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Molecular phylogeny of the weevil genus *Dichromacalles* Stüben (Curculionidae: Cryptorhynchinae) and description of a new species

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Abstract

A molecular phylogeny of the western Palearctic weevil genus *Dichromacalles* Stüben, 1998, is presented, combining two mitochondrial genes, COI and 16S, and the nuclear gene 28S in a Bayesian analysis of up to 1528 combined nucleotide positions. Based on this data we point out the putative ancestor of the currently known extant *Dichromacalles* species that initiated the unique radiation within the species of the formerly *Acalles* s.l. on the Canary Islands around 10 to 20 million years ago. Where morphology reaches its limits in species differentiation, molecular analysis can provide deeper insight. By combining morphology and molecular biology into an integrative taxonomy, new characters can be found, making phenotypic descriptions easier. Using this integrative taxonomy background, the new species *Dichromacalles algecirasensis* Stüben (Spain: Cádiz) is described here and *D. lentisci* (Chevrolat, 1861) is transferred into the subgenus *Balcanacalles* Stüben & Behne, 1998 following a molecular phylogenetic reconstruction. A catalogue of all 12 species of *Dichromacalles* is given and a key is presented, combined with image stackings of the habitus and aedeagus for all species.

Key words: *Dichromacalles*, Bayesian analysis, Integrative Taxonomy, 16S, COI, 28S, Western Palearctic, new species, Spain, Canary Islands

1. Introduction

The monophyletic genus *Dichromacalles* was separated by STÜBEN (1998) from the formerly excessively broadly circumscribed genus *Acalles* Schoenherr, 1825. Eleven species within the genus *Dichromacalles* were known at that time. With more species than any other genus in the subfamily, the oligophagous to polyphagous *Dichromacalles* species are highly diverse in their habitus and coloration. Their endophytic larvae primarily colonize ligneous plants in the lower stem or rooting zone around ground level. The highly variable availability of space and nutrition during development on the different host plants may result in species with adults ranging from 2.1 mm to 7.5 mm in size and showing a wide range of coloration.

An ongoing problem for the identification of some *Dichromacalles* species is large intraspecific variation, which partly shows interspecific overlap of characters and causes subsequent misdeterminations, especially if two species occur sympatrically, e.g. *Dichromacalles dromedarius* and *Dichromacalles diocletianus*. In no other genus of flightless Cryptorhynchinae were the same species formally described more than once: *D. dromedarius* four times, D*. diocletianus* and *D. tuberculatus* five times each (see section 2.: Catalogue of *Dichromacalles*). In addition to the high intraspecific variability of the habitus, the low interspecific variability of the aedeagus makes a correct determination even more difficult. The aedeagus – apart from internal sac (see below) – is quite uniform in most *Dichromacalles* species and rounded towards the apex, and even large series of specimens cannot assure correct determinations by specialists. Since more useful characters are not known so far, the potential of morphological determination has reached its limits (STÜBEN 1998; BAHR 2001).

But how was it possible to group around 370 valid species of western Palaearctic Cryptorhynchinae into distinct genera (cf. catalogue: STÜBEN 2012)? Using morphological and ecto-skeletal traits exclusively would not

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