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Taxonomy of the ant genus *Pheidole* Westwood (Hymenoptera: Formicidae) in the Afrotropical zoogeographic region: definition of species groups and systematic revision of the *Pheidole pulchella* group

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Abstract

This paper is a starting point towards a much needed comprehensive taxonomic treatment of the genus *Pheidole* in the Afrotropical region. Despite its hyperdiversity, the taxonomy of this globally distributed ant genus is limited to important revisions for the New World and several Asian faunas. However, *Pheidole* of the Afrotropical zoogeographic region has never been revised. The most recent Afrotropical *Pheidole* species descriptions are fifty years old and many are considerably older. Identification keys are not available and many species descriptions are of limited diagnostic value. This calls for a series of taxonomic revisions in order to resolve the complicated taxonomic situation for the complete Afrotropical *Pheidole* fauna. In this paper the following preliminary morphological species groups for the Afrotropical region are defined: *P. aurivillii* group, *P. excellens* group, *P. megacephala* group, *P. nigeriensis* group, and *P. speculifera* group. We also establish and revise the *P. pulchella* group, which currently contains eleven species, of which seven are new. The four spe-

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cies described prior to this study are: *P. pulchella* Santschi, *P. dea* Santschi, *P. nimba* Bernard, and *P. batrachorum* Wheeler **stat. rev.**, which is removed from synonymy under *P. dea* and regains species status. The following **new synonymy** is proposed (senior synonym listed first): *P. pulchella* Santschi = *P. pulchella achantella* Santschi. The following seven species are described as new: *P. christinae* **sp. n.**, *P. darwini*, **sp. n.**, *P. glabrella* **sp. n.**, *P. heliosa* **sp. n.**, *P. rebeccae* **sp. n.**, *P. semidea* **sp. n.** and *P. setosa*, **sp. n.** An illustrated key combining the minor and major worker subcastes is presented.

Key words: Myrmicinae, *Pheidole*, new species descriptions, *Pheidole pulchella* group, Africa, Guineo-Congolian rainforest belt, taxonomic revision

Introduction

The ant genus *Pheidole* Westwood (1839) is an evolutionary success story, both ecologically and in terms of species diversity. With more than 1100 valid species names it represents the ant genus with the highest species richness worldwide (Longino, 2009). Taxonomic interest in this genus increased relatively recently, especially within the last decade. Wilson's (2003) monograph on the New World fauna was particularly important since it more than doubled the number of described *Pheidole* species for the New World. However, recent material from Central America made an updated taxonomic treatment necessary, which was provided by Longino (2009). Different oriental faunas were revised by Eguchi and colleagues (Eguchi, 2000, 2001a, 2001b, 2008; Eguchi & Bui, 2005; Eguchi *et al.*, 2007), and Sarnat (2008) provided a taxonomic treatment of the *P. roosevelti* group from Fiji.

In most ecological studies within the tropics, *Pheidole* is one of the most abundant and diverse ant taxa (Ward, 2000; Wilson, 2003). In Africa, it is also one of the genera with very high rates of unidentifiable morphospecies (Belshaw & Bolton, 1993; Deblauwe & Dekoninck, 2007; Fisher, 2004; Hita Garcia *et al.*, 2009). For the Afrotropical region, this is due to both a large number of undescribed species, and a lack of modern revisionary treatments and identification keys for described species. In an attempt to revise the *Pheidole megacephala* group, Emery (1915) tried to shed light on the unclear taxonomic situation in this network of species, subspecies and variations, but with limited success. Since then, Afrotropical *Pheidole* have been neglected by ant taxonomists. Instead, tri- and quadrinomials assigned to many valid biological species remain unchanged, frustrating attempts to identify specimens based on taxonomic literature. In addition, the majority of African *Pheidole* was described between 150 to 50 years ago, mostly by A. Forel, F. Santschi, G. Mayr and C. Emery, at a time when subspecies and infrasubspecific taxa were still frequently used in ant taxonomy. Forel and Santschi alone, the two most productive taxonomists for the Afrotropical region, described more than half of their 95 *Pheidole* taxa as varieties, subspecies and races. Unfortunately, a lot of the descriptions are no longer sufficient for accurate species diagnosis. In several cases the differences between subspecies are poorly documented whereas in others different subspecies possess relatively little resemblance with each other. The most recent species to be described from the Afrotropical region were authored by Bernard (1953). Arnold (1960) described a new variation of *Pheidole shultzei*, and since then, one junior homonym was renamed by Wilson (1984).

The long neglect of the African *Pheidole* fauna and the large amount of new material and undescribed taxa calls for a comprehensive taxonomic treatment in order to provide the identification tools needed to promote and facilitate ecological, biogeographical, and evolutionary studies. These studies are strongly underrepresented and comparatively rare in the Afrotropical region. Without a good taxonomic knowledge of Afrotropical species, it will remain difficult to gain any qualified information about endemism, species turnover, evolutionary patterns, and biogeography for this remarkable and important ant genus. For other African and Malagasy ant taxa, the taxonomic situation improved considerably during the last decades (Ward, 2007), beginning with Bolton's extensive taxonomic treatments (listed in Bolton, 2003). Other authors followed his efforts and several revisions for the two regions have been published in the last few years, showing that the interest in Afro-Malagasy ant taxonomy is undiminished (Blaimer, 2010; Bolton & Fisher, 2008a, 2008b, 2008c, 2011; Fisher, 2009; Fisher & Smith, 2008; Heterick, 2006; Hita Garcia *et al.*, 2010; LaPolla *et al.*, 2010; Snelling, 2007; Yoshimura & Fisher, 2007, 2009, 2011). Nevertheless, the way towards a comprehensively documented ant fauna of the world is still long and full of challenges, especially in the case of the largest and hyperdiverse genera *Pheidole* and *Camponotus* (Wilson, 1976).