When morphometry meets genetics: the case of the common dormouse, *Muscardinus avellanarius*.

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Abstract

The aim of the study is to apply geometric morphometrics to the study of evolutionary processes that might have driven intra-specific differentiation of the common dormouse, *Muscardinus avellanarius* in Europe. The analysis of phenotypic feature appears as a valuable complement to genetic analyses, providing a complementary insight into evolutionary processes, such as differentiation by vicariance or adaptation to different environments. Previous genetic studies revealed a complex phylogeographic pattern with the presence of two highly divergent lineages subdivided into geographic clades. We thus investigated whether this genetic differentiation leads to a morphometric differentiation. We examined 240 museum specimens of dormouse from 34 localities. For each specimen, the size and shape of the first upper molar (UM1) was quantified using an outline analysis based on Fourier methods. A geographic structure emerges from the morphometric pattern of differentiation, partially corresponding to the expectations based on the genetic results. The knowledge acquired through this study might add a significant piece of the puzzle for the understanding of the evolutionary history of the common dormouse and might have important implications for its conservation.

Keywords: geometric morphometrics, *Muscardinus avellanarius*, conservation, ESU