CENOZOIC MAMMALS FROM AMAZONIA: DIVERSITY, ENVIRONMENT, AND BIOGEOGRAPHY

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The Amazon Basin constitutes more than one third of South America’s emerged areas. Essentially covered by tropical rainforests and a dense river network, this area is today a major biodiversity hotspot, notably for mammals. Yet, the mode and timing of the settlement of the corresponding mammalian guilds are far from being well known, due to the virtual lack of well-constrained data, notably for the Paleogene period. Although dramatically under-investigated, pre-Holocene Cenozoic deposits from Western Amazonia contain a wide array of fossil mammals, most of them being highly relevant to test major evolutionary and/or biogeographic hypotheses.


LATE JURASSIC THERIOPD EMBRYOS FROM PORTO DAS BARCAS, LOURINHÃ FORMATION, PORTUGAL

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A clutch of several crushed eggs and embryos from the Late Jurassic (near the Kimmeridgian-Tithonian boundary), Lourinhã Formation, Portugal contains a complete maxilla, erupted and scattered teeth, and presacular vertebrae. The maxilla bears four teeth separated by individualized interdental plates, the dorsal process of the maxilla is confluent with the maxillary body, the ventral rim of the antorbital fossa is parallel to the tooth row, and the anterior border of the maxilla forms a right angle with the ventral margin. The teeth are conical and recurved distally with cariae on mesial and distal sides. The vertebrae are amphiplatyan, with a ventral pair of neurovascular foramina and heavily pitted articular facets. These fossils allow unambiguous association of basal theriopd ostcodology (Megalosauroidea) with a new eggshell morphotype. Synchrotron micro-computed tomographic scanning (SRμCT), scanning electron microscopy, and thin-sections under polarized and normal light revealed that the outer ornamentation of the eggshell is composed of anastomosing ridges and islets, the pores communicate near the outer region of the eggshells, and in radial sections they are irregular and completely decoricate the surface. Micro-proto induced x-ray emission (micro-PIXE) analysis of the eggshell (excluding pores) revealed the presence of Mg, Fe, Mn (0.33%, 0.27% and 0.18%, respectively) and several trace elements, with a corresponding loss of Ca (39.4% detected but 40.0% expected for calcite), which suggests minimal eggshell diagenesis. The eggshell pores do not luminesce, which imply that no diagenetic phenomenon took effect. However, the quenching effect of Fe²⁺ has to be taken into consideration. Conversely, luminescence is observed in the pores since they are filled with sediment, composed of phyllosilicates, as revealed by SRμCT, micro-PIXE and x-ray diffraction analyses.