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Taxonomic decision as a compromise: *Acasis appensata* (Eversmann, 1832) in Central Italy—a case of conflicting evidence between DNA barcode and morphology (Lepidoptera: Geometridae)

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Abstract

Acasis appensata (Eversmann, 1842) (Lepidoptera: Geometridae), distributed from central and northern Europe to eastern Asia, was collected in the Mediterranean (Central Italy, Abruzzi) for the first time. Adults from this region differ significantly from nominotypical populations in external appearance and in the 5' barcode fragment of the CO1 gene (barcode). However, morphology of male and female genitalia falls completely within the range of variation of *A. appensata*, resulting in conflicting evidence with respect to its taxonomic status. Considering the striking differences in genitalia morphology between the two European species of *Acasis*, viz. *A. appensata* and *A. viretata* (Hübner, 1799), the population from the Abruzzi is not validated as different at species level but described as the subspecies *A. appensata callaina* ssp. nov. The habitus and male and female genitalia of European taxa are figured.

Key words: Lepidoptera, Geometridae, *Acasis appensata*, morphology, DNA barcode, taxonomic rank, new subspecies, Europe, Italy

Introduction

Geometrid moths are a mega-diverse family of Lepidoptera with altogether about 23,000 described species (Scoble & Hausmann 2007) and numerous still undescribed taxa, mainly from tropical regions. The European fauna is particularly well known and the discovery of new species is the exception here. Such findings are usually confined to the Mediterranean region or to other exceptional areas such as the Alps (Huemer & Hausmann 2009). The genus *Acasis* dealt with in this paper has been considered well explored, and European species have been described already in the late 18th and the first half of the 19th century. In Europe *Acasis* comprises the widely distributed palaearctic species *A. viretata* (Hübner, 1799) and *A. appensata* (Eversmann, 1842). Furthermore, the genus includes *Acasis bellaria* (Leech, 1891) and *A. exviretata* Inoue, 1982 from eastern Asia, and the nearctic *A. viridata* (Packard, 1873) (Scoble 1999). Species discrimination in Europe was hitherto considered unproblematic due to different external morphology of the adults and several specific characters of the genitalia of both sexes. Therefore it came as a surprise when during an excursion to the Abruzzi mountains in Central Italy the junior author and colleagues collected a series of specimens clearly belonging to *Acasis* but matching neither of the known European species. This doubtful population was already known to the senior author from two specimens collected in the same area a couple of years ago (H. Rietz pers. comm.) but material was insufficient for a taxonomic decision. Identification became increasingly complex when we started to evaluate diagnostic characters from phenotype, genitalia structures and DNA barcodes.

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