3D models related to the publication: The early evolution of cranial appendages in Bovoidea revealed by new species of *Amphimoschus* (Mammalia: Ruminantia) from China

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Abstract

The present 3D Dataset contains the 3D models of the holotype mandible and referred fragmented skull of the new species *Amphimoschus xishuiensis* analyzed in the article Li, Y.-K., Mennecart, B., Aiglstorfer, M., Ni, X.-J., Li, Q., Deng, T. 2021. The early evolution of cranial appendages in Bovoidea revealed by new species of *Amphimoschus* (Mammalia: Ruminantia) from China. Zoological Journal of the Linnean Society https://doi.org/10.1093/zoolinnean/zlab053

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INTRODUCTION

We described the new ruminant species *Amphimoschus xishuiensis* from the late early Miocene locality Xishuigou (China; Shanwangian; about 17-19.7 Ma, Wang et al., 2013). The new species is erected based on characters of cranium and dentition. Here we provide access to 3D data of the type specimens (the holotype IVPP V 25521.1 right hemimandible and V 25521.2 referred fragmented skull), deposited at the Institute of Vertebrate Paleontology and Paleoanthropology (IVPP), Chinese Academy of Sciences (Fig. 1, Table 1).

The diagnostic dentition of the new species allows a close affinity with the European *Amphimoschus*, whereas the fragmented skull displays the first evidence of cranial ornamentations in this genus. We ran a phylogenetic analysis on fossil and extant ruminants, with a topological constraint indicated by Chen et al. (2019). In our analysis, *Amphimoschus xishuiensis* was integrated with *Amphimoschus ponteleviensis*, and the genus *Amphimoschus* was recovered as a basal member of the Bovoidea. Furthermore, an ancestral behavior character reconstruction was carried out, and the early evolution of cranial appendages in Bovoidea could be interpreted as weapons to defend territories.

METHODS

The 3D surfaces of the hemimandible and fragmented skull were gained from the 225 kV micro-computerized tomography at the

| Inv nr.	Description
IVPPV25521.1	Right hemimandible with tooth row p2 to m3
IVPPV25521.2	Anterior part of a skull with right P4-M3 and left P3-M2

Table 1. List of presented models of the right hemimandible (IVPP V 25521.1, the holotype) and referred fragmented skull (V 25521.2) for the new species *Amphimoschus xishuiensis*. Collection: IVPP, Beijing, China

Key Laboratory of Vertebrate Evolution and Human Origins, Chinese Academy of Sciences. The hemimandible was scanned using 140 kV energy and 120 µA flux, and the skull using 160 kV energy and 120 µA flux. The 3D surface models were segmented and digitally reconstructed using the software Mimics Research (version 20.0). All the 3D surface models are provided in .ply format, and can therefore be opened with a wide range of freeware.
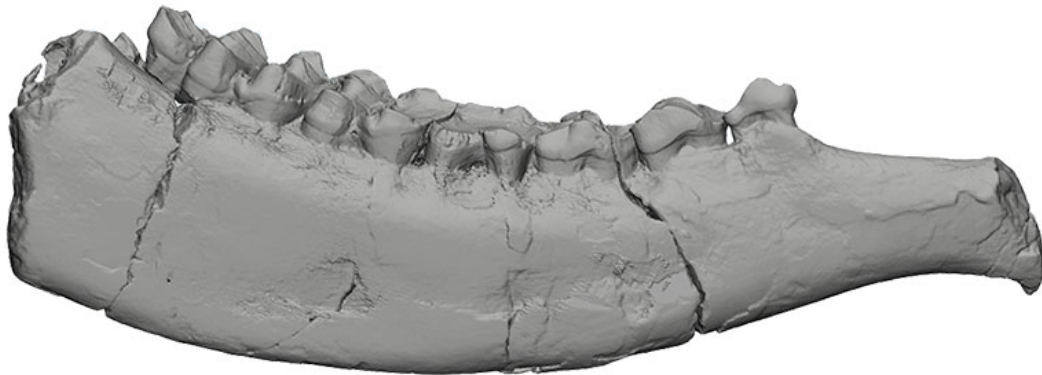
ACKNOWLEDGEMENTS
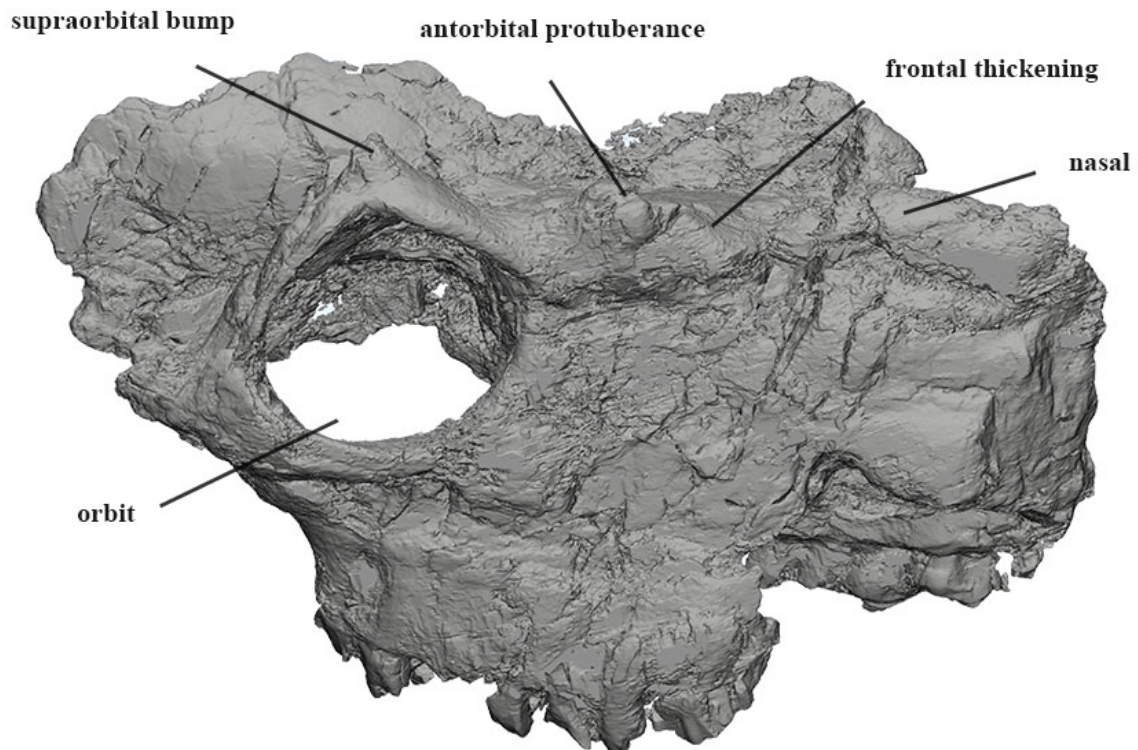
Figure 1. 3D reconstructions of the new species *Amphimoschus xishuiensis*. A, right lateral view of the referred fragmented skull (IVPP V 25521.2); B, labial view of the right hemimandible (V 25521.1, the holotype).

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