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A new aetosaur from the Upper Triassic of the Santa Maria Formation, southern Brazil

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Abstract

Aetosaurs are armored pseudosuchian archosaurs widespread in Upper Triassic units. In South America, four taxa were previously recorded: *Aetosauroides scagliai*, *Neoaetosauroides engaeus*, *Aetobarbakinoides brasiliensis*, and *Chilenosuchus forttae*. Herein we describe a new Late Triassic juvenile aetosaur from the Santa Maria Formation of southern Brazil, *Polesinesuchus aurelio* **gen. et sp. nov.**, increasing the paleobiodiversity of this interesting group to five taxa in Western Gondwana. The holotype is composed of cranial (parietal and braincase) and postcranial elements (cervical, dorsal, sacral, caudal vertebrae, both scapulae, a humerus, ilium, pubis, ischium, tibia, a partial right pes, and anterior and mid-dorsal paramedian osteoderms). It belongs to a juvenile individual, as its neurocentral sutures are open in all vertebrae, and also due to its small size. However, future paleohistological investigation is necessary to fully corroborate this assumption. This new taxon is distinguished from all other aetosaurs by the presence of an unique combination of character states (not controlled by ontogeny) such as: cervical vertebrae with prezygapophyses widely extending laterally through most of the anterior edge of the diapophyses; absence of hyposphene articulations in both cervical and mid-dorsal vertebrae; presence of a ventral keel in cervical vertebrae; anterior and mid-dorsal vertebrae without a lateral fossa in their centra; expanded proximal end of scapula; anteroposteriorly expanded medial portion of scapular blade; a short humerus with a robust shaft; and a dorsoventral and very low iliac blade with a long anterior process which slightly exceeds the pubic peduncle. Regarding its phylogenetic relationships, the present analysis placed *Polesinesuchus* as the sister taxon of *Aetobarbakinoides* and both as sister taxa of the unnamed monophyletic clade Desmotosuchinae plus Typhothoracisinae.

Key words: western Gondwana, Carnian, Archosauria, Pseudosuchia, Aetosauria, Stagonolepididae

Introduction

Aetosaurs are heavily armored quadrupedal archosaurs restricted to the Late Triassic. They have been recovered in continental deposits from South and North America, Greenland, Europe, Morocco, and India (Lucas & Heckert 2000; Parker *et al.* 2008; Desojo & Ezcurra 2011; Desojo *et al.* 2013) (Fig. 1). They are nested within Pseudosuchia, the crocodile lineage of Archosauria; however their phylogenetic relationships with other high-level suchians are still subject of intense debate (for a complete set of references see Desojo *et al.* 2012 and Desojo *et al.* 2013). Formerly, four South American taxa have been described (from Argentina, Brazil, and Chile) (Desojo & Ezcurra 2011; Desojo *et al.* 2013). The Argentinean record comprises *Aetosauroides scagliai* Casamiquela, 1960 from the Ischigualasto-Villa Unión Basin (Carnian to Norian, Ischigualasto Formation) and *Neoaetosauroides engaeus* Bonaparte, 1971 (Norian to Rhaetian, Los Colorados Formation), (Casamiquela 1960, 1961, 1967; Bonaparte 1969, 1971; Desojo 2005; Desojo & Báez 2005, 2007; Desojo *et al.* 2012). The Chilean record

regarding South American aetosaurs (particularly concerning postcranial data). This new species is based upon a unique combination of characters, many of them shared with other two genera from the Santa Maria Formation, *Aetosauroides* and *Aetobarbakinoides*. As stated in the diagnosis, some character states are shared with *Aetosauroides*, whereas others with *Aetobarbakinoides*. For instance, in *Polesinesuchus* the cervical centra present a very marked ventral keel as occurs in *Aetosauroides*. In contrast, in *Aetobarbakinoides* this structure is absent. Additionally, the dorsal vertebrae of *Polesinesuchus* do not present both infradiapophyseal laminae and the well-rimmed fossa laterally placed in the centra as is seen in *Aetosauroides*. The absence of these structures is shared with *Aetobarbakinoides*. Furthermore, the morphology of the appendicular skeleton is quite similar to that of *Aetosauroides*, as both present robust limbs. Conversely, *Aetobarbakinoides* had gracile limbs. In addition, some derived features were recognized in the pelvic girdle of the new taxon, which were not coded in the updated data-matrix by Desojo *et al.* (2012), which is mostly based upon the morphology of the osteoderms.

Despite the unequivocal position of *Polesinesuchus* in the topology generated here, some problems arose during this study. Among them, the small representativeness of postcranial elements in phylogenetic studies of Aetosauria. As *Polesinesuchus* adds a great amount of postcranial features regarding this group, a new evaluation of postcranial characters of aetosaurs housed in different collections around the world, as well as the inclusion of as many of them as possible in future phylogenetic studies is necessary in order to improve anatomical, phylogenetic, and paleobiogeographic knowledge of the Aetosauria.

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APPENDIX

Scores for *Polesinesuchus aurelioi* in the cladistic character matrix of Desojo *et al.* (2012)
Polesinesuchus aurelioi

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