

M1077

## ANTS OF MOBILE COUNTY, AL, AS MONITORED BY BAIT TRANSECTS

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### ABSTRACT

A survey in Mobile County, AL, made along three north-south transects (at 0.5-mile intervals) ca. 25 to 40 miles long showed that the red imported fire ant, *Solenopsis invicta* Buren, was the dominant species. A total of 16 species of ant was collected including the once dominant species, the Argentine ant, *Iridomyrmex humilis* (Mayr). The native North American fire ants, *S. xyloni* McCook, and *S. geminata* (F.) were not collected.

**Key Words:** Red imported fire ant, *Solenopsis invicta* Buren, bait stations, *Iridomyrmex humilis* (Mayr)

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The imported fire ant came into the United States around 1918 at the port of Mobile. Recently, Buren (1972) showed that there are, in fact, two species of imported fire ants in the United States, the black, *Solenopsis richteri* Forel, and the red, *S. invicta* Buren. It was the black ant that was imported in 1918; the red ant did not arrive until 20 to 25 years later (Buren *et al.* 1974). Today, the black imported fire ant is found only in a small area of north-eastern Mississippi and northwestern Alabama, but the red imported fire ant occurs throughout the southeastern United States from North Carolina to Florida and west to Texas.

As the red imported fire ant spreads, it may eliminate some native ant species. However, Lofgren *et al.* (1975) reported that *S. geminata* (F.), a native fire ant, offers some resistance to the red imported fire ant in Florida. A survey was therefore conducted to determine what effect the black and red imported fire ants have had upon the native ant species in the Mobile area.

### MATERIALS AND METHODS

Three semi-parallel roads running north-south 25- to 40-miles long through Mobile County were selected as the study transects. On these transects, we established 281 bait stations at 0.5-mile intervals. Two baits, a piece of ground beef and a piece of honey-sweetened agar on separate ca. 1-inch square pieces of aluminum foil, were placed 2-3 ft apart at each station. The baits were set out for ca. 1 hr. After the exposure, the foil with the bait ants was immediately dropped into 1-oz medicine cups that were then capped and labeled. The cups were returned to the laboratory and held in an ice chest. Then the ants were collected with a vacuum pump and preserved in 70% ethyl alcohol for identification. Each collection of a species, whether in meat or

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honey-agar bait and whether taken at day or night, was counted as a separate collection. Also when more than one species was collected on the same piece of bait, each was counted as a separate collection.

## RESULTS AND DISCUSSION

The 16 species of ants collected during the survey are listed in Tables 1 and 2. Many other species of ants are probably present in this area, but were not collected for a variety of reasons including choice of collection sites, placement and choice of bait materials, and time of day and season. These conditions (and the change in nomenclature) explain why the similar earlier listing for Alabama by Murphree (1947) differs from ours. His collections were made mainly in towns and urban areas<sup>3</sup> and were taken before the introduction and rapid expansion of the range of *S. invicta*. Pass (1960) in the only other list for Alabama reported that 13 species had nests within 5.1 miles of imported fire ant nests (probably *S. invicta*). He does not identify collection sites, but they were probably near Auburn.

*Solenopsis invicta* were taken in 442 of the 1174 collections, that is, in 37.6%. Moreover, 33,884 of the 40,211 specimens, 84.3%, were *S. invicta*. Since *S. invicta* was also collected at 75.1% (211 of 281) of the bait stations and from all 3 transects, it is clearly the dominant ant in the sample area.

Two species of native fire ants, *S. geminata* and *S. xyloni* McCook, were not collected though they were present previously in the Mobile area (Creighton 1930). Murphree (1947) did not list these two species from Mobile County, but he reported their widespread presence in the state. Therefore, *S. invicta* probably has displaced these species in Mobile County since it is known to have displaced *S. geminata* in Florida (Whitcomb *et al.* 1972) and *S. xyloni* in Arkansas (Roe 1973).

Some insight into other displacements, in Texas City, TX (Galveston County); Baldwin, FL (Duval County); and Gainesville, FL (Alachua County) (Wojcik and Glancey unpublished), was obtained by monitoring baited transects in these locations. In Texas City in March 1974, 5.3, 19.3, and 7.1% of the collections were *S. geminata*, *S. invicta*, and *S. xyloni*, respectively; and these collections contained 9.6, 75.2, and 2.6%, respectively of the specimens collected. In Baldwin in March 1974, *S. geminata* was not collected and 49.3% of the collections were *S. invicta* and also, 76.4% of the specimens collected. The year before, June 1973, 2.9% of the collections were *S. geminata* and 69.2% were *S. invicta*; and 9.8% of the specimens were *S. geminata*, and 81.6% were *S. invicta*. (*Solenopsis xyloni* was apparently never present in Baldwin or Gainesville, FL.) In Gainesville in March 1974, *S. invicta* was not

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<sup>3</sup>Murphree states (p. 4) that the ants discussed in his thesis were collected while scouting for the Argentine ant in Alabama for the USDA. He does not state than any later collections were used for his 1947 thesis. This survey must have been conducted in the early to middle 1930's as Smith gives Murphree credit for the Alabama collections in 1936 (Distribution of the Argentine ant in the U. S. and suggestions for its control or eradication. USDA, Circ. 387, 39 p.).

Table 1. — Ant species collected on meat baits and honey-agar baits in Mobile County, AL (totals of 1 day and 1 night collection from 3 transects collected in April 1974).

Species	No. of collections of indicated species and percent <sup>a</sup> of total collections											
	Meat bait		Honey bait		Day collections		Night collections		Total collections		No.	%
	No.	%	No.	%	No.	%	No.	%	No.	%		
<i>Aphaenogaster near texana</i> Emery	1	0.17	1	0.17	2	0.33	0	0	2	0.34	2	0.17
<i>Pheidole dentata</i> Mayr	3	.51	4	.68	5	.84	2	0.34	7	.59	7	.59
<i>P. metallescens</i> Emery	1	.17	2	.34	2	.33	1	.17	3	.25	3	.25
<i>Pheidole</i> sp. D <sup>b</sup>	3	.51	1	.17	3	.5	1	.17	4	.34	4	.34
<i>Pheidole</i> spp.	1	.17	2	.34	1	.16	2	.34	3	.25	3	.25
<i>Tetramorium guineense</i> (F.)	1	.17	1	.17	0		2	.34	2	.17	2	.17
<i>Monomorium minimum</i> (Buckley)	2	.34	0		2	.33	0		2	.17	2	.17
<i>M. viridum peninsulatum</i> Gregg	3	.51	3	.51	4	.67	2	.34	6	.51	6	.51
<i>Solenopsis invicta</i> Buren	234	39.93	208	35.37	316	53.1	126	21.76	442	37.64	442	37.64
<i>Crematogaster clara</i> Mayr	2	.34	1	.17	2	.33	1	.17	3	.25	3	.25
<i>Iridomyrmex humilis</i> (Mayr)	45	7.67	55	9.35	65	10.92	35	6.04	100	8.51	100	8.51
<i>Conomyrma</i> spp.	1	.17	2	.34	3	.5	0		3	.25	3	.25
<i>Brachymyrmex</i> sp.	0		1	.17	1	.16	0		1	.08	1	.08
<i>Paratrechina</i> spp.	6	1.02	6	1.02	5	.84	7	1.2	12	1.02	12	1.02
<i>Formica schaufussi dolosa</i> Wheeler	1	.17	1	.17	2	.35	0		2	.17	2	.17
<i>Camponotus pennsylvanicus</i> (DeGeer)	1	.17	0		1	.16	0		1	.08	1	.08
Blank (no ants)	281	47.95	300	51.02	181	30.42	400	69.08	581	49.48	581	49.48
Total	586	100.03	588	99.99	595	99.92	579	99.95	1,174	99.93	1,174	99.93

<sup>a</sup>Totals do not equal 100 because of rounding off.

<sup>b</sup>*Pheidole* spp. represents presently unidentifiable workers.

Table 2. — Number of ant specimens collected for each species on meat baits and honey-agar baits in Mobile County, AL (totals of 1 day and 1 night collection from 3 transects collected in April 1974).

Species	No. of ants collected for each species and percent <sup>a</sup> of total specimens collected											
	Meat bait		Honey bait		Day collections		Night collections		Total collections		No.	No.
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)		
<i>Aphaenogaster near texana</i>	1	0.003	1	0.019	2	0.007	0	0	2	0.005	2	0.005
<i>Pheidole dentata</i>	332	.948	72	1.391	391	1.433	13	0.101	404	1.005	404	1.005
<i>P. metallescens</i>	34	.097	2	.039	35	.128	1	.008	36	.09	36	.09
<i>Pheidole</i> sp. D	356	1.016	11	.213	367	1.345	0	0	367	.913	367	.913
<i>Pheidole</i> spp.	2	.006	4	.077	3	.011	3	.023	6	.015	6	.015
<i>Tetramorium guineense</i>	108	.308	14	.271	0	0	122	.944	122	.303	122	.303
<i>Monomorium minimum</i>	6	.017	0	0	6	.022	0	0	6	.015	6	.015
<i>M. viridum peninsulatum</i>	3	.009	10	.193	10	.034	3	.023	13	.032	13	.032
<i>Solenopsis invicta</i>	29,988	85.592	3,896	75.285	23,144	84.798	10,740	83.14	33,884	84.265	33,884	84.265
<i>Crematogaster clara</i>	3	.009	1	.019	4	.015	0	0	4	.01	4	.01
<i>Iridomyrmex humilis</i>	4,147	11.836	1,123	21.7	3,279	12.014	1,991	15.412	5,270	13.106	5,270	13.106
<i>Conomyrma</i> spp.	37	.106	3	.058	40	.147	0	0	40	.099	40	.099
<i>Brachymyrmex</i> sp.	0	0	1	.019	1	.004	0	0	1	.003	1	.003
<i>Paratrechina</i> spp.	17	.049	36	.696	8	.029	45	.348	53	.132	53	.132
<i>Formica schaufussi dolosa</i>	1	.003	1	.019	2	.007	0	0	2	.005	2	.005
<i>Camponotus pennsylvanicus</i>	1	.003	0	0	1	.004	0	0	1	.003	1	.003
Total	35,036	100.002	5,175	99.999	27,293	99.998	12,918	99.999	40,211	100.001	40,211	100.001

<sup>a</sup>Totals do not equal 100 because of rounding off.

<sup>b</sup>*Pheidole* spp. represents presently unidentifiable minor workers.

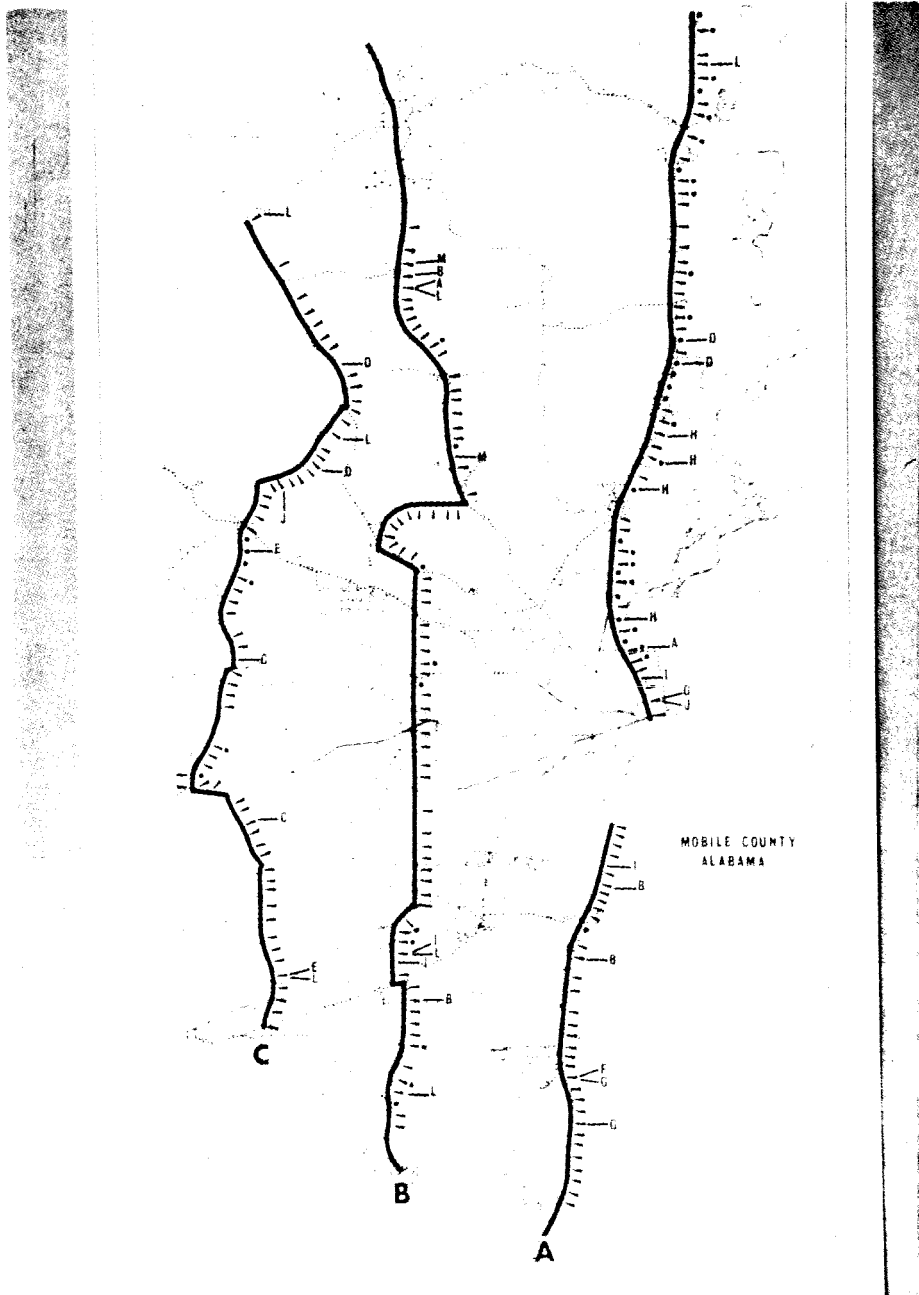


Fig. 1. — Map of Mobile County, AL, showing the 3 transects. The species collected in April 1974 are identified as follows: a = *Aphaenogaster*; b = *Pheidole dentata*; c = *P. metallescens*; d = *Pheidole* sp. D; e = *Pheidole* spp.; f = *Tetramorium guineense*; g = *Monomorium minimum*; h = *M. viridum peninsulatum*; ▲ = *Solenopsis invicta*; i = *Crematogaster clara*; ● = *Iridomyrmex humilis*; j = *Conomyrma* spp.; k = *Brachymyrmex* sp.; l = *Paratrechina* spp.; m = *Formica schaufussi dolosa*; n = *Camponotus pennsylvanicus*. Species collected at the same site were not necessarily collected on the same piece of bait.

collected and 22.3% of the collections were *S. geminata*; also, 39% of the specimens collected were *S. geminata*. Thus *S. geminata* and *S. xyloni* are now found mainly at the eastern (Gainesville) and western (Baldwin) edges of area infested with *S. invicta*, though they are also found unevenly distributed within the area (Markin *et al.* 1974; Wojcik and Glancey, unpublished).

The next most numerous species, *Iridomyrmex humilis* (Mayr), was once the dominant ant in the Mobile area (Erickson 1971, Wilson 1951). This ant can displace *S. geminata* (Fluker and Beardsley 1970). It was also reported as temporarily displacing *S. richteri* in Mobile (Wilson 1951), though Buren *et al.* (1974) questioned whether this displacement actually occurred.

*Tetramorium guineense* (F.) is a pantropical tramp species that is widely distributed by commerce. This is the first record from the Mobile area though the species is widely distributed in Alabama (Murphree 1947).

Historically, the Mobile area is the area in the United States that has had the longest infestation by imported fire ants. Therefore, the occurrence of *I. humilis* and other competing native ants in the present survey demonstrates that an equilibrium may eventually be reached with imported fire ants. However, the transects at Mobile (281 bait stations), Texas City (59 stations), Baldwin (30 stations), and Gainesville (100 stations) yielded 16, 9, 8, and 20 species, respectively, on comparable dates. Thus the very lightly infested Gainesville area, with ca. one-third as many bait stations, yielded 25% more species than the heavily infested Mobile area. Then the presence of large populations of the highly predaceous and aggressive red imported fire ant seems to simplify the ecosystem. Simplified ecosystems are usually unstable.

A further sampling of the ant populations over a period of years would be needed to determine any population shifts in Mobile County.

#### ACKNOWLEDGEMENTS

The authors thank B. B. Martin, Imported Fire Ant Laboratory, Gulfport, MS for his assistance in collecting; W. F. Buren, University of Florida, Gainesville, for his confirmations of the ant identifications and his review of the manuscript; and for their reviews of this manuscript, C. S. Lofgren, W. A. Banks, and D. P. Jouvenaz of the Insects Affecting Man Laboratory, ARS, USDA in Gainesville; and B. Wojcik of the Southern Regional Research Center, ARS, USDA, New Orleans, LA.

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