

A *Diplodocus*-sized bipedal basal sauropodomorph from the Late Triassic of South Africa

Mathew J. Wedel¹ and Adam M. Yates²

¹*College of Osteopathic Medicine of the Pacific and College of Podiatric Medicine, Western University of Health Sciences, Pomona, California;* ²*Bernard Price Institute for Palaeontological Research, University of the Witwatersrand.*

A partial skeleton of a basal sauropodomorph from the Lower Elliot Formation (mid to late Norian) of South Africa represents an animal of unprecedented size for that place and time.

Available material includes dorsal and caudal vertebrae, a dorsal rib, a chevron, an ulna, and a pedal ungual, with additional elements under preparation. All of the elements are exceptionally large, on average 1.9 times the linear size of the largest individual of the contemporary *Aardonyx*. *Aardonyx* was previously the largest known non-sauropod from the Lower Elliott Formation, with a femur length of up to ~800 mm. Cross-scaling from other basal sauropodomorphs suggests a femur length of ~1500 mm and a mass of 10-15 metric tons for the giant Elliot form. These estimates are comparable to the femur length (1540 mm) and estimated mass of CM 84/94, the holotype of *Diplodocus carnegii*. The ulna is unusually short and robust, 20% shorter than expected based on the other elements, and its morphology suggests that, like some other large basal sauropodomorphs, the giant Elliot form was an obligate biped. This is opposite to the trend of forelimb elongation in quadrupedal basal sauropods.

The giant Elliot form represents the largest known non-sauropod sauropodomorph and one of the largest bipedal animals of all time. It demonstrates that basal sauropodomorphs achieved very large body size despite lacking most of the presumed key innovations of sauropods, such as quadrupedal stance, columnar limbs, and extensive skeletal pneumaticity.