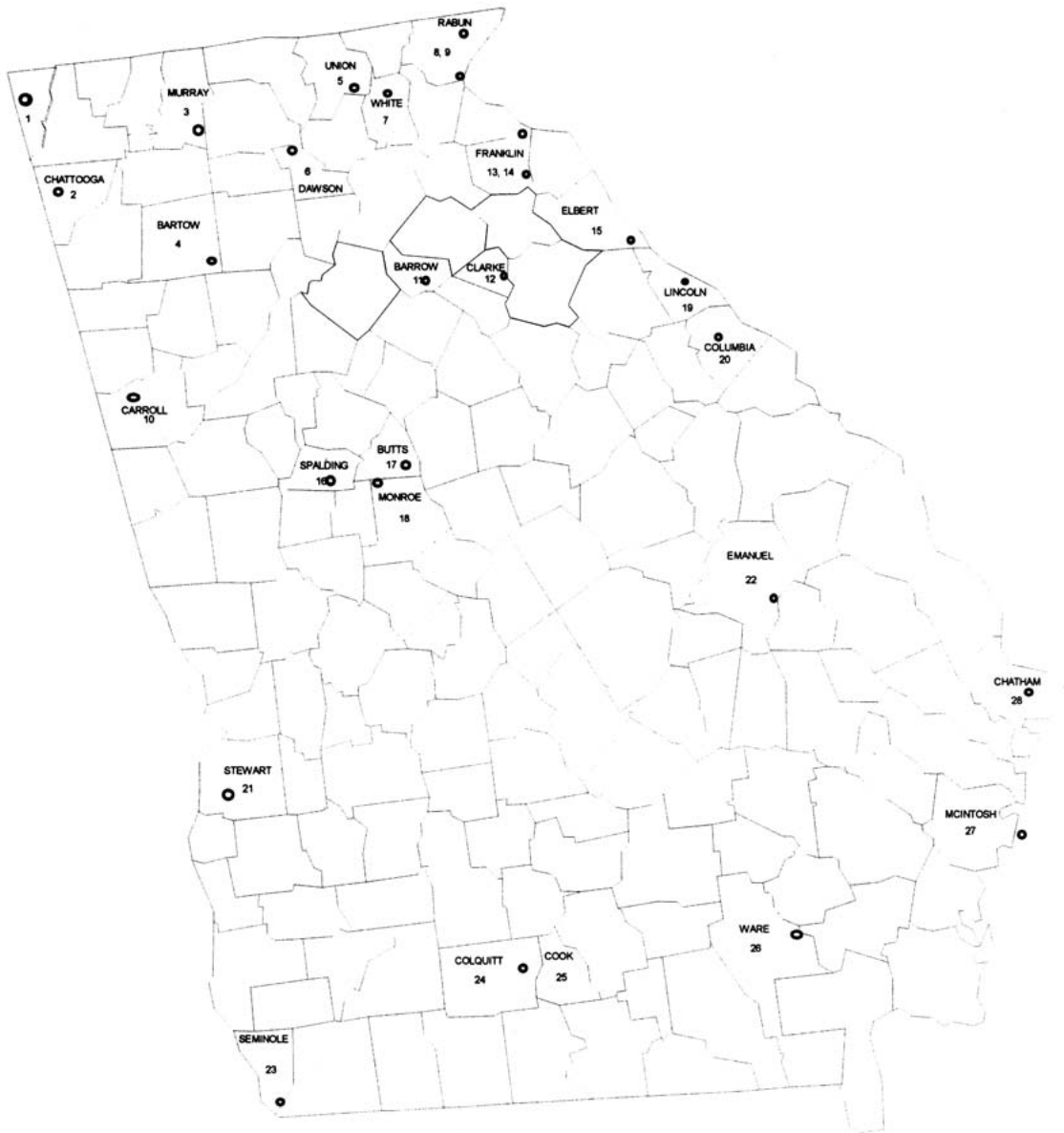


Fig. 1. Georgia sites sampled for ground-dwelling ants, 2000-2002.

meyer et al. (2000). For each sampling event, 20 pitfall traps were placed individually at 1-m intervals along a transect. Traps were 40-ml plastic vials filled to 60% of container volume with propylene glycol. The vials were placed in the ground with the upper opening level with the soil surface. The traps remained in the ground for 7 d when they were removed, capped, and transported to the laboratory for processing. Leaf litter was gathered by hand from several locations within the 600 m² site. These were combined and placed in a 50-L plastic bag, stored on ice, and transported to the laboratory. In the laboratory, litter

samples were divided and placed in Berlese funnels (Agosti & Alonso 2000) for 24 h to separate ants. Bait stations used were those described by Brinkman et al. (2001). Tuna packaged in oil, was placed in a thin layer over the surface of a 2.5-cm diam filter paper disk (Whatman no. 1) in a plastic Petri dish (10 × 35 mm). Ten stations were placed individually at 2-m intervals along a transect. The stations remained uncovered on the ground for 2 h. They were then covered, placed on ice, and transported to the laboratory for processing. The ground, tree trunks, fallen trees, and other surfaces were visually searched for ants at

TABLE 1. LOCATIONS AND CHARACTERISTICS OF SITES SAMPLED FOR GROUND-DWELLING ANTS IN GEORGIA, 2000-2002. ALL STUDY SITES WERE IN STATE-OWNED PROPERTY (STATE PARKS OR UNIVERSITY OF GEORGIA).

| Survey Site | Sites | County | N;W | Major Land Resource Areas | Elevation |
|-------------|----------------------|-----------|-------------------|------------------------------------|-----------|
| 1 | Cloudland Canyon | Dade | 34°50.4; 085°28.9 | Sand Mountain | 602 m |
| 2 | Sloppy Floyd | Chattooga | 34°26.4; 085°20.2 | Sand Mountain/Southern Appalachian | 303 m |
| 3 | Fort Mountain | Murray | 34°46.6; 084°42.5 | Southern Appalachian/Blue Ridge | 906 m |
| 4 | Red Top Mountain | Bartow | 34°08.6; 084°42.2 | Southern Appalachian/Blue Ridge | 325 m |
| 5 | Vogel | Union | 34°46.1; 083°54.9 | Blue Ridge | 236 m |
| 6 | Amicalola Falls | Dawson | 34°34.2; 084°14.7 | Blue Ridge | 900 m |
| 7 | Unicoi | White | 34°43.9; 083°43.6 | Blue Ridge | 887 m |
| 8 | Black Rock Mountain | Rabun | 34°54.4; 083°24.3 | Blue Ridge | 1055 m |
| 9 | Tallulah Gorge | Rabun | 34°44.4; 083°23.3 | Blue Ridge | 539 m |
| 10 | John Tanner | Carroll | 33°36.1; 085°09.9 | Southern Piedmont | 332 m |
| 11 | Fort Yargo | Barrow | 33°57.9; 083°43.4 | Southern Piedmont | 303 m |
| 12 | UGA Whitehall Forest | Clarke | 33°53.7; 083°21.9 | Southern Piedmont | 887m |
| 13 | Victoria Bryant | Franklin | 34°17.7; 083°09.7 | Southern Piedmont | 236 m |
| 14 | Tugaloo | Franklin | 24°29.5; 083°04.4 | Southern Piedmont | 374 m |
| 15 | Richard B. Russell | Elbert | 34°10.8; 082°45.9 | Southern Piedmont | 214m |
| 16 | Bobby Brown | Elbert | 33°58.1; 082°34.6 | Southern Piedmont | 89 m |
| 17 | UGA Griffin Campus | Spalding | 33°16.0; 084°17.2 | Southern Piedmont | 307 m |
| 18 | Indian Springs | Butts | 33°14.9; 083°55.5 | Southern Piedmont | 193 m |
| 19 | High Falls | Monroe | 33°10.3; 084°00.7 | Southern Piedmont | 178 m |
| 20 | Elijah Clark | Lincoln | 33°51.3; 082°24.0 | Southern Piedmont | 154 m |
| 21 | Mistletoe | Columbia | 33°39.9; 082°22.9 | Southern Piedmont | 163 m |
| 22 | Providence Canyon | Stewart | 32°04.0; 084°54.3 | Southern Coastal Plain | 222 m |
| 23 | George L. Smith | Emanuel | 32°32.7; 082°07.5 | Southern Coastal Plain | 123 m |
| 24 | Seminole | Seminole | 30°48.2; 084°52.7 | Southern Coastal Plain | 35 m |
| 25 | Reed Bingham | Colquitt | 31°09.6; 083°32.3 | Southern Coastal Plain | 78 m |
| 26 | Laura S. Walker | Ware | 31°08.5; 083°12.9 | Atlantic Coast Flatwoods | 47 m |
| 27 | Sapelo Island Dunes | McIntosh | 31°23.4; 081°15.9 | Atlantic Coast Flatwoods | 0 m |
| 28 | North Sapelo Island | McIntosh | 31°23.4; 081°15.9 | Atlantic Coast Flatwoods | 19 m |
| 29 | UGA Bamboo Farm | Chatham | 31°59.9; 081°16.2 | Atlantic Coast Flatwoods | 19 m |

TABLE 2. LIST OF GROUND-DWELLING ANTS COLLECTED IN GEORGIA 2000-2002 SURVEY WITH COLLECTION SITE (S) NOTED.

| Species | Survey sites ¹ |
|--|---|
| <i>Acanthomyops interjectus</i> (Mayr) | 5 |
| <i>Amblyopone pallipes</i> (Haldeman) | 6,8,21,9 |
| <i>Aphaenogaster ashmeadi</i> (Emery) | 10,28 |
| <i>Aphaenogaster fulva</i> Roger | 6,10,11,18,19 |
| <i>Aphaenogaster lamellidens</i> Mayr | 11,16,18,19 |
| <i>Aphaenogaster miamiana</i> Wheeler | 27 |
| <i>Aphaenogaster picea/rudis/texana</i> complex ² | 1,2,3,4,5,6,7,8,9,10,11,12,13,14,16,18,19,20,21,23,29 |
| <i>Aphaenogaster tennesseensis</i> (Mayr) | 23 |
| <i>Brachymyrmex depilis</i> Emery | 18,19,22,23,24,25,26,29 |
| <i>Brachymyrmex musculus</i> Forel | 23,29 |
| <i>Camponotus americanus</i> Mayr | 1,2,4,10,11,14,18,19 |
| <i>Camponotus castaneus</i> (Latreille) | 10,14,29 |
| <i>Camponotus floridanus</i> (Buckley) | 19,24,29 |
| <i>Camponotus nearcticus</i> Emery | 10,21,26 |
| <i>Camponotus pennsylvanicus</i> (De Geer) | 1,2,4,8,9,10,11,18,19,23 |
| <i>Camponotus subbarbatus</i> Emery | 1,19 |
| <i>Crematogaster ashmeadi</i> Mayr | 2,4,9,10,11,12,14,16,18,19,20,21,23,26,28,29 |
| <i>Crematogaster cerasi</i> (Fitch) | 29 |
| <i>Crematogaster lineolata</i> (Say) | 1,2,7,9,11,12,14,18,19,20 |
| <i>Crematogaster minutissima</i> Mayr | 10,18,19 |
| <i>Cyphomyrmex rimosus</i> (Spinola) | 22,24,25,26 |
| <i>Dorymyrmex bureni</i> Trager | 22,25,26,27,29,26 |
| <i>Dorymyrmex insanus</i> (Buckley) | 25,29 |
| <i>Forelius analis</i> (Andre) | 10,14,18,19,29 |
| <i>Forelius pruinus</i> (Roger) | 25 |
| <i>Formica archboldi</i> Smith | 10 |
| <i>Formica exsectoides</i> Forel | 1 |
| <i>Formica pallidefulva</i> Latreille | 6,10,14,17,19,20,21,23,29 |
| <i>Formica rubicunda</i> Emery | 1 |
| <i>Formica schaufussi</i> Mayr | 10,19 |
| <i>Formica subintegra</i> Wheeler | 10 |
| <i>Formica subsericea</i> Say | 1,5,6,7,9,10,11,18,20 |
| <i>Hypoponera opaciceps</i> (Mayr) | 5,7,18,20,23,29 |
| <i>Hypoponera opacior</i> (Forel) | 10,17,18,19,20,21,23,29 |
| <i>Lasius alienus</i> | 5,6,8,18,19,25,29 |
| <i>Lasius neoniger</i> Emery | 10 |
| <i>Leptothorax curvispinosus</i> Mayr | 2,3,4,9,10,11,29 |
| <i>Leptothorax pergandei</i> Emery | 9,16,24,28,29 |
| <i>Leptothorax schaumii</i> Roger | 14,19 |
| <i>Leptothorax smithi</i> Baroni Urbani | 16 |
| <i>Linepithema humile</i> (Mayr) | 10,17,21,25 |
| <i>Monomorium minimum</i> (Buckley) | 1,10,18,19,21 |
| <i>Monomorium viride</i> Brown | 27 |
| <i>Myrmecina americana</i> Emery | 1,3,4,5,8,9,10,11,13,14,16,20,21 |
| <i>Myrmica americana</i> Weber | 6,18,23 |
| <i>Myrmica pinetorum</i> Wheeler | 19 |
| <i>Myrmica punctiventris</i> Roger | 5,7,8,9,10,18,19 |
| <i>Myrmica spatulata</i> Smith | 5,9 |
| <i>Myrmica</i> sp. (undescribed) ³ | 6 |
| <i>Odontomachus brunneus</i> (Patton) | 29 |

¹Sites and site information are provided in Table 1.²*Aphaenogaster picea/rudis/texana* complex includes *A. picea* (Wheeler), *A. picea rudis* Enzmann, *A. texana* Wheeler, and *A. texana carolinensis* Wheeler species (S. Cover, personal communication).³Previously undescribed species (S. Cover, personal communication).⁴*Solenopsis molesta* complex includes *S. carolinensis* Forel, *S. molesta* (Say), *S. pergandei* Forel, *S. texana* Emery, *S. truncorum* Forel species (S. Cover, personal communication).⁵Two previously undescribed species and first records from Georgia (S. Cover, personal communication).

TABLE 2. (CONTINUED) LIST OF GROUND-DWELLING ANTS COLLECTED IN GEORGIA 2000-2002 SURVEY WITH COLLECTION SITE (S) NOTED.

| Species | Survey sites ¹ |
|---|--|
| <i>Pachycondyla chinensis</i> (Emery) | 11,14,15,16,18 |
| <i>Paratrechina arenivaga</i> Wheeler | 6,10,12,19,22 |
| <i>Paratrechina faisonensis</i> (Forel) | 1,7,10,11,14,17,19,21,28,29 |
| <i>Paratrechina parvula</i> (Mayr) | 19 |
| <i>Paratrechina vividula</i> (Nylander) | 2,4,7,9,10,11,19,20,28,29 |
| <i>Pheidole adrianoi</i> Naves | 29 |
| <i>Pheidole bicarinata</i> Mayr | 10,21,26,29 |
| <i>Pheidole bicarinata vinelandica</i> Forel | 10,14 |
| <i>Pheidole crassicornis</i> Emery | 18,19,22,23,25,26 |
| <i>Pheidole dentata</i> Mayr | 1,10,14,16,19,21,23,24,29 |
| <i>Pheidole dentigula</i> Smith | 10,18,19,23,24,28,29 |
| <i>Pheidole littoralis</i> Cole | 23 |
| <i>Pheidole metallescens</i> | 23 |
| <i>Pheidole morrisii</i> Forel | 29 |
| <i>Pheidole tysoni</i> Forel | 10,18,19,21,23 |
| <i>Pogonomyrmex badius</i> (Latreille) | 27,29 |
| <i>Polyergus lucidus</i> Mayr | 29 |
| <i>Ponera pennsylvanica</i> | 1,2,5,6,7,8,9,10,11,14,18,19 |
| <i>Prenolepis imparis</i> (Say) | 1,2,3,5,6,7,8,9,10,11,12,14,16,18,19,20,23 |
| <i>Proceratium croceum</i> (Roger) | 7 |
| <i>Proceratium pergandei</i> (Emery) | 19 |
| <i>Pseudomyrmex ejectus</i> (Smith) | 21 |
| <i>Pyramica bunki</i> (Brown) | 11 |
| <i>Pyramica carolinensis</i> (Brown) | 3 |
| <i>Pyramica ornata</i> (Mayr) | 10,18,19,21 |
| <i>Pyramica rostrata</i> (Emery) | 18,19 |
| <i>Pyramica wrayi</i> (Brown) | 29 |
| <i>Solenopsis geminata</i> (Fabricius) | 27 |
| <i>Solenopsis invicta</i> Buren | 10,18,19,21,22,24,25,26,28,29 |
| <i>Solenopsis molesta</i> complex ⁴ | 2,4,7,9,10,11,12,14,17,18,19,21,22,23,24,26,29 |
| <i>Stenamma brevicorne</i> (Mayr) | 18 |
| <i>Stenamma diecki</i> Emery | 1,4,5,6,7,8,9,23 |
| <i>Stenamma impar</i> Forel | 18,19 |
| <i>Stenamma schmitti</i> Wheeler | 5,6,8,18,19 |
| <i>Stenamma</i> spp. (2 undescribed species) ⁵ | 6 |
| <i>Strumigenys louisianae</i> Roger | 18,19,21,23,29 |
| <i>Tapinoma sessile</i> (Say) | 3,6,8,9,18,19,21 |
| <i>Trachymyrmex septentrionalis</i> (McCook) | 13,14,19,22,23,25 |

¹Sites and site information are provided in Table 1.

²*Aphaenogaster picea/rudis/texana* complex includes *A. picea* (Wheeler), *A. picea rudis* Enzmann, *A. texana* Wheeler, and *A. texana carolinensis* Wheeler species (S. Cover, personal communication).

³Previously undescribed species (S. Cover, personal communication).

⁴*Solenopsis molesta* complex includes *S. carolinensis* Forel, *S. molesta* (Say), *S. pergandei* Forel, *S. texana* Emery, *S. truncorum* Forel species (S. Cover, personal communication).

⁵Two previously undescribed species and first records from Georgia (S. Cover, personal communication).

each sampling time. The total amount of time spent on visual searching was 1.5 h, but varied based on the number of individuals involved in the search. Ants discovered in the visual searches were collected, placed in 70% ethyl alcohol, and transported to the laboratory for processing.

In the laboratory, ant specimens were separated and placed in 95% ethyl alcohol. Identifications were made with keys by Bolton (1994, 2000); Buren (1968); Creighton (1950); Cuzzo (2000);

Deyrup et al. (1985); DuBois (1986); Gregg (1958); Holldobler & Wilson (1990); Johnson (1988); MacKay (2000); Smith (1957); Snelling (1973, 1988); Snelling & Longino (1992); Taylor (1967); Trager (1984, 1988); Ward (1985, 1988); Wilson (1955); and Wing (1968), and by comparison with specimens housed in the University of Georgia Natural History Museum (Athens, GA). Stefan Cover (The Museum of Comparative Zoology, Harvard Univ., Cambridge, MA) and Mark Deyrup

TABLE 3. SPECIES OF GROUND-DWELLING ANTS PREVIOUSLY REPORTED TO OCCUR IN GEORGIA BUT NOT COLLECTED IN THE 2000-2002 STATE SURVEY.

| Species | Record |
|---|----------------------|
| <i>Acanthomyops claviger</i> (Roger) | UGANHM ¹ |
| <i>Acanthomyops murphyi</i> (Forel) | UGANHM ¹ |
| <i>Aphaenogaster ashmeadi</i> (Emery) | Wheeler 1913 |
| <i>Aphaenogaster treatae</i> Forel | Wheeler 1913 |
| <i>Camponotus caryae</i> (Fitch) | UGANHM ¹ |
| <i>Camponotus decipiens</i> Emery | Wheeler 1913 |
| <i>Camponotus discolor</i> (Buckley) | Wheeler 1913 |
| <i>Camponotus impressus</i> (Roger) | ABS ² |
| <i>Camponotus socius</i> Roger | Wheeler 1913 |
| <i>Crematogaster missouriensis</i> Emery | ABS ² |
| <i>Crematogaster pilosa</i> Emery | Wheeler 1913 |
| <i>Crematogaster</i> sp. (undescribed) | ABS ² |
| <i>Cryptopone gilva</i> (Roger) | UGANHM ¹ |
| <i>Discothyrea testacea</i> Roger | ABS ² |
| <i>Dolichoderus mariae</i> Forel | Wheeler 1913 |
| <i>Dolichoderus pustulatus</i> Mayr | Wheeler 1913 |
| <i>Dorymyrmex grandulus</i> (Forel) | UGA NHM ¹ |
| <i>Formica difficilis</i> Emery | Wheeler 1913 |
| <i>Formica integra</i> Nylander | Wheeler 1913 |
| <i>Formica nitidiventris</i> Emery | Wheeler 1913 |
| <i>Formica obscuriventris</i> Mayr | Wheeler 1913 |
| <i>Leptothorax bradleyi</i> Wheeler | Wheeler 1913 |
| <i>Leptothorax texanus</i> Wheeler | ABS ² |
| <i>Monomorium pharaonis</i> (L.) | Wheeler 1913 |
| <i>Myrmica latifrons</i> Starcke | Wheeler 1913 |
| <i>Nievamymex carolinensis</i> (Emery) | UGANHM ¹ |
| <i>Nievamymex nigrescens</i> (Cresson) | UGANHM ¹ |
| <i>Neivamymex opacithorax</i> (Emery) | Wheeler 1913 |
| <i>Paratrechina longicornis</i> (Latreille) | Wheeler 1913 |
| <i>Pheidole pilifera</i> (Roger) | UGANHM ¹ |
| <i>Ponera exotica</i> Smith | ABS ² |
| <i>Proceratium creek</i> De Andrade | ABS ² |
| <i>Proceratium crassicorne</i> Emery | ABS ² |
| <i>Pseudomyrmex pallidus</i> (Smith) | Wheeler 1913 |
| <i>Pyramica abdita</i> (Wesson) | ABS ² |
| <i>Pyramica angulata</i> (Smith) | ABS ² |
| <i>Pyramica clypeata</i> (Roger) | UGANHM ¹ |
| <i>Pyramica dietrichi</i> (Smith) | UGANHM ¹ |
| <i>Pyramica laevinasis</i> (Smith) | ABS ² |
| <i>Pyramica ohioensis</i> (Kennedy & Schramm) | ABS ² |
| <i>Pyramica pergandei</i> (Emery) | ABS ² |
| <i>Pyramica pilinasis</i> (Forel) | ABS ² |
| <i>Pyramica pulchella</i> (Emery) | ABS ² |
| <i>Pyramica reflexa</i> (Wesson) | ABS ² |
| <i>Solenopsis picta</i> Emery | UGANHM ¹ |
| <i>Solenopsis tennesseensis</i> Smith | ABS ² |
| <i>Solenopsis xyloni</i> McCook | Jouvenaz et al. 1977 |
| <i>Tetramorium bicarinatum</i> (Nylander) | UGA NHM ¹ |

¹University of Georgia Natural History Museum.
²Archbold Biological Station.

(Archbold Biological Station, Lake Placid, FL) confirmed species identifications. Voucher specimens have been deposited in the University of Georgia Natural History Museum and the Museum of Comparative Zoology at Harvard University.

RESULTS AND DISCUSSION

Ninety-six species of ground-dwelling ants representing 33 genera were collected and identified in this 2-year survey (Table 2). Of those collected,

9 species have not been previously reported from Georgia. These are *Myrmica americana* Weber, *M. pinetorum* Wheeler, *M. punctiventris* Roger, *M. spatulata* Smith, *Pyramica wrayi* (Brown), *Stenamma brevicorne* (Mayr), *S. diecki* Emery, *S. impar* Forel, and *S. schmitti* Wheeler.

Of those previously unreported species, *M. americana* was collected from 3 sites, *M. pinetorum* was collected from 1 site, *M. punctiventris* was collected from 7 sites, and *M. spatulata* was collected from 2 sites. Ants of this genus nest in soil and in rotting wood and are primarily carnivorous, but they will feed on plant exudates such as nectar (Creighton 1950). In addition, *P. wrayi* and *S. brevicorne* were each collected from 1 site, *S. diecki* was collected from 8 sites, *S. schmitti* was collected from 5 sites, and *S. impar* was collected from 2 sites. All *Stenamma* species are carnivorous, and *Pyramica* are specialized predators of collembolans (Holldobler & Wilson 1990).

Eleven individuals of *Myrmica* and 3 individuals of *Stenamma*, possibly representing two species, were collected from Amicalola State Park in Dawson Co. (site 6) and represent as yet undescribed species (S. Cover, pers. comm.). Those specimens were collected on 2-V-2000, primarily by pitfall trapping and leaf litter collection.

A review of ant specimens deposited in the Archbold Biological Station (ABS), the University of Georgia Natural History Museum (UGANHM), the lists of ants published by Wheeler (1913), and a survey conducted by Jouvenaz et al. (1977) reveal that 48 species of ground-dwelling ants representing 21 genera have been reported from Georgia but were not collected in the survey reported herein (Table 3). To date, these two lists (Tables 2 and 3) comprise the ground-dwelling ant species reported from Georgia. Species collected within the *Aphaenogaster picea/rudis/texana* complex and the *Solenopsis molesta* complex are footnoted in Table 2.

In terms of occurrence and distribution, *Pre-nolepis imparis* (Say) was collected from 17 of the 29 sites sampled, the *Aphaenogaster picea/rudis/texana* complex from 21 sites; the *Solenopsis molesta* complex from 17 sites, and *Crematogaster ashmeadi* Mayr from 16 sites in this survey. All other species were collected from less than one-half of the sites. Members of the genus *Pheidole* were most numerous with 2,765 individuals representing 10 species collected at 14 sites. *Dorymyrmex burnei* (Trager), *D. insanus* (Buckley), and *Cyphomyrmex rimosus* (Spinola) were collected only at southern sites, while *Amblyopone pallipes* (Haldeman), *Ponera pennsylvanica* Buckley, and *Tapinoma sessile* (Say) were collected from sites in northern Georgia. *Pseudomyrmex ejectus* (Smith) was collected from pitfall traps at one site. *Pseudomyrmex* spp. are characteristically arboreal in their habits. These specimens most likely dropped to the forest floor, and thus

were collected as ground-dwellers. Three species—the seed harvester *Pogonomyrmex badius* (Latreille), the obligate slave raider *Polyergus lucidus* Mayr, and the generalist *Aphaenogaster miamiana* Wheeler—were recovered only on Sapelo Island, a barrier island on Georgia's coast.

The survey reported herein provides a basis for various ecological studies and assessments. Ant assemblages, species composition, and community structure are important in terms of community ecology. For example, in Australia, ants are one of the most functionally important faunal groups (Matthews & Kitching 1984; Anderson 1992) and are model organisms for studies in community ecology (Anderson 1983, 1988, 1991; Greenslade & Halliday 1983). Ants also have been used as bio-indicators in mine site rehabilitation (Majer 1983, 1985).

Schultz & McGlynn (2000) noted the many interactions that occur between ants and other organisms within habitats. They further postulated that if these interactions are understood, one could predict ecological conditions within a given habitat based upon the presence or absence of specific ants. Furthermore, one could correlate the presence of a specific ant species with specific ecological conditions, and these correlations could be used as predictors of ant biodiversity and interactions among ant species (Alonso 2000).

This survey is the first published listing of ground-dwelling ants in Georgia since Wheeler (1913). This compilation will serve to support biodiversity, systematics, and ecological studies for Georgia and surrounding environs.

ACKNOWLEDGMENTS

Stan Diffie, Vanessa Hammons, and Jeremy Davidson provided technical support. Georgia Department of Natural Resources provided permission to use state parks for collection sites. Stefan Cover (The Museum of Comparative Zoology, Harvard University) and Mark Deyrup (Archbold Biological Station, Lake Placid, FL) verified species identifications, and Cecil Smith of the Georgia Natural History Museum supplied equipment and allowed access to ant specimens.

REFERENCES CITED

- AGOSTI, D., AND L. E. ALONSO. 2000. The ALL protocol: a standard protocol for the collection of ground-dwelling ants, pp. 204-206 In D. Agosti, J. Majer, L. E. Alonso, and T. Schultz [eds.], *Ants: Standard Methods for Measuring and Monitoring Biodiversity*. Smithsonian Institution Press, Washington, DC.
- ALONSO, L. E. 2000. Ants as indicators of diversity, pp. 80-88 In D. Agosti, J. Majer, L. E. Alonso, and T. Schultz [eds.], *Ants: Standard Methods for Measuring and Monitoring Biodiversity*. Smithsonian Institution Press, Washington, DC.
- ANDERSON, A. N. 1983. Species diversity and temporal distribution of ants in the semi-arid mallee region of northwestern Victoria. *Aust. J. Ecol.* 8: 127-137.
- ANDERSON, A. N. 1988. Immediate and longer-term effects of fire on seed predation by ants in sclerophyl-

- lous vegetation in southeast Australia. *Aust. J. Ecol.* 13: 285-293.
- ANDERSON, A. N. 1991. Sampling communities of ground-foraging ants: Pitfall catches compared with quadrat counts in an Australian tropical savanna. *Aust. J. Ecol.* 16: 273-279.
- ANDERSON, A. N. 1992. Regulation of "momentary" diversity by dominant species in exceptionally rich ant communities of the Australian seasonal tropics. *American Natur.* 140: 401-420.
- BESTLEMEYER, B. T., D. AGOSTI, L. E. ALONSO, C. ROBERTO, F. BRANDAO, W. L. BROWN JR., J. H. C. DELABIE, AND R. SILVESTRE. 2000. Field techniques for the study of ground-dwelling ants: an overview, description, and evaluation, pp. 122-144 *In* D. Agosti, J. Majer, L. E. Alonso, and T. Schultz [eds.], *Ants: Standard Methods for Measuring and Monitoring Biodiversity*. Smithsonian Institution Press, Washington, DC.
- BOLTON, B. 1994. Identification Guide to the Ant Genera of the World. Harvard Univ. Press, Cambridge MA. 222 pp.
- BOLTON, B. 2000. The Ant Tribe Dacetini. *Mem. Amer. Entomol. Inst. American Entomological Institute, Gainesville, FL.* 1028 pp.
- BRINKMAN, M. A., W. A. GARDNER, R. M. IPSER, AND S. K. DIFFIE. 2001. Ground-dwelling ant species attracted to four food baits in Georgia. *J. Entomol. Sci.* 36: 461-463.
- BUREN, W. F. 1968. A review of the species of *Crematogaster*, sensu stricto, in North America (Hymenoptera: Formicidae). Part II. Descriptions of new species. *J. Georgia Entomol. Soc.* 3: 91-121.
- CREIGHTON, W. S. 1950. The Ants of North America. Museum of Comparative Zoology at Harvard College, Cambridge, MA.
- CUEZZO, F. 2000. Revision del genero *Forelius* (Hymenoptera: Formicidae: Dolichoderinae). *Sociobiology* 35: 197-277.
- DEYRUP, M., J. TRAGER, AND N. CARLIN. 1985. The genus *Odontomachus* in the Southeastern United States (Hymenoptera: Formicidae). *Ent. News.* 96: 188-195.
- DEYRUP, M. 2003. An updated list of Florida ants (Hymenoptera: Formicidae) Florida Entomol. 72: 91-101.
- DUBOIS, M. B. 1986. A revision of the native New World species of the ant genus *Monomorium* (*minimum* group) (Hymenoptera: Formicidae). *Univ. Kansas Sci. Bull.* 53: 65-119.
- GREENSLADE, P. J. M., AND R. B. HALLIDAY. 1983. Colony dispersion and relationships of meat ants *Iridomyrmex purpureus* and allies in an arid locality in South Australia. *Insect. Soc.* 30: 82-99.
- GREGG, R. E. 1958. Key to the species of *Pheidole* (Hymenoptera: Formicidae) in the United States. *J. New York Entomol. Soc.* 66: 7-48.
- HOLDOBLER, B., AND E. O. WILSON. 1990. The Ants. Belknap Press, Cambridge, MA.
- HOLWAY, D. A. 1999. Competitive mechanisms underlying the displacement of native ants by the invasive Argentine ant. *Ecology.* 80: 238-251.
- JOHNSON, C. 1986. A north Florida ant fauna (Hymenoptera: Formicidae). *Insecta Mundi.* 1: 243-246.
- JOHNSON, C. 1988. Species identification in the Eastern *Crematogaster* (Hymenoptera: Formicidae). *J. Entomol. Sci.* 23: 314-332.
- JOUVENAZ, D. P., G. E. ALLEN, W. A. BANKS, AND D. P. WOJCIK. 1977. A survey for pathogens of fire ants, *Solenopsis* spp., in the southeastern United States. *Florida Entomol.* 60: 275-279.
- MACKAY, W. P. 2000. A review of the new world ants of the subgenus *Myrafant* (Genus: *Leptothorax*) (Hymenoptera: Formicidae). *Sociobiology* 36: 265-444.
- MAJER, J. D. 1983. Ants: bio-indicators of minesite rehabilitation, land-use, and land conservation. *Environ. Manag.* 7: 375-383.
- MAJER, J. D. 1985. Recolonization by ants of rehabilitated mineral sand mines on North Stradbroke Island, Queensland, with particular reference to seed removal. *Australian J. Ecol.* 10: 31-48.
- MATTHEWS, E. G., AND R. L. KITCHING. 1984. Insect Ecology. Univ. Queensland Press, Brisbane.
- PORTER, S. D., AND D. A. SAVIGNANO. 1990. Invasion of polygyne fire ants decimates native ants and disrupts arthropod community. *Ecology* 7: 2095-2106.
- SCHULTZ, T. R., AND T. P. MCGLYNN. 2000. The interaction of ants with other organisms, pp. 35-44 *In* D. Agosti, J. Majer, L. E. Alonso, and T. Schultz [eds.], *Ants: Standard Methods for Measuring and Monitoring Biodiversity*. Smithsonian Institution Press, Washington, DC.
- SMITH, M. R. 1934. A list of the ants of South Carolina. *J. New York Entomol. Soc.* 42: 353-361.
- SMITH, M. R. 1957. Revision of the genus *Stenamma* Westwood in America north of Mexico (Hymenoptera: Formicidae). *Amer. Midl. Nat.* 57: 133-174.
- SNELLING, R. R. 1973. Studies of California ants. 7. The genus *Stenamma* (Hymenoptera: Formicidae). *Contrib. Sci.* 245: 1-38.
- SNELLING, R. R. 1988. Taxonomic notes on Nearctic species of *Camponotus*, subgenus *Myrmentoma* (Hymenoptera: Formicidae), pp. 55-78 *In* J. C. Trager [ed.], *Advances in Myrmecology*. E. J. Brill, Lieden.
- SNELLING, R. R., AND J. T. LONGINO. 1992. Revisionary notes on the fungus-growing ants of the genus *Cyphomyrmex*, *rimosus* group (Hymenoptera: Formicidae: Attini), pp. 479-494 *In* D. Quintero, and A. Aiello [eds.], *Insects of Panama and Mesoamerica: Selected Studies*. Oxford University Press, Oxford.
- TAYLOR, R. E. 1967. A monographic revision of the ant genus *Ponera* Latreille (Hymenoptera: Formicidae). *Pac. Ins. Mon.* 13: 1-112.
- TRAGER, J. C. 1984. Revision of the genus *Paratrechina* (Hymenoptera: Formicidae) of the continental United States. *Sociobiology* 9: 51-162.
- TRAGER, J. C. 1988. Revision of *Conomyrma* (Hymenoptera: Formicidae) from the southeastern United States, especially Florida, with keys to the species. *Florida Entomol.* 71: 11-29.
- U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE. 1981. Land resource areas and major land resource areas of the United States, Agricultural Handbook 296. Washington, D.C.
- WARD, P. S. 1985. The Nearctic species of the genus *Pseudomyrmex* (Hymenoptera: Formicidae). *Quaest. Ent.* 21: 209-246.
- WARD, P. S. 1988. Mesic elements in the western Nearctic ant fauna: Taxonomic and biological notes on *Amblyopone*, *Proceratium*, and *Smithistruma* (Hymenoptera: Formicidae). *J. Kansas Entomol. Soc.* 61: 102-124.
- WHEELER, W. M. 1913. Ants collected in Georgia by Dr. J. C. Bradley and Mr. W. T. Davis. *Psyche.* 112-117.
- WILSON, E. O. 1955. A monographic revision of the ant genus *Lasius*. *Bull. Mus. Comp. Zool.* 113: 1-201.
- WING, W. M. 1968. Taxonomic revision of the Nearctic genus *Acanthomyops* (Hymenoptera: Formicidae). *Mem. Cornell Univ. Agric. Exp. Stn. No.* 405: 1-173.