

## **A New Shield-Faced Ant of the Genus *Pheidole* (Hymenoptera: Formicidae: *aberrans* Group) From Argentina**

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### ABSTRACT

We describe *Pheidole acutiloba* Mackay, based on the majors, minors, females and males, with the head of the major formed into a shield. This species is similar to *P. aberrans* and *P. obscurifrons*, and we discuss the similarities and differences between the majors of the three species. We provide an amendment to the key in Wilson's monograph to accommodate the new species.

### RESUMEN

Describimos la hormiga *Pheidole acutilobata* Mackay de Argentina, basada en los soldados, obreras, hembras y machos, con la cabeza del soldado en forma de escudo. Esta nueva especie es semejante a *P. aberrans* y *P. obscurifrons*; consideramos las características semejantes y diferentes de estas especies. Incluimos cambios en la clave de Wilson para identificar la nueva especie.

### INTRODUCTION

The ant genus *Pheidole* is common in most terrestrial habitats of the world, including the entire New World, and is considered to be in a hyperdiverse genus (Wilson, 2003). Wilson's recent revision (2003) laid a solid foundation for further studies of this important monophyletic genus, although many of the groups defined in the monograph are not monophyletic (Moreau, 2008). Several recent papers have been published on the New World species of the genus (for example, Burge, 2005; La Polla and Cover, 2005; Makhan, 2007; Fernandez and Wilson, 2008; Longino, 2009; Longino and Cox, 2009).

The three of us independently collected a new species in the genus, and will describe it, so that the name can be made available for studies on the ecology of the ants of Argentina.

### METHODS AND MATERIALS

Specimens were measured and illustrated using an ocular micrometer and grid in a Zeiss dissecting microscope. The following abbreviations are used (all measurements in mm):

HL—Head length, from transverse line across anteriormost edge of clypeus to transverse line across occipital lobes of head.

HW—Head width, maximum excluding eyes.

SL—Scape length, excluding basal condyle.

EL—Eye length, maximum dimension.

WL—Weber's length, anterior border of pronotum to posterior border of lobe of metapleural gland.

CI—Cephalic Index, HW/WL X 100.

SI—Scape Index, SL/HL X 100.

## Depositories:

CASC—California Academy of Sciences

CWEM—Collection of William and Emma

Mackay, Centennial Museum, University of  
Texas at El PasoIAVH—Instituto Humboldt, Villa de Leyva,  
Colombia

IMLA—Instituto Miguel Lillo, Tucuman, Argentina

MACN—Museo Argentino de Ciencias Naturales,  
Buenos AiresMCZC—Museum of Comparative Zoology,  
Harvard UniversityMZSP—Museu de Zoologia da Universidade de  
São PauloNHMB—Naturhistorisches Museum, Basel,  
SwitzerlandUSNM—United States National Museum of Natural  
History, Smithsonian Institution

## RESULTS AND DISCUSSION

***Pheidole acutilobata* n. sp. (H D E G)**

Figs. 1-20

*Diagnosis.* The major is easily recognized as being a member of the *aberrans* group (Wilson, 2003) in that the head is shaped like a shield, with antennal scrobes to protect the scapes and at least part of the funiculus; and by the transverse, coarse carina that passes transversely across the posterior part of the head. The antennal scapes are very short, reaching about 1/3 of the length to the posterior lateral corners of the head. The entire dorsum of the head is covered with longitudinal carinulae, which strongly diverge posteriorly and pass over the sides of the head posteriorly somewhat horizontally. The frontal lobes are well-developed, but do not reach the anterior edge of the clypeus. In full face view the external borders of the frontal lobes are generally convex, but within members of the type series, can be straight or even concave as in *P. obscurifrons*. The pronotum is very finely sculptured, mostly with transverse striolae. The pronotum is strongly bulging dorsally. The propodeal spines are poorly developed and the subpeduncular process is generally developed into a small ventral tooth, which is rarely followed by

a flange. It is a moderately large (total length 4-5 millimeters) dark reddish brown specimen.

The minor worker lacks the antennal scrobes and the scape extends slightly past the posterior lateral corner of the head. There is no transverse carina near the posterior border of the head. Much of the head is smooth and glossy medially, laterally it has fine striolae which pass nearly directly posteriorly. The side of the pronotum is finely punctate, and partially smooth and glossy, the dorsum of the pronotum is covered with semicircular carinulae which are somewhat reticulated centrally. The dorsopropodeum is punctate, the posteropropodeum is punctate, but somewhat smooth near the base. The propodeal spines are small. The subpeduncular process of the petiole is poorly developed and the petiolar apex is sharp as seen from the side. It is a medium sized (2-3 millimeters) medium brown specimen.

The female also has scrobes which partially protect the antennal scapes, but are less developed than in the major worker. The scapes extend more than 1/2 of the distance to the posterior lateral corners of the head. The lateral anterior border of the frontal lobe ranges from slightly convex to slightly concave. The head is nearly square in shape. There is no transverse carina near the posterior border of the head. The propodeal spines are poorly developed. The subpetiolar process may consist of a small tooth or angle, ranging to a flange along the ventral border. It is a moderately large (total length 8-9 millimeters) dark brown specimen.

The mandible of the male has three teeth (occasionally four or five, with smaller teeth between the major teeth). The males lack both the antennal scrobes and the transverse carina near the posterior border of the head. The scape extends 2/3 of the distance to the posterior lateral corner of the head, the eyes and ocelli are well-developed, the propodeal spines are represented by bumps or sometimes by blunt angles, the subpeduncular process is poorly developed and the apex of the petiole is rounded. The specimens are moderate in size (7-8 millimeters total length) and mostly brown.

*Description. Major worker measurements (mm):* HL 2.00 - 2.20, HW 1.68 - 1.72, SL 0.60 - 0.66, EL 0.19 - 0.20, WL 1.52 - 1.60. Indices: CI 76 - 86, SI 76 - 86.

Mandibles enlarged, without well-defined teeth (Fig. 4), poorly defined large tooth at apex followed by swollen bump; anterior border of clypeus concave (Fig. 3), surface of clypeus depressed and concave medially without any evidence of carina; frontal area poorly defined; head rectangular shaped, elongate, with sides of head nearly parallel; antennal scrobes well defined (Fig. 3), extending  $\frac{1}{2}$  length of head, giving head shield appearance, providing ample room for entire scape (Fig. 3) as well and as part of funiculus; lateral borders of frontal lobes ranging from slightly convex (Fig. 3), to straight, to slightly concave (Fig. 5), forming well developed angles separated from clypeus when viewed from side (Fig. 1); scape short, extending slightly past level of posterior border of eye (Fig. 3); eye small, maximum diameter approximately  $\frac{1}{3}$  length to anterior margin of head (side view); pronotum large, swollen dorsally (Fig. 1), bulbous, rounded laterally; dorsum of mesonotum swollen, but not sharp (Fig. 1); dorsopropodeum and posteropropodeum approximately equal in length, propodeal angles small (Fig. 1); subpeduncular process of petiole forming well developed angle (Fig. 1), apex of petiole sharp as seen from side, apex slightly concave as seen from behind; postpetiole without lateral connules.

One or more erect hairs present medially on anterior border of clypeus (Fig. 3), many (more than 20) erect hairs extending past sides of head (full-face view), abundant hairs on vertex and frons, sparse on remainder of dorsal and ventral surfaces of head, abundant on pronotum (Fig. 1), few hairs on mesonotum, nearly absent on propodeum, present on dorsum of petiole and postpetiole, all surfaces of gaster (Fig. 1), coxae, femora, tibiae; appressed hair sparse or absent on most surfaces.

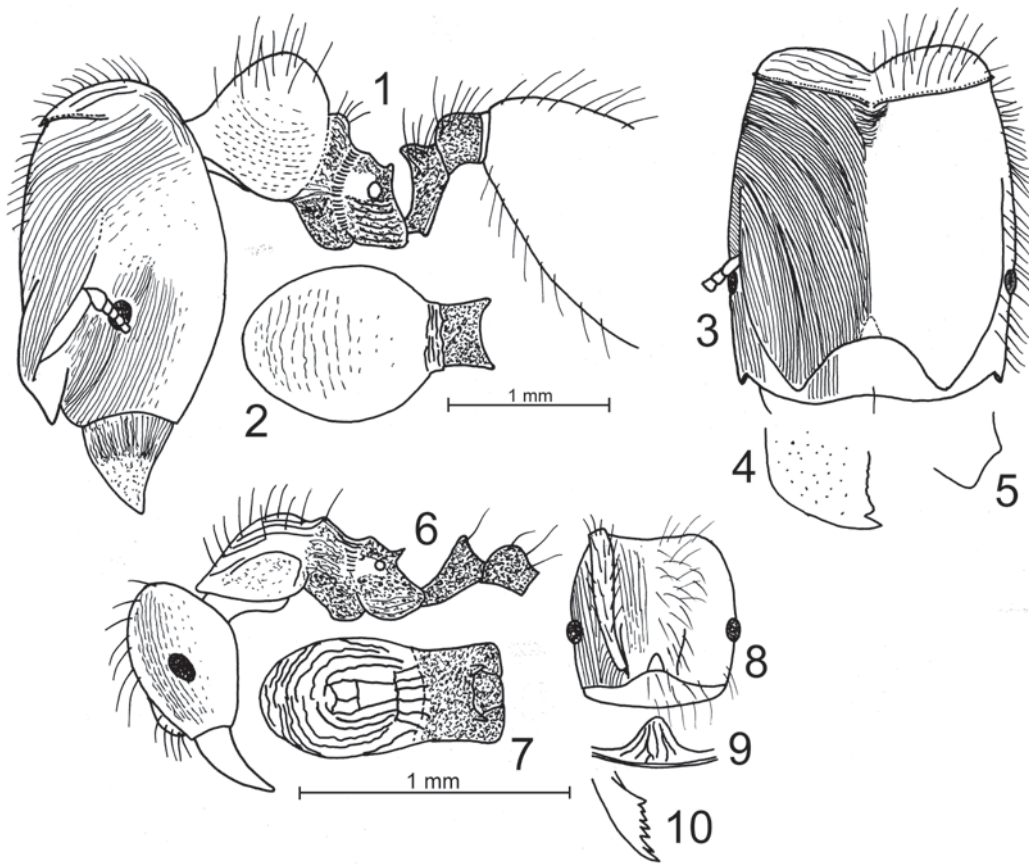
Mandibles smooth and glossy with scattered punctures (Fig. 4); clypeus mostly smooth and glossy, with carinulae along lateral edges (Fig. 4); dorsum of head with longitudinal parallel

carinulae on anterior half, which diverge and pass to sides of head posteriorly (Fig. 1), parallel carinae present in vicinity of eye and anterior to eye, region posterior to eye being partially smooth and glossy with scattered punctures, region ventral to eye along side of head with carinulae, vertex separated from remainder of head by strong well developed transverse carina (Fig. 3), which does not form angular region medially, vertex and tops of occipital lobes partially shiny, but with transverse carinulae (Fig. 3), ventral surface of head mostly smooth and glossy, medial region with longitudinal striae; lower half of pronotum with horizontal striolae (Fig. 1), dorsum of pronotum with coarser transverse striae (Fig. 2), mesopleuron mostly punctate, anepisternum with horizontal striae, mesonotum with transverse rugulae especially near swollen area; side of propodeum mostly punctate with striolae, region anterior to spiracle smooth and glossy (Fig. 1); petiole and postpetiole punctate; gaster mostly smooth and glossy, with scattered piligerous punctures.

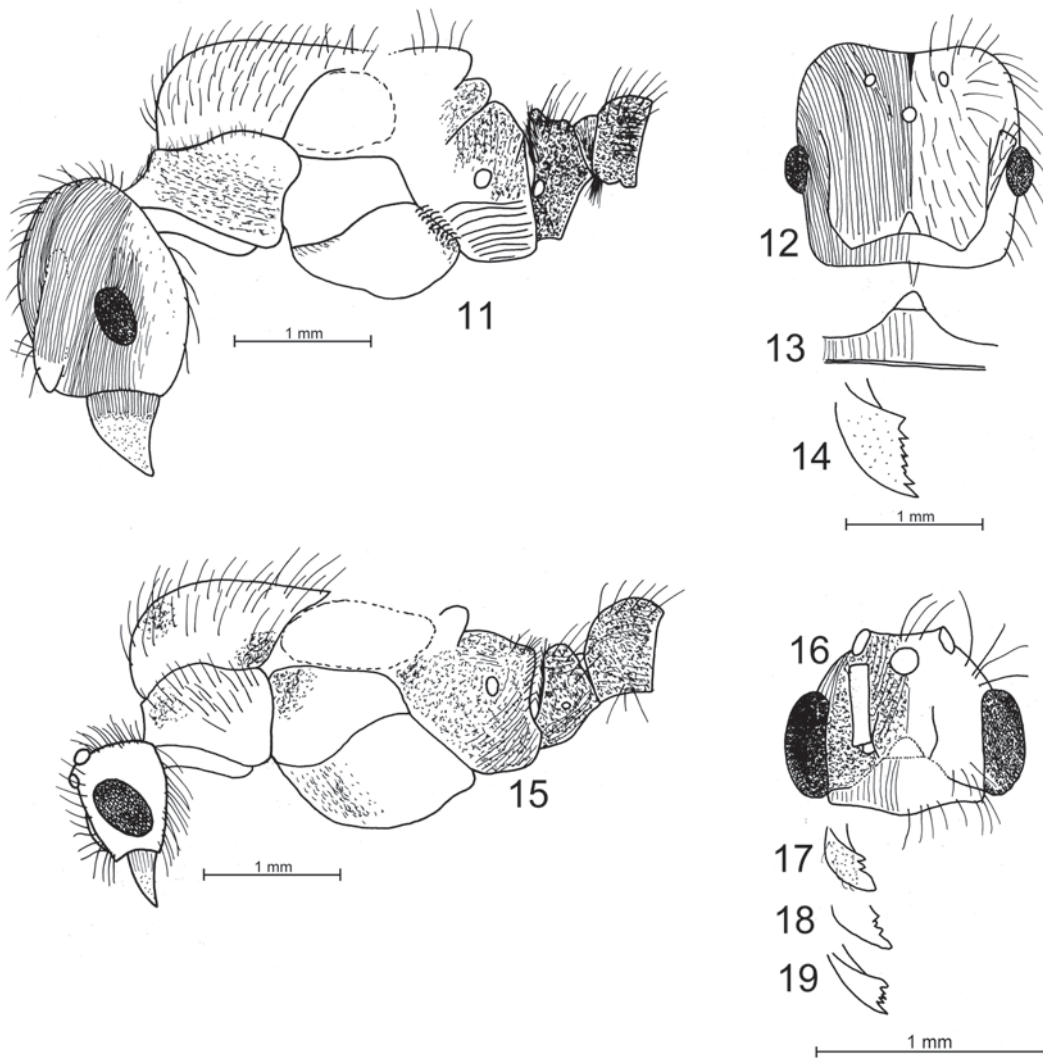
Dark reddish brown.

*Minor worker measurements (mm):* HL 0.72 - 0.74, HW 0.68 - 0.72, SL 0.56 - 0.60, EL 0.11 - 0.14, WL 0.86 - 0.92. Indices: CI 94 - 97, SI 78 - 81.

Mandibles with two well-developed apical teeth and 7-8 less well developed teeth on remainder of masticatory border (Fig. 10); anterior border of clypeus convex (Fig. 8), with upturned flange along anterior border (Fig. 9), surface of clypeus convex; frontal triangle well developed; antennal scrobe not developed; scape extends nearly 1 diameter past posterior lateral corners of head (Fig. 8); eye relatively large, greatest diameter approximately equal to  $\frac{1}{2}$  distance from anterior margin of head (Fig. 8); head nearly square-shaped, sides of head convex; pronotum not greatly enlarged; mesonotum forming bump (Fig. 6); dorsopropodeum and posteropropodeum approximately equal in length (Fig. 6), propodeal spines poorly developed; subpeduncular process poorly developed, node of petiole moderately sharp; lateral connules of postpetiole not developed.



Figs. 1-10. Workers of *Pheidole acutilobata* (note the scales are different for the major and minor): 1, Side view of the holotype major; 2, Top view of the mesosoma of the holotype major; 3, Head of the holotype major; 4, Mandible of the holotype major in frontal view; 5, Anterior edge of the frontal lobe of a paratype major; 6, Side view of a paratype minor worker; 7, Top view of the mesosoma of a paratype minor worker; 8, Head of a paratype worker; 9, Clypeus of a paratype minor worker in frontal view; 10, Mandible of a paratype minor worker.



Figs. 11-19. Female and male of *Pheidole acutilobata*: 11, Side view of a paratype female; 12, Head of a paratype female; 13, Clypeus of a paratype female in frontal view; 14, Mandible of a paratype female; 15, Side view of a paratype male; 16, Head of a paratype male; 17-19 Mandibles of paratype males with 3, 4 and 5 teeth.

Erect and suberect hairs present on mandibles, clypeus, dorsal and ventral surfaces of head, scape, sides of head, dorsum of mesosoma, petiole, postpetiole and all surfaces of gaster, all surfaces of legs, appressed pubescence not obvious.

Clypeus with coarse longitudinal carinulae (Fig. 9); dorsum of the head with coarse irregular carinulae which diverge slightly posteriorly (Fig. 8); side of pronotum moderately smooth but punctate (Fig. 6), dorsum of pronotum with semicircular carinulae around central region, which is slightly rugoreticulate medially (Fig. 7); mesopleuron punctate, with poorly defined longitudinal striolae dorsally, dorsum of mesonotum mostly transversely striate, but with some rugoreticulae; side of propodeum punctate, except for region anterior to spiracle which is smooth and glossy, dorsopropodeum and posteropropodeum punctate; petiole and postpetiole punctate, gaster smooth and polished with piligerous punctures.

Concolorous dark reddish brown.

*Female measurements (mm):* HL 1.58 - 1.66, HW 1.54 - 1.64, SL 0.72 - 0.80, EL 0.41 - 0.43, WL 2.92 - 3.00. Indices: CI 97 - 99, SI 43 - 51.

Mandibles with apical tooth large, well developed, subapical tooth developed, 5-6 additional poorly developed teeth on masticatory border (Fig. 14); clypeal surface flat; frontal triangle developed; head square-shaped, slightly narrowed anteriorly (Fig. 12); antennal scrobe developed but less so than in major worker; eyes large, separated from anterior margin of head by about 1 diameter; scape extends more than  $\frac{1}{2}$  distance to posterior border of head (Fig. 12); ocelli well developed; posterior border of head concave; mesosoma not remarkable, except propodeal angles weakly developed (Fig. 11); subpeduncular process formed into elongated flange, apex of petiole sharp; postpetiole without lateral conules.

Erect and suberect hairs present on mandibles, few hairs on medial region of anterior border of clypeus, on sides of head, on dorsal and ventral surfaces of head, on scapes, all surfaces of mesosoma (Fig. 11), dorsum of petiole and

postpetiole, all surfaces of gaster, and all surfaces of legs; appressed pubescence nearly absent, few hairs present on scutum and gaster.

Mandibles smooth and glossy, with scattered punctures (Fig. 14); clypeus with longitudinal carinulae (Fig. 13); carinulae on dorsum of head slightly diverging posteriorly (Fig. 12); not horizontal on sides of head (Fig. 11), area between frontal carina and eyes with fine longitudinal striae, ventral surface of head partially smooth and glossy with poorly developed striae; side of pronotum partially smooth and glossy, with some evidence of punctae or striolae (Fig. 11); dorsum of scutum with longitudinal carinulae, which diverge posteriorly, scutellum and mesopleuron smooth and glossy; metapleuron with striolae, as has region posterior to spiracle, mostly smooth and glossy anterior to spiracle; petiole and postpetiole punctate; gaster smooth and glossy with piligerous punctures.

Dark reddish brown.

*Male measurements (mm):* HL 0.86 - 0.90, HW 0.88 - 0.92, SL 0.28 - 0.30, EL 0.48 - 0.49, WL 2.98 - 3.06. Indices: CI 102, SI 31-35.

Mandible (Fig. 17-19) with three (or more, up to 5) teeth, apical tooth larger than remaining two subequal teeth; anterior border of clypeus convex, surface convex; antennal scrobes not developed; scape extending about  $\frac{2}{3}$  distance to posterior border (Fig. 16); eyes large occupying much of side of head (Fig. 16); ocelli well developed; mesosoma large; propodeal spines represented by raised areas or bumps (Fig. 15); subpeduncular process absent, petiole rounded at apex (Fig. 15); postpetiole without connules.

Erect hairs present on mandibles across anterior margin of clypeus, sides of head, dorsal and ventral surfaces of head, scutum (Fig. 15), scutellum, katapisternum, propodeum, dorsum of petiole and postpetiole, and all surfaces of gaster, present but reduced in numbers on legs; appressed pubescence sparse, few hairs on head and gaster.

Central region of clypeus partially smooth and glossy, sides with carinulae (Fig. 16); dorsum



of head vermiculate with fine carinulae, most of scutum smooth and glossy, anterior edge slightly roughened (Fig. 15), scutellum slightly roughened, side of pronotum with carinulae and punctures (Fig. 15), mesopleuron mostly smooth, region anterior to spiracle somewhat smooth, dorsopropodeum punctate, slightly more smooth medially, petiole and postpetiole punctate (Fig. 15), gaster smooth and glossy.

Dark brown, mandibles, funiculus, tibiae, tarsi, gaster lighter brown to yellow.

*Distribution.*— Known only from the provinces of Misiones and Buenos Aires in Argentina (Fig. 20).

*Type series.*— Holotype major worker (MACN), numerous paratype major workers, paratype minor workers, paratype females, and paratype males (CASC, CWEM, IAVH, IMLA, MCZC, MZSP, NHMB, USNM), ARGENTINA, Misiones, Parque Provincial Cañadón de Profundidad, 22°33.612'S 55°42.593'W, 160m, 29-xii-2007, W&E Mackay # 22722.

*Material examined.*— Type series and Argentina: Buenos Aires city, neighborhoods of Coghlan, 23-10-2009, R. Josens, and Núñez, 26-09-2010, F. Sola.

*Etymology.*— From Latin *acutus*, meaning sharp and *lobus*, meaning lobe, referring to the appearance of the anterior edge of the frontal lobe of the major, which appears to be a sharp point when viewed in profile.

*Discussion.*— The major of this species has characteristics which place it somewhat intermediate between *P. aberrans* and *P. obscurifrons*.

Similarities with *P. aberrans* include the form of the carinulae on the dorsum of the head (Fig. 1), which pass laterad posteriorly in both of the species and become nearly horizontal on the sides of the heads. The anterior edges of the frontal lobes (as seen from the side) extend over the surface of the clypeuses (Fig. 1) in both species, appearing like a tooth or angle. *Pheidole acutilobata* differs

from *P. aberrans* in being larger and darker, that the transverse carina near the posterior border of the head is much more developed and is definitely interrupted medially, not poorly developed and nearly continuous medially as in *P. aberrans*. The antennal scrobe is less developed in *P. acutilobata* and extends only about two eye diameters past the posterior border of the eye (Fig. 1), as compared to *P. aberrans* where the antennal scrobe extends approximately three diameters past the posterior border of the eye.

Similarities between *P. acutilobata* and *P. obscurifrons* include that they are identical in size and the external borders of frontal lobes are concave in *P. obscurifrons*, and are also occasionally concave in *P. acutilobata*. They can be separated as *P. acutilobata* is dark brown and *P. obscurifrons* is yellow. The anterior edge of the frontal lobe (as seen from the side) does not extend over the surface of the clypeus in *P. obscurifrons*, as it does in *P. acutilobata*, but rather ends in a blunted right angle (see figure of major of *P. obscurifrons* in side view in Wilson, 2003, page 139).

Unfortunately the minors of the three species are difficult to distinguish. In addition, many species of minors of *Pheidole* have concentric carinal semicircles on the dorsum of the pronotum (including *P. aberrans*, *P. cavifrons*, *P. obnixa*, *P. obscurifrons*, *P. subaberrans*, and *P. weiseri* in the *aberrans* group). The minors of *P. obscurifrons* are yellow, which would probably easily separate them from the other two species. The antennal scapes of *P. acutilobata* extend past the posterior border of the head, but do not reach the posterior border in *P. aberrans*, which should allow them to be separated.

We have not seen females or males of *P. aberrans* and they are unknown in *P. obscurifrons*, so we are not able to make comparisons. It is important to emphasize that the female (also minor and male) of *P. acutilobata* lacks the transverse carina on the posterior part of the head, which is so prominent in the major.

Fig. 20. *Pheidole acutilobata*.

*Pheidole acutilobata* would key with some difficulty to *P. obscurifrons* in Wilson's key (2003) to the majors. The key can be modified as follows to accommodate this new species:

- |   |   |
|---|---|
| <p>11(10) Relatively small, head width approximately 1.4 mm, total length 3 - 4 mm; antennal scrobe longer, extending at least 3 eye diameters past posterior border of eye ..... <b><i>aberrans</i></b></p> <p>— Relatively large, HW approximately 1.7 mm, TL 4 - 5 mm; scrobe shorter, extending at most 2 eye diameters past posterior border of eye ..... <b>12</b></p> <p>12(11) Dark brown; carinulae anterior to main transverse carina near posterior border of head, turning laterad, and becoming nearly horizontal on side of head; with head seen in side view; frontal lobe extending anteriorly and forming angle that extends</p> | <p>above clypeus, which appears to be tooth (as seen from side) ..... <b><i>acutilobata</i></b></p> <p>Yellow; carinulae on dorsum of head predominantly passing nearly directly posteriorly; frontal lobe in side view not extending as angle over clypeus, ending abruptly as right angle (see figure of side view of major in Wilson's monograph, page 139) ..... <b><i>obscurifrons</i></b></p> <p><i>Biology.</i>— The type series was collected in the beautiful Cañadón de Profundidad Provincial Park, 10.76 k S of Candelaria, which features a waterfall and river in a riparian tropical rainforest. It is a difficult place to find, but is well worth the effort as we collected an abundance of rare and interesting ants at the site. The soil was dark brown clay and was high in moisture and organic content. The nest was under a large flat stone, together with a nest of <i>Solenopsis richteri</i> Forel, adjacent to the river. There was no aggressive interaction between the</p> |
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two species, even after the stone was moved. No seeds or other food materials were seen in the nest, but brood and sexuals were present.

#### ACKNOWLEDGEMENTS

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