

Native and Exotic Ants in Mississippi State Parks

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Introduction

Ants affect flora and fauna both directly and indirectly by predation, scavenging, tending homopterans, protecting various plants, dispersing seeds, aiding in nutrient and soil turnover, providing a food source for other animals, and in many other ways. Because of their complex roles in ecosystems, they can be a useful group for monitoring the diversity, structure, and general health of habitats. Ants also are of interest because of the deleterious effects caused by various pest species, such as carpenter ants and especially some non-native species. The exotic Argentine ant and imported fire ants have negatively affected human endeavors and reduced biodiversity in the communities they have invaded during the last century.

Since 2001, the Mississippi Entomological Museum (MEM) has been conducting surveys of ants in Mississippi to provide baseline data on diversity and distributions of native and exotic species. To adequately sample ants, it is necessary to have access to the various habitats, both natural and disturbed, that are present in the state. Mississippi's state parks, of which there are 24 (including Clark Creek Natural Area), provide ideal collecting opportunities because they are spread throughout the state and offer an array of habitats, often with exceptional forested areas. Initial surveys for ants in these parks have shown that they are quite diverse in species composition.

Methods

From the summer of 2004 through late summer of 2007, ants were collected in 19 of the 24 state parks in Mississippi. The remaining five parks are scheduled to be sampled within the following years. Between 2 and 4 hours were spent collecting at each park. Collections were made using a variety of methods including baiting, soil and litter sampling, tearing apart rotting logs and trees, and visual searching for ants and nests. Specimens were collected and stored in 90% ethanol, with representatives pinned and labeled. Specimens were identified by MacGown and Hill.

Results

A total of 100 species, plus the hybrid fire ant (Table 1), have been collected in 19 of the 24 state parks in Mississippi to date. We found 11 exotic species (plus the hybrid fire ant), six new state records, one undescribed species, three species that were only recently described (Bolton 2000, Baroni Urbani and De Andrade 2003), six that were only recently reported (MacGown et al. 2005, MacGown and Brown 2006), and several species that are considered to be rare. Additionally, collections from the state parks have given us a better understanding of the distribution of many species of ants in the state.

Marked differences in species diversity and assemblages were seen at different state parks (Table 1, Fig. 1). Parks with the least amount of disturbance and the fewest exotic species had the highest species diversity and more rarely collected ants present

than did parks with high habitat disturbance and high occurrence of exotics. The greatest diversity of species was found at Wall Doxey State Park in Marshall County with a total of 56 species documented, of which several were rare. Only three exotics were found at Wall Doxey, *Lasius alienus* and *Paratrechina vividula*, whose status as exotics is questionable, and the hybrid fire ant, *Solenopsis invicta x richteri*. Conversely, we found only 8, 8, and 14 species at Buccaneer, Shepard, and Paul Johnson State Parks (respectively) in southeastern Mississippi, and these parks were dominated by exotic species. Collections at Shepard and Paul Johnson parks were made post Hurricane Katrina; consequently, the habitats were greatly disturbed and appeared to provide ideal habitat for the exotic species present.

Data from these surveys in Mississippi's state parks have been used in various projects about ants in this region including web sites, papers, presentations, and reports. A web site documenting ants found in the state parks has been prepared and includes logs of collecting trips, species lists, and photos of the parks and/or various ant species (<http://mississippientomologicalmuseum.org.msstate.edu/Researchtaxapages/Formicidae/pages/MS.state.pk.ants.htm>). Published papers have covered such topics as the eastern ant cricket, *Myrmecophilus pergandei* Bruner (MacGown and Hill 2006); Carpenter ants of Mississippi (MacGown et al. 2007a); and the exotic *Brachymyrmex patagonicus* (MacGown et al. 2007b). Another paper in preparation includes a manuscript on the ants of Mississippi. Specimens of various species of ants that have been collected are also being used by other researchers at various institutions and museums around the world.

Acknowledgments

This research was made possible by support from State Project MIS-311180, the USDA-ARS Areawide Management of Imported Fire Ant Project (Richard L. Brown, Principal Investigator), and the Department of Wildlife, Fisheries, and Parks. Thanks to Rebekah J. Jones and Stephanie Larrick for their aid in collecting ants and other insects.

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Table 1. Ant species collected at the 19 state parks sampled. (*) denotes new state record, (E) denotes exotic species, and (R) means that the species is rarely collected.

	Genus/ species	Buccaneer	Clark Creek	Clarkco	G.P. Cossar	G. Memorial	Holmes Co	Hugh White	J. P. Coleman	Lk.Lowndes	Legion	Leroy Percy	Natchez	Paul Johnson	Roosevelt	Shepard	Tishomingo	Tombigbee	Trace	Wall Doxey
1	<i>Amblyopone pallipes</i>				1	1	1		1								1	1		1
2	<i>Aphaenogaster carolinensis</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1
3	<i>Aphaenogaster fulva</i>		1	1	1		1	1		1	1	1	1		1		1	1		1
4	<i>Aphaenogaster lamellidens</i>			1	1	1	1	1	1		1				1		1	1	1	1
5	<i>Aphaenogaster mariae</i> R			1			1				1									
6	<i>Aphaenogaster miamiana</i>							1				1								
7	<i>Aphaenogaster tennesseensis</i>							1												
8	<i>Aphaenogaster treatae</i>			1	1		1		1						1		1	1	1	1
9	<i>Brachymyrmex depilis</i>			1	1	1	1	1			1		1				1	1	1	1
10	<i>Brachymyrmex patagonicus</i> E	1				1				1				1	1	1				
11	<i>Camponotus americanus</i>		1	1	1		1	1			1				1			1	1	
12	<i>Camponotus castaneus</i>	1								1				1	1					
13	<i>Camponotus chromaiodes</i>			1	1	1		1		1			1					1	1	1
14	<i>Camponotus decipiens</i>			1	1			1	1									1		1
15	<i>Camponotus mississippiensis</i>									1								1		
16	<i>Camponotus nearcticus</i>			1		1		1		1										
17	<i>Camponotus pennsylvanicus</i>				1	1	1	1	1	1	1	1		1	1		1	1		1
18	<i>Camponotus snellingi</i>			1			1	1		1	1	1	1		1				1	
19	<i>Camponotus subbarbatus</i>																1			1
20	<i>Crematogaster ashmeadi</i>			1		1	1	1	1	1	1	1	1	1	1		1	1	1	1
21	<i>Crematogaster lineolata</i>				1	1	1	1	1		1		1		1		1	1	1	1
22	<i>Crematogaster minutissima</i>																	1		
23	<i>Crematogaster vermiculata</i>																			1
24	<i>Crematogaster pilosa</i>			1		1						1							1	
25	<i>Cryptopone gilva</i>			1			1													
26	<i>Cyphomyrmex rimosus</i> E	1																		
27	<i>Discothyrea testacea</i> R			1			1	1		1										1
28	<i>Dorymyrmex bureni</i>					1		1		1				1	1	1	1	1		1
29	<i>Forelius mccooki</i>				1	1	1	1	1	1	1				1			1	1	1
30	<i>Formica dolosa</i>				1	1		1											1	
31	<i>Formica pallidefulva</i>			1	1		1	1		1	1				1		1	1	1	1

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32	<i>Formica subsericea</i>																1	1		
33	<i>Hypoponera opaciceps</i>	1				1														
34	<i>Hypoponera opacior</i>		1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1
35	<i>Lasius alienus</i> E		1					1		1			1	1				1	1	1
36	<i>Lasius neoniger</i>																			1
37	<i>Lasius umbratus</i> R							1												1
38	<i>Linepithema humile</i> E			1			1			1				1	1					
39	<i>Monomorium minimum</i>	1	1	1	1	1	1	1	1	1	1	1	1		1		1	1	1	1
40	<i>Myrmecina americana</i>		1	1	1	1	1	1	1	1	1	1			1		1	1	1	1
41	<i>Myrmica pinetorum</i> R												1							
42	<i>Myrmica punctiventris</i>									1		1								
43	<i>Neivamyrmex carolinensis</i>																			1
44	<i>Paratrechina arenivaga</i>					1														1
45	<i>Paratrechina faisonensis</i>			1	1	1		1		1	1	1	1		1		1	1	1	1
46	<i>Paratrechina parvula</i> R						1	1												
47	<i>Paratrechina vividula</i> E?						1	1	1	1	1				1		1		1	1
48	<i>Pheidole bicarinata</i>			1				1		1	1				1		1	1		1
49	<i>Pheidole dentata</i>	1	1	1	1			1		1	1	1	1		1		1	1	1	1
50	<i>Pheidole dentigula</i>		1	1	1		1	1	1	1	1		1		1		1	1	1	1
51	<i>Pheidole metallescens</i>		1	1		1	1	1							1					
52	<i>Pheidole moerens</i> E													1		1				
53	<i>Pheidole obscurithorax</i> E													1		1				
54	<i>Pheidole tetra</i> R									1										
55	<i>Pheidole tysoni</i>																		1	1
56	<i>Pheidole new sp.</i> R																			1
57	<i>Ponera exotica</i> R			1			1	1			1									
58	<i>Ponera pennsylvanica</i>				1	1	1	1	1	1	1	1	1				1	1	1	1
59	<i>Prenolepis imparis</i>			1		1		1								1			1	1
60	<i>Proceratium chickasaw</i> R								1											
61	<i>Proceratium crassicorne</i> R																			1
62	<i>Proceratium pergandei</i> R																			1
63	<i>Proceratium silaceum</i> R							1				1		1			1			1
64	<i>Pseudomyrmex ejectus</i>		1	1																
65	<i>Pseudomyrmex pallidus</i>			1			1								1					
66	<i>Pyramica angulata</i> R		1		1			1			1							1	1	

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67	<i>Pyramica clypeata</i>			1									1						1	
68	<i>Pyramica creightoni</i>											1						1		
69	<i>Pyramica dietrichi</i> R			1																1
70	<i>Pyramica hexamera</i> E		1			1							1							
71	<i>Pyramica hyalina</i> R											1								
72	<i>Pyramica laevinasis</i> R									1							1			
73	<i>Pyramica membranifera</i> E														1					
74	<i>Pyramica missouriensis</i>										1									
75	<i>Pyramica ohioensis</i>		1	1	1	1					1	1					1		1	1
76	<i>Pyramica ornata</i>			1		1		1		1	1	1					1	1	1	1
77	<i>Pyramica pergandei</i> * R																			1
78	<i>Pyramica pilinasis</i> R		1				1					1								1
79	<i>Pyramica pulchella</i>										1	1			1					1
80	<i>Pyramica reflexa</i> R		1			1	1						1							1
81	<i>Pyramica rohweri</i> R																			1
82	<i>Pyramica rostrata</i>			1	1				1						1		1			1
83	<i>Pyramica talpa</i>											1			1					1
84	<i>Solenopsis abdita</i> * R														1					
85	<i>Solenopsis carolinensis</i>															1				
86	<i>Solenopsis invicta</i> E	1	1	1		1						1		1	1	1				
87	<i>Solenopsis invicta</i> X <i>richteri</i> E						1	1		1	1							1	1	1
88	<i>Solenopsis molesta</i>			1		1		1	1	1	1	1					1	1	1	1
89	<i>Solenopsis picta</i>														1					
90	<i>Solenopsis richteri</i> E								1								1			
91	<i>Solenopsis tonsa</i> *															1				
92	<i>Stenammas meridionale</i>																			1
93	<i>Strumigenys louisianae</i>		1	1	1	1	1	1	1	1	1	1	1	1	1			1	1	1
94	<i>Strumigenys silvestrii</i> * E, R										1									
95	<i>Tapinoma sessile</i>						1	1												
96	<i>Temnothorax curvispinosus</i>		1	1	1		1	1	1		1		1		1		1	1	1	1
97	<i>Temnothorax longispinosus</i> *									1										
98	<i>Temnothorax pergandei</i>		1		1		1	1	1			1	1				1		1	1
99	<i>Temnothorax schaumii</i>			1	1		1	1	1		1		1		1		1	1	1	1
100	<i>Temnothorax tuscaloosae</i> *R			1													1			1
101	<i>Trachymyrmex septentrionalis</i>		1	1	1	1	1	1		1	1				1		1		1	1
	Total	8	21	41	29	31	36	45	23	34	34	26	22	14	36	8	34	35	35	56

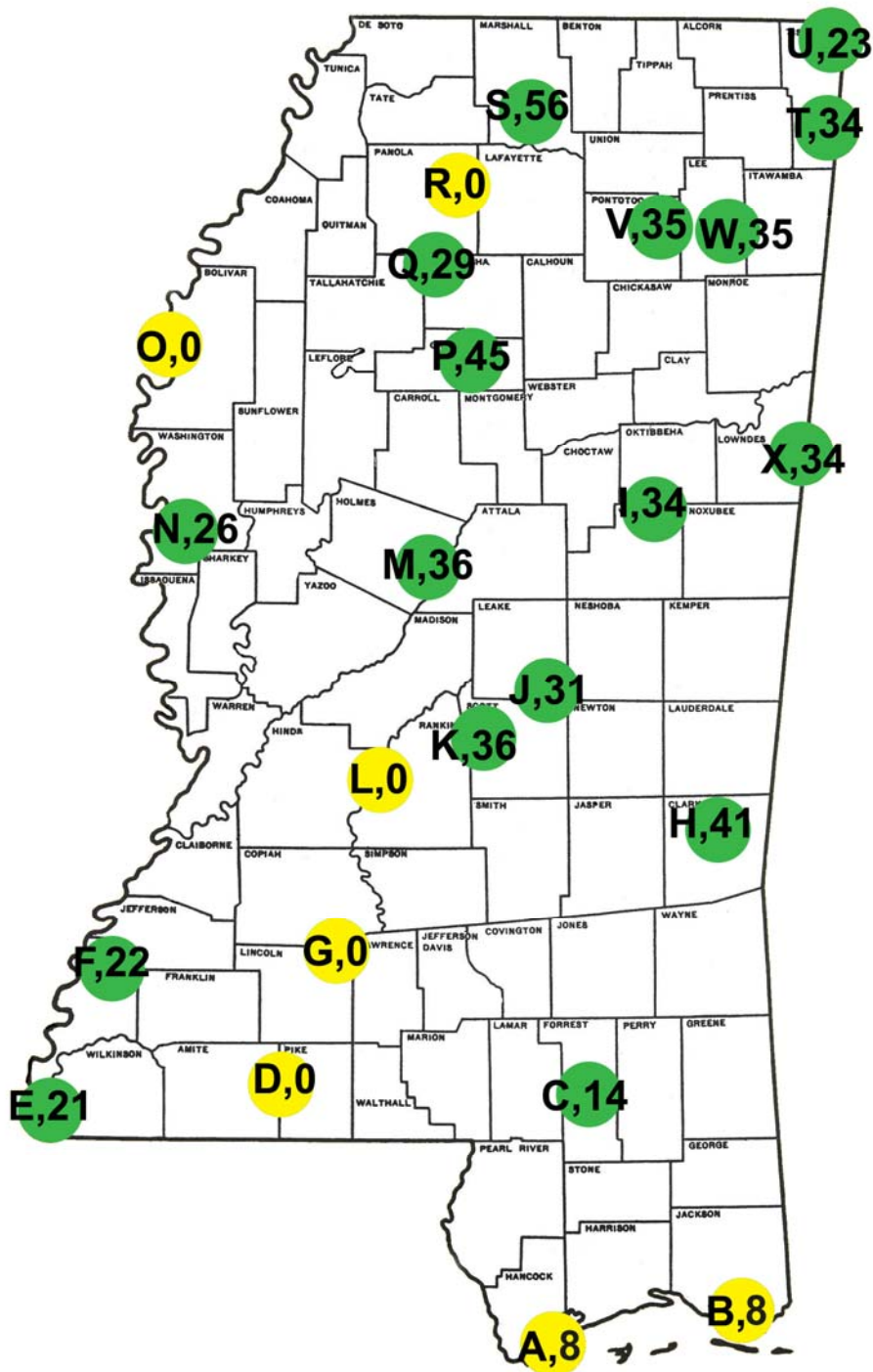


Figure 1. Locations of state parks in MS labeled with letters A-X, followed by the number of ant species collected at each park (parks not yet sampled are indicated by a "0" in a yellow circle). (A) Buccaneer, (B) Shepard, (C) Paul B. Johnson, (D) Percy Quin, (E) Clark Creek N. A., (F) Natchez, (G) Lake Lincoln, (H) Clarkco, (I) Legion, (J) Golden Memorial, (K) Roosevelt, (L) Lefleur's Bluff, (M) Holmes County, (N) Leroy Percy, (O) Great River Rd., (P) Hugh White, (Q) George P. Cossar, (R) John Kyle, (U) J. P. Coleman, (V) Trace, (W) Tombigbee, and (X) Lake Lowndes.