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Taxonomic and systematic implications of the revision of the phylogenetic relations in the genus *Ectinogonia* Spinola 1837 (Coleoptera: Buprestidae) of central Chile

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Abstract

Ectinogonia Spinola 1837 is composed of 22 species to date, but its taxonomic history has been complex and is still unresolved. The species of the Santiagan Province of Chile Central are particularly complex because they show important morphological variability and overlapping traits, making species identification and delimitation difficult. The main goal of the present study is to show the phylogenetic relationships among species of *Ectinogonia* of the Santiagan province and discuss the taxonomic and systematic implications of our findings. Phylogeny reconstructions as well as a haplotype network disclosed four groups, partially inconsistent with the traditional taxonomy. Actually, the two *Ectinogonia speciosa* subspecies (*E. speciosa speciosa* (Germain 1856) and *E. speciosa oscuripennis* Cobos 1954) belong to two distinct clades, which are not reciprocally monophyletic, meaning that *Ectinogonia speciosa* is polyphyletic. On the other hand, the two other clades each contain, two nominal species (*E. buquetii* (Spinola 1837) and *E. vidali* Moore & Guerrero 2017, and *E. isamarae* Moore 1994 and *E. speciosa oscuripennis* Cobos 1954) without reciprocal haplotype sorting. These results suggest that: (1) *E. speciosa oscuripennis* should be raised to species level and (2) the following new synonymies are proposed: *E. isamarae* Moore 1994 is synonymised with *E. oscuripennis* Cobos 1954 and *E. vidali* Moore & Guerrero 2017 is synonymised with *E. buquetii* (Spinola 1837).

Key words: COI, 16S rRNA, Wingless (Wg) genes, Santiagan Province, Synonymy, Bayesian Inference

Introduction

High altitude environments in the Andes and Coast Range both reach altitudes over 2000 m in the central area of Chile (33.5°S); they are arid environments with predominance of steppe vegetation (Luebert & Plissock 2008). These environments are considered extreme, since they have very cold winters with precipitation as snow, and very dry and hot summers with a wide thermal oscillation between day (>30 °C) and night (<0 °C) (Luebert & Plissock 2008). The two mountain ranges have similar flora and fauna (Villagran *et al.* 2005, Elgueta 1988), since they have a common evolutionary history (e.g. Cianferoni *et al.* 2013, Palma *et al.* 2017, Zúñiga-Reinoso & Méndez 2018). Most of the species of the genus *Ectinogonia* Spinola, 1837 live in these environments, especially those of the Santiagan biogeographic province (i.e. 33-37°S *sensu* Morrone 2015a). *Ectinogonia* is a group of beetles of the family Buprestidae which inhabit arid and semi-arid areas of the western slopes of the Andes in South America. The genus is currently composed of 22 species; three of them have been divided into two subspecies and one other divided into three subspecies (Moore & Diéguez 2014, Moore & Vidal 2015, Moore 2017, Moore & Guerrero 2017, Anguita-Salinas *et al.* 2017). Only seven species putatively inhabit the Santiagan province of central Chile, six of which live in high altitude environments both in the Andes and in the Coast Range. In these environments, adults of *Ectinogonia* concentrate their activity during the warmest hours of the day in summer months, while the