

Hyenas of Ice Age Sicily: Morphometric and biomechanical perspectives

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The cave hyena (*Crocota crocuta spelaea*) was among the most widespread and ecologically successful carnivores in Pleistocene Europe. Today, its closest extant relative, the spotted hyena (*C. crocuta*), is confined to sub-Saharan Africa (Kruuk, 1972). Recent paleogenetic studies indicate an early divergence between African and Eurasian *Crocota* (~2.5 Ma), followed by episodes of gene flow between lineages (Westbury et al., 2020). The dispersal of this genus towards the European continent occurred during the early phase of the Middle Pleistocene (Iannucci et al., 2021), with subsequent colonization of the Italian peninsula (Sardella & Petrucci, 2012). In Sicily, the cave hyena has been found in fossil associations attributed to the *Palaeoloxodon mnaidriensis* Faunal Complex - dated to the late Middle Pleistocene - and the San Teodoro-Pianetti Faunal Complex - dated to the late Pleistocene (Bonfiglio et al., 2003). This study investigates morphometric and functional variation in three Sicilian cave hyena populations from San Teodoro, Arena, and Z  Minica caves. We conducted a comparative morphometric analysis focusing on dental proportions (M_1 , P^4) and a mandibular biomechanical analysis using cross-sectional geometry (Therrien 2005a, 2005b). Additionally, body mass was estimated for the studied populations using multiple skeletal parameters. The aim is to assess patterns of phenotypic differentiation among insular populations and to provide new insights into the evolutionary history of *C. crocuta spelaea* in Sicily.

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