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COLORADIA BREVIS N. G. ET N. SP. (SAURISCHIA,
PROSAUROPODA), A PLATEOSAURID DINOSAUR
FROM THE LOS COLORADOS FORMATION,
UPPER TRIASSIC OF LA RIOJA, ARGENTINA¹

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INTRODUCTION

In October, 1971 remains of a medium-sized prosauropod, which is provisionally referred to the family Plateosauridae (*sensu* Galton and Cluver 1976), were found in the upper third of the Los Colorados Formation.

The discovery was made in somewhat lower beds than those of the upper part so abundant in melanosaurid prosauropods (Bonaparte 1971), in the course of a paleontological excursion organized from the Fundación Miguel Lillo, with the financial support of the Consejo Nacional de Investigaciones Científicas y Técnicas. Mssrs. Martín Vince, Juan C. Leal, Tomás H. Fasola, and the author participated.

Comparisons with this new species were made in the British Museum (N.H.), the Museum für Naturkunde in Berlin, the Staatliches Museum für Naturkunde in Stuttgart (Ludwigsburg), West Germany, and the Peabody Museum of Natural History of Yale

¹ Original citation: Bonaparte, J. F. 1978. *Coloradia brevis* n. g. et n. sp. (Saurischia - Prosauropoda), dinosaurio Plateosauridae de la Formación Los Colorados, Triásico Superior de La Rioja, Argentina. *Ameghiniana* 15(3-4):327-332. Translated by Matthew Carrano, SUNY at Stony Brook, September 1998.

University, U.S.A., institutions in which the necessary materials were kindly made available to me. The J. S. Guggenheim Foundation made it possible for the author to stay in these foreign centers, with the help of the Fundación Miguel Lillo and CONICET. My thanks to colleagues P. Galton and A. J. Charig for the useful exchange of ideas held regarding the specimen to be described shortly. The materials were patiently prepared by technician Mr. Martín Vince, Head of the Paleontology Workshop of the Fundación Miguel Lillo.

SYSTEMATICS AND DESCRIPTION

Order *SAURISCHIA*

Suborder *SAUROPODOMORPHA*

Infraorder *PROSAUROPODA*

Family *PLATEOSAURIDAE*

Genus **COLORADIA** n. g.

Type species: Coloradia brevis n. sp.

Distribution and age: Upper third of the Los Colorados Formation, upper Coloradan provincial age, referable to the highest part of the Upper Triassic; La Rioja, Argentina.

DIAGNOSIS

Antorbital region clearly shorter than in *Plateosaurus-Lufengosaurus*; with proportionally long frontals. Antorbital fenestra partially beneath the orbit; pronounced dorsal maxillary process. Orbit proportionally large, with sclerotic ring. Mandibular symphysis and posterior half of mandible shorter than in *Plateosaurus*. Cervical vertebrae low and long, bearing long, thin cervical ribs.

Coloradia brevis n. sp.

DIAGNOSIS

Same as for the genus.

Holotype: Specimen in the Vertebrate Paleontology Collection of the Fundación Miguel Lillo. PVL 3967 includes nearly the entire skull and mandible, somewhat distorted, articulated with the first 3 vertebrae; another 3 cervicals, 2 incomplete dorsals, and 3 caudals; a scapula, the coracoids, and a fragmentary humerus; portions of a radius and ulna; isolated carpal bones, an incomplete metacarpus and various manual phalanges; 1 complete astragalus and some pedal phalanges.

Horizon and locality: Upper third of the Los Colorados Formation, 180 meters below its top; La Esquina area, south of Pagancillo, Gral. Lavalle Dept., Prov. of La Rioja, Argentina.

DESCRIPTION

The skull of *Coloradia brevis* is relatively short, very tall and wide, with a large orbital cavity, and a jaw articulation below the line of the dentary crowns.

Lateral view (fig. 1): This region of the skull includes all the comprising bones, however they are somewhat displaced from their original positions. Nonetheless, it does not offer any difficulties to a reasonable reconstruction of this view.

The anterior region is low and pointed, achieving the highest point at the center of the orbit and decreasing towards the supraoccipital region. The premaxilla is relatively weak, with three or perhaps four alveoli. The large external naris is extended externally by half of a depression that is spread out for the maxilla and premaxilla.

The maxilla is preserved only on the left side. It participates in the border of the external naris for a brief portion. The dorsal process is large, with an extension connected to the nasal. It is possible that this process is united with the nasal in its posterior part, as indicated in fig. 1. The inferior border of the maxilla is relatively straight, with a flat lateral surface. The number of maxillary teeth is 23 or 24, the most posterior reaching the middle of the orbit. The lacrimal is inclined, with the dorsal region near the front, united to the prefrontal as in *Plateosaurus*, and the ventral region strongly connected to the jugal. The lateral face of the lacrimal is narrow, with angular edges in front and back.

The region of the lower temporal fenestra is very similar to that of *Plateosaurus*, with the difference that it is proportionally smaller in *Coloradia*, with the squamosal more reduced. The quadrate is long, projecting considerably more ventrally than the quadratojugal. The mandible is lower than in *Plateosaurus*, both in the symphyseal region and in the posterior half.

Dorsal view (fig. 2): The dorsal region of the skull of *Coloradia brevis* is characterized by axially short nasals and long frontals, or the inverse of the proportions shown by these bones in *Plateosaurus*.

The parietals are axially short, forming a blunt parietal crest. They have slightly extended posterolateral processes, with the ends much wider than those of the squamosals. The lateral expansions of the parietals contact the postorbitals.

The upper temporal fenestrae are rounded, with the lateral edges (squamosal and postorbital) in a lower plane than that of the parietals.

The occipital region is well enough exposed in dorsal view thanks to the forward inclination of the dorsal region, a character that clearly differentiates it from *Plateosaurus*. It has a wide unossified region between the supraoccipital and parietals. In this view, the opisthotics project backwards, considerably less than in *Plateosaurus quenstedti*, Huene 1956, fig. 254.

Lateral view of the braincase (fig. 3): From the left side, this region of the skull is very well preserved. The basisphenoids have two very clear facets, or basipterygoid processes, for articulation with the pterygoids. Ventrally it shows a marked axial depression that terminates in the cultriform process of the parasphenoid. The anterodorsal extension of the basisphenoids towards the prootic, and the posterodorsal extension (later forming the basisphenoid tubera) towards the basioccipital, which there has the basioccipital tubera. The prootic has a wide foramen for nerve V, and another in a more posterior position for VII on the side of the fenestra ovalis. Anterodorsally the laterosphenoids participate in delimiting the foramen for nerve V, and dorsally contact the anterolateral process of the supraoccipital.

AFFINITIES OF *COLORADIA BREVIS*

There are clear affinities of this new genus and species with the genera *Plateosaurus*, *Lufengosaurus*, and *Yunnanosaurus*, this last very probably synonymous with *Lufengosaurus* (*fide* Galton and Cluver 1976). On the other hand, the affinities between *Plateosaurus* and *Lufengosaurus* (Young 1951) are so evident that their generic separation is debatable.

The principle difference between *Coloradia* and *Plateosaurus-Lufengosaurus* consists of the long proportions of the snout, which is considerably shorter in *Coloradia*, and the considerably more forward position of the antorbital fenestra relative to those in the Old World genera. Associated with this condition in *Coloradia* are the shorter nasals and, curiously, the longer frontals than *Plateosaurus*. Other important differences include

the more dorsally projected position of the occipital region in the Argentine genus, and the posterior half of the lower jaw, including the mandibular symphysis.

The alternative, that *Coloradia brevis* belongs to the family Melanorosauridae, which are more frequently discovered in somewhat higher beds than those that produced this genus, is also possible, although the associated cervical vertebrae are characteristically fairly lower and more elongated than in the melanorosaurid *Riojasaurus*. Certainly this difference in cervical vertebrae does not exclude the possibility that *Coloradia brevis* is a melanorosaurid, but for now it is not possible to resolve this in particular since no skull from a typical melanorosaurid is known. Finally, the morphological affinities of the skull described with that of Plateosauridae are so marked that its assignment to this family results naturally from this comparison.

THE FAMILY PLATEOSAURIDAE

This saurischian family was proposed by Marsh (1895) and characterized by Galton and Cluver (1976) in the following manner: forms larger than Anchisauridae, with massively constructed skull; posterior half of the mandible tall, with the articulation below the tooth row; wide-type manus and pes.

These authors included in this family the genera *Plateosaurus*, *Lufengosaurus*, *Ammosaurus*, *Massospondylus*, and probably *Aristosaurus*, all from the upper part of the Upper Triassic. In other words, it is a family of Prosauropoda with a wide geographic distribution, because it has been documented throughout the world except, currently, Australia and Antarctica.

Lamentably, skull remains have been published only for the genera *Plateosaurus* and *Lufengosaurus*, which makes comparisons of *Coloradia* with the remaining plateosaurid genera difficult or impossible, except *Massospondylus* sp. It is possible to compare two unpublished skulls of this genus generously made available by Dr. John Attridge of Birbeck College, University of London, and found in South Africa (South African museum). The differences with *Coloradia* are apparent in the size of the antorbital fossa, the dorsal projection of the occiput, the shorter basiptyergoid processes in *Coloradia*, and differences in the morphology and number of teeth: 23 maxillary and 3 premaxillary in *Coloradia*, and 14 maxillary and 4 premaxillary in *Massospondylus* sp., specimen No. K1314 from the South African Museum. Currently, it is not possible to determine what type of relationship may have existed between *Coloradia* and *Ammosaurus* of North America, or with *Aristosaurus* of South Africa, since we have no knowledge of the skull materials of these genera.

The family Plateosauridae, following Galton and Cluver (1976), includes the following genera (to which is added the one described here):

Plateosauridae Marsh 1895

Plateosaurus Meyer 1837 - Europe-South America

Ammosaurus Marsh 1891 - North America

Massospondylus Owen 1854 - South Africa

Lufengosaurus Young 1941 - East Asia

Aristosaurus Hoepen 1920 - South Africa

Coloradia n. g. - South America

Galton and Cluver (*op. cit.*: 154) indicated the possibility that different prosauropod families occupied more or less distinct habitats: "it is interesting that skeletal remains of melanorosaurids occur in the lowermost levels (Passage Beds, Charig *et al.* 1965; basal Red Beds, Haughton 1924), most plateosaurid skeletons occur higher in the Red Beds, and those of anchisaurids are found in the overlying Cave Sandstone (Charig *et al.* 1965; Haughton 1924; Haughton & Brink 1956)...". Nonetheless, in Argentina we have representatives of *Coloradia* (Plateosauridae) and *Riojasaurus* (Melanorosauridae) in the upper third of the Los Colorados Formation, which is a homogenous sequence of limestones and red sands (more probably corresponding to an inundated plain), information that does not satisfactorily coincide with that expressed by the previous authors.

Besides, *Plateosaurus* sp. (Casamiquela 1964), with complete skull and skeletal remains from the El Tranquillo Formation, was found in fine green and purple limestones that indicate more reduced sedimentary environments than those of the Los Colorados Formation. In other words, plateosaurids are recorded in distinct sedimentary environments in Argentina, from uplands to lowlands (in English paleontological jargon). Because of this, I believe that the ideas of Galton and Cluver, apparently that the different prosauropod families occupied more or less distinct habitats, is not confirmed by the evidence available in South America. Rather, this indicates that plateosaurids occupied variable habitats, including oxidizing (Red Beds of Africa, Los Colorados of Argentina) as well as reducing (El Tranquillo of Argentina) sedimentary environments.

Melanorosaurids probably had comparable qualities, because in South Africa the so-called Passage Beds (base of the Red Beds) represent distinct sedimentary environments from those in the upper part of the Los Colorados Formation of Argentina.

FIGURE CAPTIONS

Fig. 1. *Coloradia brevis* n. g. et n. sp. Lateral view of the skull and mandible. Many teeth of the maxilla and dentary are not illustrated because they are lacking. Dashed lines indicate inferred sutures, or parts of bones missing as with the various segments of the sclerotic ring. Abbreviations for different bones are those typically used.

Fig. 2. *Coloradia brevis* n. g. et n. sp. Dorsal view of the skull. Cross-hatching indicates orbital and temporal fenestrae, as well as the unossified zones surrounding the supraoccipital. Abbrev.: CAR ART OP, articular surface for the opisthotic; LSP, laterosphenoids; the remaining are as used previously.

Fig. 3. *Coloradia brevis* n. g. et n. sp. Lateral and somewhat ventral view of the braincase. The fine dots indicate sections of bone; the cross-hatching indicates foramina. Abbreviations: FO, fenestra ovalis; CREST OCC, occipital crest; PTF, posttemporal foramen; SOC, supraoccipital (lateral process); V, VII, etc., exit for the fifth, seventh, etc. cranial nerve.