

## Hickory Nuts used as Nesting Sites by Ants (Hymenoptera: Formicidae)

Joe A. MacGown  
Mississippi Entomological Museum  
Mississippi State University  
Box 9775, Mississippi State, MS 39762

### Abstract

Several species of ants were found nesting or occupying hickory nuts in the Tombigbee National Forest (Ackerman Unit), Mississippi, including *Camponotus subbarbatus*, *Crematogaster lineolata*, *Crematogaster minutissima*, *Ponera pennsylvanica*, *Solenopsis* sp. cf. *molesta*, *Temnothorax curvispinosus*, and *Temnothorax pergandei*. Information on colony size is given for nesting species.

### Introduction

A survey of ants was done in the National Forest from March 1999 through the fall of 2004 that listed 72 species of ants (MacGown and Brown, In Press). During the survey, ants were collected by many methods, one of which was the collection of hickory nuts (*Carya* spp., Juglandaceae). Hickory nuts, as well as fruits of other trees, such as acorns, are known to provide nesting habitat for some ant species (Headley, 1943; Creighton, 1950; Pratt and Pierce, 2001).

### Study Area

The Tombigbee National Forest (Ackerman Unit) is located in the adjacent counties of Choctaw, Winston, and Oktibbeha in east central Mississippi and covers an area of 15,972 hectares. Most of the Tombigbee National Forest is found in the North Central Plateau Physiographic Region of the state with only a few acres found in an edge of the Flatwoods Region. The Tombigbee National Forest is mostly a mixture of deciduous trees and pines with a few cleared areas and power-line cuts, and has a variable topography ranging from the nearly flat floodplains of the Noxubee River and its tributaries to very dissected hills and steep ravines, with elevations ranging from 91 to 183m.

Hickory nuts were collected in Winston County, Mississippi at 33°12'53"N 89°06'10"W near the intersections of Sheep Ranch Road (NF Road 956) and Pigeon Roost Road (NF Road 971-1). Collections were made on a widened shelf of an open hardwood forest ravine slope approximately 80-100 m in distance from the ridge top. The area had a canopy of oak (*Quercus* spp., Fagaceae), hickory (*Carya* spp., Juglandaceae), beech (*Fagus grandifolia* Ehrhart, Fagaceae), tulip poplar (*Liriodendron tulipifera* L., Magnoliaceae), cucumber magnolia tree (*Magnolia acuminata* L., Magnoliaceae), sweetgum (*Liquidambar styraciflua* L., Altingiaceae), and basswood (*Tilia americana* L., Tiliaceae), and a thick litter layer was present.

### Methods

On 13 October 2003, I filled a one-gallon (3.79 liter) zippered storage bag with hickory nuts found on the ground. Three species of nuts were collected: *Carya glabra* (P. Mill.), *C. ovata* (P. Mill.), and *C. alba* (L.). An effort was made to collect nuts that

looked as if they had been on the ground for quite some time (probably from the previous year or years). Only nuts lacking outer husks, but with holes in the shells, were selected, because it seemed more likely to find ant colonies in nuts that provided entrance/exit holes. All of the collected nuts were taken back to the laboratory and cracked open with a walnut cracker later that day.

Hickory nuts were again collected at the same site on 21 October 2003. Three one-gallon (3.79 l) bags were filled with a mix of the same three species of nuts collected previously, with most of the nuts being *C. glabra*, because this was the most common nut found, and it was the only species of nut in which ants were found from the previous collection. Hickory nuts were taken back to the laboratory, cracked open, and searched for ants. Numbers of the nuts collected were not counted from either collection because the aim at the time was to simply collect various species of ants. Only adult ants were counted, and no estimate was made of eggs or brood. Specimens collected are housed in the Mississippi Entomological Museum (MEM).

### Results

Only 7 nuts out of the total gallon (3.79 l) of nuts collected on 13 October had ants in them, and ants were only found in the nuts of *C. glabra*. The species and colonies of ants found in those nuts were as follows: 3 colonies of *Crematogaster lineolata* (Say) with 136, 46, and 4 workers respectively; one colony of *C. minutissima* Mayr with 5 workers and 10 queens; one colony of *Temnothorax curvispinosus* Mayr with 36 workers and 1 queen; and one colony of *T. pergandei* Emery with 76 workers and 1 queen present. In addition, two specimens of *Camponotus subbarbatus* Emery were found in a nut, although they were not nesting there.

Similar to the collections made on 13 October, the only hickory nuts collected on 21 October that yielded ants were the *C. glabra* nuts. Ant species found nesting in nuts were *Crematogaster lineolata*: 11 colonies with 79 workers; 57 workers and 1 queen; 85 workers and 1 queen; 13 workers; 184 workers; 72 workers and queen; 80 workers; 5 workers and 1 queen; 116 workers; 24 workers; and 198 workers; *C. minutissima*: 3 colonies with 6 workers; 78 workers and 3 queens; and 464 workers and 4 queens; *Ponera pennsylvanica* Buckley: one colony with 5 workers; *Solenopsis* sp. cf. *molesta* (Say): 1 colony with 77 workers; *Temnothorax pergandei*: one colony with 94 workers and 1 queen; and *T. curvispinosus*: 8 colonies with 73 workers and 1 queen; 150 workers and 1 queen; 97 workers and 1 queen; 254 workers and 1 queen; 65 workers and 1 queen; 35 workers and 1 queen; 84 workers and 1 queen; and 87 workers and 1 queen.

### Discussion

The colony sizes of *T. curvispinosus* collected in the Tombigbee National Forest fall within the ranges of those observed by Headley (1943) in acorns. This is not surprising as *C. glabra* nuts are approximately the same size as many species of acorns, especially those of *Quercus alba* L., which Headley mostly searched. Similarly, Headley also reported finding nests of *P. pennsylvanica* and *C. lineolata* in acorns. Ants that nest in cavities are opportunistic in their nest site selection, but they also have specific needs that must be met, and therefore need to choose their nest site carefully. It has been shown in laboratory tests that *T. curvispinosus* select larger cavities when given a choice and that they prefer a compact, high-ceilinged cavity over a thin, flat crevice, even if of equal

volume (Pratt and Pierce, 2001). Because the outer wall of the nut of *C. glabra* is extremely strong walled, it would be able to provide suitable shelter in all seasons for the ant species collected.

Although both *C. lineolata* and *T. curvispinosus* were found with relative ease and in large numbers in the hickory nuts, and *C. minutissima* and *T. pergandei* in lesser numbers, these species were otherwise found only rarely in the Tombigbee National Forest (MacGown and Brown, In Press). In fact, in a one-year period of pitfall sampling in the National Forest at three localities, only 10 *C. lineolata* workers, 1 *C. minutissima* worker, and 7 *T. curvispinosus* workers were collected. *Temnothorax pergandei* was not collected in pitfall traps at all during that time period and was only collected by other methods on two other occasions in the National Forest.

### References

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