

DESCRIPTION OF A NEW ECUADOREAN *GNAMPTOGENYS* SPECIES (HYMENOPTERA: FORMICIDAE), WITH A DISCUSSION ON THE STATUS OF THE *ALFARIA* GROUP

CARLOS ROBERTO F. BRANDÃO AND JOHN E. LATTKE

Museu de Zoologia da Universidade de São Paulo, c.p.7172,
Brazil, 01051, and

Fundación Terramar, apartado 80659, Caracas, Venezuela, 1080

Abstract.—A new Ecuadorean species of *Gnamptogenys* Roger of the *Alfaria* group is described based upon a worker holotype and a dealated queen paratype. *Gnamptogenys vriesi*, n. sp. belongs to a subgroup of the *Alfaria* group, which includes also *G. simulans*, *G. bufonis*, and *G. falcifera*. The other subgroup includes *G. minuta*, *G. pneodonax*, *G. striolata*, and possibly, *G. caelata*. We present a characterization of the *Alfaria* group and its subgroups, and a discussion on the status of the group.

Brown (1958) in a revision of the ponerine ant tribe Ectatommini synonymized several genera and subgenera with *Gnamptogenys* Roger, stating that this genus and its synonyms constitute the "upper ectatommines." According to him the species of *Gnamptogenys* fall into four groups: *Gnamptogenys s. str.*, *Holcoponera* and *Alfaria* (the three from the New World), and *Stictoponera* (Old World). Within each group it is safe to consider the genera synonyms, albeit the assignment of all these generic and subgeneric names to the synonymy of *Gnamptogenys* was "set down with the greatest reluctance, and with the hope that some future study based on better material may establish a clear division of the species" (Brown, 1958).

New material of *Gnamptogenys* has accumulated in collections at a relatively slow pace, as these terrestrial ants are often difficult to see against the substrate. Nevertheless the "Museu de Zoologia da Universidade de São Paulo" (MZUSP) recently received two important collections of Ecuadorean soil ants, including a new *Gnamptogenys* species of the *Alfaria* group, which is described below.

Alfaria was described by Emery (1896) from workers, queens and a male of *A. simulans*, collected by A. Alfaro at Suerre, near Jimenez, Costa Rica. While the paper was in press Emery added another species, *A. minuta*, described from two alate queens collected in the Bolivian Chaco (received from "Casa Staudinger e Bang-Haas").

Mann (1926) described *A. bufonis* from a single "worker" taken from a stomach of a *Bufo valliceps* specimen, collected by Nelson and Goldman in July, 1894 at Choapan, Oaxaca, Mexico.

Borgmeier (1957) described *A. striolata* based on two workers collected by Fritz Plaumann in October, 1956 at Nova Teutônia, state of Santa Catarina, southeastern Brazil.

Alfaria mus Santschi, 1931 (Panamá: French Field); *A. emeryi* Forel, 1910 (Columbia: vic. Dibulla); *A. panamensis* Weber, 1940 (Panama: Barro Colorado Island); *Opisthoscyphus scabrosus* Mann, 1922 (Honduras: Lombardia) and *A. carinata* We-

ber, 1940 (British Guiana: Forest Settlement, Mazaruni River) were all correctly synonymized with *Gnamptogenys minuta* by Brown (1958).

After Brown's (1958) revision, three more *Gnamptogenys* species which fit into the *Alfaria* group concept were described by Kempf: *G. caelata* described in 1967(a) from an unique worker collected at Iguaçú, state of Paraná, southeastern Brazil by F. Plaumman; *G. falcifera*, described in 1967(b) from a female collected at Tingo Maria, Peru by William L. Brown, Jr., and *G. pneodonax*, described in 1968 from a worker taken in Benjamin Constant, Brazilian Amazon by Karol Lenko. Two additional species, both from Venezuela, remain to be published (Lattke, in press).

All these species share with the one we are describing the inflated second gastric segment (not so extremely vaulted in *G. striolata*), and a greater development of the frontal lobes than in other *Gnamptogenys* species. In the *Alfaria* group the frontal lobes are higher and more expanded laterally and anteriorly; as a consequence the base of the scape and the articular condyle are not so easily observable. Also particular to the *Alfaria* group is the presence of a carina that briefly borders the anterolateral regions of the antennal fossa, distinct from the neighboring sculpture. Despite these differences we see no cause for resurrecting *Alfaria* as a genus. The discovery and description of *G. striolata* was fundamental in relating this group with the rest of *Gnamptogenys* (Brown, 1958:222). Also Kempf (1967a) while describing *G. caelata* comments that it is "somewhat intermediate between *striolata* and the more orthodox species of *Gnamptogenys*."

NOTES OF MEASUREMENTS

All measurements were obtained under 40× magnification. Head width was obtained across eyes (HWE) and just in front of the eyes (HW). The mandibular length (MLC) is represented by the chord between the externo-lateral clypeo-mandibular limit to the apex of the apical tooth. The scape length is taken from the visible part of the scape, as the frontal lobes completely cover the scape insertion and condylus, to the apex; (ED) represents the compound eye diameter. The petiolar (PL) and postpetiolar (PpL) were taken in dorsal view.

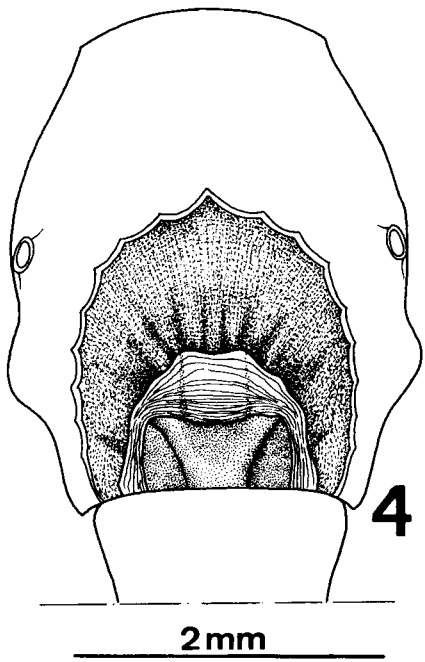
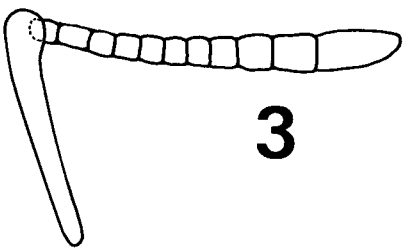
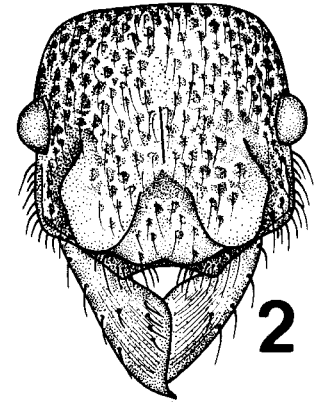
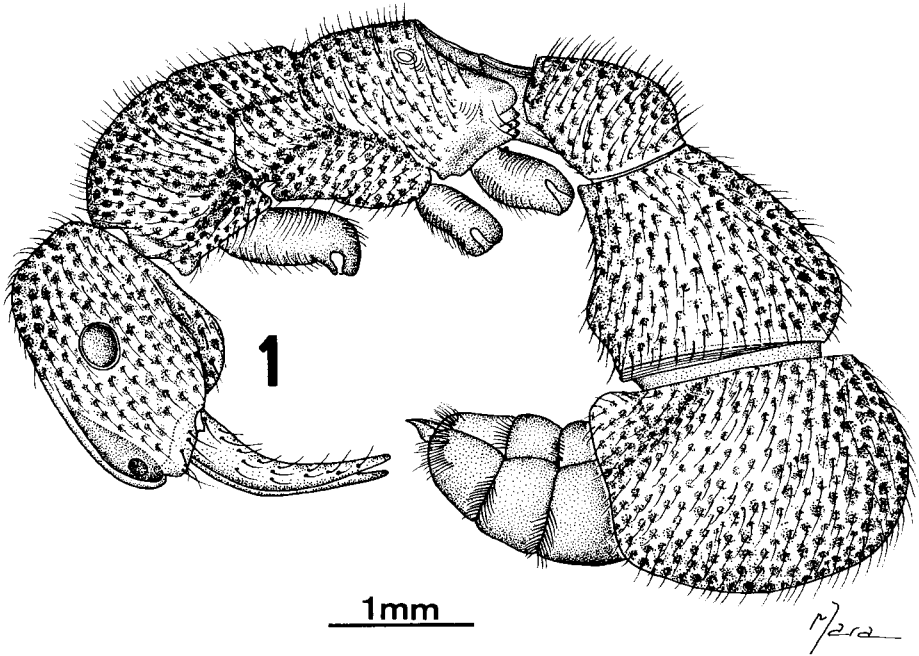
Gnamptogenys vriesi, new species

Figs. 1-7

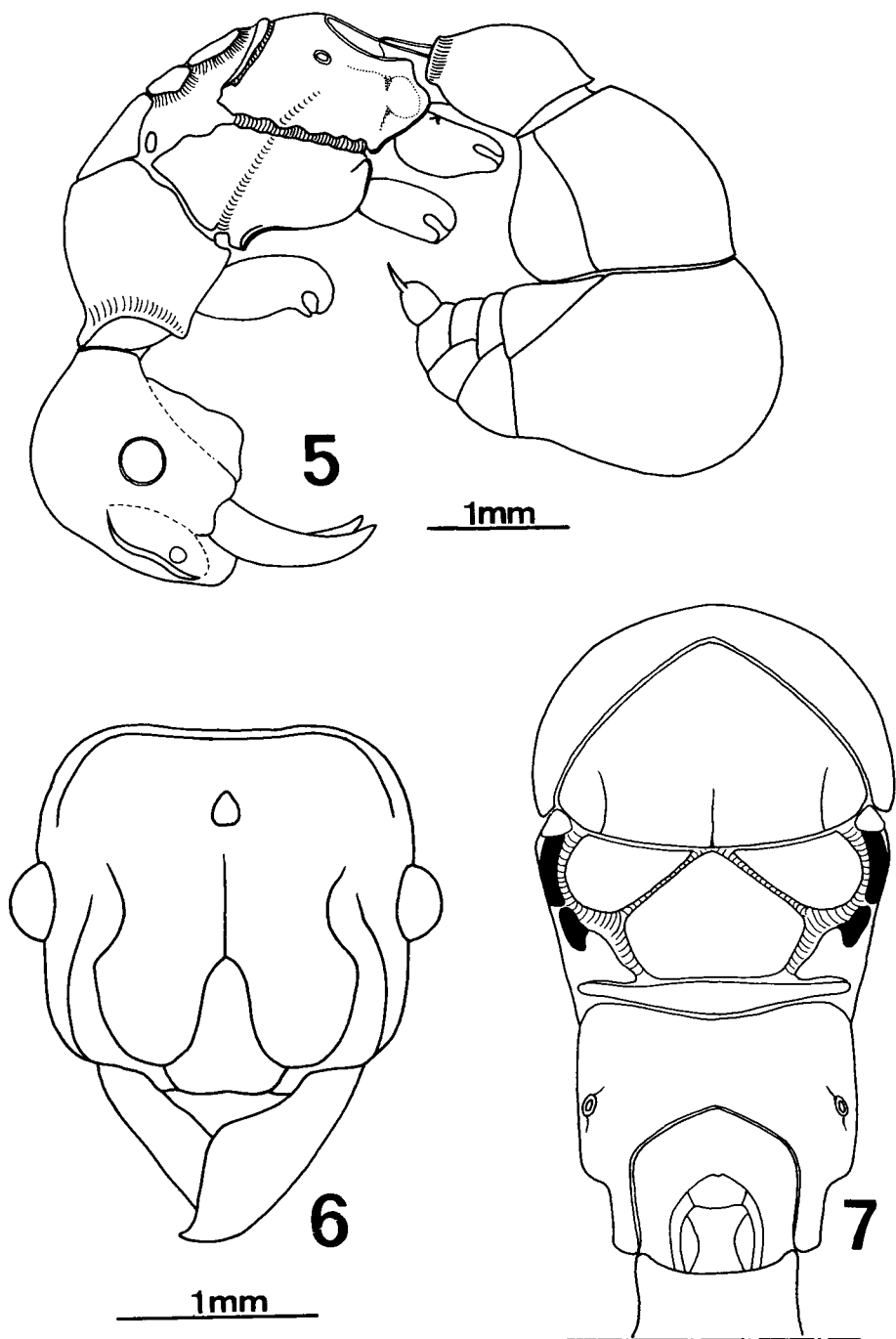
Diagnosis. Similar to *G. simulans*, *G. bufonis*, and *G. falcifera*, from which it differs in measurements (WL > 3.00 mm) and the following characters: anterior border of clypeus conspicuously concave; compound eyes bulging and with more than 20 facets in eye diameter, interrupting the head profile in full face view; metanotal groove deeper; propodeal spiracles circled by a conspicuous lighter band and bulging; propodeum declivity more deeply impressed; foramen circled by a raised margin (Fig. 4); and anterodorsal margin of petiole raised.

The paratype queen is very similar to the worker holotype, though slightly smaller (see measurements) and with the normal caste differences, i.e., three ocelli (the posterior ones may be confused with the surrounding foveolae, but bear visible lenses), complete alitrunk with parapsidal sutures and the arm of the notaulus. The extra tooth of each tarsal claw is less developed in the queen than in the worker.

Etymology. The specific name is a patronym in honor of the collector of the types.



Figs. 1–4. *Gnamplogenys vriesi*, n. sp. Holotype worker. 1. Side view, reticulation omitted. 2. Head in frontal view, reticulation and antennae omitted. 3. Left antenna, condylus omitted. 4. Detail of propodeum declivity depression in dorsal aspect.



Figs. 5-7. *Gnaptogenys vriesi*, n. sp. Paratype queen dealated, sculpture and pilosity omitted in all figures. 5. Side view. 6. Head in frontal view (antennae omitted). 7. Alitrunk in dorsal view.

Types. Worker (holotype) and dealated queen (paratype) collected at Ecuador: prov. Morona-Santiago: Los Tayos (03°08'S, 78°14'W) 3 July 1976 by Tjitte de Vries. Collection numbers VIII-4 (holotype) and I-16 (paratype). Holotype and paratype deposited at "Museu de Zoologia da Universidade de São Paulo."

Measurements (in mm). Holotype: HL 1.85, HWE 2.20, HW 2.00, MLC, 1.58, SL 1.83, WL 3.15, ED 0.33, PL 1.30, PpL 1.60, HfL 2.30, CI (HW/HL × 100) 108, SI (SL/HW × 100) 91.7, Paratype: HL 1.85, HWE 2.15, HW 1.88, MLC 1.53, SL 1.83, WL 3.10, ED 0.38, PL 1.25, PpL 1.56, HfL 2.15, CI 101.6, SI 97.3.

Remarks. The body surfaces of *G. simulans*, *G. bufonis*, *G. falcifera* and *G. vriesi* share a characteristic sculpturing: except for the legs, mandibles, anterolateral portions of frontal lobes and anterior portion of clypeus; very finely striolate and mostly covered by piligerous foveolae. In *G. vriesi* the foveolae are nearly contiguous and the striolation can be seen only at high magnifications at the confluence of the depressions. From each foveola departs an eccentric hair, which is turned in different directions, depending on the area of the body. *G. simulans*, *G. bufonis* and *G. falcifera* may have extensive areas smooth and shining, but in *G. vriesi*, as can be seen in Figure 1, the foveolae cover all body surfaces, except the cited ones. The holotype worker had these foveolae filled with earth, in a manner similar to that found by Hölldobler and Wilson (1986) in *Basiceros* and *Stegomyrmex* (Myrmicinae).

The propodeal declivity in the four species bears a crested depression, completely sculptured with radiate punctations, clearly centered at the foramen in the new Ecuadorean species (Fig. 4), but faintly visible in the previously described ones.

These combined features distinguish these species from other taxa described as *Gnamptogenys* and also from other species of the *Alfaria* group. They may be considered thus as forming a distinct subgroup of the *Alfaria* group.

In the case of *G. bufonis* we thought at first that it would prove to be a junior synonym of *G. simulans*. The *bufonis* type, deposited in the U.S. National Museum and examined by one of us (CRFB), presents some discrepant measurements, when compared to those obtained from Costa Rican samples of *G. simulans*, but as already stated by Brown (1958) these discrepancies, and also the differently shaped alitrunk, could be explained if the *G. bufonis* type is not a true worker, but a queen-worker "intermediate." The type series of *G. simulans* (not examined by us) included a dealated queen, with a "normal" alitrunk for the caste, but Brown (1958:225, 227) says that some cases among *Gnamptogenys* are known, especially in small species, where "intermediate" and "normal" females occur in the same species.

The "Museu de Zoologia da USP" Formicidae collection houses the following Costa Rican samples of *G. simulans*: 3 workers collected by the Peck couple on Osa Peninsula, Puntarenas in August, 1966; a worker from Tres Rios and two from San Isidro de Coronados, all collected by Bierig in September, 1940. One of us (JEL) examined more material of *G. bufonis* and *G. simulans* in the following collections: Museum of Comparative Zoology—Harvard University, U.S. National Museum, Los Angeles County Museum, and Jack Longino personal collection. He studied two more workers from the Osa Peninsula, Costa Rica, two samples from Mexico (a worker from Oaxaca and another from Chiapas) and a worker from Nicaragua, Santa Maria de Ostuma, collected in October, 1959 by N. L. Krauss. WL in all samples ranges from 1.90 to 2.00 mm. When we compare HL and HW above eyes the Costa Rican and Nicaragua-Mexican samples fall in two distinct groups. Those of Costa Rica have HL ranging from 1.23 to 1.33 mm and HW from 1.18 to 1.25 mm, while

in the northern ones HL ranges from 1.35 to 1.47 mm and HW from 1.33 to 1.35 (including here the type *G. bufonis*). For the time being it seems best to consider them as two different taxa.

G. minuta, *G. striolata* and *G. pneodonax* constitute another tight subgroup within the *Alfaria* group of *Gnamptogenys*. It could be characterized by a coarse reticulo-rugose surface sculpturing, the meshes generally enclosing deeply impressed foveolae. The integument is densely covered with standing hairs, which are as long as the greatest thickness of scape, and fine, abundant and extremely fine suberect to subdecumbent pubescence among the long hairs. The propodeum faces in this subgroup may meet in more or less sharp angles or denticles; the declivity never bears the depression observable in the other subgroup. *G. caelata* is also very close to *G. minuta* and its allies, but its petiole and tergum I of gaster are costulate and not coarsely punctate.

From this latter subgroup the "Museu de Zoologia da USP" recently received: a worker of *G. minuta* from a cocoa field reserve at km 22 of Itabuna-Ilhéus Road (BR 415), state of Bahia, eastern Brazil, collected by Jacques Delabie, another *G. minuta* worker collected at Mirassol, São Paulo state, southeastern Brazil, by Jorge L. Diniz at April, 1989, carrying an unidentified calcareous millipede between the mandibles under log; two workers of *G. pneodonax* collected in primary forest soil and in an old cocoa field at "Centro Científico Rio Palenque," Pichincha province, Ecuador. *G. pneodonax* was known till now by the single type worker from cis-Andean Amazon!

ACKNOWLEDGMENTS

We wish to thank Tjitte de Vries and Sonia Sandoval for sending us their Ecuadorean ant samples. Also the curators of several institutions who loaned material under their care or received our visit to study the ant collections. CNPq and FAPESP supported CRFB research. E. Ross/Smithsonian Institute, and California Academy of Sciences supported JEL. We thank Dr. W. L. Brown, Jr. for useful comments on the manuscript.

LITERATURE CITED

- Borgemeier, T. 1957. Mirmecologisches Studien. I. Anais Acad. bras. Cienc. 29(1):103-128.
- Brown, Jr., W. L. 1958. Contributions toward a Reclassification of the Formicidae. II, Tribe Ectatommini (Hymenoptera). Bull. Mus. comp. Zool. Harv. 118(5):175-362.
- Emery, C. 1896. Studi sulle formiche della fauna neotropica. XVII-XXV. Boll. Soc. ent. ital. 28:33-107.
- Hölldobler, B. and E. O. Wilson. 1986. Soil-binding pilosity and camouflage in ants of the tribes Basicerotini and Stegomyrmicini (Hymenoptera, Formicidae). Zoomorphology 106:12-20.
- Kempf, W. W. 1967a. New ants from southwestern and central Brazil. Studia Entomol. 9: 121-128.
- Kempf, W. W. 1967b. Three new South American ants. Studia Entomol. 10:353-360.
- Kempf, W. W. 1968. Miscellaneous studies on Neotropical ants. IV. Studia Entomol. 11:369-415.
- Lattke, J. E. In press. Revisión del género *Gnamptogenys* Roger para Venezuela (Hymenoptera: Formicidae). Acta Terramaris.
- Mann, W. M. 1926. Some new Neotropical ants. Psyche 33(4-5):97-101.

Received 13 September 1989; accepted 22 February 1990.