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Phylogenetic signals in scale shape in Caucasian rock lizards (Darevskia species)

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Abstract

The genus *Darevskia* comprises over 20 species of small-bodied lizards, mainly occurring in the Caucasus Mountain Region. They show differences in body size, scalation and coloration, however, fully diagnostic characters that could separate the species with a high confidence level are still lacking. The early phylogenetic hypothesis of this group was based on 'traditional' analysis of morphology, based on multiple body and head measurements and scalation traits. Later, a molecular phylogeny of the genus rejected some of the proposed topology based on morphological traits. In this paper, we used quantitative morphological data (outline-based shape data) to test phylogenetic similarities, as proposed by these earlier hypotheses. We analyzed the pileus shape and the anal area of more than 200 individuals, representing six species of *Darevskia*, using outline based elliptic Fourier analysis. The analysis did confirm a clustering of the individuals and species (using UPGMA) from the same mitochondrial DNA clade. Hence, the phylogenetic affinity of the major clades in *Darevskia* could be identified using both molecular methods and outline analysis, whereas a traditional quantitative morphological analysis could not.

Keywords: Fourier analysis; geometric morphometrics; outline analysis; phylogenetically informative traits; pileus; scalation.