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Three new species of *Macrelmis* Motschulsky (Coleoptera: Elmidae: Elminae) from Southeastern Brazil with new definition of species groups to the genus

MARIA INÊS SILVA DOS PASSOS^{1,4}, GUSTAVO SILVA DE MIRANDA² & JORGE LUIZ NESSIMIAN³

¹Laboratório de Insetos Aquáticos, Departamento de Biociências, Universidade Federal do Estado do Rio de Janeiro, cep: 2290240, Rio de Janeiro, RJ. E-mail: minespassos@gmail.com

²Center for Macroecology, Evolution and Climate, Natural History Museum of Denmark (Zoological Museum), University of Copenhagen, Universitetsparken 15, 2100, Copenhagen, Denmark

³Laboratório de Entomologia, Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro, Caixa postal. 68044, 21944-970, Rio de Janeiro, RJ

⁴Corresponding author

Abstract

Three new species of *Macrelmis* Motschulsky, 1859 are described and illustrated based on adult males from Rio de Janeiro, Minas Gerais and São Paulo states (southeastern Brazil). A new species groups definition is proposed for the genus, with a redefinition of the former six (*aristea* sp. group, *celsa* sp. group, *isus* sp. group, *granigera* sp. group, *milleri* sp. group and *striata* sp. group) and designation of four new groups (*alea* new sp. group, *amazonica* new sp. group, *grandis* new sp. group and *jureceki* new sp. group). The male genitalia of *M. clypeata* is illustrated for the first time and distributional maps for all species of the genus are provided.

Key words: riffle beetles, taxonomy, morphology, Atlantic Forest, Neotropics

Introduction

The genus *Macrelmis* Motschulsky, 1859 is a Nearctic-Neotropical group found from southern United States to Argentina and Paraguay (Figs. 6, 7). The main character distinguishing this genus from all other elmid genera is the presence of a short accessory stria on the base of each elytron between the first and second striae (Hinton 1940, Brown 1972, Manzo 2005, Passos *et al.* 2007). Currently, 49 species of *Macrelmis* are known (35 in South America, 24 in Brazil).

The species-rich genus *Macrelmis* was divided into several species groups in order to better compare them. The first groups proposed were the *striata*-group (Hinton 1940), *granigera*-group (Hinton 1945), and *isus*-group (Hinton 1945). Spangler (1997) added a new one, the *milleri*-group, based on two species from Venezuela. Besides these, two other species groups were recognized, *aristaea*-group (Sampaio *et al.* 2012) and *celsa*-group (Sampaio *et al.* 2012.), but just half of all these had a formal definition published (*granigera*, *isus* and *milleri*; Hinton 1945, 1946 and Spangler 1997, respectively), i.e., had a diagnosis which stated the delimiting characters.

Species groups can be defined as logical groupings based on overall similarities, and are proposed to facilitate comparisons and identifications within a given genus. Differently from monophyletic groups, species groups do not require a phylogenetic analysis, but a qualitative analysis of characters of a given set of species. The current composition of *Macrelmis* groups does not help differentiation of the species due to the mix of several common characteristics, and the absence of a standardization of defining structures. Therefore, the present contribution is an attempt to clearly describe and delimit *Macrelmis* groups in a logical manner, redefining and rearranging all six known species groups and proposing four new ones (based mainly on the morphology of the male genitalia). A distributional map showing all known species of the genus is provided.

Additionally, three new species of *Macrelmis* are described and illustrated from the states of Minas Gerais, Rio de Janeiro and São Paulo, southeastern Brazil, and the genitalia of *M. clypeata* (Hinton 1936) is illustrated for the first time.