



A Konservat-Lagerstätt from the lower Permian of Uruguay

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The shales and mudstones of the lower Permian Mangrullo Formation of Uruguay outcropping near the Yaguarí Creek (Tacuarembó County, northeastern Uruguay), contain a fossil assemblage including mesosaur reptiles, pygocephalomorph crustaceans, insects, plants and ichnofossils. These rocks were deposited during a regressive event that led to a restriction of the basin in a progressively more arid and warmer climate with seasonal periods of low precipitation and high evaporation. Stratification of the water column may have produced hypersaline and anaerobic bottom conditions, with precipitation of gypsum and deposition of abundant organic matter. The exceptional preservation of most of the specimens, including impressions of soft body tissues, and tri-dimensional preservation, is consistent with a Konservat-Lagerstätt. Molds of mesosaur skeletons are so well preserved that they reveal even the most delicate structure of each bone. Infilling cylindrical elements on the mandible appear to be blood vessels and possibly nerves that surround each tooth position, a condition not commonly found in the fossil record. Several pygocephalomorphs were preserved in copula and in the molting process, suggesting sudden death and burrowing. Association between adult and young mesosaurs suggests parental care in these reptiles, which would be the oldest occurrence of this behavior among amniotes. The Mangrullo Konservat-Lagerstätt constitutes a unique assemblage that, besides allowing a better understanding of the anatomy of the represented taxa, also provides noteworthy information about reproductive biology and behavior.

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