

## SOLENOPSIS PHORETICA, A NEW SPECIES OF APPARENTLY PARASITIC ANT FROM FLORIDA (HYMENOPTERA: FORMICIDAE)

LLOYD R. DAVIS<sup>1</sup> AND MARK DEYRUP<sup>2</sup>  
<sup>1</sup>3920 NW 36<sup>th</sup> Place, Gainesville, FL 32606

<sup>2</sup>Archbold Biological station, P.O. Box 2057, Lake Placid, FL 33862  
 e-mail: mdeyrup@archbold-station.org

### ABSTRACT

A new species of ant, *Solenopsis phoretica*, is described from a dealate queen found clinging to the petiole of a nest queen of *Pheidole dentata* Mayr in Gilchrist County, Florida. The position of the *Solenopsis* queen, as well as details of its morphology, strongly suggest that it represents a parasitic species. It is distinguished from other *Solenopsis* by its concave clypeal area and slender, elongate mandibles with an enlarged basal tooth. A single specimen is known.

Key Words: parasitic ant, parasitic *Solenopsis*, parasitic fire ant

### RESUMEN

Se describe una nueva especie de hormiga, *Solenopsis phoretica* de una reina dealatada (que boto las alas) encontrada colgada al peciolo de la reina hormiga de *Pheidole dentata* Mayr en el condado de Gilchrist en la Florida. La posición de la reina de *Solenopsis* y los detalles de su morfología, sugiere fuertemente que esta representa una especie parasítica. Se distingue esta especie de otras *Solenopsis* por tener la área del clipeo concavo y la mandíbula elongada y delgada con un diente basal engrandecido. Un solo espécimen es conocido.

*Solenopsis* is a genus of over 180 described species (Bolton 1995). The genus shows variable habits. Many species are polyphagous, above-ground foragers, such as the notorious pest, *Solenopsis invicta* Buren. Other species, especially those species formerly placed in the subgenus *Diplorhoptrum*, are primarily subterranean foragers. Some of these subterranean species may issue from small galleries to carry off food and larvae from brood chambers of other ants (Hölldobler & Wilson 1990). A few species of *Solenopsis* are workerless parasites that were at one time placed in the genera *Labauchena* or *Paranamyrma* (Ettershank 1966). Here, we describe a new species of *Solenopsis* based on a single dealate queen. This species appears to be parasitic on other ants, but we do not know whether it is workerless, nor do we know whether it is closely related to any other parasitic species.

Character states defining *Solenopsis* are detailed by Ettershank (1966). In the North American fauna the genus can be recognized by the combination of a few character states: two-segmented petiole; two-segmented antennal club; propodeum lacking spines or angles; clypeus longitudinally bicarinate, with a median, apical marginal seta. The clypeal features are lacking on the species described below.

*Solenopsis phoretica*, Davis and Deyrup  
**new species**

Diagnosis of dealate female (Fig. 1): The dealate female is distinguished from other *Sole-*

*nopsis* by the following combination of character states: mandibles elongate, teeth lacking or vestigial, except for apical point and enlarged basal angle; clypeus concave, smooth.

Description of holotype dealate female: features visible in lateral view described from left side. Measurements in mm. Total length (length of head excluding mandibles + length of mesosoma + length of petiole + length of postpetiole + length of gaster): 3.03; head length: 0.55; head width at rear margins of eyes in frontal view: 0.55; length of mesosoma: 0.88; length of petiole: 0.30; length of postpetiole: 0.20; length of gaster 1.10. Color: yellowish brown, appendages yellow. Head: smooth, shining, sparsely covered with setigerous punctures separated by 2-8 times the width of a puncture, setae suberect, directed posteriorly in the frontal area, elsewhere directed anteriorly; ocelli not enlarged, each ocellus about the width of antennal scape at base; malar area long and narrow, slightly shorter than length of eye; mandibles elongate, over half the length of head at midline, apical tooth elongate, delimited proximally by a narrow notch apparently representing a vestigial tooth, inner profile of mandible strongly concave, concavity delimited proximally by strongly produced basal angle with a truncate apex; clypeus smooth, concave, without carinae, with four subapical elongate setae; antennae 10-segmented, scape reaching outer corners of head in frontal view, antennal club 2-segmented, club about as long as remainder of funiculus. Mesosoma: smooth and shining, with sparse setigerous

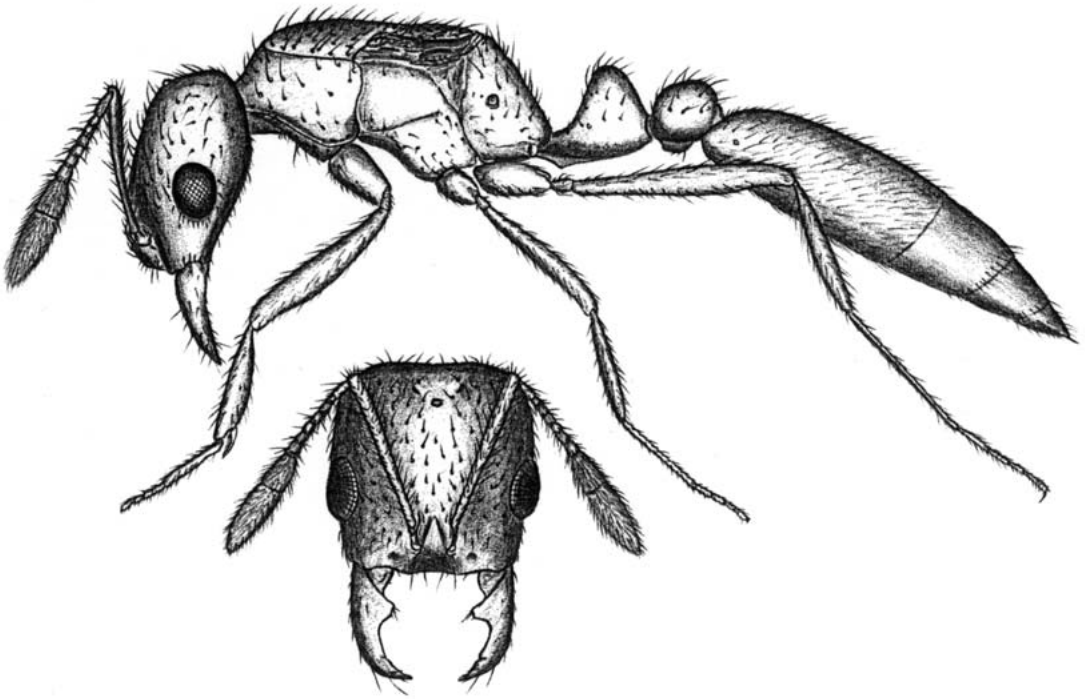


Figure 1. *Solenopsis phoretica*, **new species**, dealate queen, lateral view (above) and frontal view of head. Actual length of insect: 3.03 mm.

punctures on pronotum, near margins of mesonotum, mesopleura, sides of propodeum; disc of mesonotum and declivity of propodeum unpunctured; propodeum evenly declivitous in lateral view, only slightly convex; legs smooth, shining, with sparse, strong, semidecumbent, distally-directed hairs. Petiole: peduncle short, less than 0.25 length of base of petiole in lateral view; petiole in lateral view triangular, apex broadly and smoothly rounded; in posterior view apex strongly convex; ventral process narrowly expanded, with a small triangular tooth. Postpetiole: low and rounded above in lateral view, in posterior view about 1.5 times as wide as long, broadly convex. Gaster: in dorsal view with prominent, rounded anterior corners of first tergite; first tergite covered with sparse, long, posteriorly-directed hairs that are longer than the distance between them and emerging from inconspicuous punctures; tergites 2-4 smooth, with a subapical row of hairs.

Type locality and associated information: collecting data on label of holotype: FL: Gilchrist Co., Route 47, 2.5 miles north of junction with Route 232, 9 February 1992, Lloyd R. Davis. Mandibles locked around petiole of nest queen of *Pheidole dentata*.

We deposited the holotype specimen in the Museum of Comparative Zoology, Harvard University, Cambridge, MA.

Etymology: species epithet derived from *phoretos* (Greek), meaning "carried," referring to the phoretic relationship between the holotype and the nest queen of *Pheidole dentata*.

#### DISCUSSION

It is generally undesirable to describe a species of ant on the basis of a single queen. By convention and convenience, ant holotypes are generally workers. Workers, as well as males, may be very different from queens. In this case, no additional specimens have been found since the date of capture in 1992. Our intent is to alert the myrmecological community to this unusual species, in the hope that this exposure may lead to the discovery of more specimens and more natural history information.

Only a limited amount of speculation is justified, as only a single specimen is available. The generic placement of *S. phoretica* is based on its general resemblance to queens of such small *Solenopsis* species as *S. carolinensis* Forel and *S. abdita* Thompson. Resemblances include the two-segmented antennal club, smooth and shiny integument, the type and placement of setigerous punctures, and the shape of the petiole and postpetiole. If, however, the antennal club were three-segmented, rather than two-segmented, the spe-

cies could be plausibly placed in the genus *Monomorium*. We were also influenced by the precedent of parasitic species of *Solenopsis* with reduced or absent clypeal carinae, such as the South American *S. daguerrei* (Santschi). There is no evidence, however, that *S. phoretica* is closely related to *S. daguerrei* and its relatives. The latter species lacks a number of features found in *S. phoretica*: enlarged punctures bearing short setae on the head and mesosoma; angulate subpetiolar process; falcate mandibles with a strongly projecting basal angle. The petiole of *S. daguerrei* is sharply angulate above in lateral view, the post-petiole is narrow in posterior view, the anterior edge of the mesonotum is slightly protuberant, overhanging the pronotum, and the inner margins of the mandibles are oblique with four teeth (including the apical tooth).

We suspect that *S. phoretica* is parasitic because it was found clinging to the petiole of a nest queen of *Pheidole dentata* and because the mandibles and concave clypeal area fit exactly around the petiole. The radical nature of the clypeal and mandibular modifications suggest a relatively long phoretic association, although not necessarily with *P. dentata*. There are other local ants, such as *Pheidole crassicornis* Emery, *Solenopsis geminata* (Fabricius) and possibly *S. pergandei* Forel that have a petiole that might well accommodate the mandibles of *S. phoretica*. A phoretic relationship in which the parasite is attached to the petiole of the host queen is, to our knowledge, unique in ants. *Solenopsis daguerrei* queens cling to the neck of their host queen, immobilizing her, and greatly decreasing her reproductive ability (Silveira-Guido et al. 1973). There is also a highly specialized parasitic ant, *Teleutomyrmex schneideri* Kutter, whose queens ride about unattached on the host queen (Hölldobler & Wilson 1990).

It is impossible to define, on the basis of our single observation, the nature of the suspected

parasitic relationship. *Solenopsis phoretica* seems equipped for a prolonged period of phoresy on its host, but it is still possible that *S. phoretica* dismounts after it is fully imbued with the odor of the host queen. It is tempting to suggest, by analogy with known parasitic *Solenopsis*, that *S. phoretica* is a workerless parasite, but there is no evidence of this, aside from the absence of worker *Solenopsis* in the host nest. Whatever relationship *S. phoretica* may have with its host, it is certain to be interesting and unusual. We hope that myrmecologists and other naturalists working in southeastern North America will be on the lookout for this species. It might not be necessary to find nest queens of the host, as at some point in the life cycle of *S. phoretica* there should be numerous alate *S. phoretica* in the host colony.

#### ACKNOWLEDGMENTS

We thank Stefan Cover for helpful suggestions and encouragement, and anonymous reviewers for useful comments. This project was supported by the Archbold Biological Station.

#### LITERATURE CITED

- BOLTON, B. 1995. A New General Catalog of the Ants of the World. Harvard University Press, Cambridge, MA. 504 pp.
- ETTERS HANK, G. 1966. A generic revision of the world Myrmicinae related to *Solenopsis* and *Pheidologeton* (Hymenoptera: Formicidae). Australian J. Zool. 14: 73-171.
- HÖLLDOBLER, B., AND E. O. WILSON. 1990. The Ants. Harvard University Press, Cambridge, MA. 732 pp.
- SILVEIRA-GUIDO, A., J. CARBONELL, AND C. CRISCI. 1973. Animals associated with the *Solenopsis* (fire ants) complex, with special reference to *Labauchena daguerrei*. Proc. Tall Timbers Conf. Ecol. Animal Control Habitat Management 4: 41-52.