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Genera of euophryine jumping spiders (Araneae: Salticidae), with a combined molecular-morphological phylogeny

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Table of contents

Abstract

Morphological traits of euophryine jumping spiders were studied to clarify generic limits in the Euophryinae and to permit phylogenetic classification of genera lacking molecular data. One hundred and eight genera are recognized within the subfamily. Euophryine generic groups and the delimitation of some genera are reviewed in detail. In order to explore the effect of adding formal morphological data to previous molecular phylogenetic studies, and to find morphological synapomorphies, eighty-two morphological characters were scored for 203 euophryine species and seven outgroup species. The morphological dataset does not perform as well as the molecular dataset (genes 28S, Actin 5C; 16S-ND1, COI) in resolving the phylogeny of Euophryinae, probably because of frequent convergence and reversal. The formal morphological data were mapped on the phylogeny in order to seek synapomorphies, in hopes of extending the phylogeny to include taxa for which molecular data are not available. Because of homoplasy, few globally-applicable morphological synapomorphies for euophryine clades were found. However, synapomorphies that are unique locally in subclades still help to delimit euophryine generic groups and genera. The following synonyms of euophryine genera are proposed: *Maeotella* with *Anasaitis*; *Dinattus* with *Corythalia*; *Paradecta* with *Compsodecta*; *Cobanus*, *Chloridusa* and *Wallaba* with *Sidusa*; *Tariona* with *Mopiopia*; *Nebridia* with *Amphidraus*; *Asaphobelis* and *Siloca* with *Coryphasia*; *Ocnotelus* with *Semnolius*; *Palpelius* with *Pristobaeus*; *Junxattus* with *Laufeia*; *Donoessus* with *Colyttus*; *Nicylla*, *Pselcis* and *Thianitara* with *Thiania.* The new genus *Saphrys* is erected for misplaced species from southern South America.

Key words: Salticidae, Euophryinae, generic review, phylogeny, morphology, molecules, new synonym, new combination, new genus

Introduction

The Euophryinae is one of the largest groups in jumping spiders (Salticidae), with about 1000 species (Prószyński 2012; Zhang & Maddison 2012a, b, c, d; Platnick 2014) reported from all over the world. Most euophryine species are found in the tropics of both the Old World and New World. Spiders of this group have evolved a great variety of body forms: some are relatively large and slender with long legs (e.g. *Bathippus* spp.), some are very robust with short legs and a high carapace (e.g. *Omoedus piceus* Simon), some are flattened (e.g. *Thiania spectrum* (Simon)), some are weevil-like (*Coccorchestes* spp.), and some are ant-like (*Sobasina* spp. and *Paraharmochirus* spp.).

The Euophryinae was initially erected by Eugène Simon (1901) using the name "Evophrydeae". In Simon's classification (Simon 1901; 1903), it was considered as a group in Unidentati and comprised three genera: *Akela*, *Euophrys* and *Rhyphelia,* of which *Akela* is not closely related with the other two judging from its morphology (see Galiano 1989). Most of the genera currently considered as euophryines were scattered among more than 20 groups of Pluridentati, Unidentati and Fissidentati in Simon's classification (see Table 1). More than seventy years after the Euophryinae was erected, Jerzy Prószyński (1976) clarified the group for the first time by a delimiting feature: the presence of a coiled embolus at the distal end of palpal tegulum. Based on this delineation he included 13 genera (*Admestina*, *Agobardus*, *Chalcoscirtus*, *Corythalia*, *Euophrys*, *Habrocestum*, *Laufeia*, *Marchena*, *Neonella*, *Saitis*, *Stoidis*, *Talavera*, *Thiania*) as euophryines in his partial classification of salticids. Among these, *Admestina* is now considered a marpissoid (Maddison & Hedin 2003) and *Marchena* a heliophanine (Maddison 1987). Maddison and Hedin (2003) extended the content of the subfamily and explicitly indicated 34 genera as euophryines (see Table 1). They also revised the delimitation to further specify the particular form of the embolus and tegulum in euophryines: the plane of the spiral of the embolus is more or less parallel to the longitudinal axis of the palp and a loop in the sperm duct projects towards the centre of the tegulum. A recent molecular phylogenetic study on the Euophryinae dramatically extended its content to 85 genera (Zhang & Maddison 2013). A sample of diverse euophryines was shown to be monophyletic in a recent molecular study with eight gene regions (Maddison et al. 2014).

Although the morphological and molecular delimitation for the subfamily Euophryinae is relatively clear, the taxonomy within the subfamily is a mess. There are indications from the molecular phylogeny that similar body forms in different euophryine lineages have arisen by convergence, and therefore have resulted in polyphyletic genera (e.g., the old concept of *Bathippus*). In addition, genitalic organs within this subfamily are relatively simple and usually show little interspecific variation, hindering attempts to classify genera. Most work on this subfamily has concentrated on describing species and genera, or on a regional revision of some genera (e.g. Bryant 1940, 1943, 1950; Balogh 1980a–c; Berry et al. 1996, 1997, 1998; Edwards 2002; Logunov & Azarkina 2008), and there is little systematic work on the group as a whole. Although a few genera have been reviewed in the past

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