



New pterosaur fossils from the Early Cretaceous of Colombia

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ABSTRACT

The fossil record of pterosaurs in northwestern Gondwana has been relatively scarce, with only two previous occurrences. This study presents new pterosaur findings from three sites in Colombia, including a new record of an *Anhanguera*-like specimen and other bones referable to *Anhangueria*. The new material includes a distinctive partial lower jaw found in association with parts of a radius and a complete distal syncarpal. The lower jaw has a triangular glenoid fossa in dorsal view, a fossa depressoria with a bean-shaped outline, and a retroarticular process with a straight margin in lateral or medial views. The new fossils extend the record of *Anhanguera*-like pterosaurs into the earliest part of the Cretaceous and expand our knowledge of the vertebrate fossil record of lower latitudes.

1. Introduction

The fossil record of pterosaurs from northern South America is poorly sampled thus far, with just two occurrences, both from Early Cretaceous-aged horizons. The first, from the Aptian Apón Formation of Venezuela, is a nearly complete, isolated scapulocoracoid whose size and proportions match those of anhanguerids (Kellner and Moody, 2003). The second, from the Valanginian Rosa Blanca Formation of Colombia, includes a partial radius with ctenochasmatoïd or azhdarchoid affinities and a lower jaw resembling ornithocheiroids (Cadena et al., 2020). However, the incompleteness of these remains precludes further systematic analysis, leaving unresolved the affinities of the pterosaurs from this region.

Here, we describe new and better-preserved pterosaur remains from two localities in the Valanginian Rosa Blanca Formation of Zapatoca, Santander, Colombia (Fig. 1). Although these remains are insufficient to justify naming a new species, they support the hypothesis forwarded by Cadena et al. (2020) that the pterosaurs from this formation resemble *Anhanguera* (Campos and Kellner, 1985) from the Early Cretaceous of Brazil. Additionally, we expand the fossil record of pterosaurs in Colombia by reporting and describing the first Barremian record from the La Paja Formation in Villanueva, Santander (Fig. 1). These specimens contribute to the growing knowledge of pterosaurs from low

latitudes in the Americas.

2. Material and methods

2.1. Fossil preparation and study

Rock matrix was removed from some specimens using dental picks. One specimen required preparation from an air scribe and sulfamic acid (H₃NSO₃) at the Centro de Investigaciones Paleontológicas in Villa de Leyva, Colombia.

The fossils were measured using a caliper, and they were photographed and examined with a Nikon Eclipse SMZ1270 stereomicroscope at the laboratory of the Traditional and Molecular Neotropical Paleontology Group (PaleoNeo) at the Universidad del Rosario.

In order to infer growth patterns of some of the specimens, thin sections from long bone fragments were prepared at the Mineral Lab company, Bogotá, Colombia (see below, "Bone Histology"). The thin sections were studied and photographed using polarized-light and Blue Color Balancing Filter (DLF) on a Leica DM750P microscope at the PaleoNeo lab, Universidad del Rosario.

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