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The first well-preserved coelophysoid theropod dinosaur from Asia

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Abstract

Coelophysoid dinosaurs represent the earliest major radiation of neotheropods. These small-to-medium-sized agile bipeds lived throughout much of Pangaea during the Late Triassic–arly Jurassic. Previously reported coelophysoid material from Asia (excluding the Gondwanan territory of India) is limited to two specimens that comprise only limb fragments. This paper describes a new genus and species of coelophysoid, *Panguraptor lufengensis*, from the Lower Jurassic Lufeng Formation of Yunnan Province, China. The new taxon is represented by a well-preserved skeleton, including the skull and lower jaw, the presacral vertebral column and partial ribs, the right scapula, a partial forelimb, part of the pelvic girdle, and an almost complete hind limb. It is distinguished from other coelophysoid theropods by the unique combination of the following three character states: 1) diagonal (rostrodorsal-caudoventral) ridge on lateral surface of maxilla, within antorbital fossa, 2) elliptical, laterally facing fenestra caudodorsal to aforementioned diagonal ridge, and 3) hooked craniomedial corner of distal tarsal IV. Cladistic analysis recovers *Panguraptor lufengensis* deeply nested within Coelophysoidea as a member of Coelophysidae, and it is more closely related to *Coelophysis* than to *"Syntarsus*". *Panguraptor* represents the first well-preserved coelophysoid theropod dinosaur from Asia, and provides fresh evidence supporting the hypothesis that terrestrial tetrapods tended to be distributed pan-continentally during the Early Jurassic.

Key words: Theropoda, Coelophysoidea, new genus and species, Early Jurassic, Lufeng Formation, Lufeng

Introduction

Coelophysoid dinosaurs are small-to-medium-sized agile bipedal meat-eaters that lived throughout much of Pangaea during the Late Triassic and Early Jurassic (Tykoski 2005; Tykoski & Rowe 2004). They are among the earliest well documented dinosaurs and represent the earliest major radiation of neotheropods (Brusatte *et al.* 2010; Colbert 1989; Cope 1889; Sereno 1999). A recent study indicated that late Norian–Rhaetian theropod assemblages were dominated by basal (early diverging) coelophysoids, whereas Early Jurassic ones were composed of coelophysids (*Coelophysis bauri* + "*Syntarsus*" *kayentakatae* and all descendents of their most recent common ancestor), dilophosaurids and basal averostrans (Ezcurra 2012). However, despite the well-documented discoveries of derived coelophysoids in North America and Africa, the coelophysoid material that has previously been reported from Asia is limited to two specimens comprising only limb fragments and perhaps belonging to one individual (Irmis 2004). Here we describe a new genus and species of coelophysoid based on a well-preserved skeleton from the same rock unit, the Lower Jurassic Lufeng Formation of Yunnan Province, China, that yielded both previously reported specimens. Our cladistic analysis shows that the new taxon is a coelophysid coelophysoid, and is more closely related to *Coelophysis* than to *"Syntarsus"*. This new taxon represents the most basal theropod dinosaur currently known in China, and provides fresh evidence supporting the hypothesis that terrestrial tetrapods tended to be distributed pan-continentally during the Early Jurassic.

Institutional abbreviations: AMNH, American Museum of Natural History, New York, New York, USA;

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The Lufeng Saurischian Fauna (Young 1951), or more appropriate the Early Jurassic Lufeng Dinosaur Fauna, represents one of the richest dinosaur faunas in the world, and provides critical information regarding dinosaur evolution and biogeography during the Early Jurassic. Eight species of sauropodomorphs (*Lufengosaurus huenei* Young, 1941, *L. magnus* Young, 1947, *"Gryposaurus" sinensis* Young, 1941, *Yunnanosaurus huangi* Young, 1942, *Y. robustus* Young, 1951, *Jinshanosaurus xinwaensis* Zhang and Yang, 1995, *Chuxiongosaurus lufengensis* L *et al.*, 2010, *Xixiposaurus suni* Sekiya, 2010) and two species of ornithischians (*Tatisaurus oehleri* Simmons, 1965 and *Bienosaurus lufengensis* Dong, 2001) have been reported from the Lower Jurassic Lufeng Formation in the Lufeng area. In contrast, only one theropod, *Sinosaurus sinensis* Young, 1948 has been previously confirmed to exist in these strata (Xing 2012). The discovery of *Panguraptor lufengensis* adds a second theropod to the known fauna of the Lufeng Formation.

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