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Preliminary considerations on phylogeny of Simuliidae Genera from Southern Hemisphere (Insecta, Diptera)

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Abstract

In this paper, the first phylogenetic hypothesis for the 13 Southern Hemisphere genera of Simuliidae is proposed, through a cladistic approach. In order to investigate the position of those genera representatives of five Northern Hemisphere genera were also included in the analyses as outgroups. The study was based on a data matrix with 33 terminal taxa and 119 morphological characters of adult, pupa and larva. The phylogenetic analysis under equal weights resulted in four most parsimonious trees, with similar topologies and 349 steps (CI = 49; RI = 68). The analyses showed that all Southern Hemisphere genera of Simuliidae are closer to Simuliini than to Prosimuliini. According to our analyses, *Araucnephia* Wygodzinsky & Coscarón and *Paracnephia* Rubtsov are polyphyletic, and *Gigantodax* Enderlein and *Crozetia* Davies are monophyletic. It is possible also to recognize the following groups (*A. iberaensis* Coscarón & Coscarón-Arias + *Lutzsimulium s.l.* d'Andretta & d'Andretta); ((*Simulium* Latreille + *Metacnephia* Crosskey) (*Cnesiamima* Wygodzinsky & Coscarón (*Paraustrosimulium* Wygodzinsky & Coscarón + *Austrosimulium* Tonnoir))); and ((*Paracnephia* of Australia + *Cnesia* Enderlein) (*Pedrowygomyia* Coscarón & Miranda-Esquivel + *Gigantodax* Enderlein)).

Key words: Cladistics, morphology, Neotropical region, Afrotropical region, Australasian region

Introduction

During the 20th century, several classificatory schemes for Simuliidae were developed. The relationship proposals were constructed under the gradistic paradigm and culminated in the schemes of Rubtsov (1974) and Crosskey & Howard (1997), the latter followed by most workers currently. Crosskey & Howard (1997) recognized only two subfamilies in Simuliidae, Parasimuliinae, monotypic, and Simuliinae, divided into two tribes, Simuliini and Prosimuliini. With exception of *Simulium* Latreille and *Austrosimulium* Tonnoir, the other 22 genera of Simuliinae have been placed in Prosimuliini (Crosskey & Howard, 2004). This division in tribes has been criticized because Prosimuliini is defined by symplesiomorphies (*e.g.* Wygodzinsky & Coscarón, 1973a; Adler *et al.*, 2004): (1) pupal cocoon raggedly shapeless or nearly absent; (2) adult thorax with shallow, broad and incomplete furrow above the katepisternum; (3) adult hind leg without pedisulcus (Crosskey, 1990).

The paper by Wygodzinsky & Coscarón (1962) was the first study under the approach of the phylogenetic systematics in Simuliidae, being even previous to the translation of the work of Hennig (1966) into the English language. I spite of its approach, this work does not present a phylogenetic tree, a fact which also happens in some other studies (*e.g.* Wygodzinsky & Coscarón, 1973a, b; Py-Daniel, 1982, Coscarón, 1985, 1987). The use of the cladistic methodology in researches about Simuliidae started in the late 1990's and it has been growing in the last few years. However, there are still few studies and they are mostly restricted to *Simu-*

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