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Acropyga oreithauma (Hymenoptera: Formicidae), a new species from Panama

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Abstract

A new species of *Acropyga* (Hymenoptera: Formicidae: Formicinae) is described from Panama. The largest known *Acropyga* species in the New World, *Acropyga oreithauma*, new species is described and images are provided. Based on its morphology, *A. oreithauma* is likely closely related to *A. exanguis* and *A. fuhrmanni*. These three *Acropyga* are also known to enter into trophobiotic relationships with the same mealybug species, *Neochavesia caldasiae*.

INTRODUCTION

Recent investigations of the ant genus *Acropyga* (Hymenoptera: Formicidae: Formicinae) have involved examining the intriguing relationship between the ants and their mealybug (Hemiptera: Rhizoecidae) trophobionts (Schneider and LaPolla 2011), and diversification and biogeography of the genus (Blaimer et al. 2016, Janda et al. 2016). It has been over a decade since the genus *Acropyga* was globally revised taxonomically by LaPolla (2004) and in the years since three *Acropyga* have been discovered and described: *A. bakwele* from Gabon (LaPolla and Fisher 2005) *A. yushi* from Taiwan (Terayama 2009) and the Dominican amber fossil species *A. glaesaria* (LaPolla 2005). Here we report on another new species that has recently been discovered in Panama. This species, *A. oreithauma*, is the second largest *Acropyga* in the world, and is the largest known *Acropyga* in the New World. That such a large species could go undetected in an area that has been reasonably well collected for ants emphasizes how field studies are still very much needed.

MATERIALS AND METHODS

All measurements were taken using a Leica MZ16 dissecting microscope with a stage micrometer, recorded to the nearest 0.001 mm, and rounded to two decimal places for presentation. For each measurement the number of specimens measured is designated as *n* in parentheses. Minimum and maximum measurements and indices are presented. All measurements are recorded in millimeters. Digital color images were created using a Q-imaging digital camera and Syncroscopy Auto-Montage software. Morphological terminology for measurements and indices employed throughout are defined as:

GL (Gaster Length): the length of the gaster in lateral view from the anteriormost point of the first gastral segment (third abdominal segment) to the posteriormost point.
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.
HW (Head Width): the maximum width of the head in full-face view.
SL (Scape Length): the maximum length of the antennal scape excluding the condylar bulb.
TL (Total Length): HL+WL+GL
WL (Weber's Length): in lateral view, the distance from the posteriormost border of the metapleural lobe to the anteriormost border of the pronotum, excluding the neck.
CI (Cephalic Index): (HW/HL) • 100
SI (Scape Index): (SL/HW) • 100

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Specimens examined for this study are deposited in the National Museum of Natural History (USNM), Washington, D.C., USA and the Museum of Comparative Zoology (MCZC), Harvard University, Cambridge, M.A., USA.

SYSTEMATIC TREATMENT

Acropyga oreithauma, sp. nov.

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Figures 1-4

Holotype worker — PANAMA: Panamá: Cerro Azul; 9.24533, -79.40209; 840 m; 24 Jan 2015; montane wet forest; under stone; J. Longino #9168 (USNM). 7 paratype workers with same locality information as holotype (4 paratypes in USNM; 3 paratypes in MCZC).

Diagnosis — Distinctly large among the New World *Acropyga* (TL: 3.66-4.02); medially clypeal margin extends in a short shelf-like manner; 8 segmented antennae.

Description — Worker Head (fig. 1): yellow to darker yellow from midpoint of posterior margin toward torulae and also darker along mandibular margins; covered in a dense layer of pubescence; head slightly wider than long; posterior margin distinctly concave medially; 3-4 erect macrosetae found on either side of the posterior margin concavity; eyes small, laterally placed about 0.25 mm from anterior margin of head; 8 segmented, incrassate antennae; scape surpasses posterior margin by about ½ length of pedicel; scapes with erect macrosetae scattered across surface and covered with a dense layer of pubescence; clypeus covered in a dense layer of pubescence, with longer macrosetae along clypeal margin; medially clypeal margin convex (fig. 1); mandible with 4 distinct teeth, a smaller tooth sometimes present between the 3rd and 4th tooth (counted from apical tooth back to most proximal (basal) tooth) in which case the mandible effectively has 5 teeth (fig. 2); when a smaller tooth not present, a diastema is present between 3rd and 4th teeth; a gap exists between the inner mandibular margin and anterior clypeal margin. Mesosoma (figs. 3 & 4): yellow, slightly darker along segmental margins; nota covered in a layer of pubescence, with many long erect macrosetae scattered across mesosomal dorsum; in lateral view pronotum rises steeply toward mesonotum; in lateral view, mesonotum much higher than propodeum; dorsal face of propodeum flat, with declivitous face steep and as about as long as dorsal face. Petiole and Gaster: petiole thick and erect reaching to slightly surpassing dorsal face of the propodeum; gaster yellow; covered in thick layer of pubescence, with scattered erect macrosetae throughout.

Measurments.— (*n= 8; in millimeters*) TL: 3.66-4.02; HW: 0.97-1.06; HL: 0.87-0.95; SL: 0.73-0.83; WL: 1.17-1.38; GL: 1.5-1.76; CI: 109-112; SI: 82-89.

Queen — Unknown.

Male — Unknown.

Etymology — Greek; combining form of *oros* (mountain) and *thauma* (wonder). Noun in apposition, invariant.

Disscussion — This is by far the largest species of *Acropyga* in the New World. There are several New World species such as *A. ayanganna* LaPolla, 2004, *A. decedens* (Mayr, 1887), *A. fuhrmanni* (Forel, 1914), and *A. guianensis* Weber, 1944 where workers can be as large as 2.6 mm in total length, but *A. oreithauma* surpasses 3.5 mm in total length and some workers were greater than 4 mm. Its overall size will easily separate it from other New World species. It is interesting that this new species is so large and was discovered in Panama, a country that has been reasonably well collected for ants. The cryptic nature of *Acropyga* of course makes the discovery of species within the genus more difficult unless researchers are either specifically looking for *Acropyga* or employing soil and leaf litter collection techniques.

Worldwide only five other *Acropyga* species are known to exceed 3 mm in total length and they are all Old World: *A. acutiventris* Roger, 1862

(widespread across tropical Asia), *A. bakwele* LaPolla & Fisher, 2005 (tropical West Africa), *A. butteli* Forel, 1912 (Southeast Asia), *A. myops* Forel, 1910 (Australia), and *A. rubescens* Forel, 1894 India (this is the largest *Acropyga* with workers exceeding 5 mm in total length). This makes *A. oreithauma* the second largest *Acropyga* in the world.

Collected with *A. oreithauma* were several individuals of the mealybug *Neochavesia caldasiae* (Balachowsky, 1957). This mealybug species has also been found in trophobiotic relationships with *A. exsanguis* (Wheeler, 1909) and *A. fuhrmanni* (Williams, 1998; Schneider and LaPolla, 2011). Interestingly, based on morphology *A. exsanguis* and *A. fuhrmanni* appear to be closely to *A. oreithauma*; *A. fuhrmanni* has 8 antennal segments and four mandibular teeth (and a diastema between the 3rd and 4th tooth as in *A. oreithauma*) and *A. exsanguis* has 8-9 antennal segments and three mandibular teeth. All three species also have a similarly shaped head and mesosoma. The finding of a close relationship between *Acropyga* species that are trophobiotic with the same mealybug species is consistent with the findings of Schneider and LaPolla (2011), which found that *A. guianensis* and *A. stenotes* LaPolla, 2004 both were trophobiotic with *Neochavesia linealuma* Schneider & LaPolla, 2011. Blaimer et al. (2016) subsequently confirmed that *A. guianensis* and *A. stenotes* are sister species. Since all three species may be sympatric (*A. exsanguis* and *A. fuhrmanni* are known to occur sympatrically; *A. oreithauma* is presently only known from the type location reported here, but all three species occur in Panama), the study of them may shed light on a mealybug species that enters into trophobiotic relationships with at least three species of *Acropyga* and in particular what the implications are when, and if, they do so in the same location.

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REFERENCES

Balachowsky AS (1957) Sur un nouveau genre aberrant de coche- nille radicicole myrmécophile nuisible au caféier en Colombie. *Revue de Pathologie Végétale et d'Entomologie Agricole de France* 36: 157–164.

Blaimer BB, JS LaPolla, MG Branstetter, MW Lloyd, SG Brady (2016) Phylogenomics, biogeography and diversification of obligate mealybug-tending ants in the genus *Acropyga*. *Molecular Phylogenetics and Evolution* 102: 20-29.

Forel A (1894) Les Formicides de l'Empire des Indes et de Ceylan. Part IV. *Journal of the Bombay Natural History Society* 8:396-420.

Forel A (1910) Formicides australiens reçus de MM. Froggatt et Rowland Turner. *Revue Suisse de Zoologie* 18:1-94.

Forel A (1912) H. Sauter's Formosa-Ausbeute. Formicidae (Hym.) (Schluss). *Entomologische Mitteilungen. Berlin-Dahlem* 1:67-81.

Forel A (1914) Quelques fourmis de Colombie. Pp. 9-14 in: Fuhrmann, O.; Mayor, E. 1914. Voyage d'exploration scientifique en Colombie. *Mémoires de la Société Neuchâteloise des Sciences Naturelles* 5(2):1-1090.

Janda M, P Matos-Maravi, M Borovansk, J Zima Jr., E Youngerman, NE Pierce (2016) Phylogeny and population structure of the ant genus *Acropyga* (Hymenoptera: Formicidae) in Papua New Guinea. *Invertebrate Systematics* 30: 28–40.

LaPolla JS (2004) *Acropyga* (Hymenoptera: Formicidae) of the world. *Contributions of the American Entomological Institute* 33(3): 1-130.

LaPolla JS (2005) Ancient trophophoresy: a fossil *Acropyga* (Hymenoptera: Formicidae) from Dominican Amber. *Transactions of the American Entomological Society* 131(1+2): 21-28.

LaPolla JS and BL Fisher (2005) A remarkable new *Acropyga* (Hymenoptera: Formicidae) species from Gabon. *Proceedings of the California Academy of Sciences* 56(27): 595-599

Mayr G (1887) Südamerikanische Formiciden. *Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien* 37:511-632.

Roger J (1862) Einige neue exotische Ameisen-Gattungen und Arten. *Berliner Entomologische Zeitschrift* 6:233-254.

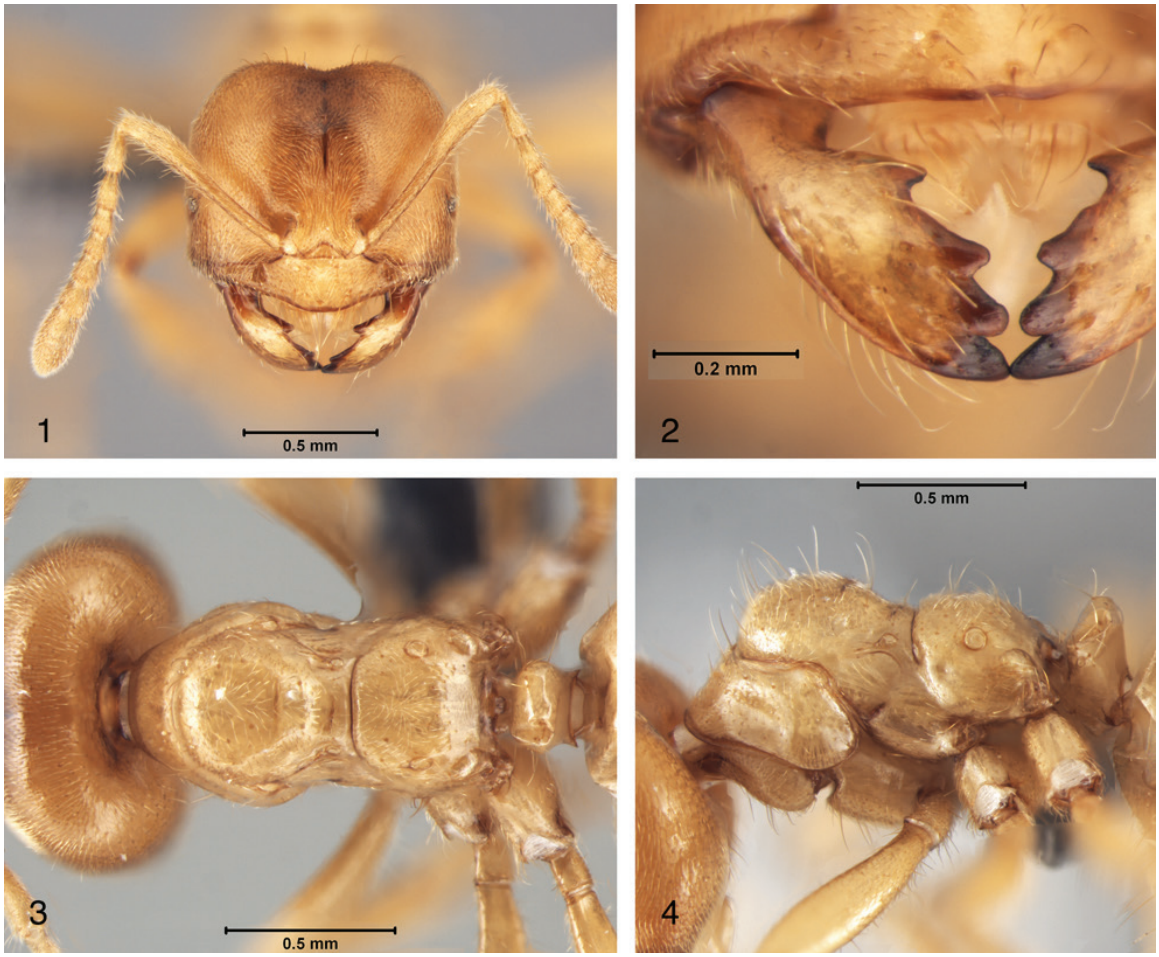
Schneider SA and LaPolla JS (2011) Systematics of the mealybug tribe Xenococcini (Hemiptera: Coccoidea: Pseudococcidae) with a discussion of trophobiotic associations with *Acropyga* Roger ants. *Systematic Entomology* 36: 57-82.

Terayama M (2009) A synopsis of the family Formicidae of Taiwan. *Research Bulletin of Kanto Gakuen University* 17: 81-266.

Weber NA (1944) The neotropical coccid-tending ants of the genus *Acropyga* Roger. Annals of the Entomological Society of America 37: 89–122.

Wheeler WM (1909) Ants collected by Prof. F. Silvestri in Mexico. *Bollettino del Laboratorio di Zoologia Generale e Agraria della Reale Scuola Superiore d'Agricoltura. Portici* 3:228-238.

Williams DJ (1998) Mealybugs of the genera *Eumyrmococcus* Silvestri and *Xenococcus* Silvestri associated with the ant genus *Acropyga* Roger and a review of the subfamily Rhizoecinae (Hemiptera, Coccoidea, Pseudococcidae). *Bulletin of the British Museum* (*Natural History*). *Entomology* 67: 1–64.



Acropyga oreithauma in various views; figure 1: head in full frontal view; figure 2: close-up view of mandible; figure 3: dorsal view of mesosoma; figure 4: lateral view of mesosoma.