An advanced, new long-legged bird from the Early Cretaceous of the Jehol Group (northeastern China): insights into the temporal divergence of modern birds

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Abstract

We describe a new ornithuromorph bird species, Gansus zheni from the Lower Cretaceous lacustrine deposits of the Jiufotang Formation (Jehol Group), Liaoning Province, China. A cladistic analysis resolves Gansus zheni as the sister taxon of the roughly contemporaneous Gansus yumenensis (Xiagou Formation, Gansu Province), and together as the most immediate outgroup to Ornithurae. Gansus zheni is the most advanced bird known today for the Jehol Biota. Its discovery provides the best-documented case of inter-basinal correlations (Jehol and Changma basins of Liaoning and Gansu provinces, respectively) using low-taxonomic clades of fossil birds. The existence of close relatives of Ornithurae in deposits formed at about 120 million years ago helps to mitigate the long-standing controversy between molecular and paleontological evidence for the temporal divergence of modern birds (Neornithes).

Key words: Early Cretaceous, Neornithes, birds, anatomy

Introduction

The remarkable Jehol Lagerstätte has yielded thousands of fossil birds representing multiple species spread over a vast portion of the phylogenetic tree of early avians. While enantiornithine birds dominate in taxonomic diversity, a growing number of fossils are revealing that a large diversity of basal ornithuromorphs (Zhou et al. 2009, 2012), the group that includes all living birds, is also characteristic of the Jehol Biota. Research on those early ornithuromorphs has revealed important ecological differences between these birds and their enantiornithine contemporaries. Evidence for niche partitioning is apparent from the fossil record of Jehol enantiornithines, which primarily represent forest, or arboreal birds, and the Jehol ornithuromorphs representing either land or semiaquatic birds (Wang et al. 2013). With the exception of the small hongshanornithids (Zhou & Zhang 2005; Chiappe et al. 2014), all other basal ornithuromorphs from the Jehol Biota lack clear specializations for wading. Here we report on a new fossil taxon, much larger than the hongshanornithids, and with definitive semiaquatic specializations. The new taxon shows close similarities with the roughly coeval Gansus yumenensis Hou & Liu 1984 (see You et al. 2006) from the Lower Aptian Xiagou Formation (Suarez et al. 2013) of Gansu Province’s Changma Basin, thus providing a well-documented case of inter-basinal correlation based on Early Cretaceous birds.

Systematic Paleontology

Aves Linnaeus, 1758
Above the Heads of Dinosaurs

A new specimen of the Early Cretaceous bird

References


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A NEW LONG-LEGGED BIRD FROM CHINA

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APPENDIX I. Scoring of *Gansus zheni* used in the cladistic analysis.

Character matrix taken from Wang et al. 2014.

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