



ABSTRACT BOOK



19th
EAVP
CONFERENCE 2022

Benevento / Pietraroja Italy
27.06 – 02.07.2022

UNRAVELLING THE LOCOMOTION OF REPTILES: CONTRIBUTION OF FEMORAL MICROANATOMY AND PALEOBIOLOGICAL IMPLICATIONS

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Keywords: *reptile, locomotion, microanatomy, paleobiology, functional morphology*

The water-to-land transition represents a key event in the evolution of tetrapod vertebrates. The mechanical constraints inherent to this new environment led amniotes to develop novel locomotor strategies that granted them access to new ecological niches, thus contributing to the evolutionary success of the clade. Today, amniotes show great locomotor and postural diversity, especially in reptiles, whose extant representatives include erect bipeds (birds), "semi-erect" quadrupeds (crocodilians) and sprawling quadrupeds (lepidosaurs and turtles). But the various events that led to such diversity remain enigmatic and the locomotion and posture of many extinct species, such as the Triassic *Euparkeria capensis* (archosauriform) and *Marasuchus lilloensis* (dinosauriform), raise questions. The study of reptile microanatomy can help address these uncertainties. Indeed, this locomotor and postural diversity is accompanied by great microanatomical disparity. We show how microanatomical parameters measured in cross-section, such as bone compactness and the position of the medullo-cortical transition, can be related to locomotion and posture in reptiles. Using statistical methods accounting for phylogeny (phylogenetic flexible discriminant analyses), we develop several inferential models from a sample of femur cross-sections belonging to 51 reptilian species. We use these models to infer the locomotor mode and posture of 7 extinct reptile taxa. Our study contributes to the understanding of the evolution of locomotion in various early reptile species. Our models and methods could be used by palaeontologists to infer locomotion, including posture, in other extinct reptilian taxa, especially when considered in combination with other lines of evidence.