PELVIS AND HIND LIMB MUSCLES RECONSTRUCTION IN THE WELL PRESERVED PSEUDOSUCHIAN *BATRACHOTOMUS KUPFERZELLENSIS*

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Most fossil vertebrates are known by their hard-tissues, but inferring their soft-tissues is important to elaborate a bigger picture of them. Muscular reconstructions in fossil vertebrates are mostly focused on mammals and dinosaurs, whereas two such studies were recently performed within the crocodilian-lineage of archosaurs, in the pseudosuchians *Poposaurus* and *Prestosuchus*. The most accurate methodology for soft-tissue reconstruction is the EPB, combining phylogeny, osteological correlates, and living relatives comparison. The pelvis and hindlimb musculature of the exquisitely preserved pseudosuchian *Batrachotomus* is presented here. Most muscles were inferred with low speculation; in more than one third of the attachments, the inferences were the least speculatives (*e.g.*, origins of Mm. ambiens, iliofibularis, gastrocnemius); other muscles present more speculation because the avian homologue is quite different, but their reconstruction is based on similarities with crocodilians (*e.g.*, Mm. puboischiotibialis, fibulares). The lower leg and foot soft-tissues inferences are very speculative, including some muscles unable to reconstruct (*e.g.*, digit flexors and extensors) due to the scarce information and the broad differences with birds. Differences in some muscles like iliotibiales and iliofemoralis origins and puboischiofemoralis attachments were noted with *Poposaurus*, but shearing the same condition with *Prestosuchus*. Similarities between *Batrachotomus* and *Prestosuchus* are expected by their close phylogenetic affinity and also probably by their quadrupedal locomotion and associated paleobiological traits, contrasting with the biped poposauroid *Poposaurus*. This muscular reconstruction will allows us to face other studies (*e.g.*, morphofunctional) relevant to understand *Batrachotomus* paleobiology, and eventually study the evolutionary patterns of the stance and gait within Pseudosuchia.

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EFFECT OF THE GENERALIZED EUCLIDEAN DISTANCE ON DISPARITY ANALYSES OF MORPHOLOGICAL MATRICES

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A large number of palaeontological studies dealing with morphological disparity has been published over the last decade. A critical step of these studies is the transformation of the morphological matrix into a distance matrix. The generalized Euclidean distance (GED) is the most extensively used distance measure to do this, in part because it allows the use of matrices with high amounts of missing data without the need to remove taxa if a subsequent ordination of the data set is desired to reduce dimensionality. The GED accomplishes this by replacing the missing dissimilarities with a mean weighted dissimilarity. Previous studies suggested that the GED may generate a bias in the morphospace and in some disparity measures, but a detailed analysis of this effect was lacking. By studying over 150 morphological matrices, we find that the GED creates a systematic bias, whereby taxa with higher percentages of missing data are placed closer to the centre of the morphospace than those with more complete scorings. This bias extends into pre- and post-ordination calculations of disparity measures and can lead to erroneous interpretations of disparity patterns, especially if specimens present in a particular time interval or clade have distinct percentages of missing data. Results recovered using an alternative distance measure, Maximum Observed Rescaled Distance (MORD), are more robust to the presence of missing data. This is possibly because MORD does not replace the missing dissimilarities with a mean value. We recommend against using the GED for matrices with a high amount of missing data.