Stenamma foveolocephalum (=*S. carolinense*) Rediscovered (HYMENOPTERA: Formicidae: Myrmicinae)

by

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ABSTRACT

Workers representing *Stenamma carolinense* were recently collected in the Florida panhandle, the first recorded collection since 1937. Workers representing *Stenamma foveolocephalum* were subsequently collected in Mississippi, the first recorded collection since 1930. Additional specimens were collected in Alabama. After examining this material and comparing it with known types, we synonymize *S. carolinense* with *S. foveolocephalum*. Apparently this taxon is active near the surface only during winter months which may explain why this ant has not been encountered for over 50 years.

INTRODUCTION

Ants of the genus *Stenamma* are not frequently encountered in the United States; colonies are particularly difficult to locate (MBD pers. obs.). Most species move exceedingly slowly when disturbed and colonies are usually of small size. This is part of the reason why some species are known only from one or a few localities (see DuBois, 1993 for additional discussion).

Stenamma carolinense was described from two workers collected in 1937 from a peach orchard in Hoffman, Richmond Co., N. Carolina (Smith, 1951). Although some individuals have searched for additional specimens (for example, Carter, 1962), no additional collections have been reported (Smith, 1979). The most closely related species, *S. foveolocephalum*, was also collected as two workers in 1930 (2 miles South of Ackerman, Choctaw Co., Mississippi) (Smith, 1930). The holotype survives in the U.S. National Museum, but the second specimen placed in the Mississippi State College Entomology Depart-

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ment collection is now presumed lost (Smith, 1957). Searching by both authors in this collection failed to find the specimen in February, 1994. Nearly 60 years after the first specimens of *S. carolinense* were collected in North Carolina, one of us (LRD) had the good fortune to locate additional individuals in the Florida panhandle. This represents an extension of the known range of this species by approximately 700 km.

Based upon the information obtained by LRD in his initial collection of *S. carolinense*, we visited the type locality (and the surrounding area) of *Stenamma foveolocephalum* in February, 1994. Additional specimens were discovered, the first since 1930. In addition, we searched south central Alabama and discovered additional material as well. The Alabama forms were intermediate between the two "species," and we therefore believe *S. carolinense* and *S. foveolocephalum* represent variation extremes within a single wide ranging species.

METHODS

Ants collected during our study were located through patient searching of soil and leaf litter. Some individuals were encountered as stray individuals; most were directly extracted from nest entrances. Nest entrances are described below in further detail. Excavation of nests did not yield large concentrations of ants; most were encountered near the surface. No reproductives were encountered.

Measurements follow those described by DuBois (1993) and all are expressed in millimeters. Additional measurements include:

Eye Length. Maximum length of compound eye, measured with head in lateral view.

Eye Width. Maximum width of compound eye, measured with head in lateral view.

Eye Bottom to Mandibular Insertion. Maximum length between lowest part of compound eye and mandibular articulation, measured with head in lateral view.

Eye Top to Occipital Vertex. Maximum length between highest part of compound eye and occipital vertex, measured with head in lateral view.

Petiole Width. Maximum width of petiole, measured across node, in dorsal view.

Postpetiole Length. Maximum length of postpetiole, measured from ventral juncture with petiole to ventral juncture with gaster.

Postpetiole Height. Maximum height of postpetiole, measured perpendicularly, from apex of postpetiolar node to venter of postpetiole (directly beneath node).

Postpetiole Width. Maximum width of postpetiole, measured across

node, in dorsal view.

Specimens have been distributed as follows (codens follow those of Arnett and Samuelson, 1986): USNM - 3 workers, MCZC - 6 workers, LACM - 6 workers, BMNH - 3 workers, INHS - 2 workers, M. DuBois Personal Collection - 10 workers, FSCA - 14 workers, L. Davis Personal Collection - 3 workers, ABSC - 41 workers, MUIC - 1 worker.

RESULTS

Comparisons

Smith (1957) provided a key for separation of *S. carolinense* and *S. foveolocephalum* from other North American *Stenamma* that are found in the southeastern U.S. These ants are larger (total length 2.75 - 4.00 mm), with compound eyes containing 5 - 12 ommatidia in greatest diameter, and possess transverse rugulae or rugulose-reticulate sculpturing on the promesonotum. This combination of characters separates both species from all other *Stenamma* which might be encountered in the southeastern U. S.

Smith (1957) also provided the following characters to separate the two species. *S. carolinense* has large compound eyes (0.2 mm in greatest diameter) with 10-12 ommatidia and short, blunt, tuberculate propodeal spines. *S. foveolocephalum* has smaller compound eyes (0.15 mm in greatest diameter) with 7-8 ommatidia and short, tuberculate propodeal spines with an acute apex. MBD examined both types and confirmed Smith's characters. Additional features of both types are discussed along with the new material below. However, Smith (1957) described the base of the propodeum as subhorizontal in *S. carolinense* and sloping in *S. foveolocephalum*. Such terms are not easily quantified and MBD could determine no significant difference between the types for this character.

Examination of new material collected from Mississippi coupled with material from Florida and Alabama indicate intergradations between these types. Additionally, features previously used to separate *S. foveolocephalum* and *S. carolinense* vary independently, not concordantly. The types of these taxa represent extremes of variation for selected characters. In several aspects, the recently discovered populations in Florida and Alabama represent intergradation between the previously distinct forms.

Petiolar node profile (when viewed from rear) is flat in the paratype of *S. foveolocephalum* (Fig. 13) and slightly convex in the paratype of *S. carolinense* (Fig. 3). This profile is slightly convex (flat in some specimens) in the Florida population (Fig. 8). This character would identify

some members of the Florida population as *S. foveolocephalum* and others as *S. carolinense*. The Alabama population has a petiolar node profile more similar to that of *S. carolinense* (slightly convex).

Compound eye size also varies between populations. These are somewhat larger in the paratype of *S. carolinense* and in the Florida population. This character would identify the Florida population as *S. carolinense*. The Alabama population also has an eye size more similar to that of *S. carolinense*. However, this character is not absolute (see Table 1). Ranges of measurements for eye length overlap between populations: Florida (0.18 - 0.26), Mississippi (0.17 - 0.21), Alabama (0.21 - 0.23). Eye width measurements also overlap (Table 1).

Table 1. Individual measurements of representatives of the Florida population of *Stenamma foveolocephalum*. Refer to text for further discussion.

Worker Measurements (mm)	n =	Minimum	Maximum	Mean	Standard Deviation	Standard Error
Florida Population						
Total Length	72	4.27	5.35	4.78	0.193	0.023
Head Length	72	1.00	1.18	1.12	0.038	0.004
Head Width	72	0.85	1.02	0.96	0.038	0.004
Cephalic Index	72	82.19%	89.21%	85.86%	1.516%	0.179%
Scape Length	72	0.73	0.89	0.83	0.028	0.003
Scape Index	72	80.65%	92.59%	86.26%	2.118%	0.250%
Eye Length	72	0.18	0.26	0.23	0.015	0.002
Eye Width	72	0.13	0.18	0.16	0.011	0.001
Eye Bottom to Mandibular Insertion	72	0.19	0.26	0.23	0.016	0.002
Eye Top to Occiput	72	0.42	0.53	0.47	0.023	0.003
Alitrunk Length	72	1.29	1.61	1.47	0.066	0.008
Pronotal Width	72	0.55	0.69	0.64	0.031	0.004
Petiole Length	72	0.40	0.52	0.47	0.026	0.003
Petiole Width	72	0.18	0.24	0.22	0.014	0.002
Petiole Height	72	0.27	0.34	0.30	0.017	0.002
Postpetiole Length	72	0.35	0.45	0.39	0.018	0.002
Postpetiole Width	72	0.27	0.37	0.33	0.021	0.003
Postpetiole Height	72	0.27	0.35	0.30	0.018	0.002
Alabama Population						
Total Length	3	4.16	4.40	4.25	0.133	0.077
Head Length	3	0.97	1.04	1.00	0.033	0.019
Head Width	3	0.87	0.90	0.89	0.019	0.011
Cephalic Index	3	86.82%	90.32%	88.80%	1.794%	1.036%
Scape Length	3	0.76	0.79	0.77	0.016	0.009
Scape Index	3	85.71%	87.50%	86.75%	0.927%	0.535%
Eye Length	3	0.21	0.23	0.21	0.009	0.005
Eye Width	3	0.14	0.16	0.16	0.009	0.005

Eye Bottom to Mandibular Insertion	3	0.20	0.23	0.21	0.012	0.007
Eye Top to Occiput	3	0.39	0.42	0.41	0.017	0.010
Alitrunk Length	3	1.29	1.35	1.32	0.032	0.019
Pronotal Width	3	0.57	0.61	0.59	0.021	0.012
Petiole Length	3	0.42	0.43	0.43	0.009	0.005
Petiole Width	3	0.18	0.19	0.19	0.008	0.005
Petiole Height	3	0.27	0.27	0.27	0.000	0.000
Postpetiole Length	3	0.34	0.34	0.34	0.000	0.000
Postpetiole Width	3	0.27	0.28	0.27	0.008	0.005
Postpetiole Height	3	0.25	0.28	0.26	0.017	0.010
Mississippi Population						
Total Length	8	4.15	4.59	4.31	0.168	0.059
Head Length	8	0.97	1.08	1.01	0.039	0.014
Head Width	8	0.85	1.00	0.90	0.047	0.017
Cephalic Index	8	87.60%	92.54%	89.50%	1.519%	0.537%
Scape Length	8	0.72	0.81	0.76	0.026	0.009
Scape Index	8	79.03%	87.74%	84.51%	2.776%	0.982%
Eye Length	8	0.17	0.21	0.19	0.012	0.004
Eye Width	8	0.11	0.14	0.14	0.011	0.004
Eye Bottom to Mandibular Insertion	8	0.18	0.23	0.21	0.017	0.006
Eye Top to Occiput	8	0.39	0.48	0.42	0.033	0.012
Alitrunk Length	8	1.29	1.45	1.35	0.061	0.022
Pronotal Width	8	0.52	0.68	0.59	0.050	0.018
Petiole Length	8	0.42	0.45	0.44	0.014	0.005
Petiole Width	8	0.19	0.23	0.20	0.018	0.006
Petiole Height	8	0.24	0.30	0.26	0.019	0.007
Postpetiole Length	8	0.28	0.34	0.31	0.018	0.006
Postpetiole Width	8	0.24	0.31	0.26	0.023	0.008
Postpetiole Height	8	0.23	0.28	0.25	0.016	0.006

The type of *S. foveolocephalum* has two clypeal carinae on each side of the midline while the type of *S. carolinense* has one. The bulk of specimens examined from Florida have two clypeal carinae on each side of the midline; but not all. A few have one. Thus, specimens collected from nearby nest entrances would be identified as separate species in the Florida population. Most members of the Alabama population would be identified as *S. carolinense*; one would fit *S. foveolocephalum* using this character. However, several members of the Mississippi population also have one clypeal carina on each side of the midline.

The anterior subpetiolar process is quite reduced in the type of *S. foveolocephalum* (Fig. 12) and present as a distinct bump in *S. carolinense* (Fig. 2). Members of the Florida population are most similar to Fig. 2 (with a few exceptions); members of the Alabama population are most similar to Fig. 2. However, members of the Mississippi

Table 2. Comparisons of the Florida population with lectotype of *S. foveolocephalum* and paratype of *S. carolinense*. Refer to text for further discussion.

Worker Measurements (mm)	Observed Minimum	*S. foveolocephalum* Lectotype	*S. carolinense* Paratype	Observed Maximum
Total Length	4.15	4.69	4.59	5.35
Head Length	0.97	1.09	1.08	1.18
Head Width	0.85	0.97	0.95	1.02
Cephalic Index	82.19%	88.97%	88.06%	92.54%
Scape Length	0.72	0.81	0.79	0.89
Scape Index	79.03%	82.64%	83.05%	92.59%
Eye Length	0.17	0.18	0.19	0.26
Eye Width	0.11	0.13	0.14	0.18
Eye Bottom to Mandibular Insertion	0.18	0.23	0.23	0.26
Eye Top to Occiput	0.39	0.40	0.48	0.53
Alitrunk Length	1.29	1.37	1.40	1.61
Pronotal Width	0.52	0.63	0.63	0.69
Petiole Length	0.40	0.47	0.47	0.52
Petiole Width	0.18	0.22	0.21	0.24
Petiole Height	0.24	0.29	0.29	0.34
Postpetiole Length	0.28	0.35	0.37	0.45
Postpetiole Width	0.24	0.31	0.27	0.37
Postpetiole Height	0.23	0.27	0.26	0.35

population exhibit variation ranging from a highly reduced process to a prominent bump.

Length, number, and arrangement of carinae on the first gastral tergite base also vary within and between populations. The single specimen of *S. foveolocephalum* exhibits fairly uniform short carinae (Fig. 15) while the type of *S. carolinense* has longer carinae near the midline of the tergite (Fig. 5). Most members of the Florida population exhibit longer, yet more uniform carinae (Fig. 10). These are most similar to the type of *S. foveolocephalum*. Members of the Alabama population exhibit longer carinae near the midline of the tergite (as in Fig. 5) and are more similar to *S. carolinense* in this feature. Some members of the Mississippi population also exhibit carinae more similar to Fig. 5.

Length and acuteness of propodeal spines might also be considered a good separatory character (and was used by Smith, 1957). However, a great deal of variation exists even within the Florida population (ranging from that exhibited by both types — from short sharp spines to blunt projections). Most members of the Mississippi population do have slightly longer and more acute propodeal spines (but not all).

Although color is rarely a good separatory character, many specimens are darker than "typical" *Stenamma*. Several approach piceous,

especially on their gaster. However, color also varies between individuals (even between some collected from the same nest entrance). Overall, Mississippi specimens are slightly darker than either Alabama or most Florida specimens (a few Florida specimens are equally dark).

Measurements and associated statistics of Florida, Alabama, and Mississippi populations are provided in Table 1. Measurements for types of both "taxa" are compared with observed minimum and maximum measurements for all populations sampled are listed in Table 2. Average values for these measurements from each population sampled are presented in Table 3. One would expect all of the various measurements would not overlap (Table 2). A similar argument has recently been used to synonymize two Russian species of *Stenamma* (DuBois, 1993). We have also verified the 4,3 palpal formula for this taxon (Figs. 16, 17).

We found that 1) multiple populations of *Stenamma carolinense* and *S. foveolocephalum* occur throughout parts of the southeastern United States, 2) these populations are not separated by clear morphological boundaries (and actually appear to intergrade), 3) these intergradations do not vary concordantly between populations, 4) they are easily separated from remaining species of *Stenamma* found in the United States, and 5) both taxa have a suspected unique habit of only foraging

Table 3. Comparisons of known populations of *S. foveolocephalum* (average values). Refer to text for further discussion.

Worker Measurements (mm)	North Carolina	Florida	Alabama	Mississippi
Total Length	4.59	4.78	4.25	4.31
Head Length	1.08	1.12	1.00	1.01
Head Width	0.95	0.96	0.89	0.90
Cephalic Index	88.06%	85.86%	88.80%	89.45%
Scape Length	0.79	0.83	0.77	0.76
Scape Index	83.05%	86.26%	86.75%	84.51%
Eye Length	0.19	0.23	0.21	0.19
Eye Width	0.14	0.16	0.16	0.14
Eye Bottom to Mandibular Insertion	0.23	0.23	0.21	0.21
Eye Top to Occiput	0.48	0.47	0.41	0.42
Alitrunk Length	1.40	1.47	1.32	1.35
Pronotal Width	0.63	0.64	0.59	0.59
Petiole Length	0.47	0.47	0.43	0.44
Petiole Width	0.21	0.22	0.19	0.20
Petiole Height	0.29	0.30	0.27	0.26
Postpetiole Length	0.37	0.39	0.34	0.31
Postpetiole Width	0.27	0.33	0.27	0.26
Postpetiole Height	0.26	0.30	0.26	0.25

above ground during winter months. Based upon these facts we conclude that only one variable species exists which is currently recognized by two names. We therefore synonymize these names as follows:

Stenamma fovolocephala [misspelling - see below] M. R. Smith, 1930. Ann. Entomol. Soc. America 23: 564 - 565. Worker — UNITED STATES: Mississippi, Choctaw Co., 2 miles South of Ackerman, February 8, 1930. [NMNH, Examined].

=*Stenamma carolinense* M. R. Smith, 1951. Proc. Entomol. Soc. Washington 53(3): 156 - 158, Figs. 1 & 2. Worker — UNITED STATES: North Carolina, Richmond Co., on U.S. Hwy. 1, approx. 1 mi North of Hoffman, February 10 -11, 1937. [NMNH Type 60922, Examined]. **New synonymy**.

We believe Smith intended to spell the name *foveolocephalum*. Although it is listed as *fovolocephala* in the heading, Smith first refers to the name as *foveolocephalum*. Additionally, he indicates one of the defining characters is the reticulate-foveolate sculpturing of the head. We understand the International Code of Zoological Nomenclature grants an exception for misspellings of the original name if there is clear evidence of an inadvertent error (such as a printer's error). We believe this to be the case. Such evidence is reinforced by Smith's (1957) revision of *Stenamma* where he clearly indicates the spelling as *foveolocephalum* numerous times.

Habitat and Nest

Types *Stenamma carolinense* (Wm. F. Turner, Feb. 10-11, 1937) were discovered in "sparsely vegetated, sandy soil in a peach orchard..." (Smith, 1951: 158). Additionally, types of *S. foveolocephalum* were "collected from sandy soil on the south slope of a thinly wooded hillside..." (Smith, 1930: 565). These two specimens were discovered on Feb. 8, 1930.

Recent Florida collections of *S. foveolocephalum* came from a power line (transmission) cut through a section of sand pine scrub on the southern periphery of Eglin Air Force Base. This site was located in Walton County, Florida approximately 1.1 mi (2 km) NW of Portland (Figures 19 and 20). Nests were in sparsely vegetated sand and resembled fire ant foraging entrances. Sand granules piled around the nest entrance were arranged in a circle with the shaft of the nest entrance located centrally. Nest entrances had only small accumulations of these sand granules, but included sand grains that were yellow (Fig. 21). (Surface sand is lighter, yellow sand occurs 7 - 10 cm below the surface). Nests appeared to be small chambers containing ants located within 15 cm of the surface. No brood, alates, or queens were

collected.

Recent collections were made on January 10, 1993 (Lloyd Davis, Jr.) and February 5, 1993 (Lloyd Davis, Jr. and Mark Deyrup). Subsequent searching on March 19 and 21, 1993 revealed the same species of ants encountered previously, but no further *Stenamma*.

Recent Mississippi collections were made near the type locality of *S. foveolocephalum* [UNITED STATES: Mississippi, Winston Co., T16N R12E Sec 10, 300' elevation, 19 February, 1994, M. B. DuBois & L. R. Davis, Jr., MBD # 1752I; Mississippi, Choctaw Co., T16N R11E Sec 12, 250' elevation, 20 February, 1994, M. B. DuBois & L. R. Davis, Jr., MBD # 1753D]. Both sites were in the Tombigbee National Forest and had sandy soil and were covered by pine and scrub. The latter site had recently been burned. All nests were encountered within 10 meters of the gravel roadway. Nest entrances were similar to those described for the Florida populations. It appears this ant prefers disturbed habitats as most colonies were encountered on roadside cuts made by grading equipment. Such open areas may aid a winter-foraging species by providing less shade than found in the surrounding forest.

Recent Alabama collections [UNITED STATES: Alabama, Bibb Co., Talladega National Forest, Forest Route 737 at County Route 1, 350' elevation, February 21, 1994, M. B. DuBois and L. R. Davis, Jr.] were represented by sandy soil and pine scrub as well. Again, nest entrances were as described for the Florida population and were found within 10 meters of the gravel roadway.

DISCUSSION

Given the time span between collections of this taxon, few hypotheses can be made concerning its biology. To date, no reproductives have been reported. It appears that this ant prefers to forage near the surface only during winter months. All collections of *S. foveolocephalum* have been during winter months (January and February). Subsequent searching of the same habitat (in Florida) in March failed to uncover additional specimens. Carter's (1962) attempts to locate specimens during summer months were also unsuccessful.

A number of these ants are dark (particularly on their gaster). It is possible such coloration aids in thermal regulation while these ants forage above ground. It is of interest that this species should be rediscovered on a military installation. Eglin Air Force Base is a very large tract of land which contains large acreages of xeric habitat that have been lost to development in the counties outside the base boundaries.

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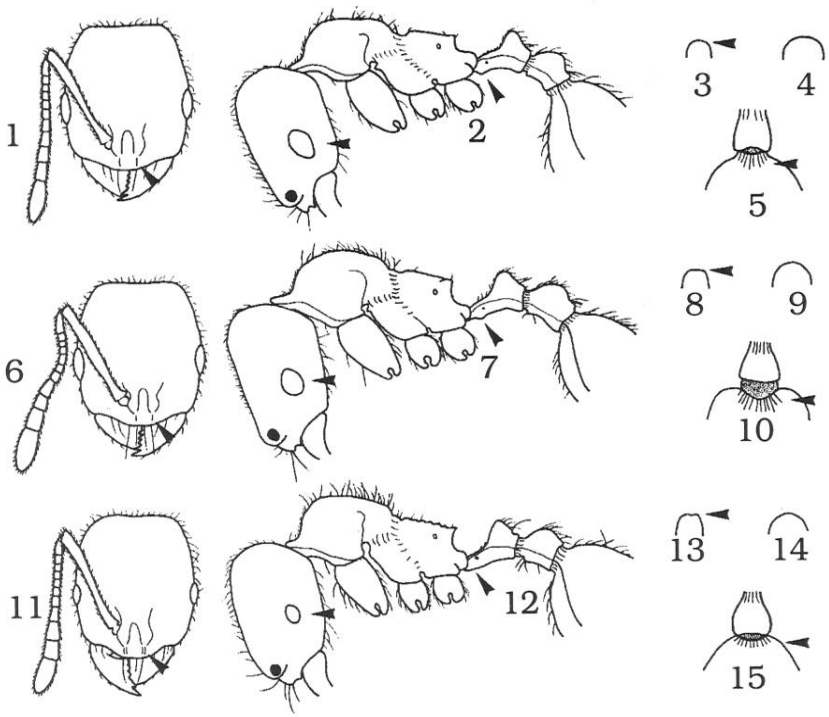
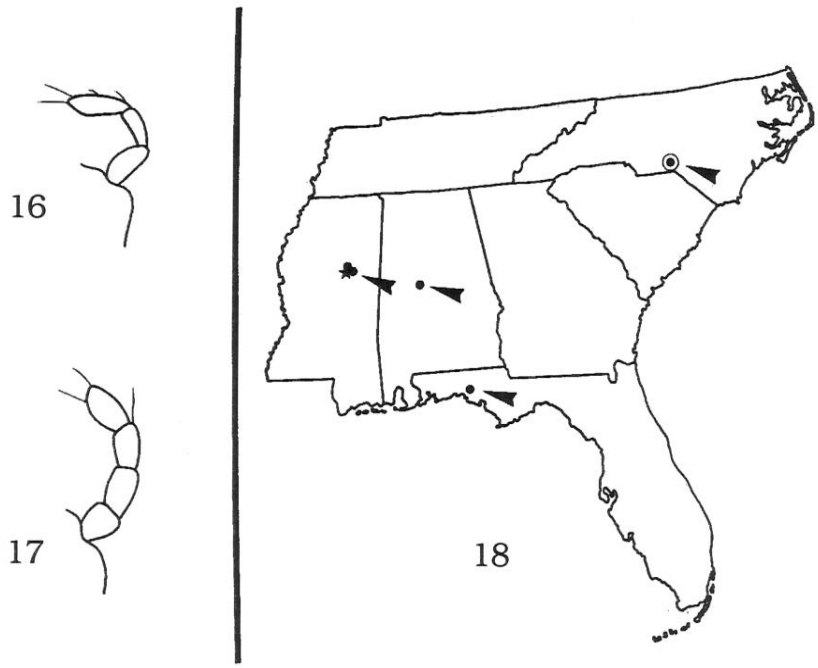


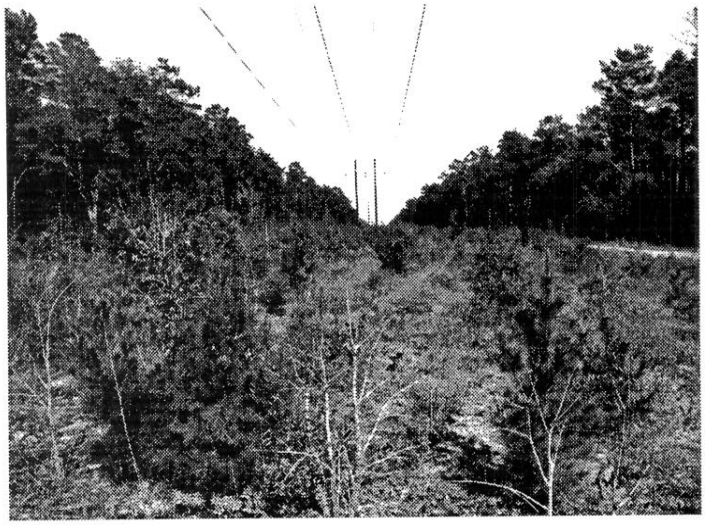
Figs. 1 - 5. *Stenamma carolinense* (paratype worker). 1 - Head, full face view. 2 - Head, alitrunk, petiole, postpetiole and gaster (part), lateral view (legs, except coxae, excluded). 3 - Petiolar node, dorsal view from rear. 4 - Postpetiolar node, dorsal view from rear. 5 - Postpetiole (part) and gaster (part), dorsal view. Arrows discussed in text.

Figs. 6 - 10. *Stenamma foveolocephalum* (Florida worker). 6 - Head, full face view. 7 - Head, alitrunk, petiole, postpetiole and gaster (part), lateral view (legs, except coxae, excluded). 8 - Petiolar node, dorsal view from rear. 9 - Postpetiolar node, dorsal view from rear. 10 - Postpetiole (part) and gaster (part), dorsal view. Arrows discussed in text.

Figs. 11 - 15. *Stenamma foveolocephalum* (lectotype worker). 11 - Head, full face view. 12 - Head, alitrunk, petiole, postpetiole and gaster (part), lateral view (legs, except coxae, excluded). 13 - Petiolar node, dorsal view from rear. 14 - Postpetiolar node, dorsal view from rear. 15 - Postpetiole (part) and gaster (part), dorsal view. Arrows discussed in text.



Figs. 16 - 17. *Stenamma foveolocephalum* (Florida worker). 16 - Labial palp. 17 - Maxillary palp. Fig. 18. Distribution of *Stenamma foveolocephalum* in the Southeastern U. S. Arrows pointing to closed circles indicate localities of recent *S. foveolocephalum* collections. Arrow pointing to star indicates type locality of *S. foveolocephalum*. Arrow pointing to to closed circle within open circle indicates type locality of *S. carolinense*.



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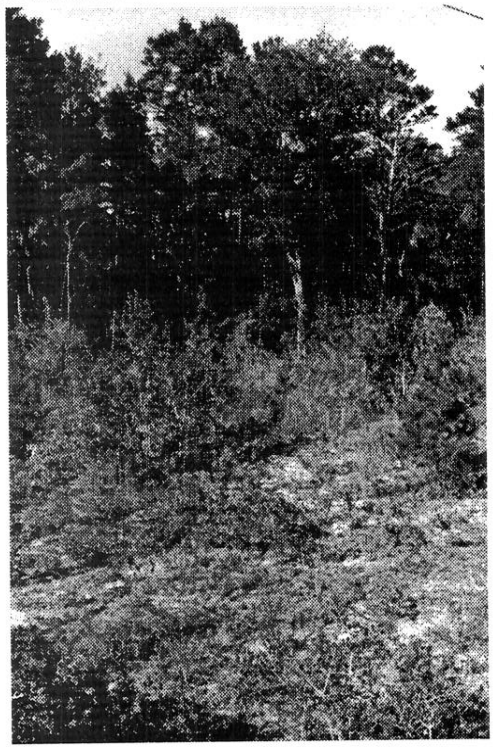

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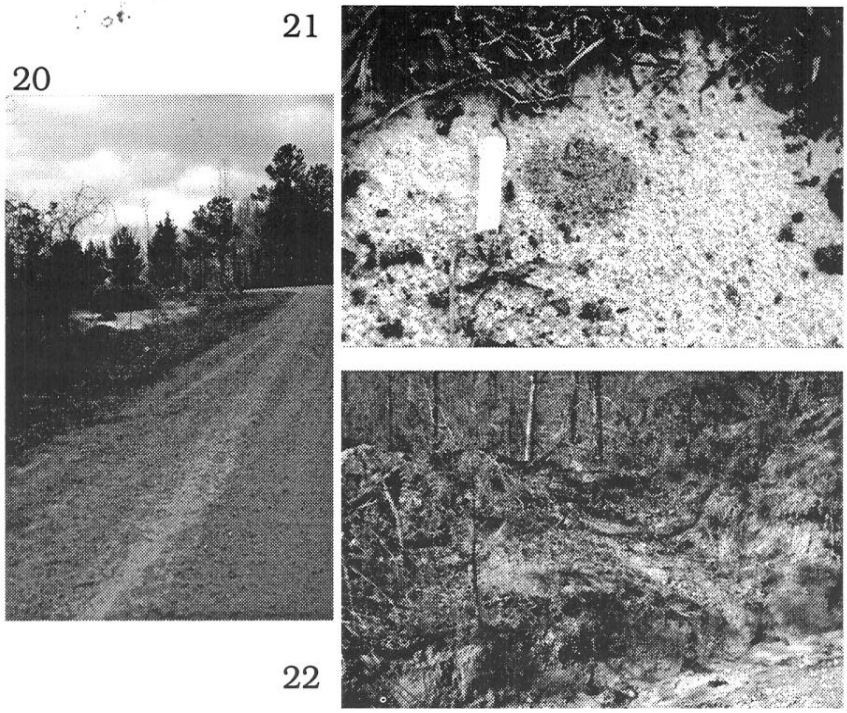
Figs. 19 - 20. Habitat of *Stenamma foveolocephalum* in Florida. 19 - View of power line cut where nests were located. 20 - View of surrounding sand pine scrub. Both photos by M. DuBois.



Figs. 21 - 23. Nest and habitat of *Stenamma foveolocephalum*. 21 - Nest at Florida site (vial measures approximately 3 cm). 22 - Habitat in Mississippi (Winston Co.) near abandoned sand pit. Nests were located along left roadside margin. 23 - Habitat in Alabama. Nests were located along roadside margin. Photos by L. Davis, Jr.