N O T E

Ground-Dwelling Ant Species Attracted to Four Food Baits in Georgia[1]

Mark A. Brinkman,[2] Wayne A. Gardner, Reid M. Ipser, and Stanley K. Diffie

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

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Ant sampling methods are biased (Bestelmeyer et al., 2000, *In* D. Agosti et al. [eds.], Pp. 122-144, Ants: standard methods for measuring and monitoring biodiversity. Smithsonian Institution Press) and, therefore, different sampling methods should be integrated to capture representative species (Delabie et al. 2000, *In* D. Agosti et al. [eds.], Pp. 122-144, Ants: standard methods for measuring and monitoring biodiversity. Smithsonian Institution Press) in conducting a species survey. Researchers have used different foods as baits to attract ants, but studies were targeted at a single species (Ali and Reagan, 1986, J. Econ. Entomol. 79: 1404-1405; Stein et al., 1990, Florida Entomol. 73: 117-123; Cherry and Nuessly, 1992, Environ. Entomol. 21: 767-770). The objective of the research reported herein was to determine which of four food baits would attract the greatest variety of ant species.

Four baits that were tested were peanut oil (Dutcher and Sheppard, 1981, J. Georgia Entomol. Soc. 16: 210-213), raw egg, honey (Baker et al., 1985, J. Econ. Entomol. 78: 1083-1088) diluted 1:1 with sterile distilled water, and canned tuna in oil. For peanut oil, egg, and honey bait, 2.5-cm diam grade 1 Whatman filter paper was saturated in the liquid and then placed in a 35-mm diam plastic tissue culture dish (Becton Dickinson Labware, Franklin Lakes, NJ). For tuna bait, a thin layer of meat covered the surface of the filter paper in the plastic dish. Ten stations were flagged at each site in a transect line, and each of the four baits was placed at a station. The distance between each bait dish was 1 m and stations were about 15 m apart. A total of ten sites were located in Griffin (4), Jackson (2), Thomaston (2), and Tifton (2), Georgia. The sites were town parks or undeveloped lots with small clearings and mixed pine and hardwood canopy. Baits were initially placed out between 1300 and 1500 h and left undisturbed for 2 h. In preliminary tests, we found that very few ants were captured in baited dishes left out for less than 2 h. Baits exposed for more than 2 h usually became dehydrated or, as was often the case with tuna, most of the meat

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[2]To whom all inquiries should be directed (email: brinkman@griffin.peachnet.edu).

was removed by *Solenopsis invicta* Buren workers. The study was conducted between 30 March and 23 May 2000. Ants were identified to species by using keys of Holldobler and Wilson (1990, The ants. Belknap Press, Cambridge, MA), Creighton (1950, The ants of North America. Museum of Comparative Zoology at Harvard College, Cambridge, MA), and by comparison with specimens in the University of Georgia Natural History Museum in Athens. Ant specimens were deposited in the T.L. Bissell Insect Museum at the Experiment Station in Griffin, GA. PROC GLM (1996, SAS Institute, Cary, NC) was used to conduct analysis of variance and separation of means was done by the least significant differences test (LSD, $\alpha = 0.05$).

A total of 5,293 ants representing 3 subfamilies and 13 species was captured in the bait study (Table 1). Typically, not more than one species was trapped in a bait dish. In only one case, *S. invicta* and *Linepithema humile* (Mayr) were caught together in the same dish. Significantly ($F = 26.99$; df = 3,271; $P = 0.0001$) more individual ants representing nine species were attracted to tuna baited dishes, than to the other three baits. Eight ant species were trapped in egg and honey baits; three were trapped in peanut oil. All of the species attracted to peanut oil were also found in the tuna. Three

Table 1. List of ants attracted to four food baits. One hundred plastic dishes were used for each food bait at ten sites in Georgia

	Number of ants			
	Peanut oil	Egg	Tuna	Honey
Myrmicinae				
Pheidole crassicornis Emery	—	—	245	—
Crematogaster coarctata vermiculata Emery	—	1	49	—
Monomorium minimum (Buckley)	8	—	478	116
Solenopsis geminata (Fabricius)	—	—	1	—
Solenopsis invicta Buren	41	175	3,656	8
Leptothorax curvispinosus Mayr	—	1	—	—
Dolichoderinae				
Linepithema humile (Mayr)	1	28	71	93
Forelius foetida (Buckley)	—	4	—	—
Tapinoma sessile (Say)	—	14	67	8
Formicinae				
Brachymyrmex depilis Emery	—	—	—	2
Camponotus americanus Mayr	—	—	6	2
Prenolepis imparis Say	—	70	20	122
Formica pallidefulva Latreille	—	1	—	4
Total number of individuals (Σ)	50	294	4,594	355
Number of species	3	8	9	8

of the species trapped in egg baits were not trapped with tuna. Two of the species attracted to honey were not found in tuna samples. It is not known if mixing egg, tuna, and honey together would result in more species being attracted than by using tuna separately.

The number of ant species captured in our bait study was surprisingly low. At the two Tifton locations, only *S. invicta* and *Brachymyrmex depilis* Emery were found in samples. Wheeler and Wheeler (1985, Prairie Nat. 17: 49-64) listed 210 species for Texas. Smith (1933, Florida Entomol. 17: 21-26) reported that Florida was home to at least 107 ant species. The reasons for the low number of species trapped in the baits may have been due to the bias of the sampling method together with the prevalence of introduced exotic species in the four middle Georgia municipalities. According to Longino (2000, *In* D. Agosti et al. [eds.], Pp. 186-203, Ants: standard methods for measuring and monitoring biodiversity. Smithsonian Institution Press), baiting attracts species that are generalized omnivores with highly developed recruiting ability and undersamples other types of ants. Human and Gordon (1996, Oecologia 105: 405-412) found that *L. humile* finds baits faster and recruits more workers to baits than native ants. Also, the competitive ability of *L. humile* and *S. invicta* has allowed them to displace native ants in many areas (Holway, 1999, Ecology 80: 238-251; Porter and Savignano, 1990, Ecology 71: 2095-2106, respectively).

There has been no comprehensive survey for ant species biodiversity in the state of Georgia. Results from our study show that use of food baits alone captures relatively few ant species and this method should be combined with other sampling methods such as pitfall trapping, active searching, and leaf litter sampling in order to determine the ant fauna present in Georgia.

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