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Taxonomy 2.0: Sequencing of old type specimens supports the description of two new species of the *Lasiocampa decolorata* group from Morocco (Lepidoptera, Lasiocampidae)

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Abstract

The type of *Lasiocampa decolorata* (KLUG, 1830), collected in 1820, was successfully barcoded to generate a 658bp COI-fragment after 194 years. The resulting molecular data allowed the description of two closely related species from Morocco: *Lasiocampa hanna*e SPEIDEL, MOOSER & WITT sp. n. from the Anti Atlas and *Lasiocampa editae* SPEIDEL, MOOSER & WITT sp. n. from the High Atlas.

Key words: DNA barcode, *Lasiocampa decolorata*, *Lasiocampa hanna*e, *Lasiocampa editae*, *Lasiocampa staudingeri*, new species, taxonomy, Morocco, Egypt, North Africa

Introduction

The use of sequence data from a standardized region in the mitochondrial genome (COI 5', 'DNA barcode region') has been proposed as a tool for species identification (HEBERT *et al.* 2003) and for descriptive (alpha-) taxonomy (e.g. HEBERT *et al.* 2004). After controversial discussions about the suitability of such molecular data for taxonomy (cf. e.g. TAUTZ *et al.* 2002, 2003, WILL *et al.* 2005), there is now broad acceptance of the "integrated taxonomic approach" which combines molecular and morphological data (e.g. TELETCHEA 2010; PADIAL *et al.* 2010, GOLDSTEIN & DeSALLE 2011, HAUSMANN 2011). Although this approach, recently dubbed 'taxonomy 2.0' (JÖRGER & SCHRÖDL 2014), is now widely accepted, the crucial point, i.e. the correct linkage of molecular data with type specimens as the name-bearing key vouchers is still infrequent. Following initial success in sequencing old specimens with rather demanding, time-consuming methods (HAUSMANN *et al.* 2009a, 2009b), a different approach which focused on the recovery of a short 164bp amplicon from the centre of the COI 5' barcode gene fragment yielded a very high success rate (80%) for thousands of geometrid type specimens. Here we report a recent breakthrough in recovering the full 658bp COI barcode fragment from a 194 year old type specimen (*Lasiocampa decolorata*) in one single step through next-generation sequencing (NGS).