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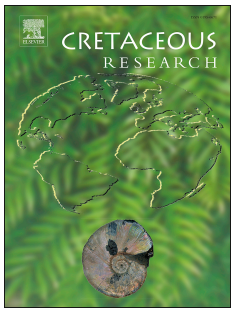

Multiple parallel deinonychosaurian trackways from a diverse dinosaur track assemblage of the Lower Cretaceous Dasheng Group of Shandong Province, China

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Multiple parallel deinonychosaurian trackways from a diverse dinosaur track assemblage of the Lower Cretaceous Dasheng Group of Shandong Province, China

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Abstract:

Many newly-discovered dinosaur tracksites have recently been reported from the Lower Cretaceous Dasheng Group of Shandong Province. These are proving valuable as tools for characterizing the fauna in deposits almost devoid of body fossils. Here we report on a new Cretaceous site, the 14th documented in recent years, with multiple track-bearing levels, that adds ~300 tracks to a growing database. At least two morphotypes tentatively labelled as cf. *Menglongpus* isp., representing a deinonychosaur, and cf. *Tatarornipes* isp., representing an avian theropod, add to the list of at least seven named ichnogenera attributed to avian and non-avian theropods reported from the Dasheng Group in Shandong Province. Combined with two sauropodomorph and two ornithopod ichnogenera, and unnamed turtle tracks, the genus-level ichnodiversity (~14) is one of the highest reported for any Cretaceous unit either regionally in China or globally.

The tracks identified as cf. *Menglongpus* isp. occur in four parallel trackways indicating a group of small didactyl bipeds of inferred deinonychosaurian affinity. Despite the lack of body fossils from the Dasheng Group in Shandong Province, a high diversity of deinonychosaur body fossils is known from the contemporary Jehol Biota from northeastern China. This similarity underscores the importance of the Shandong track assemblage as indicators of regional, tetrapod biodiversity during the Cretaceous.

Key words: Early Cretaceous; deinonychosaur; avian theropod; theropod; sauropodomorph; ornithopodan

Chinese Cretaceous dinosaur tracks are best known and most abundantly reported in Inner Mongolia (Lockley et al., 2002), Sichuan Basin (Jiaguan Formation) (Xing and Lockley, 2016) and the Yishu fault zone in Shandong Province (Xing et al., 2013a; Li et al., 2015). The latter region, the subject of this report, boasts a remarkable concentration and diversity of tracksites, currently numbering 13 with multiple track-bearing levels each representing a separate sample. These track records are important substitutes of local Early Cretaceous skeletons which are absent.

The Yishu fault zone, aligned from Zhucheng to Junan, Linshu and Tancheng, between Shandong Province and northern Jiangsu Province, is part of the famous Tanlu (=Tan-Lu) fault zone in northeastern China (Zhang et al., 2003). The Yishu fault zone area has extensive outcrops of Jurassic–Cretaceous strata, bearing abundant dinosaur tracks. Xing et al (2015a) summarized data on thirteen dinosaur tracksites, which are all Lower Cretaceous sties except for the Yangzhuang site, which is from the Middle–Upper Jurassic Zibo Group (Li et al., 2002). Recently, a large-scale track site from Nanquan has been reported by Xing et al (in press a), with a diverse sauropod-theropod-dominated track assemblage. The former 13 tracksites can be further divided into five sites from the Laiyang Group and eight sites from the Dasheng Group. The Huanglonggou site is the most important of the Laiyang Group (Valanginian–Barremian) sites and thought to be China's largest dinosaur tracksite with more than 2200 dinosaur footprints, including diverse theropod (*Grallator yangi* and *Corpulentapus lilasia*), sauropod and turtle tracks (Li et al.,