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## Phylogeny of *Protopolybia* Ducke, 1905 and taxonomic revision of the *Protopolybia exigua* species-group (Hymenoptera: Vespidae, Polistinae), with description of four new species

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### Abstract

A first phylogenetic hypothesis is proposed for *Protopolybia* Ducke, 1905 based on cladistic analysis of 31 species. New evidence in support of monophyly of the genus is presented. A revision of the *Protopolybia exigua* species-group is also presented. *Protopolybia diligens* (Smith, 1857), **stat. resurr.** is revalidated. Four new species are described: *P. collombiana* Santos, Silveira & Carpenter, **sp. nov.**, *P. clypeata* Santos, Silveira & Carpenter, **sp. nov.**, *P. similis* Santos, Silveira & Carpenter, **sp. nov.**, and *P. potiguara* Santos, Silveira & Carpenter, **sp. nov.** *Protopolybia holoxantha* (Ducke, 1904) and *P. rubrithorax* Bequaert, 1944 are redescribed. New synonymy is proposed for *P. bituberculata* Silveira & Carpenter, 1995 = *Polybia nana* Cameron, 1912 (nom. praeocc., nec de Saussure 1863), **syn. nov.** New records and description of the male genitalia are provided for some of the species of the *P. exigua* species-group.

**Key words:** social wasps, monophyly, new synapomorphy, new species, tribe Epiponini, Neotropical region

### Introduction

*Protopolybia* Ducke, 1905 is a medium-sized Neotropical genus of social wasps in the tribe Epiponini. Species are polygynous and new colonies are founded by swarms (Jeanne 1991). The nests show a considerable degree of structural variation, but commonly consist of a comb covered by an envelope and attached to the substrate by numerous pedicels (Richards 1978; Wenzel 1998).

Taxonomic history of the genus begins with Ducke (1905a), in a work on the social wasps of South America, in which among other things he described two new genera of Polistinae: *Protopolybia* and *Pseudochartergus* Ducke, 1905, the latter including *Charterginus cinctellus* Fox, 1898 and *Ch. fuscatus* Fox, 1898. Bequaert (1938) revised *Pseudochartergus*, designating *C. cinctellus* as the type species and recognizing only two species. In a subsequent paper, Bequaert (1944a) undertook the first revision of *Protopolybia*, describing four new species, considering *Polistes minutissima* Spinola 1851 and *Polybia sedula* de Saussure 1854 as forms of a single species, and selecting *Polybia bella* von Ihering, 1903 as the type species of the genus. Bequaert (1944b) prepared an identification key that allowed separation of *Protopolybia* from *Pseudochartergus*. More recently, Richards (1978) in a revision of social wasps of the Americas elevated many of the varieties proposed by Bequaert (1944a) to species level, with *Protopolybia* then comprising 23 species and two subspecies.

Carpenter and Wenzel (1989) considered the diagnostic characters of *Pseudochartergus* and *Protopolybia* as ineffective and proposed their synonymy. These authors did not make any suggestion concerning the phylogenetic position of the species of *Pseudochartergus* within the enlarged *Protopolybia*. The genus comprises 30 described species that occur from México to Argentina. Sixteen species are recognized from Brazil, with only one being endemic (Carpenter & Marques 2001; Silveira 2004). Four species are newly described in this work.

In the revision by Richards (1978), the species-group of *Protopolybia exigua* (as implicit in his identification key) was composed of eight species that have the first segment of the metasoma petiolate, and the propodeum with