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Comparative morphology of the pectoral girdle and forelimb of a phytosaur

Hornung, K.[1], Stocker, M. R.[1]
kelseyhornung@utexas.edu
1. Jackson School of Geosciences, The University of Texas at Austin, Austin, TX

Phytosauria is a widespread clade of large, quadrupedal, carnivorous archosauriforms known only from the Late Triassic. Despite recent phylogenetic analyses revising phytosaur ingroup relationships and taxonomy, many details of the anatomy, phylogeny, and diversity of non-phytosaurid phytosaurs remain unknown. Complete skeletons are rare, and only two taxa are known from more than cranial material. Because of this lack of data, there is no comprehensive understanding of their skeletal anatomy. We address this by elucidating the forelimb anatomy of a specimen similar and possibly referable to *Angistorhinus* (TMM 31100-1332). Current diversity estimates for *Angistorhinus* range from one to eight species, though specimen-level systematic have not been tested. *Angistorhinus* and *Brachysuchus* both are known from the Otis Chalk localities of Texas. A newly prepared specimen from the Otis Chalk is the only specimen referable to *Angistorhinus* that consists of a nearly complete skeleton in articulation, and is one of the most complete North American phytosaurs known. Pectoral girdle and forelimb material prepared from the field jacket includes right and left coracoids, one right and two left scapulae, right humerus, left ulna, left radius, 1st-4th left metacarpals, 1st-3rd and 5th right metacarpals, six complete and five partial phalanges, and two distal phalanges. In comparison to *Smilosuchus gregorii*, the most common phytosaur taxon used in higher-level archosaur phylogenies, the anterior notch of the coracoid is rounder and more extensive and the olecranon process of the ulna is less expanded. In addition to clarifying the skeletal anatomy of a non-phytosaurid phytosaur, TMM 31100-1332 is skeletally immature based on the open neurocentral sutures in all observable presacral vertebrae. We developed phylogenetic characters based on comparative anatomical examination of the morphology of the forelimb to test whether inclusion of the postcranial information affected our understanding of relationships within Phytosauria. A potential issue with inclusion of postcranial characters is the paucity of specimens that include both identifiable cranial remains as well as postcranial elements. We analyzed the dataset in two ways: first, with all taxa and only cranial characters, and second, only including the taxa that have postcrania with only the cranial characters. We compared the two resultant trees to examine the topology. Our results from this analysis showed that the topology does not change when excluding the taxa without postcranial material. This specimen represents presents a rare opportunity to clarify phytosaur postcranial anatomy, develop phylogenetic characters from the entire skeleton, and explore the effects of an expanded phylogenetic dataset on phytosaur relationships.

Keywords: Phytosauridae, systematics, morphology, Triassic, postcrania