PROCEEDINGS OF THE CALIFORNIA ACADEMY OF SCIENCES
Fourth Series

Volume 56, No. 30, pp. 601–605, 4 figs. December 30, 2005

A Remarkable New Species of *Acropyga* (Hymenoptera: Formicidae) from Gabon, with a Key to the Afrotropical Species

John S. LaPolla[1] and Brian L. Fisher[2]

[1] *Department of Entomology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20013-7012 USA; Email: lapollaj@si.edu*; [2] *Department of Entomology, California Academy of Sciences, San Francisco, California, 94103, USA; Email: bfisher@calacademy.org*

A new species of *Acropyga, A. bakwele* sp. nov., is described from Gabon. This is an intriguing species because unlike any other known because its worker possesses a median ocellus, unlike any other known *Acropyga*. This species is the largest *Acropyga* known from Africa, and one of the largest in the world. In overall appearance, the worker resembles the southern African *A. arnoldi*. A key to Afrotropical *Acropyga* is provided.

KEYWORDS: *Acropyga*, Afrotropical, Formicinae, Gabon, Hymenoptera, Lasiini, trophophoresy.

Acropyga are small formicine ants known for their habit of tending mealybugs underground on plant roots (Bünzli 1935; Weber 1944; Johnson et al. 2001; LaPolla et al. 2002). The relationship between the ants and mealybugs is complex (LaPolla et al. 2002; LaPolla 2004), and perhaps the most spectacular expression of this complexity is the fact that virgin queens emerge from their birth nests carrying a mealybug between their mandibles to presumably serve as a seed individual for the new ant colony. This behavior has been termed trophophoresy (LaPolla et al. 2002).

A recent world revision of *Acropyga* revealed 37 species (LaPolla 2004). One of the surprising results of that study was the lack of *Acropyga* species diversity from the rainforests of West and Central Africa. In other rainforest areas, such as in Southeast Asia and the Neotropics, *Acropyga* species diversity surpasses at least a dozen species in each region. LaPolla (2004) reported only two species from Africa, *A. arnoldi* and *A. silvestrii*. It remained unclear if Africa simply possessed a lower number of *Acropyga* species for unknown reasons (there are now a total of three species known from the continent), but the relatively few collections from western and central Africa may be indicative of a collecting artifact. In support of a collecting bias giving a lower number of *Acropyga* species than actually present in West and Central Africa, we report here on a new, interesting species recently collected in Gabon. Given the recent world revision by LaPolla (2004), we were able to recognize this new species and place it within a comparative framework.

MATERIALS AND METHODS

In February 1998, BLF participated in a biological inventory of the Minkébé forest, an area of about 32,000 km^2, in northeastern Gabon. Goodman et al. (2001) provides additional details on the inventory. The Minkébé forest is composed of a large block of Guineo-Congo lowland forest that drains a vast area. The northern area of that forest is part of the Ntem River watershed and the rest enters into the Ivindo River. The inventory was near the northwestern boundary of the Minkébé

Protected Area in an area of pockets of mixed heterogeneous and Maranthaceae forests within a vast area of marshland. This region is part of the Aya River drainage, which forms one of the main tributaries of the Ntem River. Our camp was in place between 5 and 17 February 1998 and was located in the Province de Woleu-Ntem, 28 km ESE Minvoul 2º05.2′N, 12º22.5′E, 600 m a.s.l. We began our trek into the forest from the Baka village of Doumasi, along the Ntem and to the east of Minvoul. Three distinct habitats types were found adjacent to the camp: marshlands dominated by *Raphia*, heterogeneous forest, and homogeneous forest composed of *Gilbertiodendron*. The leaf litter transect that collected the *Acropyga* described here (BLF1684) was from forest adjacent to the marsh. The soil was moist and sandy.

All measurements were taken at 80 × power with a Leica MZ 12 microscope using an orthogonal pair of micrometers and recorded to the nearest 0.001mm and rounded to two decimal places for presentation. All measurements are given in millimeters. Digital images (Figs. 1–4) were created using a JVC KY-F75 digital camera and Syncroscopy Auto-Montage (v 5.0) software. Morphological terminology employed throughout follows Bolton (1994), with modifications where noted. Anatomical abbreviations are elaborated here:

TL: Total Length: HL+ML+GL.
HL: Head length: the length of the head proper, excluding the mandibles; measured in full-face view from the midpoint of the anterior clypeal margin to a line drawn across the posterior margin from its highest points (to accommodate species where the posterior margin is concave).
HW: Head Width: the maximum width of the head in full-face view (excluding the portion of the eyes that extend pass the lateral sides of the head).
SL: Scape Length: the maximum straight line of the antennal scape excluding the condylar bulb.
ML: Mesosoma Length: the length of the mesosoma (=alitrunk) in lateral view from the anterior most point of the pronotum (including the "neck" of the pronotum) to the posteriormost point of the metapleuron.
GL: Gaster Length: the length of the gaster in lateral view from the anteriormost point of first gastral segment (third abdominal segment) to the posteriormost point of the acidopore.
CI: Cephalic Index: HW = 100/HL.
SI: Scape Index: SL = 100/HW.

Systematic Treatment

Acropyga bakwele LaPolla and Fisher, sp. nov.

Figures 1–4.

Holotype worker.— Gabon: Province Woleu-Ntem, 31.3 km 108º ESE Minvoul, 2º04.8′N, 12º24.4′E, elev. 600 m 11.ii.1998, sifted leaf litter, rainforest (coll. B.L. Fisher) collection code: BLF01684, specimen code: CASENT0104123 (CASC)

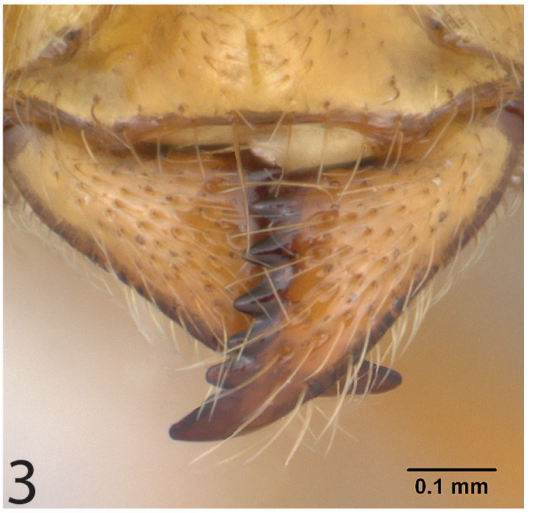
Diagnosis.— 8-toothed mandible; mandibular apical tooth about twice as along as other teeth; median ocellus present; total length > 3 mm.

Description.— Worker: Overall appearance similar to *Acropyga arnoldi* and *A. silvestrii*, see LaPolla (2004) for details of these two species. Head (see Fig. 2): reddish-yellow; head slightly longer than wide; covered in a thick layer of appressed hairs, with short erect hairs along posterior margin; posterior margin slightly concave medially; median ocellus present; eyes relatively large for an *Acropyga* (ca. 10 facets) and placed at lower ¼ of head; 11-segmented, incrassate antennae; scape surpasses posterior margin by about half length of pedicel; scape with thick layer of appressed hairs, scattered erect hairs throughout; clypeus slightly convex medially; mandible

Figures 1–4 (right). *Acropyga bakwele*, sp. nov. 1) lateral view; 2) head in full-frontal view; 3) mandible in full frontal view; 4) dorsal view.


1
0.5 mm


2
0.2 mm


3
0.1 mm


4
0.5 mm

broad, with six distinct teeth; mandibular basal angle distinct, but not forming seventh tooth; apical tooth twice as long as other teeth (Fig. 3). Mesosoma (see Figs. 1, 4): reddish-yellow; in lateral view, pronotum with short anterior shelf; dorsum covered in layer of appressed hairs, with scattered erect to suberect hairs throughout; metanotal area distinct; propodeum rounded; declivity steep. Gaster: petiole think and erect, with erect hairs; gaster reddish-yellow, with thick layer of appressed hairs and scattered erect to suberect hairs throughout.

Queen.— Unknown.

Male.— Unknown.

Etymology.— The species epithet, *bakwele*, is in honor of the Bakwele pygmies who assisted BLF during his fieldwork in Gabon.

Measurements.— (Holotype worker) TL: 3.24; HL: 0.902; HW: 0.870; SL: 0.751; ML: 1.069; GL: 1.272; CI: 96.45; SI: 86.32.

Discussion.— This new *Acropyga* species is not only the largest species presently known from Africa, but it is also one of the largest in the world. Only four other species are known to exceed 3 mm in total length (all are Old World): *A. acutiventris*, *A. butteli*, and *A. myops* all have been observed to exceed 3 mm in total length, whereas *A. rubescens* has been observed over 5 mm in total length.

The most remarkable attribute of *A. bakwele* is the presence of a median ocellus. In the extensive review of *Acropyga* by LaPolla (2004), ocelli were never observed on workers (they are present in queens and males). Unfortunately, with only a single specimen of *A. bakwele* available for study it is impossible to know if the presence of a median ocellus is typical for this species or if the specimen is simply an aberrant worker. Nonetheless, its presence is intriguing and the collection of a nest series will hopefully clarify the point.

Nothing is known about the natural history of this *Acropyga*, except that was collected from sifted leaf litter (a method that commonly collects *Acropyga*) in moist, sandy soil rainforest, near an extensive network of marshland. Where the natural history is known, *Acropyga* are found to nest close to soil in leaf litter, rotting logs, and under stones. They form large colonies with thousands of workers, and some species are possibly polygynous.

The relationship of *A. bakwele* to other species is uncertain, but superficially all African species and *A. paleartica* (known only from Greece) appear closely related. Pending the discovery of *A. bakwele* males, the species remains unplaced in a species-group. The holotype worker resembles *A. arnoldi* in many respects. However, *A. bakwele* is significantly larger than *A. arnoldi*, possesses a longer mandibular apical tooth, and has erect hairs scattered throughout the mesosomal dorsum. One interesting characteristic of *A. bakwele* is that, like *A. arnoldi* and *A. paleartica*, it possesses a 5:4 palpal formula, a characteristic that may be associated with more basal *Acropyga*. In fact, LaPolla (2004) hypothesized that *A. arnoldi* represented that most basal extant species. All African *Acropyga* have worker morphologies that suggest a more basal placement. The mandible in all species can possess over six teeth, with *A. arnoldi* known to possess up to nine teeth. *A. silvestrii* is known to possess up to seven teeth, although some specimens have been recorded with as few as four.

Key to Afrotropical *Acropyga* species (workers)

The following key is modified from LaPolla (2004)

1. Head width < 0.55 mm . . . . . *A. silvestrii*
   Head width > 0.55 mm 2
2. Head width < 0.7 mm; total length < 3 mm; erect hairs concentrated on the posterior pronotum; median ocellus absent; southern Africa. . . . . *A. arnoldi*
   Head width > 0.7 mm; total length > 3 mm; erect hairs scattered throughout dorsum; median ocellus present; West Africa. . . . . *A. bakwele*, sp. nov.

ACKNOWLEDGMENTS

Funding for the BLF's field research was provided by WWF-US. Travel for JSL to California was provided by the Smithsonian Institution's Office of Sponsored Research and National Science Foundation under Grant No. INT 9998672 to BLF. We thank April Nobile for creating the images. We thank Wojciech Pulowski and Donat Agosti for their reviews of the paper.

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