

Osteology, paleobiology, and relationships of the sauropod dinosaur *Sauroposeidon*

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Acta Palaeontologica Polonica 45 (4), 2000: 343-388

Sauroposeidon proteles is a large brachiosaurid sauropod recently described from the Antlers Formation (Aptian-Albian) of southeastern Oklahoma. *Sauroposeidon* represents the culmination of brachiosaurid trends toward lengthening and lightening the neck, and its cervical vertebrae are characterized by extensive pneumatic structures. The elaboration of vertebral air sacs during sauropod evolution produced a variety of internal structure types. We propose a new classification system for this array of vertebral characters, using computed tomography (CT) of pneumatic internal structures. Comparisons with birds suggest that the vertebrae of sauropods were pneumatized by a complex system of air sacs in the thorax and abdomen. The presence of a thoraco-abdominal air sac system in sauropods would dramatically affect current estimates of mass, food intake, and respiratory requirements. *Sauroposeidon* was one of the last sauropods in the Early Cretaceous of North America; sauropods disappeared from the continent by the early Cenomanian. The demise of sauropods in the Early Cretaceous of North America predates significant radiations of angiosperms, so the decline and extinction of this dinosaur group cannot be linked to changes in flora.

Key words: Dinosauria, Sauropoda, *Sauroposeidon*, pneumatic structures, Cretaceous, Oklahoma.

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