

Biogeochemical and ecomorphological inferences on prey selection and resource partitioning among mammalian carnivores in an early Pleistocene community

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ABSTRACT

Biogeochemical ($\delta^{13}\text{C}$, $\delta^{15}\text{N}$, and $\delta^{18}\text{O}$ values) and ecomorphological analyses of the early Pleistocene fauna of Venta Micena (Orce, Guadix-Baza basin, SE Spain) provide interesting clues on the physiology, dietary regimes, habitat preferences, and ecological interactions of large mammals. Such inferences are useful in deciphering aspects of paleocommunity structure and predator-prey relationships. Specifically, the hypsodonty index combined with $\delta^{13}\text{C}$ values allows classifying the ungulates among grazers from open habitat (*Equus altidens*, *Bison* sp., *Praeovibos* sp., *Hemitragus albus*, *Hippopotamus antiquus*, and *Mammuthus meridionalis*), mixed feeders (*Soergelia minor* and *Pseudodama* sp.), and browsers from canopy areas (*Stephanorhinus* sp. and *Praemegaceros* cf. *verticornis*). Given that $\delta^{13}\text{C}$ values indicate that all these herbivores fed exclusively on C_3 plants, significant differences in isotopic values between perissodactyls (monogastric, hindgut fermenters) and ruminants (foregut fermenters) reflect differences in digestive efficiency. Values of $\delta^{18}\text{O}$ indicate the dietary water source of ungulates, revealing that *Pseudodama* sp., *Hemitragus albus*, and *Soergelia minor* obtained a significant fraction of their metabolic water from vegetation. Carnivores show higher $\delta^{15}\text{N}$ values than herbivores, which records the isotopic enrichment expected with an increase in trophic level. *Hippopotamus antiquus* and *Praeovibos* sp. have unexpectedly high $\delta^{15}\text{N}$ values, suggesting that they predominantly consumed aquatic plants and lichens, respectively. Inferences on predator-prey relationships, derived from the use of linear mixing models, indicate resource partitioning among sympatric predators; saber-tooth *Megantereon whitei* and jaguar *Panthera* cf. *gombaszoegensis* were ambushers in closed habitat while saber-tooth *Homotherium latidens* and wild dog *Lycaon lycaonoides* were coursing predators in open plains. The giant hyena *Pachycrocuta brevirostris* scavenged the prey of these hypercarnivores.

