

GEOMETRIC MORPHOMETRICS AND ANCIENT DNA ANALYSIS: INNOVATING IN SPECIES CLASSIFICATION. A CASE STUDY WITH RODENTS FROM EL MIRÓN CAVE (CANTABRIA, SPAIN)

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Fossil microvertebrate assemblages are important for advancing our understanding of past environments and the environmental conditions that shaped their evolution and distribution. Particularly, small mammal communities are important for biostratigraphy and climate reconstructions during the Quaternary. The Arvicolinae species (Cricetidae, Rodentia) are one of the important groups for these studies, due to their high evolutionary rates and morphological adaptations to different climate conditions. However, the main diagnostic anatomical element in fossil arvicolines, the lower first molar (m1), has close morphological similarities among many of these species, which hinders their classification. Here we combine geometric morphometrics and ancient DNA (aDNA) analyses to differentiate between two morphologically similar species in El Mirón Cave, *Terricola pyrenaicus* and *T. lusitanicus*. We performed two principal component analyses (PCA) using geometric morphometric data (16 landmarks and 80 semilandmarks) from the m1 of 686 specimens of Arvicolinae (PCA1) and a smaller dataset (PCA2) with only the *Terricola* species, the latter also used for a linear discriminant analysis (LDA). We identified through aDNA analysis one individual of *T. pyrenaicus*, from level 130 of El Mirón Cave (50.900–39.280 cal BP modelled age). This led us to identify as such a larger group of individuals within the PCA1. Although PCA2 did not clearly discriminate between the *Terricola* species, the LDA showed a complete separation. The combination of these techniques allowed us to verify the presence of *T. pyrenaicus*. Thus, we suggest that the integration of molecular and morphological data can be useful to identify species with high morphological similarities.

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