



Multivariate analyses reveal a new assemblage of diverse and small archosauriforms (Reptilia, Diapsida) from the Upper Triassic of India

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The study is based on a large collection of vertebrate microfossils collected from the Upper Triassic Tiki Formation of the Rewa Gondwana basin of India, which is a mud-dominated fluvial succession. About 8600 kg of mudrocks from the Tiki Formation were screen washed to yield 1865 vertebrate microfossils, of which 67% are isolated teeth. Of these, there are about 450 well-preserved teeth, which are leaf-shaped, slightly recurved and have subtriangular crowns with expanded and asymmetric bases, and distinct denticles both on the posterior or anterior carinae. The morphology of these teeth suggests that these belong to Archosauriformes (Heckert, 2004; Irmis et al., 2007). Since the teeth were found isolated, without being associated with any other skeletal elements, it is not possible to ascertain their taxonomic position up to the generic and species level. However, based on their distinct dental attributes, twelve morphotypes are identified, of which five show similarity with the teeth of the basal saurischian dinosaurs.

Principal Component and Canonical Variate analyses (PCA and CVA) are performed on these isolated teeth to evaluate the differentiation of the specimens based on the variance of their variables and to assess the consistency of identification by qualitative and quantitative methods (Hammer and Harper, 2006). PCA and CVA are applied to the variance-covariance matrix of the logarithmically transformed variables, the latter including six measured dimensions characterizing the different crown proportions. Since the first three principal components (PCs) account for more than 98% of the total variance, PC4 is discarded. Principal component scores are plotted on PC 1 and PC 2, and PC 2 and PC 3 to show the scatter of the archosauriform teeth examined. Although distinct clustering of specimens belonging to the different morphotypes is seen, there is considerable overlapping as represented by the convex hull polygons. The quantitative analyses show that many of the teeth collected from the Tiki Formation are similar to that of other known Late Triassic archosauriforms such as *Protecoyasaurus*, *Revueltosaurus*, *Pekinosaurus* and *Crosbysaurus*. Although more analyses are required for precise taxonomic identification, the current study highlights a large array of Late Triassic archosauriforms from India, which so far remained unknown.

References:

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