

AFTER AWHILE...CROCODILE?: AN ASSESSMENT OF CROCODYLIANS AS LIVING FOSSILS

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ABSTRACT

Crocodylians, which include extant crocodiles, alligators, caimans, the gharial, and the tomistoma, are often considered living fossils. Many evolutionists have argued that the term ‘living fossil’ is inappropriately applied to crocodylians, since past diversity within Crocodylia, as well as within the more inclusive group Crocodylomorpha, implies that they have evolved substantially since their first appearance in the fossil record. In contrast, many creationists argue that the morphological conservativeness of living fossils like crocodylians is unexpected from a gradualistic model of evolution. To clarify this issue, we argue that while the term ‘living fossil’ has varied meanings within the literature, morphological conservativeness is a key aspect of the living fossil concept. From the fossil record, it is clear that some extinct crocodylomorphs have bauplans that differ greatly from that of extant crocodylians. These include fully marine forms with flippers and a caudal fin and fully terrestrial forms including herbivores, carnivores with theropod-like teeth, and even forms with mammal-like teeth. Nevertheless, all extant and most extinct fossil crocodylians have a similar bauplan, being quadrupedal, semi-aquatic predators. The fossil range of Crocodylia extends from the Upper Cretaceous to the present. When forms that are very “crocodylian-like” (e.g., goniopholidids) are included, this range is extended into the Jurassic. Morphological conservativeness is a relative term, but by any standard, the crocodylian or “crocodylian-like” bauplan is surprisingly conservative morphologically, especially given the immense amount of time assigned to these intervals by conventional geologists, the massive global environmental perturbations that are thought to have occurred during this time, and the large-scale changes that must have occurred—from an evolutionary perspective—in other lineages (e.g. mammals) during that same time. Thus, we argue that it remains appropriate to consider crocodylians ‘living fossils.’ Evolutionists need to grapple with the lack of substantial morphological change in the crocodylian lineage since the Mesozoic. At the same time, creationists need to be careful to not overemphasize the degree of morphological stasis in certain examples of living fossils when using them to argue against aspects of evolutionary theory.

KEYWORDS

Crocodylia, fossil record, living fossils, stasis, evolution, transitional forms, extinction

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Caleb earned his B.A. in biology in 2019 from Thomas Edison State University in Trenton, New Jersey. He is currently working on his Ph.D. in biology at Loma Linda University in Loma Linda, California. His area of research is in vertebrate paleontology, focusing on an extinct group of crocodile-like reptiles called phytosaurs. He has been involved in creation apologetics ministry for over ten years. He is currently teaching as an adjunct professor at The Master’s University in Santa Clarita, California. His areas of interest in creation research include building the Flood model, biostratigraphy, baraminology, and understanding the pattern of life.