

A new specimen of *Birgeria liui* (Osteichthyes, Actinopterygii) from the Longobardian (Ladinian, Middle Triassic) of Xingyi, Guizhou Province, South China

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Abstract - *Birgeria* was one of the largest carnivorous fishes from the Triassic, spanning almost the entire period and, with an almost cosmopolitan distribution. *Birgeria liui* was originally described based on the incomplete holotype from the Middle Triassic marine Falang Formation of Changdi, Yunnan province, South China, which lacks the skull and anterior part of the body. Herein, we describe a new well preserved specimen of *B. liui* from the early Late Ladinian of South China. The description of the new material presents previously unknown anatomical information, which substantially enhances our understanding of *B. liui*.

Keywords: *Birgeria liui*, Actinopterygii, Middle Triassic, South China

1. Introduction

Birgeria was one of the largest carnivorous fishes from the Triassic, spanning almost the entire period and with an almost cosmopolitan distribution. This genus was erected by Stensiö (1919) on material from the Middle Triassic Muschelkalk of Bayreuth (Germany) that was previously known as *Saurichthys mougeoti* (Agassiz, 1843). In 1921, Stensiö gave a detailed description of birgeriids from the Lower Triassic of Spitsbergen and referred them to *Birgeria mougeoti*, the type species of *Birgeria*. Besides, Stensiö (1921) also referred two little known species of *Saurichthys*, both from Europe and previously described as *S. acuminata* (Agassiz, 1844) and *S. annulata* (Winkler, 1880) to this genus. Subsequently, Aldinger (1931) described a new species, *B. stensiöi*, from the Middle Triassic of Switzerland. Stensiö (1932) added a further species, *B. groenlandica*, from the Lower Triassic of East Greenland and placed *Xenestes velox* (Jordan, 1907) in *Birgeria*. Lehman (1948) erected *B. nielseni* from the Lower Triassic of Madagascar. The *Birgeria* specimens from Spitsbergen were reclassified as *B. aldingeri* by Schwarz (1970). Jin (2001) named *B. liui* from the Middle Triassic of South China and then Liu *et al.* (2006) identified *B. guizhouensis* from the Late Triassic of South China.

In addition, remnants of *Birgeria* sp. were also reported from the Lower Triassic of Madagascar (Beltan, 1977, 1980, 1996; Guffroy, 1956), Siberia (Berg *et al.*, 1967), British Columbia (Schaeffer and Mangus, 1976); Middle Triassic of Poland (Chrząstek, 2008), South China (Jiang *et al.*, 2016); Late Triassic of Bolivia (Beltan *et al.*,

1987), Italy (Boni, 1937; Gozzi, 2006), Slovenia (Jurkovec and Kolar-Jurkovec, 1986; Kolar-Jurkovec, 1991).

Birgeria liui was originally described based on the incomplete holotype from the Middle Triassic marine Falang Formation of Changdi, Yunnan province, South China, which lacks the skull and anterior part of the body. Herein, we describe a new well preserved specimen of *B. liui* from the early Late Ladinian of South China. Unfortunately, the preservation of the skull is too poor to provide valuable information, so we neglect the skull in this description. The description of the new material presents previously unknown anatomical information in detail, which substantially enhances our understanding of *B. liui*.

Institutional Abbreviations

IVPP, Institute of Vertebrate Paleontology and Paleoanthropology

XNGM, Xingyi National Geopark Museum, Guizhou, China.

2. Materials and methods

The specimen of *Birgeria liui* described herein was collected from the excavation site in the Zhuganpo Member of the Falang Formation, around Nimaigu village of Wusha District, Xingyi City, Guizhou Province, South China (Fig. 1). It is stored in the Xingyi National Geopark Museum, Guizhou, China. It was prepared mechanically by fine steel needles under binocular microscopes Nikon SMZ645.

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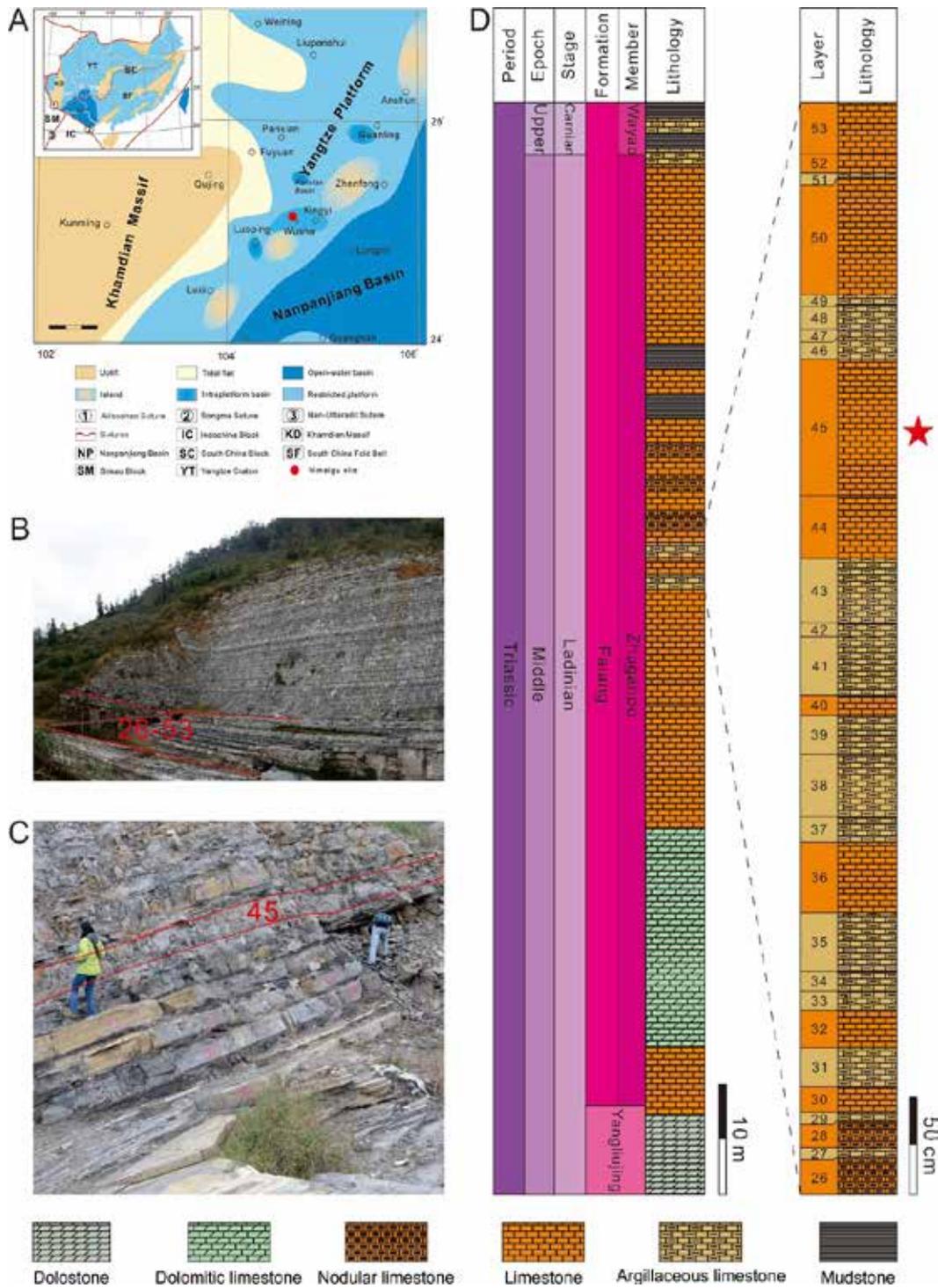


Figure 1. Geological location and stratigraphic section of Xingyi Fauna. A, paleogeographic map of southern China during the Middle Triassic (modified after Liu *et al.*, 2013). B, photograph of the Nimaigu section, with the fossil layer 26-53 marked by red lines. C, photograph of the fossil layer, with the bed 45, where *Birgeria liui* has been found, marked by red lines. D, stratigraphic column of Nimaigu section and the fossil layer, with red star indicating bed 45, where *Birgeria liui* was found.

3. Systematic palaeontology
 Class Actinopterygii Cope, 1887
 (sensu Rosen *et al.*, 1981)
 Superorder Chondrostei Müller, 1844
 (sensu Patterson, 1982)
 Order Birgeriiformes Jin, 2001
 Family Birgeriidae Aldinger, 1937

Genus *Birgeria* Stensiö, 1919
 Species *Birgeria liui* Jin, 2001

Holotype. IVPP V 12569.
Material. XNGM WS-45-F21.
 Specimen XNGM WS-45-F21 is a well-preserved fish of 76 cm in standard length (SL) and 94 cm in total length

(TL), fairly complete except for the most posterodorsal part of the skull and the middle of the abdominal region that was lost during the collecting. Unfortunately, the preservation of the skull is too poor to provide valuable information.

Locality

Nimaigu village, Wusha District, Xingyi City, Guizhou Province, South China.

Horizon

Fossiliferous layers of upper assemblages, Zhuganpo Member of the Falang Formation.

Age

Early Longobardian, Ladinian, Middle Triassic.

4. Result and discussion

Both the new specimen and the holotype of *Birgeria liui* came from the Zhuganpo Member, Falang Formation, they were found in Xingyi, Guizhou and in Luoping, Yunnan, respectively, both sites located within the scope of the Xingyi Fauna. In addition to coming from the same horizon, the new specimen of *Birgeria* shares similar features with the holotype in the postcranial skeleton. Hence, we affirm that this new specimen belongs to the species *Birgeria liui*.

5. Conclusions

The description of the new material presents previously unknown anatomical information, which substantially enhances our understanding of *B. liui*. New anatomical information concerns: osteology of paired fins and their supports; neural and haemal arches and their changes along the body length (orientation, proportions, paired or not, kind of contact relationship between the neighbouring arches, correspondence between the neural and the haemal arch, and so on); presence of pectoral ribs; osteology of medial fins and their support; scales and their changes along the orientation.

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