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SUPPLEMENTARY ONLINE MATERIAL FOR

**A new rebbachisaurid sauropod from the Aptian–Albian,
Lower Cretaceous Rayoso Formation, Neuquén, Argentina**

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Supplementary Online Material

1. List of modification included in the data matrix
2. Complete trees recovered in the analysis
3. Data matrix in tnt format

1. LIST OF MODIFICATION INCLUDED IN THE DATA MATRIX

ADDED CHARACTERS

406. Postorbital, excluded from the infratemporal fenestra due to the articulation of the jugal with the squamosal: absent (0); present (1). (New)
407. Squamosal, ventral shape: thin (0); broad (1). (New)
408. Preantorbital fenestra development: small, differentiated from the posterior maxillary foramen in its direction (see Wilson and Sereno, 1998) (0); laterally opened middle sized fenestra (1); laterally opened large fenestra (2). (New character, resulted from the modification of character 9)
409. Mid- and posterior dorsal neural arches, centroprezygapophyseal fossa depth: shallow or absent (0); deep, passing nearly all the way through the neural arch. (Wilson and Allain, 2015: ch. 101)
410. Mid- Posterior dorsal vertebrae, parapophysis, position with respect to prezygapophyses: at the same level or below (0); well above (1). (Wilson and Allain, 2015: ch. 100)
411. Posterior dorsal neural arches, centroprezygapophyseal lamina (CPRL), shape: single (0); divided (1). (Wilson and Allain, 2015: ch. 107)
412. Posterior dorsal neural arches, spinoparapophyseal lamina (SPPL): absent (0); present (1). (Wilson and Allain, 2015: ch. 109)
413. Middle caudal vertebrae, prezygapophyses orientation: anterodorsally oriented (around 45 degrees) (0); anteriorly oriented (nearly horizontal) (1). (New)

MODIFIED CHARACTERS

363. Tibial proximal condyle, shape: narrow, anteroposterior axis less than 50% of the lateromedial axis (0); narrow, anteroposterior axis between 60 and 70% the

lateromedial axis (1); expanded transversely, anteroposterior and lateromedial axis subequals (2)

One state was added in order to include the much lateromedial compressed proximal tibial condyle of rebbachisaurids (i.e., *Zapalasauros*, *Limaysaurus*, *Comahuesaurus*, and, *Lacovatia*).

List of changes introduced based on the new character states.

Taxon	Previous score	New score
<i>Mamenchisaurus</i>	1	0
<i>Shunosaurus</i>	1	0
<i>Zapalasauros</i>	?	2
<i>Comahuesaurus</i>	?	2
<i>Lacovatia</i>	?	2
<i>Limaysaurus</i>	?	2

ADDED TAXA

Taxa	Reference
<i>Katepensaurus</i>	Ibiricu et al., 2013; Ibiricu et al., 2015
<i>Tataouinea</i>	Fanti et al., 2013; Fanti et al., 2015

MODIFIED CHARACTERS

237. Anterior caudal neural spines, transverse breadth: (0) approximately 50% of ; (1) square (length and width are similars); (2) laterally expanded, being around 1.5 times wider tha long; (3) + **shaped** (new state was added)

MODIFIED SCORES

Amazonsaurus

Character	Previous score	New score
244	0	1

Zapalasaurus

Character	Previous score	New score
236	0	1

Comahuesaurus

Character	Previous score	New score
117	?	0
172	?	0
236	0	?

Limaysaurus

Character	Previous score	New score
28	0	?
45	2	?
50	0	-

130	?	0
236	0	1
245	1	0

Cathartesaura

Character	Previous score	New score
130	?	0
147	?	0
231	?	4
244	?	1
246	?	1
256	1	0

Demandasaurus

Character	Previous score	New score
236	0	1
245	1	0

Nigersaurus

Character	Previous score	New score
10	0	1
92	1	0
236	?	0
244	0	1
245	1	0

303	1	0
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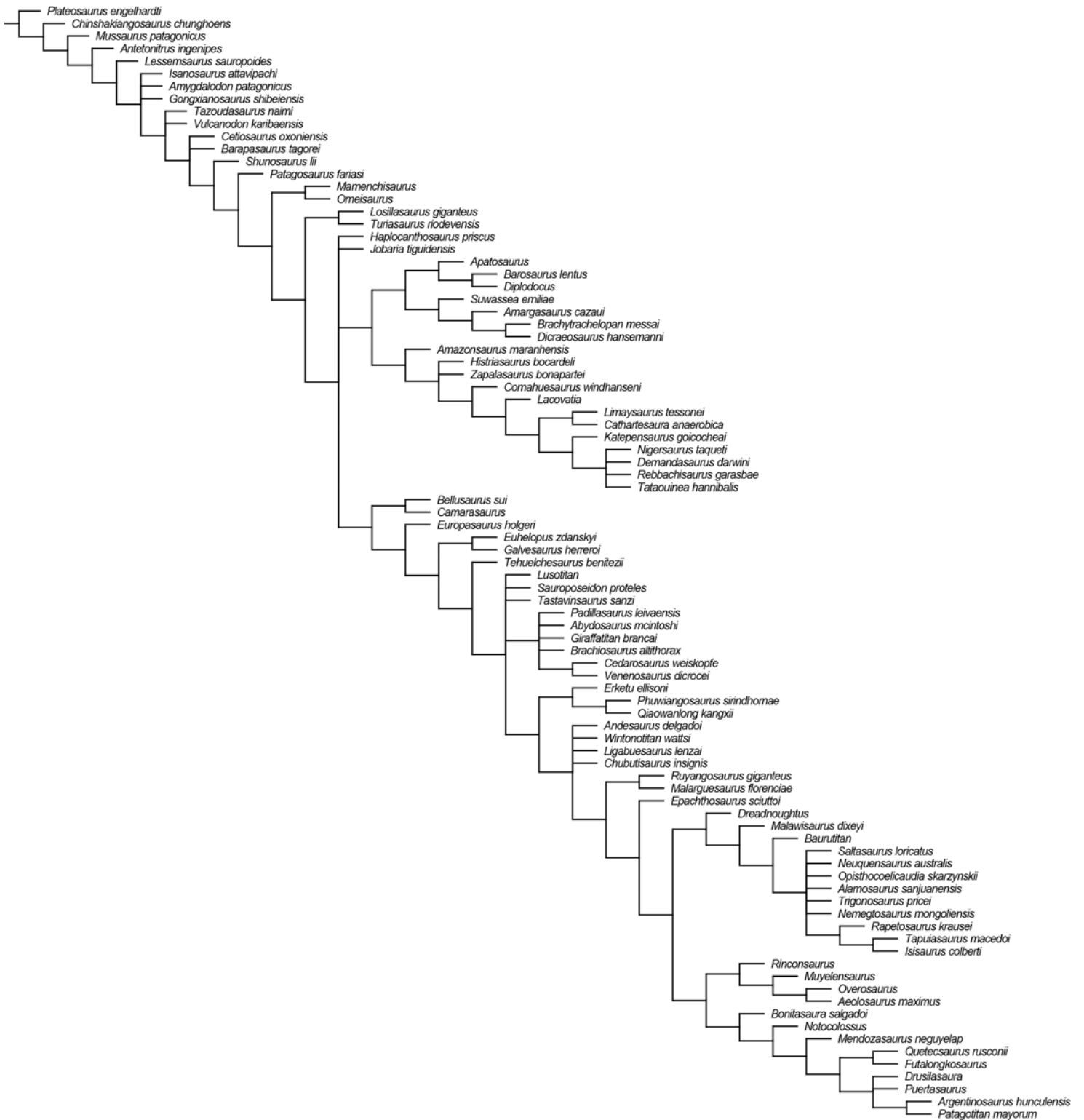
Rebbachisaurus

Character	Previous score	New score
107	0	?
108	3	?
116	1	?
117	0	?
147	0	?
159	?	1
161	?	1
170	?	1
171	?	2
172	?	1
173	?	0
174	?	1
175	?	2
177	?	2
182	0	1
191	0	1
217	1	?
235	?	0
237	?	3
243	?	1
244	?	1

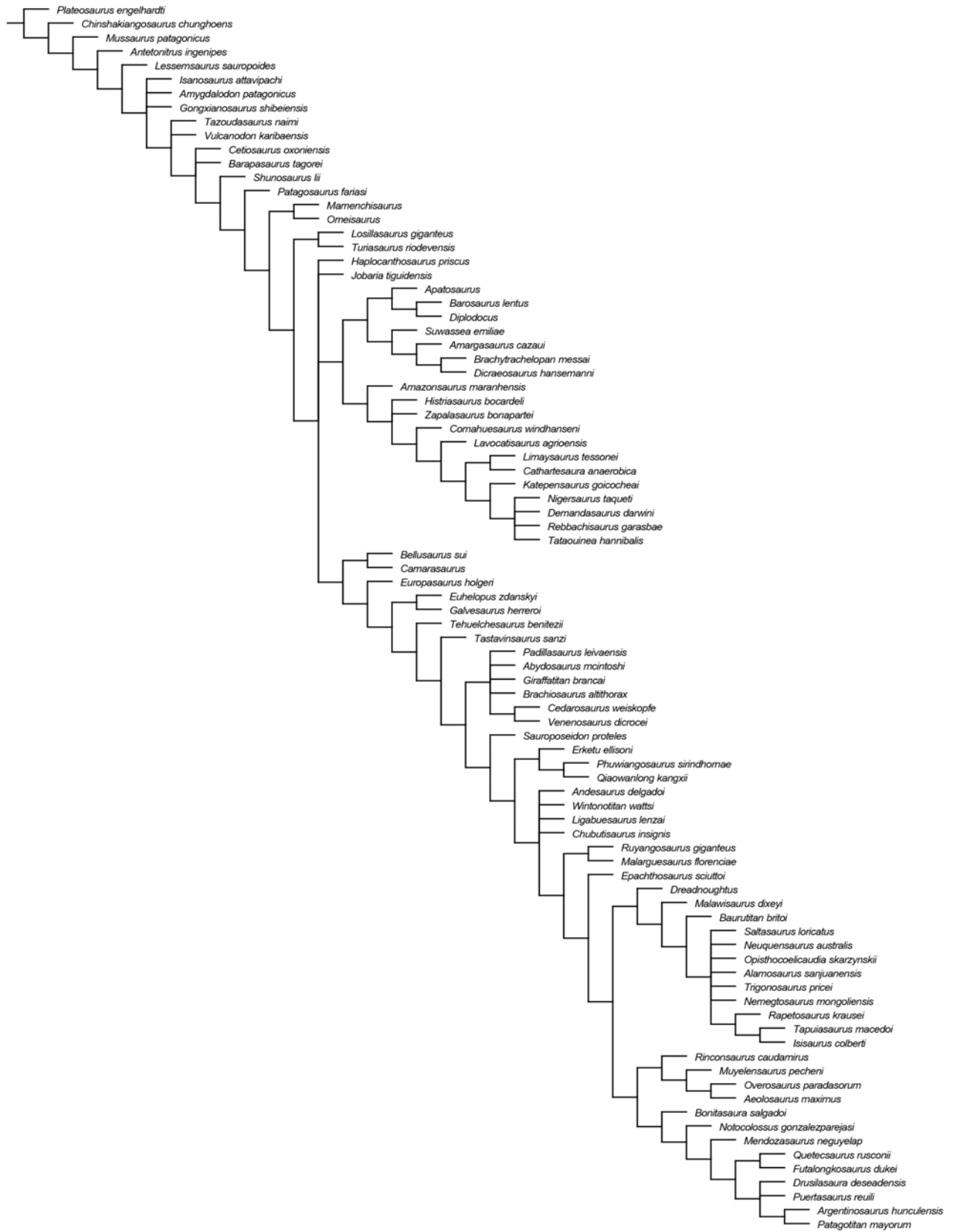
245	?	0
246	?	1
248	?	0
249	?	0
298	?	0
301	?	1
302	?	0
303	?	0
304	?	0
306	0	0/2
307	?	0
338	?	1
339	?	0
340	?	0
341	?	0
342	?	0

2. COMPLETE TREES RECOVERED IN THE ANALYSIS

Reduced strict consensus tree after pruning *Rayososaurus*



Strict consensus tree removing *Rayososaurus* and *Lusotitan* prior to the analysis



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'Isanosaurus_attavipachi'
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'Vulcanodon_karibaensis'
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??011?000?0001010?1??0?00000
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01000?10000011011?0001010000000??000001001??20000011011000001
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??011101[0 1]0-11[0 1]?000020000010-0001001000000000000001001000-0-
--0?000?02001?00---
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00100000??00000?0?11100110000101?1000?0?10?0011111001110??111?1111
1001000?00000
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Omeisaurus

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Mamenchisaurus 1110001?0-

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'Turiasaurus_riodevensis'

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'Losillasaurus_giganteus'

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'Haplocanthosaurus_priscus'

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'Abydosaurus_mcintoshi'

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'Padillasaurus_leivaensis'

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'Venenosaurus_dicrocei'

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'Wintonotitan_wattsi'

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'Malarguesaurus_florenaciae'

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'Andesaurus_delgadoi'

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'Malawisaurus_dixeyi'

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11??1?????????????????00?001110??01?1011002110001?0??1??111?????1??????
??00111110010?????1210?????????1111010????????????????????????
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'Isisaurus_colberti'

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'Nemegtosaurus_mongoliensis' 00200??11-0?12?10[0 1]?01[0
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??0011??01?12?101000321010121?0????????????????????????????????????
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'Rapetosaurus_krausei'
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?1?????110011?????1??2?2?????????????1?
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??1101301
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2]12000020?000?11121110111?0?1221????????????????????001????????????
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'Alamosaurus_sanjuanensis'
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111011110122??00001

'Neuquensaurus_australis'
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111?11110110001?1110110010212101110111111011110111011111100111101
111011110122??00001

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'Bonitasaura_salgadoi'

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?1110?????????0??2?1????????????000110110010101212???1001?1011?010?1?
0??1??101??1111101111????1????????00001

'Patagotitan_mayorum'

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'Argentinosaurus_hunculensis'

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'Amazonsaurus_maranhensis'

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'Zapalasaurus_bonapartei'

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'Histriasaurus_bocardeli'

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'Comahuesaurus_windhanseni'

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'Barosaurus_lentus'

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