



Discovery of a new Namurian archaeorthopterid from Ningxia, China (Insecta: Archaeorthoptera)

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Abstract

A new archaeorthopterid *Chenxiella liuae* **gen. et sp. nov.** is described from the Upper Carboniferous (Namurian B-C) of the Tupo Formation in Ningxia Hui Autonomous Region (China). The new taxon exhibits a unique combination of wing venation characters. Together with other described archaeorthopterids, this new specimen further demonstrated considerable diversity of this group in Namurian ecosystems. However, *C. liuae* **gen. et sp. nov.** (uncertain family assignment) makes the higher systematics and classification of Archaeorthoptera more complicated and difficult.

Key words: Insecta, Panorthoptera, Archaeorthoptera, "Protorthoptera", new genus, new species, taxonomy, Upper Carboniferous, Namurian, Ningxia, China

Introduction

Qilian Mountains are situated in adjacent regions of Ningxia, Gansu, Inner Mongolia and Xinjiang of northwestern China. Fossils known as "Qilianshan biota", including plants, insects, brachiopods, corals, ammonites, bivalves, conodonts and fish, have recorded in alternated beds of terrestrial and marine phases, located mainly in Zhongning and Zhongwei Counties of Ningxia Hui Autonomous Region (Li *et al.* 1993; Hong 1998; Lu *et al.* 2002; Prokop & Ren 2007).

"Qilianshan entomofauna", as part of "Qilianshan biota", is considered as the oldest known entomofauna in China so far (Hong 1998). Fossil insects occurred in black shale of the Upper Carboniferous Tupo Formation dated to stage C2t (Bashkirian – Moscovian) as equivalent to the European Namurian B–C, near the Xiaheyuan Village (N37° 25', E105° 05'), Zhongwei County, southern Ningxia Hui Autonomous Region (Peng *et al.* 2005). Namurian is the earliest stage with sudden occurrence of diverse winged insects (Pterygota) (Brauckmann *et al.* 2003; Prokop *et al.* 2005). Fossil insect specimens from the Namurian deposits of Ningxia were rather numerous; therefore its diversity greatly enriched knowledge about the Namurian entomofauna. The locality also represents the first Namurian deposits with fossil insects from the Far East. Its distant paleogeographical location from other Carboniferous insect localities and occurrence in low latitudes make this site rather significant for studying of insect evolution (Rasnitsyn & Quicke 2002).

Most of the specimens from the Qilianshan entomofauna are preserved as isolated and incomplete wings, only a few with body structures. This state of preservation resulted in more difficulty to study insect taxonomy. Up to date, only 13 species, referable to eight genera, have been described (Peng *et al.* 2005; Zhang *et al.* 2006; Prokop & Ren 2007; Ren, Nel & Prokop 2008). Fortunately, we have recently collected many