Wear your diet on your teeth: Dental Microwear Texture Analysis as a proxy for estimating the diet of extinct South American caviomorph rodents

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Modern caviomorphs or South American hystricognathous rodents exhibit a great taxonomical and ecological diversity,with a broad spectrum of dietary habits, ranging from frugivorous to grass eaters. Their oldest record dates back to the late middle Eocene from Peruvian Amazonia. Continuous paleontological field efforts have substantially increased the fossil record of early caviomorphs, testifying of a complex early evolutionary history. The late Oligocene locality of Salla (Bolivia) has yielded a diverse assemblage of caviomorphs, including taxa representing the four extant superfamilies. The systematics of the Salla rodents is now better established, but little is known regarding their ecology and ecological interactions.

Here, we reconstructed the diet of the Salla rodents in performing a Dental Microwear Texture Analysis (DMTA) on the enamel tooth surface. Microwear analyses are proxies providing an insight not on the ability but directly on the use of teeth. The DMTA describes and analyzes automatically surface textures with a high degree of precision. We firstly analyzed the microwear texture of 79 wild specimens of extant caviomorphs showing different feeding habits that we compared with those of 241 fossil specimens from Salla. For each specimen of modern and fossil species, we performed a scan on a high resolution silicon mold of the molar occlusal surface with an optical surface profilometer (2). We then applied a scale-sensitive fractal analysis with Toothfrax and Sfrax softwares to describe the microwear textures through four variables: Asfc (complexity), epLsar (anisotropy), HAsfc (heterogeneity of the complexity), and TFV (textural fill volume).

Feeding habits among extant caviomorph species provide distinct microwear textural signals for each studied variable. However, diet distinctions for the extinct Salla species are not as marked as in extant species. Dental microwear textures vary significantly among Salla species primarily on the complexity and textural fill volume. But only main tendencies regarding the paleoecology and niche partitioning can be advocated for the Salla rodent community.

Based on complexity, *Incamys*, *Sallamys*, *Migraveramus* and *Cephalomys* appear to have been generalist frugivorous (as the modern *Dasyprocta)*, and *Eoviscaccia* might have fed on tougher items such as leaves (as the modern *Phyllomys)*. In contrast, *Protosteiromys* and *Branisamys* seemingly included blander young leaves in their diet (as the modern *Coendou)*.

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