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A new species of *Shaanxispira* (Bovidae, Artiodactyla) from the upper Miocene of China

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Abstract

A new species of the bovid *Shaanxispira*, from the upper Miocene deposits of the Linxia Basin, Gansu Province, China, is described here. *Shaanxispira* is endemic to Northern China and was previously known only from the Lantian area, Shaanxi Province, by two species, *S. chowi* and *S. baheensis*. The new species, *S. linxiaensis* nov. sp., is of early Bahean in age, slightly older than the species from the Lantian area. The horn-cores of the new species are more derived, with large wing-shaped antero-medial keels, suggesting the occurrence of a different lineage of *Shaanxispira* in the Linxia Basin. Although *Shaanxispira* has homonymously twisted horn-cores, it is not closely related to other late Miocene bovinds with homonymously twisted horn-cores, like *Oioceros* and *Samotragus*. Its phylogenetic status is still in debate, but might be more closely related to the late Miocene “ovibovines.”

Key words: Linxia Basin, China, late Miocene, *Shaanxispira*, Ovibovini, Bovidae

Introduction

Since the beginning of last century, several late Miocene bovinds with specialized horn-cores have been reported from China, including *Hezhengia* (Qiu *et al.* 2000), *Plesiaddax* (Bohlin 1935a; Xue *et al.* 1995; Deng *et al.* 2011), *Tsaidamotherium* (Bohlin 1935b; Shi 2014) and *Urmitherium* (Bohlin 1925, 1935a) (their stratigraphic distributions are shown in figure 1). They were considered to be closely related to each other, characterized by having short and almost vertical braincase, strengthened cranium-atlas articulation, and especially the accessory articular surface between occipital condyle and paroccipital process (Bohlin 1935a; Qiu *et al.* 2000; Shi 2014). Some other bovinds like *Lantiantragus* and *Shaanxispira* were also grouped with them, according to the similarities on teeth and skull (Liu *et al.* 1978; Zhang 2003; Chen & Zhang 2004, 2009).

Shaanxispira is a large late Miocene bovid with derived horn-cores: long and straight, moderately divergent, homonymously twisted, and with a distinct antero-medial keel. This genus was endemic to northern China, and its fossil record, especially the skulls, is quite sparse. Until now, only two *Shaanxispira* species have been described: the type species, *S. chowi*, and *S. baheensis*. Both of them were discovered from the upper part of the Bahe Formation (Unit 2), in Lantian area of Shaanxi Province, China. The age of the type species is about 8.21Ma (Loc.30, 59S6, 63702.L4), whereas the age of *S. baheensis* is 8.07Ma (Loc.6/33, 59S5, 63702.L1) (Liu *et al.* 1978; Zhang *et al.* 2002, 2013; Zhang 2003; Zhang & Liu 2005; Deng 2006).

The current literature includes a brief mention of the occurrence of *Shaanxispira* in the Linxia Basin, Gansu Province, but no detailed information has ever been provided (Deng *et al.* 2004a, b, 2013). Here we describe a new species of *Shaanxispira* from the Linxia Basin, represented by a well preserved skull with a pair of horn-cores. It is the first description of this genus outside of the Lantian area, and the preservation state of the new specimen is better than all previously known specimens of *Shaanxispira*. The discovery also provides important supplement to the morphological features of the skull, especially the upper dentitions and the bone sutures.

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