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Gondwanasuchus scabrosus gen. et sp. nov., a new terrestrial predatory crocodyliform (Mesoeucrocodylia: Baurusuchidae) from the Late Cretaceous Bauru Basin of Brazil

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ABSTRACT

Baurusuchids are among the most common and diverse crocodyliform fossils from the Late Cretaceous Bauru Basin of Brazil. This inland continental basin was the habitat of a rich crocodyliform fauna containing five mesoeucrocodylian families, of which the Baurusuchidae represents highly specialized predatory crocodyliforms of terrestrial habits as indicated by their dental, cranial, and postcranial features. The large size they achieved, together with likely predatory adaptations, would suggest they competed and occupied theropod ecological niches in the Bauru Basin. Here we describe *Gondwanasuchus scabrosus* gen. et sp. nov., a medium-sized baurusuchid with a strongly laterally compressed skull, bearing unique dentition with deep apicobasal sulci and probably well-developed binocular vision. The cranial and dental features in *Gondwanasuchus* suggest that this active predator would have fed on small vertebrates and took the role of small theropods in terrestrial guild. *Gondwanasuchus* is the most distinctive baurusuchid known to date and enriches the knowledge on these important Gondwanan terrestrial predatory crocodyliforms.

1. Introduction

The Late Cretaceous continental Bauru Basin of southeastern Brazil has yielded a rich crocodyliform fauna. Five mesoeucrocodylian families are recognized from the 300 m-thick sediments of the Adamantina and Marília formations: baurusuchids, sphagesaurids, notosuchids, peirosaurids, and trematochampsids (e.g., Price, 1945, 1950, 1955; Carvalho and Bertini, 1999; Carvalho et al., 2005, 2007, 2010a, 2011; Marinho and Carvalho, 2009; Iori and Carvalho, 2009, 2011). Among these, the Baurusuchidae is the most diverse and abundant crocodyliform family found in the Adamantina Formation (*sensu* Paula e Silva, 2003; Paula e Silva et al., 2005) that includes six species: (1) *Baurusuchus pachecoi* Price, 1945; (2) *B. salgadoensis* Carvalho, Campos & Nobre, 2005; (3) *B. albertoi* Nascimento and Zaher, 2010; (4) *Stratiotosuchus maxhechti* Campos, Suarez, Riff & Kellner, 2001; (5) *Campinasuchus dinizi* Carvalho, Teixeira, Ferraz, Ribeiro, Martinelli, Neto, Sertich, Cunha, Cunha & Ferraz, 2011; and (6) *Pissarrachampsa sera* Montefeltro, Larsson & Langer, 2011.

Baurusuchids are terrestrial crocodyliforms regarded as active cursorial predators, based on dental, cranial, and postcranial features (Price, 1945; Riff and Kellner, 2011; Vasconcellos and Carvalho, 2007). The distribution of these animals during the Late Cretaceous is exclusively Gondwanan, with *Cynodontosuchus rothi* and *Wargosuchus australis* from the Argentinean Bajo de La Carpa Formation (Neuquén Basin), *Pabwehshi pakistanensis* from the Pab Formation of Pakistan plus the Brazilian species (Woodward, 1896; Wilson et al., 2001; Martinelli and Pais, 2008; Carvalho et al., 2011; Montefeltro et al., 2011).

Here we describe a new baurusuchid based on a well-preserved partial skull and mandible from the Adamantina Formation (Turonian–Santonian). This material was found in close association with a large specimen of *Baurusuchus salgadoensis*, and at the same stratigraphic horizon of *Armadillosuchus arrudai* Marinho and Carvalho, 2009 (Marinho et al., 2011), showing the contemporaneous occurrence of these crocodyliform taxa (Fig. 1). The new taxon represents the most distinctive baurusuchid known to date in

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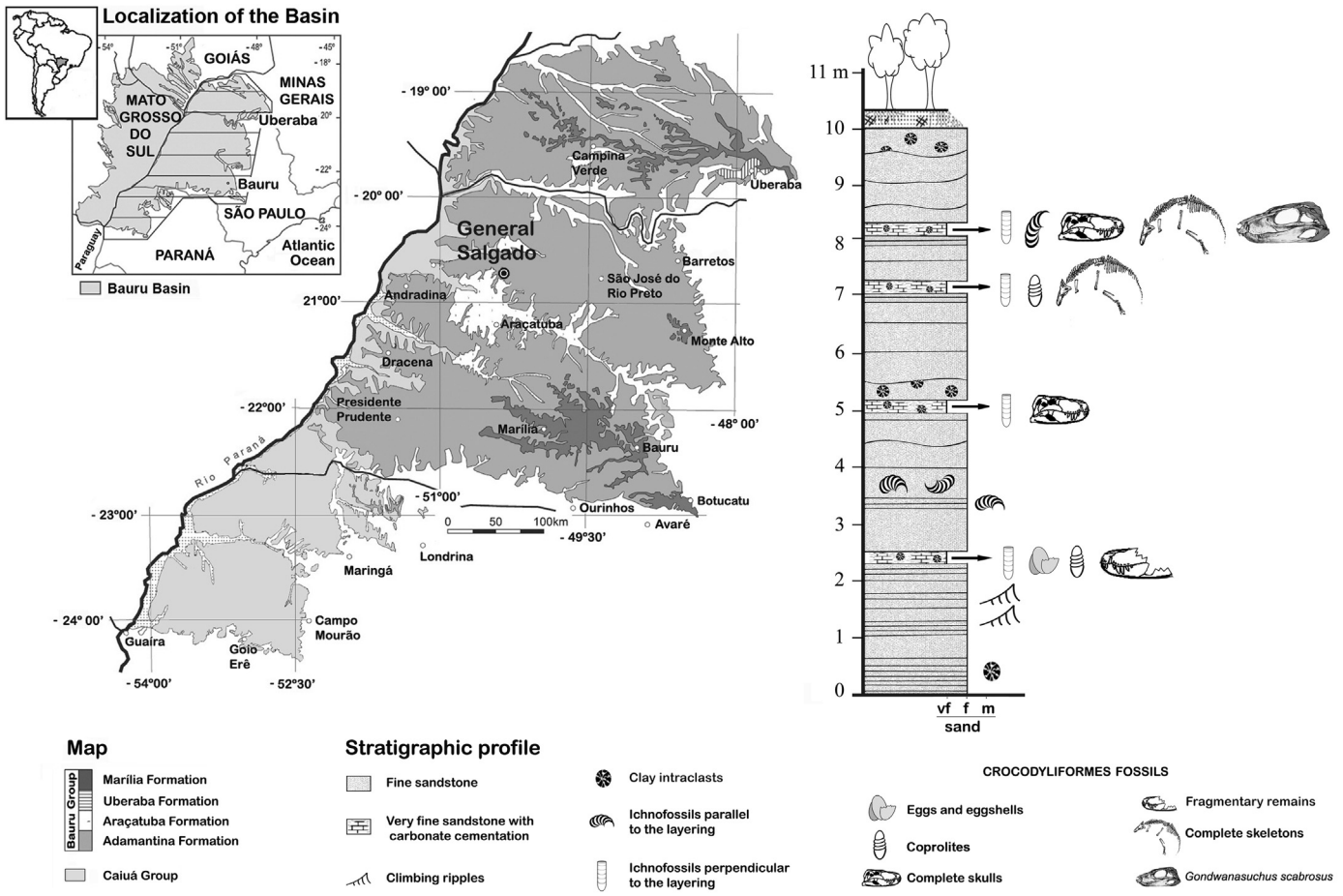

Fig. 1. Lithostratigraphic map of the eastern part of the Bauru Basin (modified from Fernandes and Coimbra, 2000), and stratigraphic profile of the Adamantina Formation at the Fazenda Buriti Paleontological Site, General Salgado County, Brazil.

that it displays a strongly laterally compressed skull, dentition bearing deep apicobasal sulci and probably binocular vision, thus adding a new bauplan to the diversity of these Gondwanan crocodyliforms.

The institutional abbreviations used in this article are as follows: UFRJ DG, Departamento de Geologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil; CPP, Centro de Pesquisas Paleontológicas Llewellyn Ivor Price, Peirópolis, Uberaba, Minas Gerais, Brazil.

2. Geological setting

Gondwanasuchus was found in an outcrop of the Adamantina Formation (Turonian–Santonian of Bauru Basin; *sensu* Dias Brito et al., 2001) at Fazenda Buriti Paleontological Site, General Salgado County, Northwestern São Paulo State, Brazil (Carvalho et al., 2010b) (Fig. 1). This outcrop is composed of fine-grained sandstones and siltstones with intercalations of red oxidized mudstones, which were deposited on an extensive alluvial plain reworked by fluvial systems alongside scattered shallow ephemeral lakes in an arid or semi-arid seasonal climate (Fernandes and Coimbra, 1996; Garcia et al., 1999; Goldberg and Garcia, 2000; Fernandes and Basilici, 2009). The Bauru Basin was formed during the early breakup of Gondwana associated with the opening of the South Atlantic Ocean (Fernandes and Coimbra, 1996).

The fossil assemblage of Fazenda Buriti Paleontological Site is composed mostly by baurusuchid remains, represented by skulls, semi-articulated skeletons and complete specimens (Carvalho et al., 2010b). In addition, these outcrops have also yielded specimens of *Armadillosuchus arrudai*, anilioid snake vertebrae, invertebrate ichnofossils, and coprolites and egg remains attributed to crocodyliforms (Zaher et al., 2003; Arruda et al., 2004; Carvalho et al., 2010b; Marinho et al., 2011).

3. Systematic paleontology

Crocodyliformes Hay, 1930 (*sensu* Clark, in Benton and Clark, 1988)
Mesoeucrocodylia Whetstone and Whybrow, 1983 (*sensu* Clark, in Benton and Clark, 1988)
Notosuchia Gasparini, 1971
Baurusuchidae Price, 1945
Pissarrachampsinae Montefeltro, Larsson and Langer, 2011
Gondwanasuchus gen. nov.

Etymology: Generic name refers to the southern paleocontinent Gondwana as an allusion to the Gondwanan distribution of the Baurusuchidae, plus *souchus*, Greek for crocodile, leading to Latin, *suchus*.

Diagnosis: As for the type and only known species.

Type species: *Gondwanasuchus scabrosus*

Gondwanasuchus scabrosus sp. nov.