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DNA barcoding confirms species rank for a cryptic geometrid species from Turkey and Bulgaria (Lepidoptera: Geometridae: Sterrhinae)

FEZA CAN

University of Mustafa Kemal, Faculty of Agriculture, Department of Plant Protection, Entomology Section, 31034-Hatay-Turkey.
E-mail: fezacan@mku.edu.tr; cezafan_onurcan@hotmail.com

Abstract

Scopula drenowskii Sterneck, 1941, stat. n. is raised from the synonymy of *Scopula decorata* to species rank, based on differences in the male genitalia correlated to a considerable genetical distance in the DNA barcode region (COI). The 'new' species is known so far from Bulgaria and Turkey.

Key words: Lepidoptera, Geometridae, *Scopula*, COI, new species, PCR, Turkey

Introduction

The genus *Scopula* Schrank, 1802 (Lepidoptera: Geometridae) contains more than 900 species worldwide, and is the most species-rich genus in the subfamily Sterrhinae (Sihvonen 2005). In Europe, the genus includes 50 species in 9 species-groups, with 25 recorded for Turkey (Hausmann 2004; Koçak & Kemal 2007; Can 2008; Okyar & Mironov 2008). Identifications and taxonomy of several species in the genus are difficult (Hausmann 2004). Although there have been many geometrid publications overall treating the European fauna, the Turkish literature is comparatively scant (see reviews by: Okyar & Aktaç 1999; Koçak & Seven 2001; Doğanlar 2003; Can & Mironov 2006; Koçak & Kemal 2006, 2007; Özdemir 2007; Can 2008; Okyar & Mironov 2008).

Materials and methods

Recent collecting in the Anatolia, Mediterranean and Black-Sea regions of Turkey has been conducted for the following taxa in the *S. ornata* species-group (sensu Hausmann 2004): *S. ornata* (Scopoli, 1763), *S. orientalis* (Alpheraky, 1876), *S. decorata* (Denis & Schiffermüller, 1775), *S. submutata* (Treitschke, 1828). In order to examine relationships among these taxa, 37 specimens were examined morphologically, and 25 of these submitted to molecular analysis of mitochondrial DNA sequences along with 17 non-Turkish vouchers of *S. vigilata*, *S. ornata* and *S. decorata*. All specimens were dissected in the laboratory, with the genitalia embedded on slides (partly in Entellan, partly in Euperal) following standard procedures. Confirmation of species identity was assisted by comparing material with identified specimens at the ZSM (Zoologische Staatssammlung München).

DNA barcodes (658 bp COI gene 5') were generated by submitting dry tissues (legs) to the CCDB (Canadian Centre for DNA Barcoding-University of Guelph) where the material was sequenced using standard high-throughput protocols (Ivanova *et al.* 2006; Vaglia *et al.* 2008; see http://www.dnabarcoding.ca/pa/ge/research/protocols). Images, GPS coordinates, institutional repository, and sequence trace files for each

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