**Supplementary Information**

**A reassessment of the osteology and phylogenetic relationships of the enigmatic, large-headed reptile *Sphodrosaurus pennsylvanicus* (Late Triassic, Pennsylvania, USA) indicates archosauriform affinities**

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**Additional institutional abbreviations (not mentioned in the main text)**

**AMNH**, American Museum of Natural History, New York, USA; **CRILAR-Pv**, Centro Regional de Investigaciones y Transferencia Tecnológica de La Rioja, Paleontología de Vertebrados, Anillaco, Argentina; **DMNH**, Denver Museum of Natural History, Denver, USA; **GPIT**, Paläontologische Sammlung der Universität Tübingen, Tübingen, Germany; **MACN-Pv**, Museo Argentino de Ciencias Naturales ‘Bernardino Rivadavia’, Colección Nacional de Paleovertebrados, Buenos Aires, Argentina; **MCN**, Museu de Ciências Naturais, Secretaria Estadual do Meio Ambiente e Infraestrutura, Porto Alegre, Brazil; **MHI**, Muschelkalkmuseum, Ingelfingen, Germany; **MNHN**, Muséum national d'Histoire naturelle, Paris, France; **NMS**, National Museums Scotland, Edinburgh, UK; **NMT**, National Museum of Tanzania, Dar es Salaam, Tanzania; **PEFO**, Petrified Forest National Park, Arizona, USA; **PIMUZ**, Paläontologisches Institut und Museum der Universität Zürich, Zurich, Switzerland; **QG**, Zimbabwe Natural History Museum, Bulawayo, Zimbabwe; **SHYMS**, Shropshire Museum, Lodlow, UK; **TTU**, Texas Tech University Museum, Lubbock, USA; **UFRGS**, Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil; **UNIPAMPA**, Universidade Federal do Pampa, São Gabriel, Brazil; **USNM**, National Museum of Natural History (formerly United States National Museum), Smithsonian Institution, Washington, D.C., USA; **ZPAL**, Institute of Paleobiology of the Polish Academy of Sciences, Warsaw, Poland.

**Modifications of the data matrix based on previous papers**

**Cavicchini *et al.* (2020)**

*Feralisaurus corami* was added based on their scorings on the matrix of Scheyer *et al.* (2020) and scoring of characters included after Scheyer *et al.* (2020).

**Foffa *et al.* (2020)**

The modifications in the scorings of *Erpetosuchus granti* (NHMUK PV R3139, NMS G.1992.37.1) were followed with the following exceptions:

Character 8: there is a latex cast of NHMUK PV R3139 that clearly shows the presence of a median sagittal crest in the temporal region. Thus, the original scoring was not modified.

Character 44 (wrongly reported as 42 in Foffa *et al.* 2020): this character is scored only for mature individuals. We do not know the ontogenetic stage of available specimens of *Erpetosuchus granti*. Thus, the original scoring was not modified.

Character 55: the boundary between states (0) and (1) was modified in a more recent version of the data matrix. Thus, it was not necessary to modify the original scoring.

Character 321: this character was modified in a more recent version of the data matrix and the condition described by Foffa *et al.* (2020) does not require a modification in the original scoring.

Character 436: this character refers to the ulna excluding the olecranon process. Thus, the scoring of this character was modified from (?) to (1), and not (0), based on the information of Foffa *et al.* (2020).

Character 661: the most posterior dorsal vertebrae of NMS G.1992.37.1 are not preserved. Thus, the original scoring was not modified.

The modifications in the scorings of *Erpetosuchus* sp. (AMNH 29300) were followed with the following exceptions:

Character 15: the presence/absence of a second antorbital fenestra cannot be determined based on the new information. The original scoring was not modified.

Character 203: the ectopterygoid body arcs anteriorly. The original scoring was changed from (?) to (0).

**Maidment *et al.* (2020)**

393. Scapula, lateral tuber on the posterior edge, just dorsal of the glenoid fossa: (0) absent; (1) present (Nesbitt 2011: 219; Pritchard *et al.* 2015: 146; Ezcurra 2016: 393). The second state was deleted.

Changes in scorings of *Chalishevia cothurnata* and *Garjainia prima*.

**Pinheiro *et al.* (2020)**

-The scorings of *Teyujagua paradoxa* were updated based on the description of this paper and scorings in the matrix modified from Butler *et al.* (2019a).

**Scheyer *et al.* (2020)**

-All the modified scorings and characters, and the new characters of Scheyer *et al.* (2020) were included (characters 826–839 in this matrix), with exception of their characters 701 and 707 because they were already included in the iteration of Ezcurra *et al.* (2020a) of this data matrix.

**Trotteyn & Ezcurra (2020)**

-All the modified scorings and the two new characters (824 and 825 in this matrix) of Trotteyn & Ezcurra (2020) were included.

**Wynd *et al.* (2019)**

-The scorings of *Rugarhynchus sixmilensis* has been added and more recently added characters were scored. However, the new character was not added because it is considered not independent of the absence of an infratemporal fenestra and the following scoring changes were not followed:

Character 5: changes in *Doswellia kaltenbachi*, *Jaxtasuchus salomoi*, *Pseudochampsa ischigualastensis*, and *Chanaresuchus bonapartei* were not followed because these taxa possess prominent tubercles or ridges on the external surface of the nasal and skull roof.

Character 17: the orbital rim of *Proterochampsa barrionuevoi* is not elevated on the jugal.

Character 34: *Proterochampsa barrionuevoi* has a prenarial process (PVL 3434).

Character 41: the presence of a palatal process in the premaxilla cannot be determined clearly in available specimens of *Proterochampsa barrionuevoi*.

Character 44: it is preferred to not score this character for the holotype and only known specimen of *Pseudochampsa ischigualastensis* until information of its ontogenetic stage is available.

Character 61: the contact between maxilla and prefrontal is present in *Proterochampsa barrionuevoi* (PVL 3434), *Chanaresuchus bonapartei* (PULR 07), and *Pseudochampsa ischigualastensis* (PVSJ 567).

Characters 66 and 67: the maxillae of *Proterochampsa barrionuevoi* and *Chanaresuchus bonapartei* have a strongly developed palatal process (CRILAR-Pv 579; PULR 07)

Character 69: the condition in *Proterochampsa barrionuevoi* cannot be determined in available specimens and it is present in *Chanaresuchus bonapartei*.

Character 71: the maxillary tooth row does not reach posteriorly the level of the anterior border of the orbit in *Proterochampsa barrionuevoi*.

Character 86: the lacrimal is not exposed on the skull roof in *Proterochampsa barrionuevoi* and *Chanaresuchus bonapartei*. The strongly dorsoventrally crushed skull of the holotype and only known specimen of *Pseudochampsa ischigualastensis* does not allow to score this character confidently.

Character 87: the maxilla forms a substantial border of the dorsal margin of the antorbital fenestra in *Chanaresuchus bonapartei*.

Character 97: the tubercles present on the jugal of *Proterochampsa barrionuevoi* are not considered homologous to the ridge present in other proterochampsids.

Character 113: the nasals enter into a slot in the frontal but do not form an angle of 60º in *Chanaresuchus bonapartei*.

Character 127: it was kept as originally scored in *Doswellia kaltenbachi* because the postorbital and squamosal contact only dorsally on the lateral face of the skull.

Character 128: *Chanaresuchus bonapartei* has a flange extending over the posterodorsal corner of the orbit, but this flange is not considered homologous to the centrally positioned boss on the main body of the postorbital that it is present in some other archosauriforms.

**Ezcurra *et al.* (2021c)**

The scorings of the new species *Bharitalasuchus tapani* and six new characters (characters 840–845 in this matrix) were added to the matrix. The modification of character 503, as well as the scoring changes, were followed.

**Ezcurra *et al.* (2021b)**

The modification of character 464 and its respective scoring changes were followed here.

**Nesbitt *et al.* (2021)**

*Malerisaurus langstoni* and *Malerisaurus robinsonae* were added based on personal observations and the scorings of Nesbitt *et al.* (2021). Their characters 338 and 339 were added to the character list (characters 848 and 849 in this data matrix), but the formulation of the latter character was slightly modified here.

**Sues *et al.* (2021)**

All the scorings modified were followed. The modification of character 660 was followed. Their characters 714 and 715 were added (character 846 and 847 in this matrix), and character 716 was integrated with character 803, thus adding a state to the latter. The other characters added by Sues *et al.* (2021) to their previous iteration of the data matrix were already included in Ezcurra *et al.* (2020a).

**Modified characters**

Character 2: Skull, total length versus length of the presacral vertebral column: (0) <0.15; (1) 0.18-0.38; (2) 0.44-0.72; (3) 0.94-0.98. ORDERED. The first state was added here to describe the condition in post-Carnian sauropodomorphs.

Character 9 has been deactivated because it is not independent to character 34.

14. Antorbital fenestra, anterior margin in lateral view: (0) gently rounded; (1) nearly pointed. The formulation of the second state was modified to exclude a relationship with the angle formed between the ascending and posterior process of the maxilla.

16. Orbit, shape: (0) anteroposteriorly longer than tall; (1) approximately as anteroposteriorly long as tall; (2) dorsoventrally taller than long. The second state was modified to account for non-sub-circular obits.

34. Premaxilla, prenarial process (= nasal process): (0) absent; (1) developed as a very short, approximately as long as or shorter than its anteroposterior depth at base; (2) well-developed, less than the anteroposterior length of the main body of the premaxilla; (3) well-developed, greater than the anteroposterior length of the main body of the premaxilla (modified from Ezcurra, 2016: 34). ORDERED. The first and second states were added here.

55. Maxilla, anteroposterior length of the antorbital fossa anterior to the antorbital fenestra versus length of the antorbital fenestra: (0) 0.09-0.24; (1) 0.28-0.66; (2) 0.83-0.94; (3) >2.00. The upper boundary of the first state was expanded here.

60. Maxilla, width of ascending process in lateral view, excluding the area that articulates with the lacrimal: (0) tapers at some point of its length; (1) remains the same width along all its length or broadens. The wording of this character was modified, but it does not imply changes in scorings.

71. Maxilla, posterior extension in non-early juvenile individuals in lateral view: (0) at level or posterior to posterior orbital border; (1) anterior to posterior orbital border but posterior to anterior orbital border; (2) at level or anterior to anterior orbital border. The wording of this character was modified, but it does not imply changes in scorings.

78. Nasal, anterior margin at midline: (0) with an anteromedial process; (1) lacking an anteromedial process. The wording of this character was modified, but it does not imply changes in scorings.

80. Nasal, dorsal surface around posterior margin of external naris with a depression that lacks sculpturing: (0) absent; (1) present. The wording of this character was modified, but it does not imply changes in scorings.

93. Jugal, anterior process continuously dorsally curved: (0) absent, being straight or curved only at its proximal half; (1) present. The wording of this character was modified, but it does not imply changes in scorings.

112. Frontal, frontals fused to one another in non-early juvenile individuals: (0) absent; (1) present. The wording of the character was slightly modified here.

113. Frontal, suture with the nasal: (0) transverse; (1) oblique, forming an angle of at least 60° with long axis of the skull and frontal(s) entering between both nasals; (2) oblique, and nasal entering considerably between frontal(s). The wording of the third state was modified, but it does not imply changes in scorings.

151. Quadratojugal, shape: (0) L-shaped or strip-like bone; (1) subtriangular; (2) subcircular to suboval. The third state was added here.

159. Parietal, median contact between both parietals in non-early juvenile individuals: (0) suture present; (1) fused with loss of suture. The wording of the character was slightly modified here.

177. Quadrate, angle between the posterior margins of the dorsal and ventral ends: (0) 41-47º; (1) 60-96º; (2) 106-137º; (3) 143-158º. The lower value of the second character state was modified here.

225. Basioccipital-parasphenoid/parabasisphenoid, contact with each other in non-early juvenile individuals: (0) loose, overlapping suture; (1) tightly sutured, sometimes by an interdigitated suture, or both bones fused with each other. The wording of the character was slightly modified here.

240. Parasphenoid/parabasisphenoid, foramina for entrance of the cerebral branches of the internal carotid artery leading to the pituitary fossa: (0) ventral; (1) posterolateral; (2) anterolateral; (3) absent, internal carotids do not enter the braincase.

266. Dentary, minimum height of the bone (at or posterior to the third tooth position or excluding the downturned anterodorsal margin of the bone if present) versus length of the alveolar margin (including edentulous anterior end if present): (0) 0.05-0.14; (1) 0.16-0.19; (2) 0.22-0.29; (3) 0.32-0.36. The wording of the character was slightly modified here.

279. Dentary, number of tooth rows on occlusal surface of the bone (omitting lingual teeth if present): (0) one; (1) two; (2) more than two. The formulation of the character was slightly modified here, but it results in modifications of the scorings of rhynchosaur taxa.

287. Surangular, dorsal margin in lateral view: (0) straight, sigmoid or gently convex or concave; (1) strongly convex. The wording of the first state was slightly modified here.

315. Cervical and dorsal vertebrae, anterior centrodiapophyseal lamina or paradiapophyseal lamina in posterior cervical vertebrae, anterior dorsal vertebrae, and sometimes middle dorsal vertebrae: (0) absent; (1) present. The formulation of this character was slightly modified here.

319. Cervical and dorsal vertebrae, thick, mainly vertical tuberosity immediately below the transverse process, but both structures are not connected with each other, in posterior cervical vertebrae, anterior dorsal vertebrae, and sometimes middle dorsal vertebrae: (0) absent; (1) present. The formulation of this character was slightly modified here.

320. Cervical and dorsal vertebrae, gradual transverse expansion of the distal half of the neural spine in the fifth cervical vertebra to middle dorsal vertebrae: (0) absent; (1) present, but lacking distinct mammillary processes on the lateral surface of the neural spine; (2) present, with distinct mammillary processes on the lateral surface of the neural spine. The formulation of this character was slightly modified to specify the region of the vertebral series.

321. Cervical vertebrae, distally restricted transverse expansion of the postaxial neural spines (not mammillary process): (0) absent; (1) present. The formulation of the character was modified here (‘spine table’ was changed to ‘distally restricted transverse expansion’).

322. Cervical and dorsal vertebrae, distal surface of distally restricted transverse expansion of the cervical and anterior to middle dorsal postaxial neural spines (not mammillary process): (0) strongly convex; (1) flat; (2) concave. The formulation of this character was modified here and now it is not applicable if character 321 and 844 have state (0).

323. Cervical and dorsal vertebrae, outline of distally restricted transverse expansion of the postaxial neural spines (not mammillary process) in dorsal view: (0) sub-oval or sub-rectangular; (1) sub-triangular or heart-shaped. The formulation of this character was slightly modified here and it is non-applicable if character 321 and 845 have state (0)

324. Cervical vertebrae, number of vertebrae in the neck: (0) six or less; (1) seven; (2) eight or nine; (3) ten or more. ORDERED. The first state was added here.

326. Cervical vertebrae, centrum of atlas in non-early juvenile individuals: (0) separate from axial intercentrum; (1) fused to axial intercentrum. The wording of the character was slightly modified here.

342. Cervical vertebrae, maximum height of neural spine versus height of the posterior articular surface of centrum in the third to fifth cervical vertebrae: (0) <0.38; (1) 0.42-0.81; (2) 0.85-1.10; (3) 1.17-1.36; (4) 1.40-1.68; (5) 1.74-1.90; (6) >2.0-<3.0; (7) >3.0. ORDERED. The formulation of this character was modified because the previous height versus length ratio of the neural spine was not completely independent from the overall elongation of the vertebrae (character 331). In addition, states were changed to ratios.

353. Dorsal vertebrae, ventral surface of middle and posterior centra: (0) transversely convex; (1) ridged, with slightly swollen sides; (2) at least some with a single keel; (3) double keel. The third state was slightly modified here.

356. Dorsal vertebrae, parapophysis in anterior and middle dorsal vertebrae: (0) close to the body of the midline; (1) at least some vertebrae with parapophyses expanded on stalks; (-) parapophysis and diapophysis merged into a synapophysis in anterior and middle dorsal vertebrae. The formulation of the character and second state were slightly modified here.

359. Dorsal vertebrae, hyposphene-hypantrum accessory intervertebral articulation in posterior and sometimes anterior and middle dorsal vertebrae: (0) absent; (1) present. The formulation of this character was slightly modified here.

368. Dorsal ribs, proximal end: (0) dichocephalous in both anterior and middle dorsal elements; (1) holocephalous in at least one middle dorsal element; (2) holocephalous in all anterior and middle dorsal elements (modified from Ezcurra 2016: 368 and Pritchard & Sues 2019: 191) ORDERED. The formulation of the character was slightly modified and the third state was added here.

375. Sacral and caudal vertebrae, transverse processes and ribs of sacral and/or anterior caudal vertebrae in non-early juvenile individuals: (0) sutured to the vertebra; (1) fused to the vertebra. The wording of the character was slightly modified here.

379. Caudal vertebrae, neural spine height versus anteroposterior length at its base in anterior caudal vertebrae: (0) <2.21; (1) 2.36-2.65; (2) 2.92-3.05; (3) 3.21-3.54. The lower value of the first state was expanded here.

384. Scapula-coracoid, both bones fused with each other in non-early juvenile individuals: (0) present, without a complete line of suture; (1) absent. The wording of the character was slightly modified here.

387. Scapula, total length of the scapula versus minimum anteroposterior width of the scapular blade: (0) 1.23-6.73; (1) 7.92-11.31; (2) >12.0. ORDERED. The lower range of the first state was expanded here and the ratio of the third character state was modified here to include the condition of, for example, *Sacisaurus agudoensis*.

403. Coracoid, postglenoid process shape: (0) rounded posterior margin in lateral view; (1) tapering posterior margin in lateral view; (-) postglenoid process proximodistally expanded. The inapplicable condition was added here.

410. Interclavicle, transverse width at mid-length of the posterior process versus the length of the posterior process: (0) ≤0.14; (1) 0.20-0.27. The lower range of the first state was expanded here.

411. Interclavicle, posterior ramus: (0) little change along the anterior half of the ramus and posteriorly it may taper; (1) gradual transverse expansion present; (2) strongly tapering, without subparallel lateral margins on the anterior half of the ramus. The third state was added here.

416. Humerus, transverse width of the proximal end versus total length of the bone in non-early juvenile individuals: (0) 0.10-0.41; (1) 0.44-0.70. The lower range of the first character state was modified here. The wording of the character was slightly modified here.

424. Humerus, length of the deltopectoral crest versus total length of the bone in non-early juvenile individuals: (0) 0.16-0.18; (1) 0.24-0.49; (2) 0.52-0.55. The wording of the character was slightly modified here.

425. Humerus, medial development of the entepicondyle: (0) moderately large, being poorly projected from the level of the shaft; (1) strongly developed, distinctly offset from the shaft but forming an angle >45° with respect to the longitudinal axis of the shaft; (2) strongly developed, distinctly offset from the shaft and forming an angle <45° with respect to the longitudinal axis of the shaft. ORDERED.

432. Ulna, olecranon process as a separate ossification in non-early juvenile individuals: (0) absent; (1) present. The wording of the character was slightly modified here.

435. Radius, total length versus total length of the humerus: (0) 0.55-0.66; (1) 0.69-0.92; (2) 0.95-0.97; (3) 1.12-1.28; (4) =>1.33. The lower boundary of the first state was modified here.

457. Pelvic girdle, acetabular antitrochanter on the ilium: (0) absent, acetabular surface not distinctly rimmed posteriorly; (1) present, acetabular surface well defined posteriorly by a posteriorly concave and elevated ridge. The wording of the characters and states were reworded here, but without implying scoring modifications.

474. Pubis, tuberosity for the attachment of the ambiens muscle in non-early juvenile individuals: (0) prominent; (1) incipient or absent. The wording of the character was slightly modified here.

506. Femur, process for the attachment of the caudifemoralis musculature in medial or lateral view: (0) distal end forming a low-angle slope to the shaft; (1) distal end forming a steep angle, close to 90°, to the shaft. The formulation of the character states was slightly modified here, but without implying scoring modifications.

520. Tibia, lateral surface of the proximal half: (0) smooth; (1) with a longitudinal scar or low, mound-like ridge; (2) with a longitudinal, tall and flange-like crest (= fibular crest). ORDERED. The second state was added here.

574. Metatarsus, length of metatarsal IV versus length of metatarsal III: (0) 0.70-1.00; (1) 1.04-1.08; (2) 1.11-1.28; (3) 1.31-1.34. The lower boundary of the first state has been modified here.

579. Metatarsus, metatarsal V lateral plantar tubercle in non-early juvenile individuals: (0) absent; (1) present. The wording of the character was slightly modified here.

580. Metatarsus, metatarsal V medial plantar tubercle in non-early juvenile individuals: (0) absent; (1) present. The wording of the character was slightly modified here.

663. Sacral vertebrae, centra in non-early juvenile individuals: (0) all separate; (1) co-ossified at the ventral edge between at least two vertebrae. The wording of the character and states were modified here.

705. Maxilla, shape of anterior process (= premaxillary process) in lateral or medial view: (0) sub-triangular, shorter and considerably dorsoventrally higher than the posterior process; (1) continuously tapering, ending in a pointed end, and as low and long as the posterior process; (2) trapezoidal, with an extensive diagonal suture with the premaxilla, and approximately as low as the posterior process; (3) sub-rectangular, similar to or longer than the length posterior process. The fourth state was added here.

761. Teeth, dentary teeth apicobasal height: (0) crowns remain relatively same height throughout dentition; (1) maximum height on central third of tooth row; (2) hypertrophied crown or crowns among the first three teeth; (3) maximum height on posterior third of tooth row; (4) maximum height on the anterior third of tooth row but not among the first three teeth; (-) presence of blade-groove mandibular occlusion or edentulous dentary (modified from Gauthier 1986; Butler *et al.* 2008; Pol *et al.* 2011; modified from Baron *et al.* 2017: 179). The formulation and character states were substantially modified.

791. Ilium, iliac blade dorsoventral height relative to acetabular height at the level of the dorsalmost point of the supraacetabular crest: (0) shorter than two times; (1) two times higher or more. The formulation of this character was slightly modified here.

803. Femur, development of attachment of muscle caudifemoralis on the ventral/posterior surface of the bone: (0) not distinct or developed as a rugose scar; (1) distinct, crest-like, but dorsoventrally/anteroposteriorly lower than the shaft at its minimum depth; (2) distinct, crest-like, dorsoventrally/anteroposteriorly taller than or subequal to the shaft at its minimum depth (Sues *et al.* 2021: character 716) ORDERED. The formulation of the second state was modified, the third state was added, and the character was considered as ordered here.

810. Tibia, separation of the proximal posterior hemicondyles in proximal view: absent (0); separated by a distinct change in angle or shallow notch or notches (1); separated by a deep groove or grooves (2). ORDERED.

833. Squamosal, suture with the posterior process of the postorbital: mainly straight and diagonal (0); V-shaped, with a posteriorly oriented apex (1). The formulation of the character and states was reworded here.

849. Pubis, proximal end of ambiens process: finishes proximally before reaching acetabulum (0); contacts proximally the acetabulum (1); ambiens process absent (-) (modified from Nesbitt *et al.* 2021: 339). The formulation of this character was slightly modified here.

**Added characters**

1. Skull, maximum width versus length of the presacral vertebral column: 0.044–0.117 (0); 0.132–0.208 (1); 0.236–0.303 (2); 0.336–0.440 (3); >0.5 (4) (New) ORDERED.
2. Frontal, crista cranii (= subolfactory processes) ventral development: as very low, mound-like ridges (0); as strongly developed crests, forming a U-shaped olfactory tract in cross-section (1); as strongly developed crests that arch beneath forebrain (2) (modified from Gauthier *et al.* 2012: 38) ORDERED.
3. Postorbital, contact with postfrontal: anterior (= medial) process sits posteroventral to postfrontal (0); anterior (= medial) process laps dorsally over postfrontal (1); postfrontal absent or fused to postorbital (-) (Pritchard & Sues 2019: 50).
4. Squamosal, posterior lamina: present, covering much of posterior aspect of quadrate (0); absent, posterior aspect of quadrate exposed in occipital view (1) (Pritchard & Sues 2019: 61).
5. Parietal, median posterior projection in dorsal view: present (0); absent, the posterior margin of the skull roof is concave or straight (1) (modified from Ford & Benson 2020: 5).
6. Quadrate, contact with squamosal: braced laterally by squamosal, but does not extend dorsally to contact the ventral surface of squamosal exposure on skull roof (0); extends dorsally to contact the ventral surface of squamosal exposure on skull roof (1) (reworded from Pritchard & Sues 2019: 62).
7. Quadrate, dorsal end: tapers dorsally (0); expanded dorsally into prominent convexity (dorsal condyle/head) (1) (Pritchard & Sues 2019: 63).
8. Quadrate, pterygoid ramus: ventral margin of posterior base of ramus in line with quadrate condylar surface (0); posterior base of ramus elevated dorsally relative to quadrate condylar surface (1) (Pritchard & Sues 2019: 73).
9. Parasphenoid/parabasisphenoid, teeth on the ventral surface of the main body: present (0); absent (1) (New).
10. Lower jaw, morphology of symphysis (classes sensu Holliday & Nesbitt 2013): flat symphyseal plates, conspicuous smooth region, equally high and deep joint (class I) (0); narrower symphyseal space, more rugosities and better organized rugosities (class II) (1); smooth area absent, heavily interdigitated rugosities (class III) (2); complete fusion of hemimandibles (class IV) (3) (based on Holliday & Nesbitt 2013).
11. Dentary, anteroventral margin with a ventral chin-like projection in lateral view: absent (0); present, the dentary is dorsoventrally taller there than immediately posterior to the ventral projection (1) (New).
12. Surangular-angular, distinct coarse ornamentation on lateral surface: absent (0); present (1) (New).
13. Foramen intermandibularis medius (FIM): absent (0); present (1) (Bona *et al.* in press).
14. Foramen intermandibularis caudalis (FIC; =inframeckelian foramen caudalis): absent or only incipient slit-like opening(s) in the area (0); present (1) (Bona *et al.* in press).
15. Foramen intermandibularis caudalis (FIC; =inframeckelian foramen caudalis), splenial contribution: absent, FIC fully enclosed by prearticular (0); present (1); FIC or splenial absent (-) (modified from Bona *et al.* in press).
16. Foramen intermandibularis caudalis (FIC; =inframeckelian foramen caudalis), prearticular and angular contributions when the splenial contributes to the border of the opening: present, distinct emargination on prearticular (0); present, distinct emargination on angular (1); present, distinct emarginations on both prearticular and angular (2); FIC absent or splenial contribution to FIC absent (-) (modified from Bona *et al.* in press).
17. Coronoid, independent ossification: present (0); absent (1) (Bona *et al.* in press).
18. Prearticular, area ventral to the IMF in medial view: larger contribution of the prearticular than the angular (0); larger contribution of the angular than the prearticular or subequal contribution of both bones (1); prearticular absent (-) (Bona *et al.* in press).
19. Prearticular, ventral margin in medial/lateral view posterior to its contact with the splenial: straight or ventrally curved anterior half of bone (0); dorsally curved anterior half of bone, acquiring a semilunate overall shape (1); prearticular absent (-) (New).
20. Prearticular, anterior portion in medial/lateral view: unexpanded or slightly expanded (0); dorsally expanded, in which the maximum height of the anterior portion, measured perpendicularly to the main axis of that part of the bone, is more than 2.0 times the minimum height of the bone (1); prearticular absent (-) (New).
21. Retroarticular process, dorsoventral development at base: similar to the height of the hemimandible immediately below to the posterior lip of the glenoid fossa or restricted to the dorsal portion of the hemimandible (0); restricted to the ventral half of the posterior margin of the hemimandible (1); retroarticular process absent (-) (New).
22. Stapes, dorsal process: absent (0); present (1) (Pritchard *et al.* 2015: 76; Pritchard & Sues, 2019: 119).
23. Cervical and dorsal vertebrae, count: 30 or more (0); 29–26 (1); 25 or less (2) (modified from Ford & Benson 2020: 200). ORDERED.
24. Cervical vertebrae, position of diapophysis (or dorsal edge of synapophysis) in anterior cervical vertebrae: posteriorly positioned relative to parapophysis (or ventral edge of synapophysis) (0); positioned directly dorsally relative to parapophysis (or ventral edge of synapophysis) (1) (slightly modified from Pritchard & Sues 2019: 334).
25. Cervical vertebrae, diapophysis in fifth cervical vertebra: present on a process shorter than the anteroposterior depth of its rib facet (0); present on a strongly developed stalk longer than the anteroposterior depth of its rib facet (1) (New).
26. Dorsal vertebrae, ventral keel serial variation: keel restricted to the anterior one-third of the dorsal series (0); keel restricted to the anterior two-thirds of the dorsal series (1); keel also present in at least one of the elements of the posterior one-third of the dorsal series (2); ventral keel absent in anterior dorsal vertebrae (-) (New). ORDERED.
27. Dorsal vertebrae, texturing on dorsal tip of neural spine: marked by pebbly, unfinished bone (0); marked by transverse striations (1) (Pritchard & Sues 2019: 200).
28. Dorsal vertebrae, lateral surface of dorsal end of neural spine: smooth (0); marked by multiple dorsoventrally oriented striations (1) (New).
29. Dorsal ribs, lateral surface of the proximal half of the anterior-middle dorsal ribs: smooth (0); at least some ribs with a rugose ridge or flange (1) (Dilkes & Sues 2009: 118).
30. Caudal vertebrae, transverse process of anterior caudal vertebrae: curved posterolaterally (0); straight (1); curved anterolaterally (2) (Pritchard & Sues 2019: 213).
31. Caudal vertebrae, orientation of base of transverse process in anterior caudal vertebrae: perpendicular to long axis of vertebra (0); angled posterolaterally from base (1) (Pritchard *et al.* 2015: 134; Pritchard & Sues 2019: 214).
32. Limb bones, epiphyses (= secondary ossification centres): absent (0); present (1) (Gauthier *et al.* 1988; Pritchard *et al.* 2015: 139; Pritchard & Sues 2019: 227).
33. Humerus, position of the deltopectoral crest in anterior/ventral view: adjacent to the lateral margin of the bone (0); medially displaced from the lateral margin of the bone (1) (New).
34. Humerus, entepicondylar flange: present as prominent postaxial crest (0); absent (1) (based on Ezcurra *et al.* 2014).
35. Ulna, anteromedial surface of the shaft: smooth (0); with a prominent longitudinal ridge (1) (based on Currie 1981).
36. Carpus, ulnare and radiale (and intermedium if present) elongation: elements longer proximodistally than in pre-axial-post-axial plane (0); elements shorter proximodistally than in pre-axial-post-axial plane (1); elements shorter proximodistally than in pre-axial-post-axial plane and subequal in height to the distal carpals (2) (modified from Pritchard & Sues 2019: 260).
37. Calcaneum, lateral projection, ventrolateral margin: coplanar with dorsolateral margin of projection (0); ventrolateral margin of calcaneum curls externally (1); calcaneal tuber absent (-) (Pritchard *et al.* 2015: 309).
38. Metatarsus, metatarsal I distal articular surface: symmetrically distally developed (0); with a distinctly more distally extended lateral condyle, resulting in an overall mediodistally facing distal articular surface (1) (New).
39. Metatarsus, articular surface on metatarsal II for metatarsal I in proximal view: straight or convex (0); concave (1); deeply recessed, with an inflexion between the anterior portion and a posteromedial flange (2) (modified from Sereno 1999; Yates 2007: 153) ORDERED.
40. Pes, pedal unguals of digits II–IV: subequal to or shorter than at least one non-ungual phalanx of the same digit (0); longer than all non-ungual phalanges of the same digit (1) (New).

**Modified scorings**

Character 2: all taxa scored as (0) were changed to (1), all scored as (1) were chanted to (2), all scored as (2) were changed to (3), and all scored as (1/2) were changed to (2/3).

Character 34: all taxa scored as (0) were changed to (2) with exception of *Macrocnemus bassanii* and *Tanystropheus* spp.[changed from (0) to (1) based on Miedema *et al.* (2020) and Spiekman *et al.* (2020)]; all taxa scored as (1) were changed to (3) with exception of *Macrocnemus fuyuanensis* [changed from (1) to (0/1)]; and all taxa scored as (-) were changed to (0) based on Jaquier *et al.* (2017)]. In addition, the scoring of *Prolacerta broomi* was changed from (?) to (2/3) based on Spiekman (2018).

Character 321: all taxa scored as (0/2) were changed to (0), all taxa scored as (0/1) were changed to (?), all taxa scored as (1/3) were changed to (1), all taxa scored as (2/3) were changed to (?), all taxa scored as (2) were changed to (0), all taxa scored as (3) were changed to (1), *Chasmatosuchus magnus* was changed from (?) to (1), *Guchengosuchus shiguaiensis* was changed from (0) to (1), and *Vonhuenia fredericki* was changed from (0) to (?).

Character 324: all taxa scored as (1) were changed to (2) and those scored as (2) were changed to (3).

Character 342: all taxa were rescored following the new calculated ratios.

*Acerosodontosaurus piveteaui*

Characters 123, 130: changed from (?) to (1).

Character 356: changed from (0) to (-).

Character 368: changed from (1) to (2).

Character 468: changed from (0) to (1).

Character 761: changed from (?) to (0/1/2/4).

Character 766: changed from (1) to (0).

*Aenigmastropheus parringtoni*

Character 368: changed from (?) to (0/1).

*Aetosauroides scagliai*

Character 6: changed from (1) to (0&1) because MCN-PV 2347 lacks ridges radiating from centres of growth (Paes Neto *et al.* 2021a).

Character 18: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 19: changed from (?) to (1) based on Paes Neto *et al.* (2021b).

Character 26: changed from (0) to (1) based on Paes Neto *et al.* (2021a).

Character 34: changed from (2) to (1).

Character 37: changed from (1) to (0).

Character 41: changed from (?) to (1) based on Paes Neto *et al.* (2021a).

Character 60: changed from (0) to (1).

Character 64: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 66: changed from (?) to (1) based on Paes Neto *et al.* (2021a).

Character 67: changed from (?) to (1) based on Paes Neto *et al.* (2021a).

Character 86: changed from (1) to (0) based on Paes Neto *et al.* (2021a).

Character 91: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 98: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 99: changed from (?) to (1) based on Paes Neto *et al.* (2021a).

Character 100: changed from (?) to (2) based on Paes Neto *et al.* (2021a).

Character 102: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 103: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 104: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 105: changed from (?) to (1) based on Paes Neto *et al.* (2021a).

Character 106: changed from (?) to (1) based on Paes Neto *et al.* (2021a).

Character 122: changed from (0/1) to (1) based on Paes Neto *et al.* (2021a).

Character 123: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 124: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 125: changed from (?) to (1) based on Paes Neto *et al.* (2021a).

Character 127: changed from (?) to (2) based on Paes Neto *et al.* (2021a).

Character 128: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 130: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 131: changed from (?) to (1).

Character 133: changed from (?) to (1) based on Paes Neto *et al.* (2021a).

Character 134: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 135: changed from (?) to (1) based on Paes Neto *et al.* (2021a).

Character 136: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 137: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 138: changed from (?) to (1) based on Paes Neto *et al.* (2021a).

Character 139: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 141: changed from (?) to (1) based on Paes Neto *et al.* (2021a).

Character 142: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 143: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 144: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 145: changed from (?) to (1) based on Paes Neto *et al.* (2021a).

Character 146: changed from (?) to (-) based on Paes Neto *et al.* (2021a).

Character 147: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 148: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 149: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 150: changed from (?) to (1) based on Paes Neto *et al.* (2021a).

Character 151: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 153: changed from (?) to (2) based on Paes Neto *et al.* (2021a).

Character 154: changed from (?) to (1) based on Paes Neto *et al.* (2021a).

Character 155: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 156: changed from (?) to (2) based on Paes Neto *et al.* (2021a).

Character 162: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 163: changed from (?) to (-) based on Paes Neto *et al.* (2021a).

Character 164: changed from (?) to (1/2) based on Paes Neto *et al.* (2021a).

Character 170: changed from (?) to (1) based on Paes Neto *et al.* (2021a).

Character 177: changed from (?) to (2) based on Paes Neto *et al.* (2021a).

Character 178: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 179: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 180: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 181: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 182: changed from (1) to (0&1) based on Paes Neto *et al.* (2021a).

Character 188: changed from (?) to (1) based on Paes Neto *et al.* (2021a).

Character 189: changed from (?) to (-) based on Paes Neto *et al.* (2021a).

Character 192: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 193: changed from (?) to (0/1) based on Paes Neto *et al.* (2021a).

Character 195: changed from (?) to (-) based on Paes Neto *et al.* (2021a).

Character 196: changed from (?) to (-) based on Paes Neto *et al.* (2021a).

Character 198: changed from (?) to (-) based on Paes Neto *et al.* (2021a).

Character 201: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 202: changed from (?) to (2) based on Paes Neto *et al.* (2021a).

Character 208: changed from (?) to (0) based on Paes Neto *et al.* (2021b).

Character 209: changed from (?) to (1) based on Paes Neto *et al.* (2021b).

Character 210: changed from (?) to (1) based on Paes Neto *et al.* (2021b).

Character 211: changed from (?) to (1) based on Paes Neto *et al.* (2021b).

Character 212: changed from (?) to (0) based on Paes Neto *et al.* (2021b).

Character 213: changed from (?) to (1) based on Paes Neto *et al.* (2021b).

Character 214: changed from (?) to (1) based on Paes Neto *et al.* (2021a).

Character 215: changed from (?) to (1) based on Paes Neto *et al.* (2021b).

Character 216: changed from (?) to (0) based on Paes Neto *et al.* (2021b).

Character 217: changed from (?) to (4) based on Paes Neto *et al.* (2021b).

Character 218: changed from (?) to (1) based on Paes Neto *et al.* (2021b).

Character 219: changed from (?) to (-) based on Paes Neto *et al.* (2021b).

Character 220: changed from (?) to (1) based on Paes Neto *et al.* (2021b).

Character 222: changed from (?) to (1) based on Paes Neto *et al.* (2021b).

Character 223: changed from (?) to (1) based on Paes Neto *et al.* (2021b).

Character 227: changed from (0) to (1) based on Paes Neto *et al.* (2021b).

Character 228: changed from (?) to (2) based on Paes Neto *et al.* (2021a).

Character 233: changed from (?) to (1) based on Paes Neto *et al.* (2021b).

Character 235: changed from (?) to (0) based on Paes Neto *et al.* (2021b).

Character 236: changed from (?) to (1) based on Paes Neto *et al.* (2021b).

Character 237: changed from (?) to (0) based on Paes Neto *et al.* (2021b).

Character 239: changed from (?) to (1) based on Paes Neto *et al.* (2021b).

Character 240: changed from (?) to (2) based on Paes Neto *et al.* (2021b).

Character 241: changed from (?) to (-) based on Paes Neto *et al.* (2021b).

Character 242: changed from (?) to (0) based on Paes Neto *et al.* (2021b).

Character 243: changed from (?) to (0) based on Paes Neto *et al.* (2021b).

Character 244: changed from (?) to (1) based on Paes Neto *et al.* (2021b).

Character 245: changed from (?) to (1) based on Paes Neto *et al.* (2021b).

Character 246: changed from (?) to (0) based on Paes Neto *et al.* (2021b).

Character 247: changed from (?) to (0) based on Paes Neto *et al.* (2021b).

Character 248: changed from (?) to (0) based on Paes Neto *et al.* (2021b).

Character 254: changed from (?) to (1) based on Paes Neto *et al.* (2021b).

Character 255: changed from (?) to (1) based on Paes Neto *et al.* (2021b).

Character 256: changed from (?) to (1) based on Paes Neto *et al.* (2021b).

Character 258: changed from (?) to (1) based on Paes Neto *et al.* (2021b).

Character 277: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 282: changed from (0) to (1) based on Paes Neto *et al.* (2021a).

Character 283: changed from (1) to (2) based on Paes Neto *et al.* (2021a).

Character 284: changed from (0) to (1) based on Paes Neto *et al.* (2021a).

Character 293: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 294: changed from (?) to (1) based on Paes Neto *et al.* (2021a).

Character 295: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 296: changed from (?) to (1) based on Paes Neto *et al.* (2021a).

Character 313: changed from (?) to (0) based on Paes Neto *et al.* (2021c).

Character 325: changed from (?) to (0) based on Paes Neto *et al.* (2021c).

Character 327: changed from (1) to (2) based on Paes Neto *et al.* (2021c).

Character 330: changed from (?) to (1) based on Paes Neto *et al.* (2021c).

Character 335: changed from (?) to (0) based on “*Polesinesuchus aurelioi*”.

Character 338: changed from (?) to (0) based on “*Polesinesuchus aurelioi*”.

Character 361: changed from (0) to (1) based on Paes Neto *et al.* (2021c).

Character 378: changed from (?) to (0&1) based on Paes Neto *et al.* (2021c).

Character 390: changed from (?) to (1) based on “*Polesinesuchus aurelioi*”.

Character 394: changed from (?) to (0) based on “*Polesinesuchus aurelioi*”.

Character 398: changed from (?) to (1) based on “*Polesinesuchus aurelioi*”.

Character 402: changed from (?) to (0) based on “*Polesinesuchus aurelioi*”.

Character 403: changed from (?) to (0) based on “*Polesinesuchus aurelioi*”.

Character 585: changed from (?) to (0) based on “*Polesinesuchus aurelioi*”.

Character 586: changed from (?) to (0) based on “*Polesinesuchus aurelioi*”.

Character 587: changed from (?) to (0) based on “*Polesinesuchus aurelioi*”.

Character 596: changed from (0) to (1).

Character 631: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 632: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 633: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 634: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 635: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 636: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 637: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 639: changed from (?) to (0) based on Paes Neto *et al.* (2021b).

Character 640: changed from (?) to (0) based on Paes Neto *et al.* (2021b).

Character 641: changed from (?) to (0) based on Paes Neto *et al.* (2021b).

Character 642: changed from (?) to (-) based on Paes Neto *et al.* (2021b).

Character 643: changed from (?) to (1) based on Paes Neto *et al.* (2021b).

Character 644: changed from (?) to (0) based on Paes Neto *et al.* (2021b).

Character 645: changed from (?) to (1) based on Paes Neto *et al.* (2021b).

Character 647: changed from (0) to (1) based on Paes Neto *et al.* (2021a).

Character 652: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 678: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 679: changed from (?) to (0).

Character 692: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 693: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 694: changed from (?) to (0) based on Paes Neto *et al.* (2021b).

Character 709: changed from (0) to (1) based on Paes Neto *et al.* (2021a).

Character 714: changed from (?) to (1) based on Paes Neto *et al.* (2021a).

Character 715: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 716: changed from (?) to (-) based on Paes Neto *et al.* (2021a).

Character 718: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 719: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 721: changed from (?) to (0) based on Paes Neto *et al.* (2021b).

Character 722: changed from (?) to (1) based on Paes Neto *et al.* (2021b).

Character 723: changed from (?) to (0) based on Paes Neto *et al.* (2021b).

Character 724: changed from (?) to (0) based on Paes Neto *et al.* (2021b).

Character 727: changed from (?) to (0) based on Paes Neto *et al.* (2021b).

Character 745: changed from (0) to (1) based on Paes Neto *et al.* (2021a).

Character 761: changed from (?) to (1) based on Paes Neto *et al.* (2021a).

Character 764: changed from (?) to (1) based on “*Polesinesuchus aurelioi*”.

Character 773: changed from (?) to (0) based on “*Polesinesuchus aurelioi*”.

Character 829: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 833: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 834: changed from (?) to (1) based on Paes Neto *et al.* (2021b).

Character 836: changed from (?) to (0) based on Paes Neto *et al.* (2021a).

Character 840: changed from (?) to (0) based on “*Polesinesuchus aurelioi*”.

Character 841: changed from (?) to (1) based on Paes Neto *et al.* (2021c).

Character 842: changed from (?) to (0) based on Paes Neto *et al.* (2021c).

*Aetosaurus fearratus*

Character 34: changed from (2) to (1).

Character 56: changed from (0) to (-) because of the absence of a secondary antorbital fenestra.

Character 83: changed from (1) to (0).

Character 147: changed from (-) to (0).

Character 148: changed from (-) to (0).

Character 199: changed from (-) to (0).

Character 208: changed from (-) to (?).

Character 223: changed from (0) to (?).

Character 303: changed from (0) to (1&2).

Character 304: changed from (2) to (0).

Character 392: changed from (1) to (0).

Character 399: changed from (1) to (0).

Character 437: changed from (1) to (0).

*Ammorhynchus navajoi*

Character 761: changed from (?) to (-).

*Amotosaurus rotfeldensis*

Character 321: changed from (0) to (?).

Characters 322, 323: changed from (-) to (?).

Character 342: changed from (1) to (0).

Character 356: changed from (0) to (-).

Character 368: changed from (1) to (2).

Character 403: changed from (-) to (0).

*Angistorhinus talainti*

Character 763: changed from (?) to (0).

*Antarctanax shackletoni*

Character 322: changed from (?) to (-).

Character 368: changed from (?) to (0/1).

*Archosaurus rossicus*

Character 34: changed form (?) to (2/3).

*Archosaurus* complete

Character 34: changed form (?) to (2/3).

Character 316: changed from (1) to (?) because the preserved cervical vertebrae correspond to the anterior to middle region of the neck.

Character 334: changed from (0) to (1).

*Arizonasaurus babbitti*

Character 353: changed from (0&2) to (2).

Character 368: changed from (0) to (0/1).

Character 481: changed from (1) to (0).

Character 798: changed from (?) to (1).

*Asilisaurus kongwe*

Character 520: changed from (0) to (1).

Character 810: changed from (0) to (0&2).

*Asperoris mnyama*

Character 8: changed from (0) to (1).

Character 34: changed from (?) to (1/2/3).

*Augustaburiana vatagini*

Character 342: changed from (1) to (0).

*Austriadactylus cristatus*

Character 761: changed from (?) to (2).

*Austriadraco dallavecchiai*

Character 761: changed from (?) to (0/1/2/4).

*Azendohsaurus laaroussi*

Character 1: changed form (0) to (1).

Character 653: changed from (?) to (1).

Character 761: changed from (0) to (0/1).

*Azendohsaurus madagaskarensis*

Character 1: changed form (0) to (1).

Character 217: changed from (2) to (0).

Character 240: changed from (?) to (3).

Character 241: changed from (?) to (-).

Character 320: changed from (0) to (2).

Character 332: changed from (2) to (1).

Character 342: changed from (1) to (0).

Character 345: changed from (-) to (2).

Character 365: changed from (-) to (?).

Character 382: changed from (1) to (0&2).

Character 403: changed from (-) to (0&1).

Character 485: changed from (0) to (1).

Character 548: changed from (0) to (1).

Character 660: changed from (1) to (0).

Character 810: changed from (0) to (1).

*Batrachotomus kupferzellensis*

Character 5: changed from (1) to (0).

Character 368: changed from (0) to (0/1).

Character 810: changed from (0) to (?).

*Bentonyx sidensis*

Character 761: changed from (?) to (-).

*Boreopricea funerea*

Character 368: changed from (1) to (0/1).

*Brasinorhynchus mariantensis*

Character 129: changed from (1) to (-).

Characters 342 and 810: changed from (0) to (?).

Character 761: changed from (0/1) to (-).

*Buriolestes schultzi*

Character 457: changed from (1) to (0).

Characters 544 and 545: changed from (0) to (1).

Character 546: changed from (-) to (2).

Characters 547, 552: changed from (-) to (1).

Characters 548, 549, 550, 551: changed from (-) to (0).

Character 810: changed from (0) to (1).

*Caelestiventus hanseni*

Character 761: changed from (0) to (2).

*Chalishevia cothurnata*

Character 37: changed from (?) to (1).

Character 286, 287, 289, 312, 317, 319, 334, 336, 337, 340, 351, 353, 355, 360, 657, 658, 744, 765, 768: changed from (0) to (?).

Character 310, 311, 315, 316, 332, 354, 660, 681, 766: changed from (1) to (?).

*Chanaresuchus bonapartei*

Character 342: changed from (0) to (1&2).

Character 368: changed from (0) to (0/1).

Character 403: changed from (-) to (0).

Character 803: changed from (1) to (2).

Character 810: changed from (0) to (1).

Chañares rhynchosaur

Character 761: changed from (?) to (-).

*‘Chasmatosaurus’ yuani*

Character 368: changed from (1) to (0/1).

Character 403: changed from (-) to (1).

Character 425: changed from (1) to (2).

Character 810: changed from (0) to (1).

*Chasmatosuchus magnus* (the holotype of *C. magnus* probably is a Cv4 because of the strong development of the tuberosity that extends posteriorly from the diapophysis and the length of the prezygapophyses)

Character 322: changed from (?) to (0).

Character 323: changed from (?) to (0).

Character 335: changed from (0) to (0&1).

Character 345: changed from (-) to (?).

Character 767: changed from (?) to (0).

*Chasmatosuchus rossicus* (the anterior cervical vertebra referred to *C. rossicus* seems to correspond to a Cv5 because of its short prezygapophyses)

Character 322: changed from (-) to (0).

Character 323: changed from (-) to (0).

Character 342: changed from (1&2) to (2&3).

Character 345: changed from (?) to (1).

Character 355: changed from (?) to (0).

Character 767: changed from (?) to (0).

*Chasmatosuchus vjushkovi*

Character 34: changed from (?) to (2/3).

*Chromogisaurus novasi*

Character 537: changed from (?) to (2).

*Clevosaurus hudsoni*

Character 342: changed from (1) to (0).

Character 356: changed from (0) to (-).

Character 368: changed from (1) to (2).

Character 403: changed from (-) to (1).

Character 701: changed from (1) to (-).

Character 761: changed from (1) to (3).

*Coelophysis bauri*

Character 457: changed from (1) to (0&1).

Character 520: changed form (1) to (2).

Character 810: changed from (0) to (?).

Character 820: changed from (2) to (0).

CRILAR-Pv 461

Character 761: changed from (?) to (-).

CRILAR-Pv 497

Character 761: changed from (?) to (-).

*Cteniogenys* sp.

Character 34: changed from (2) to (1).

Character 81: changed from (?) to (-).

Character 791: changed from (?) to (0).

*Ctenosauriscus koeneni*

Character 368: changed from (0) to (?).

*Cuyosuchus huenei*

Character 322: changed from (1) to (-).

Character 368: changed from (0) to (0/1).

Character 403: changed from (-) to (0).

Character 811: changed from (0) to (1).

*Diandongosuchus fuyuanensis*

Character 273: changed from (0) to (1).

Character 274: changed from (-) to (0).

Character 303: changed from (?) to (0).

Character 342: changed from (0) to (1).

Character 368: changed from (0) to (0/1).

Character 403: changed from (-) to (0).

Character 761: changed from (0) to (?).

Character 810: changed from (0) to (?).

*Dimorphodon macronyx*

Character 761: changed from (0) to (2).

Character 838: changed from (-) to (?).

Character 845: changed from (?) to (0).

*Dinocephalosaurus orientalis*

Character 342: changed from (1) to (?).

Character 356: changed from (0) to (-).

Character 368: changed from (1) to (2).

Character 761: changed from (?) to (4).

*Dorosuchus neoetus*

Character 811: changed from (0) to (1).

*Doswellia kaltenbachi*

Characters 320, 470, 476, 477: changed from (1) to (0).

Characters 322, 798: changed from (1) to (-).

Character 342: changed from (1) to (?).

Character 478: changed from (3) to (-).

Characters 480, 481, 669: changed from (0) to (-).

Character 761: changed from (0) to (?).

Character 795: changed from (-) to (0).

*Dromomeron gregorii*

Character 810: changed from (0) to (1).

*Dromomeron romeri*

Character 810: changed from (0) to (1).

*Dynamosuchus collisensis*

Character 282: changed from (0) to (1).

Character 321: changed from (?) to (1) based on Müller *et al.* (2019: 6).

Character 342: changed from (0) to (?).

Character 591: changed from (?) to (2).

*Elessaurus gondwanoccidens* (changes from scorings of de Oliveira *et al.* 2020)

Characters 457, 468, 521, 522, 523, 562, 601, 675: changed from (?) to (0).

Character 460: changed from (?) to (1) based on de Oliveira *et al.* (2020: 8).

Character 510: changed from (1) to (1/2) based on de Oliveira *et al.* (2020: 8).

Characters 533, 567, 667: changed from (?) to (1).

Character 556: changed from (0) to (?) because the distal articular surface of the calcaneum is not exposed.

Character 557: changed from (0) to (0/1). The condition is not clear, but the centrale is positioned at approximately the same proximodistal level as the astragalus in the tarsus, thus it may have contacted the tibia during full extension of the pes.

Characters 558, 560: changed from (?) to (0) based on de Oliveira *et al.* (2020: 11).

Character 564: changed from (1) to (?) because the none of the pedal digits is complete.

*Elorhynchus carrolli*

Character 761: changed from (?) to (-).

*Eoraptor lunensis*

Characters 129, 136, 183, 271: changed from (?) to (0) based on PVSJ 512.

Character 198: changed from (?) to (1) based on PVSJ 512.

Character 217: changed from (?) to (4) based on PVSJ 745.

Characters 218, 221, 230, 231, 232, 233, 237, 357, 371, 381, 497, 499, 663, 685: changed from (?) to (0) based on PVSJ 745.

Characters 223, 225, 227, 228, 229, 495, 496, 526: changed from (?) to (1) based on PVSJ 745.

Character 239: changed from (1) to (0) based on PVSJ 745 (the region is better preserved in this specimen than in PVSJ 512).

Character 240: changed from (?) to (1/2) based on PVSJ 745.

Character 241: changed from (?) to (-) based on PVSJ 745.

Characters 514, 656: changed from (0) to (1) based on PVSJ 745.

Character 805: changed from (1) to (0&1).

Character 810: changed from (0) to (2).

*Eorasaurus olsoni*

Character 342: changed from (0) to (?).

Character 368: changed from (?) to (0/1).

*Erpetosuchus granti*

Character 342: changed form (0) to (1&2&3).

Character 365: changed from (?) to (-) based on Foffa *et al.* (2020).

Character 684: changed from (?) to (0) based on Foffa *et al.* (2020).

Character 781: changed from (?) to (0) based on Foffa *et al.* (2020).

Character 783: changed from (?) to (0) based on Foffa *et al.* (2020).

Character 788: changed from (?) to (0) based on Foffa *et al.* (2020).

Character 789: changed from (?) to (0) based on Foffa *et al.* (2020).

Character 825: changed from (?) to (0) based on Foffa *et al.* (2020).

*Erpetosuchus* sp.

Character 55: changed from (2) to (0) based on the 3D model of Foffa *et al.* (2020).

Character 283: changed from (1) to (2) based on Foffa *et al.* (2020).

*Erythrosuchus africanus*

Character 322: changed from (1) to (-).

Character 342: changed from (0) to (?).

Character 353: changed from (0&2) to (2).

Character 368: changed from (0) to (0/1).

Character 393: changed from (2) to (0).

Character 403: changed from (-) to (0).

Character 602: changed from (0) to (1).

Character 811: changed from (0) to (1).

*Eudimorphodon ranzii*

Character 761: changed from (0) to (2).

*Euparkeria capensis*

Character 322: changed from (1) to (-).

Character 403: changed from (-) to (0).

*Feralisaurus corami*

Characters 2, 18, 47, 103, 265, 280, 286, 287, 367, 402, 599: changed from (?) to (0).

Character 9: changed from (0) to (?) because the probable distal end of the prenarial process is missing.

Characters 17, 20: changed from (0) to (0/1).

Characters 23, 91, 95, 126, 356, 417, 423: changed from (1) to (?).

Characters 46, 94: changed from (-) to (0).

Characters 48, 105, 616, 650: changed from (?) to (-).

Characters 54, 56, 63, 614, 615: changed from (0) to (-).

Character 57: changed from (0) to (?) because the dorsal margin of the maxilla is damaged or cannot be rendered confidently.

Characters 58–60, 272–276, 395, 396, 623: changed from (-) to (?).

Characters 69, 77, 79, 269, 314, 319, 411, 421, 424, 602, 636: changed from (0) to (?).

Character 92: changed from (0/1) to (0).

Characters 264, 278, 434, 678: changed from (1) to (0).

Character 303: changed from (2) to (1/2).

Character 356: changed from (0) to (-).

Character 368: changed from (1) to (2).

Character 398: changed from (1) to (2) because the right coracoid strongly expands posteriorly from the level of the articulation with the humerus (Cavicchini *et al.* 2020: 3D model of the complete specimen).

Character 409: changed from (0) to (1) because the lateral and posterior processes form a sharp angle between each other, contrasting with the diamond-shaped anterior portion of the interclavicle of taxa with a web of bone connecting these processes.

Character 412: changed from (?) to (1) based on the dorsal placement of the right clavicle with respect to the lateral process of the interclavicle (Cavicchini *et al.* 2020: 3D model of the complete specimen).

Character 428: changed from (1) to (0) based on the 3D model of the humerus (Cavicchini *et al.* 2020).

Character 430: changed from (1) to (0) based on the 3D model of the ulna (Cavicchini *et al.* 2020).

Characters 431 and 621: changed from (1) to (-).

Character 451: changed from (?) to (0) based on the 3D model of the manus (Cavicchini *et al.* 2020).

Character 655: changed from (?) to (0) based on the 3D model of the atlas-axis (Cavicchini *et al.* 2020).

*Fodonyx spenceri*

Character 761: changed from (?) to (-).

*Fuyuansaurus acutirostris*

Character 303: changed from (0) to (1).

Character 322: changed from (-) to (1).

Character 323: changed from (-) to (0).

Character 342: changed from (1) to (0).

Character 368: changed from (1) to (1/2). A holocephalous rib is present at least in D4.

*Garjainia madiba* combined

Character 34: changed from (?) to (2/3).

Character 322: changed from (1) to (-).

Character 368: changed from (0) to (0/1).

Character 403: changed from (-) to (0).

Character 811: changed from (0) to (1).

*Garjainia prima*

Character 112, 159, 276, 307, 326, 346, 366, 376, 380, 570, 586, 587, 599, 600, 601, 665, 711, 771: changed from (?) to (0).

Character 171: changed from (1/2) to (2).

Character 191, 193: changed from (?) to (0/1).

Character 320: changed from (1) to (2).

Character 342: changed from (3) to (1).

Character 345: changed from (-) to (1).

Character 348, 377, 435, 436, 458, 484, 489, 490, 530, 660: changed from (?) to (1).

Character 349: changed from (?) to (1/2).

Character 351: changed from (0) to (0&1).

Characters 359, 373, 375, 393, 475, 661: changed from (0) to (1).

Character 365: changed from (-) to (2).

Character 374: changed from (-) to (?).

Character 403: changed from (-) to (0).

Character 585: changed from (?) to (0&1).

Character 602: changed from (?) to (1).

Character 172, 589: changed from (?) to (-).

Character 811: changed from (0) to (1).

*Gephyrosaurus bridensis*

Character 356: changed from (0) to (-).

Character 368: changed from (1) to (2).

Character 403: changed from (-) to (?).

Character 761: changed from (1) to (3).

Character 791: changed from (1) to (0).

*Gracilisuchus stipanicicorum*

Character 60: changed from (0) to (1).

Character 112: changed from (0) to (?).

Character 133: changed from (1) to (0&1).

Character 337: changed from (2) to (0).

Character 810: changed from (0) to (1).

*Gualosuchus reigi*

Character 342: changed from (0) to (1).

Character 368: changed from (0) to (0/1).

Character 403: changed from (-) to (0).

Character 803: changed from (1) to (2).

*Guchengosuchus shiguaiensis*

Character 320: changed from (1) to (?).

Character 323: changed from (-) to (0).

Character 342: changed from (0) to (?).

Character 368: changed from (0) to (0/1).

Character 393: changed from (2) to (0).

Character 602: changed from (?) to (1).

*Halazhaisuchus qiaoensis*

Character 322: changed from (1) to (-).

Character 368: changed from (?) to (0/1).

Character 403: changed from (-) to (?).

*Herrerasaurus ischigualastensis*

Character 457: changed from (1) to (0&1).

Characters 544 and 545: changed from (0) to (1).

Character 546: changed from (-) to (2).

Characters 547, 548, 552: changed from (-) to (1).

Characters 549, 550, 551: changed from (-) to (0).

Character 810: changed from (0) to (1&2).

*Heterodontosaurus tucki*

Characters 314, 348, 385, 394, 397: changed from (?) to (0) based on Radermacher *et al.* (2021).

Character 351: changed from (?) to (0&1).

Character 383: changed from (2) to (1) based on Radermacher *et al.* (2021).

Character 403: changed from (-) to (1).

Character 686: changed from (?) to (1) based on Radermacher *et al.* (2021).

Character 810: changed from (1) to (2).

Character 837: changed from (?) to (0).

*Hyperodapedon gordoni*

Character 342: changed from (?) to (0).

Character 403: changed from (-) to (0).

Character 718: changed from (0) to (1).

Character 761: changed from (?) to (-).

*Hyperodapedon huenei*

Characters 70, 130, 626, 706: changed from (1) to (0).

Character 266: changed from (3) to (-).

Character 279: changed from (1/2) to (1).

Character 761: changed from (0) to (-).

*Hyperodapedon huxleyi*

Character 403: changed from (-) to (0).

Character 482: changed from (3) to (1) (ratio = 2.43; ISIR 4).

Character 761: changed from (?) to (-).

*Hyperodapedon mariensis*

Characters 45, 70, 626, 706: changed from (1) to (0).

Character 266: changed from (3) to (-).

Character 289: changed from (0) to (1).

Character 403: changed from (-) to (0).

Character 761: changed from (0) to (-).

*Hyperodapedon sanjuanensis*

Characters 70, 626, 706: changed from (1) to (0).

Characters 193, 277: changed from (0) to (1).

Character 403: changed from (-) to (0).

Character 761: changed from (?) to (-).

*Hypselorhachis mirabilis*

Character 368: changed from (?) to (0/1).

*Isalorhynchus genovefae*

Character 761: changed from (0) to (-).

Character 810: changed from (0) to (1).

*Ixalerpeton polesinensis*

Character 810: changed from (1) to (2).

*Jaxtasuchus salomoni*

Character 262: changed from (1) to (?).

Character 342: changed from (1) to (0).

*Jesairosaurus lehmani*

Character 324: changed from (0/1) to (2).

Character 368: changed from (?) to (0/1).

Character 403: changed from (-) to (0).

*Kadimakara australiensis*

Character 303: changed from (?) to (0).

*Lagerpeton chanarensis*

Character 761: changed from (0) to (0/4).

Character 810: changed from (0) to (1).

Character 825: changed from (?) to (-).

*Lagosuchus talampayensis*

Character 810: changed from (0) to (1).

*Langeronyx brodiei*

Character 761: changed from (?) to (-).

*Langobardisaurus pandolfii*

Character 342: changed from (1) to (?).

Character 368: changed from (?) to (0/1).

Character 761: changed from (0) to (3).

*Lesothosaurus diagnosticus*

Character 342: changed from (1) to (?).

Character 353: changed from (0&2) to (2).

Character 520: changed from (1) to (0).

Character 761: changed from (1) to (3).

Character 803: changed from (1) to (2).

*Lewisuchus admixtus*

Character 520: changed from (0) to (1) based on PULR V-113.

Character 531: changed from (?) to (0) based on PVL 3456.

Characters 592 and 593: changed from (0) to (1) based on PULR 01.

Character 659: changed from (1) to (0) based on PULR 01.

Character 810: changed from (0) to (1).

*Litorosuchus somnii*

Character 29: changed from (0) to (1).

Character 342: changed from (1) to (0).

Character 403: changed from (-) to (0).

*Lotosaurus adentus*

Character 368: changed from (0) to (0/1).

*Luperosuchus fractus*

Character 5: changed from (1) to (0).

*Machaeroprosopus pristinus*

Characters 342, 810: changed from (0) to (?).

Character 403: changed from (-) to (1).

Character 591: changed from (2) to (1&2).

*Macrocnemus bassanni* (based on new information provided by Miedema *et al.* 2020)

Characters 19, 61, 76, 85, 137, 140, 141, 150, 173, 177, 209, 213, 214, 219, 223, 226, 229, 231, 233, 244, 254, 272, 273, 277, 283, 284, 298, 723, 764: changed from (?) to (1).

Characters 22, 33, 44, 49, 66, 78, 142, 143, 144, 146, 151, 152, 153, 154, 155, 156, 168, 170, 178, 179, 181, 183, 184, 200, 201, 208, 210, 211, 212, 216, 217, 218, 220, 221, 224, 225, 227, 230, 232, 234, 235, 236, 237, 239, 242, 243, 245, 247, 248, 252, 253, 255, 257, 258, 264, 266, 268, 274, 275, 282,285, 291, 293, 295, 325, 326, 610, 639, 643, 645, 704, 720, 721, 724, 727, 744, 748, 752: changed from (?) to (0).

Character 28: changed from (2) to (3).

Characters 53, 67, 105, 158, 172, 238, 256, 259, 276, 694, 719: changed from (?) to (-).

Characters 114, 342: changed from (1) to (0).

Characters 157, 171, 202: changed from (?) to (2).

Characters 193, 228: changed from (?) to (0/1).

Character 202: changed from (2) to (?) based on the discussion of Miedema *et al.* (2020: 13).

Character 261: changed from (0) to (2).

Characters 321, 717: changed from (0) to (1).

Character 322: changed from (-) to (1).

Character 323: changed from (-) to (0).

Character 368: changed from (1) to (1/2).

Character 403: changed from (-) to (0).

Character 810: changed from (0) to (?).

*Macrocnemus fuyuanensis*

Characters 34, 49: changed from (1) to (0).

Character 61: changed from (0) to (?).

Character 321: changed from (0) to (1).

Character 322: changed from (-) to (1).

Character 323: changed from (-) to (0).

Character 342: changed from (1) to (0).

*Malerisaurus robinsonae*

Character 1: changed form (0) to (1).

Character 111: changed from (0) to (?).

Character 239: changed from (0) to (1).

Character 240: changed from (0) to (3).

Character 241: changed from (0) to (-).

Character 246: changed from (1) to (0).

Character 304: changed from (0) to (?).

Character 320: changed from (0) to (?).

Character 321: changed from (0) to (1).

Character 322: changed from (-) to (1).

Character 323: changed from (-) to (0).

Character 342: changed from (1) to (0).

Character 485: changed from (0) to (0/1).

Character 535: changed from (?) to (1).

Character 653: changed from (-) to (?).

Character 810: changed from (0) to (1).

Character 816: changed (1) to (?).

*Mandasuchus tanyauchen*

Character 330: changed from (0) to (1).

Character 480: changed from (1) to (0&1).

*Megachirella wachtleri*

Character 342: changed from (?) to (0).

*Megapnosaurus rhodesiensis*

Character 457: changed from (1) to (0&1).

Character 520: changed form (1) to (2).

Character 810: changed from (0) to (1).

*Mesodapedon kuttyi*

Character 761: changed from (?) to (-).

*Mesosuchus browni*

Character 114: changed from (0) to (1).

Character 217: changed from (2) to (0).

Character 342: changed from (0) to (2).

Character 403: changed from (-) to (0).

Character 810: changed from (0) to (?).

*Mystriosuchus planirostris*

Characters 315–318, 321, 322, 333, 350: changed from (?) to (1) based on Huene (1923: fig. 1).

Character 327: changed from (?) to (1/2).

Characters 336, 343, 401, 402, 403, 654, 656, 767, 824: changed from (?) to (0) based on von Huene (1923: fig. 1).

Character 342: changed from (0) to (2).

Characters 345, 772: changed from (?) to (-).

Character 349: changed from (1/2) to (2).

Character 386: changed from (?) to (0/1).

Character 810: changed from (0) to (?).

*Nicrosaurus kapffi*

Character 342: changed from (0) to (2).

*Noteosuchus colletti*

Character 368: changed from (1) to (0/1).

Character 810: changed from (0) to (1).

*Nundasuchus songeaensis*

Character 368: changed from (0) to (0/1).

Character 761: changed from (0) to (?).

*Ornithosuchus woodwardi*

Character 206: changed from (1) to (?).

Character 591: changed from (1) to (2).

Character 810: changed from (0) to (?).

*Osmolskina* complete

Character 322: changed from (1) to (-).

Character 342: changed from (0) to (1).

Character 368: changed from (?) to (0).

Character 403: changed from (-) to (0).

Character 761: changed from (0) to (0/3).

*“Paleorhinus” sawini*

Character 342: changed from (0) to (1).

Character 343: changed from (1) to (0).

*Paliguana whitei* (generally based on the new information provided by Ford *et al.* 2021)

Characters 1, 60, 72, 73, 86, 91, 97, 101, 102, 103, 104, 106, 116, 120, 121, 143, 144, 147, 152, 153, 156, 160, 178, 180, 185, 187, 188, 193, 197, 203, 204, 206, 211, 219, 220, 221, 254, 277, 286, 287, 293, 612, 613, 626, 648, 678, 694, 706, 713, 715, 718, 751, 752, 753, 756, 758, 828, 830, 834, 836: changed from (?) to (0).

Characters 40, 170, 183, 228, 258, 265, 284: changed from (0) to (?).

Characters 57, 61, 100, 112, 150, 189, 209, 255, 256, 270, 278, 754: changed from (?) to (1).

Characters 85, 151, 207, 299: changed from (?) to (2).

Characters 93, 129, 145, 745: changed from (1) to (0).

Characters 105, 154, 155, 614–616, 619–621, 636, 649, 712, 716, 719, 727: changed from (?) to (-).

Characters 127, 267: changed from (?) to (0/1).

Character 146: changed from (0) to (2).

Characters 157, 176: changed from (2) to (1).

Characters 158, 259: changed from (-) to (?).

Characters 177, 202: changed from (2) to (?).

Characters 192, 305: changed from (0) to (1).

Character 195: changed from (?) to (0/2/3/5).

Character 261: changed from (?) to (1/2).

Character 303: changed from (?) to (0&1).

Character 632: changed from (-) to (0).

*Pamelaria dolichotrachela*

Character 1: changed form (0) to (1).

Character 239: changed from (0) to (1).

Character 322: changed form (0) to (-).

Character 342: changed from (1) to (0).

Character 403: changed from (-) to (0).

Character 485: changed from (0) to (1).

Character 679: changed from (?) to (0).

Character 761: changed from (0/2) to (0/1/2).

Character 810: changed from (0) to (1).

*Parasuchus hislopi*

Character 342: changed from (0) to (?).

Character 763: changed from (?) to (0).

*Parringtonia gracilis*

Character 34: changed from (?) to (1/2/3).

Character 803: changed from (1) to (?).

*Pectodens zhenyuensis*

Character 34: changed from (?) to (2).

Character 342: changed from (1) to (0).

*Peteinosaurus zambellii*

Character 761: changed from (0) to (2).

*Petrolacosaurus kansensis*

Character 36: changed from (0) to (1).

Character 37: changed from (-) to (0).

Character 38: changed from (-) to (?).

Character 39: changed from (-) to (3).

Character 342: changed from (1) to (0).

Character 356: changed from (0) to (-).

Character 368: changed from (1) to (2).

Character 403: changed from (-) to (1).

Character 810: changed from (0) to (?).

*Planocephalosaurus robinsonae*

Character 356: changed from (0) to (-).

Character 368: changed from (1) to (2).

Character 403: changed from (-) to (1).

Character 761: changed from (1) to (3).

Character 810: changed from (0) to (?).

*Polymorphodon adorfi*

Characters 15, 47, 84, 182, 280, 467: changed from (?) to (0).

Character 22: changed from (?) to (1).

Character 23: changed from (?) to (0/1).

Characters 30, 38, 176, 213, 229: changed from (0) to (1).

Character 37, 194, 201, 247: changed from (1) to (0).

Character 39: changed from (0) to (0/1/2).

Character 51: changed from (1) to (-).

Character 55, 195−198, 241, 505: changed from (-) to (?).

Character 66: changed from (?) to (1/2).

Character 67, 199: changed from (-) to (0).

Character 75: changed from (1) to (2).

Characters 17, 96, 137, 139, 143, 144, 145, 225, 504, 507, 588, 599, 600: changed from (0) to (?).

Character 138, 231: changed from (1) to (?).

Character 202: changed from (2) to (?).

Character 299: changed from (4) to (1).

Character 567: changed from (?) to (3).

Character 761: changed from (2) to (1/2).

*Preondactylus buffarinii*

Character 100: changed from (?) to (1/2/3).

Character 761: changed from (0) to (2).

*Prestosuchus chiniquensis*

Character 5: changed from (1) to (0).

Character 481: changed from (1) to (0).

Character 798: changed from (0) to (1).

*Prestosuchus nyassicus*

Character 342: changed from (1) to (?).

Character 368: changed from (?) to (0/1).

Character 379: changed from (1) to (1/2).

Character 481: changed from (1) to (0).

*Prolacerta broomi*

Character 321: changed from (0) to (1).

Character 322: changed from (-) to (1).

Character 323: changed from (-) to (0).

Character 356: changed from (0) to (-).

Character 368: changed from (1) to (2).

Character 403: changed from (-) to (1).

Character 723: changed from (1) to (0).

*Protanystropheus antiquus*

Character 321: changed from (?) to (0).

Character 342: changed from (1) to (0).

*Proterochampsa barrionuevoi*

Character 34: changed from (?) to (2/3).

Characters 67, 704, 759: changed from (?) to (1) based on CRILAR-Pv 579.

Characters 335, 678, 749, 750: changed from (?) to (0) based on CRILAR-Pv 579.

Character 342: changed from (0) to (1).

Character 403: changed from (-) to (?).

Character 810: changed from (0) to (1).

*Proterochampsa nodosa*

Character 34: changed from (?) to (2/3).

*Proterosuchus alexanderi*

Character 403: changed from (-) to (1).

Characters 417, 419, 422, 423, 775: changed from (0) to (?).

Characters 420, 421, 687: changed from (?) to (0).

Character 425: changed from (1) to (2).

Characters 426, 427, 428: changed from (?) to (1).

Character 429: changed from (?) to (-).

*Proterosuchus fergusi*

Character 342: changed from (2) to (1).

Character 368: changed from (1) to (0/1).

Character 763: changed from (0) to (1) based on RC 846 and SNSB-BSPG 1934 VIII 514.

Character 810: changed from (0) to (1).

*Proterosuchus goweri*

Character 34: changed from (?) to (2/3).

Character 810: changed from (0) to (1).

*Protorosaurus speneri*

Character 39: changed from (-) to (0).

Character 324: changed from (0) to (1).

Character 342: changed from (1) to (1&2).

Character 403: changed from (-) to (0).

Character 430: changed from (0) to (2).

Character 431: changed from (-) to (0).

Character 810: changed from (0) to (?).

*Pseudochampsa ischigualastensis*

Character 321: changed from (?) to (0).

Character 322, 323: changed from (?) to (-).

Character 368: changed from (0) to (?).

Character 403: changed from (-) to (?).

Character 803: changed from (1) to (2).

Character 810: changed from (0) to (?).

*Raeticodactylus filisurensis*

Character 761: changed from (0) to (2).

*Raibliania calligarisi*

Character 368: changed from (1) to (1/2).

*Rhynchosaurus articeps*

Character 270: changed from (0) to (?).

Character 342: changed from (0) to (1).

Character 761: changed from (?) to (-).

*Riojasuchus tenuisceps*

Character 206: changed from (1) to (0).

Character 282: changed from (0) to (1).

Character 342: changed from (0) to (1/2).

Character 591: changed from (0) to (2) based on Baczko *et al.* (2020).

*Rugarhynchus sixmilensis*

Character 34: changed from (2) to (1/2/3).

Character 53: changed from (0) to (-).

Characters 57, 67: changed from (0) to (1).

Character 58: changed from (-) to (1).

Characters 59, 60, 81: changed from (-) to (0).

Character 98: changed from (1) to (0).

Character 127: changed from (2) to (0) because the authors describe that the condition is similar to *Doswellia kaltenbachi*.

Characters 188, 189: changed from (?) to (0).

Character 333: changed from (0) to (?).

Character 636: changed from (?) to (-).

*Salvator rufescens*

Character 93: changed from (0) to (1).

Character 177: changed from (0/1) to (1).

Character 266: changed from (-) to (0).

Character 356: changed from (0) to (-).

Character 368: changed from (1) to (2).

Character 701: changed from (2) to (-).

*Sarmatosuchus otschevi*

Character 34: changed from (?) to (2/3).

Character 322: changed from (1) to (-).

Character 342: changed from (2) to (0).

Character 356: changed from (?) to (0).

Character 357: changed from (?) to (1).

Character 368: changed from (?) to (0/1).

Character 403: changed from (-) to (0).

*Saturnalia tupiniquim*

Character 457: changed from (1) to (0).

Characters 544 and 545: changed from (0) to (1).

Character 546: changed from (-) to (2).

Characters 547, 552: changed from (-) to (1).

Characters 548, 549, 550, 551: changed from (-) to (0).

Character 761: changed from (?) to (0/1/2/4).

Character 810: changed from (0) to (1).

*Shansisuchus kuyeheensis*

Character 403: changed from (-) to (0).

*Shansisuchus shansisuchus*

Character 37: changed from (0&1) to (1).

Character 68: changed from (0) to (2) based on Wang *et al.* (2013: fig. 2).

Character 322: changed from (1) to (-).

Character 342: changed from (?) to (0).

Character 353: changed from (0) to (2&3).

Character 368: changed from (0) to (0/1).

Character 393: changed from (2) to (0).

Character 403: changed from (-) to (0).

Character 602: changed from (?) to (1).

Character 811: changed from (0) to (1).

*Shringasaurus indicus*

Character 1: changed form (0) to (1).

Character 41: changed from (0) to (1).

Character 240: changed from (?) to (3).

Character 241: changed from (?) to (-).

Character 342: changed from (0) to (2).

Character 368: changed from (1) to (0).

Character 403: changed from (-) to (1).

Character 485: changed from (0) to (0/1).

Character 761: changed from (0/2) to (?).

Character 810: changed from (0) to (?).

*Simoedosaurus lemoinei*

Character 322: changed from (0&1) to (-).

Character 356: changed from (0) to (-).

Character 368: changed from (1) to (2).

Character 403: changed from (-) to (1).

Character 467: changed from (0) to (0&1) because of the presence of each character state in MNHN.F.R3313 and MNHN.F.BR.12090, respectively.

*Silesaurus opolensis*

Character 520: changed from (1) to (2).

Character 810: changed from (0) to (0&1).

*Smilosuchus* spp.

Character 342: changed from (0) to (2).

Character 403: changed from (-) to (1).

Character 591: changed from (0) to (1).

*Sphenodon punctatus*

Character 195: changed from (6) to (-).

Character 324: changed from (0) to (2).

Character 342: changed from (0) to (1).

Character 356: changed from (0) to (-).

Character 368: changed from (1) to (2).

Character 403: changed from (-) to (1).

Character 411: changed from (0) to (2).

Character 761: changed from (1) to (3).

*Spinosuchus caseanus*

Character 324: changed from (0) to (2).

Character 356: changed from (-) to (0).

Character 403: changed from (-) to (?).

Character 758: changed from (1) to (0).

Character 761: changed from (0) to (1&3).

Character 810: changed from (0) to (1).

*Spondylosoma absconditum*

Character 321: changed from (0) to (?).

Characters 322, 323: changed from (-) to (?).

Character 368: changed from (?) to (0/1).

Character 810: changed from (0) to (1).

*Stagonolepis robertsoni*

Character 34: changed from (2) to (1).

Character 56: changed from (0) to (-) because of the absence of a secondary antorbital fenestra.

Character 83: changed from (1) to (0).

Character 147: changed from (-) to (0).

Character 148: changed from (-) to (0).

Character 199: changed from (-) to (0).

Character 208: changed from (-) to (?).

Character 218: changed from (0) to (1).

Character 223: changed from (0) to (1).

Character 244: changed from (0) to (1).

Character 303: changed from (0) to (1&2).

Character 308: changed from (0) to (1).

Character 320: changed from (1) to (0).

Character 342: changed from (0) to (?).

Character 392: changed from (1) to (0).

Character 399: changed from (1) to (0).

Character 409: changed from (1) to (0).

*Stenaulorhynchus stockleyi*

Character 129: changed from (1) to (-).

Character 356: changed from (-) to (0).

Character 761: changed from (0) to (-).

*Tanystropheus* spp.

Character 34: changed from (1) to (0&1).

Character 219: changed from (0) to (?).

Character 342: changed from (1) to (0).

Character 403: changed from (-) to (0).

*Tanystropheus haasi*

Character 321: changed from (?) to (0).

*Tanytrachelos ahynis*

Character 342: changed from (1) to (0).

Character 356: changed from (0) to (-).

Character 368: changed from (1) to (2).

Character 403: changed from (-) to (0).

*Tarjadia ruthae*

Character 342: changed from (0) to (?).

Character 403: changed from (-) to (?).

Character 761: changed from (0) to (0/3).

*Tasmaniosaurus triassicus*

Character 171: changed from (0) to (0/1).

Character 415: changed from (?) to (0).

Character 425: changed from (?) to (1).

Character 763: changed from (0) to (1).

*Tawa hallae*

Character 342: changed from (1) to (?).

Character 457: changed from (1) to (0).

Characters 544 and 545: changed from (0) to (1).

Character 546: changed from (-) to (2).

Characters 547, 552: changed from (-) to (1).

Characters 548, 549, 550, 551: changed from (-) to (0).

Character 780: changed from (1) to (0).

Character 810: changed from (0) to (2).

*Teleocrater rhadinus*

Character 321: changed from (0) to (1).

Characters 322, 323: changed from (-) to (0).

Character 342: changed from (0) to (1&2).

Character 368: changed from (?) to (0).

Character 544: changed from (0) to (1).

Character 810: changed from (0) to (0&1).

*Teraterpeton* *hrynewichorum*

Character 342: changed from (0) to (2).

Character 368: changed from (1) to (0/1).

Character 403: changed from (-) to (?).

Character 758: changed from (1) to (0).

*Teyujagua paradoxa*

Characters 1, 66, 89, 90, 123, 142, 178, 181, 183, 188, 189, 190, 193, 194, 195, 261, 266, 268, 273, 277, 294, 295, 321, 632, 655, 678, 679, 692, 703, 749, 750, 757, 758, 761, 762: changed from (?) to (0) based on Pinheiro *et al.* (2020).

Characters 41, 192, 196, 199, 215, 272, 313, 346: changed from (?) to (1) based on Pinheiro *et al.* (2020).

Character 75: changed from (2/3) to (3) based on Pinheiro *et al.* (2020).

Characters 67, 156, 274, 719: changed from (?) to (-) based on Pinheiro *et al.* (2020).

Character 150: changed from (1) to (0) based on Pinheiro *et al.* (2020).

Characters 151, 152, 153, 155, 636: changed from (0) to (-) based on Pinheiro *et al.* (2020).

Characters 169, 754: changed from (0) to (1) based on Pinheiro *et al.* (2020).

Characters 187, 197, 202: changed from (?) to (2) based on Pinheiro *et al.* (2020).

Character 299: changed from (0/1) to (1) based on Pinheiro *et al.* (2020).

Character 342: changed from (2) to (3).

Character 623: changed from (-) to (1).

*Teyumbaita sulcognathus*

Character 403: changed from (-) to (0).

Characters 718 and 810: changed from (0) to (1).

Character 761: changed from (?) to (-).

*Ticinosuchus ferox*

Character 368: changed from (0) to (0/1).

Character 798: changed from (?) to (1).

Character 803: changed from (1) to (0/1).

*Trachelosaurus fischeri*

Character 34: changed from (?) to (2).

Character 321: changed from (0) to (1).

Character 322: changed from (-) to (0).

Character 323: changed from (-) to (0).

Character 342: changed from (1) to (?).

Character 368: changed from (1) to (1/2).

*Trilophosaurus buettneri*

Character 1: changed form (?) to (0).

Character 34: changed from (?) to (2).

Character 324: changed from (0) to (2).

Character 342: changed from (0) to (1&2).

Character 353: changed from (0) to (2).

Character 356: changed from (-) to (0).

Character 403: changed from (-) to (1).

Character 758: changed from (1) to (0).

Character 761: changed from (0) to (1&3).

Character 810: changed from (0) to (?).

*Tropidosuchus romeri*

Character 368: changed from (?) to (1/2).

Character 403: changed from (-) to (1).

Character 803: changed from (1) to (2).

Character 810: changed from (0) to (1).

*Turfanosuchus dabanensis*

Character 25: changed from (?) to (-).

Character 34: changed from (2) to (1/2) because only the base of the prenarial process is preserved.

Character 42: changed from (1) to (1/2) because it cannot be determined confidently if there are four or five tooth positions.

Character 54: changed from (3) to (2).

Character 810: changed from (0) to (1).

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Character 311: changed from (0) to (?).

Character 320: changed from (1) to (0).

Character 323: changed from (?) to (0).

Character 368: changed from (?) to (0/1).

*Vancleavea campi*

Character 32: changed from (0) to (1).

Character 368: changed from (0) to (0/1).

Character 761: changed from (2) to (2/3).

Character 810: changed from (0) to (1) based on Parker & Barton (2008: fig. 9.7).

*Venaticosuchus rusconii*

Character 206: changed from (1) to (?).

Character 227: changed from (1) to (?).

Character 282: changed from (0) to (1).

*Vonhuenia fredericki*

Character 322: changed from (1) to (?).

Character 323: changed from (-) to (?).

*Wannia scurriensis*

Character 34: changed from (?) to (2/3).

Waldhaus poposauroid

Character 368: changed from (?) to (0/1).

*Yarasuchus deccanensis*

Character 321: changed from (0) to (1).

Characters 322, 323: changed from (-) to (0).

Character 342: changed from (0) to (1&2).

Character 368: changed from (?) to (0/1).

Character 403: changed from (-) to (0).

Character 544: changed from (0) to (1).

Character 810: changed from (0) to (0&1).

*Yonghesuchus sangbiensis*

Character 42: changed from (1) to (2) based on IVPP V12379.

Character 132: changed from (1) to (?).

*Youngosuchus sinensis*

Character 63: changed from (1) to (2).

Character 65: changed from (1) to (0).

Character 342: changed from (0) to (2).

*Youngina capensis*

Characters 39 and 81: changed from (-) to (?).

Character 59: changed from (0) to (-).

Character 342: changed from (0) to (?).

Character 356: changed from (0) to (-).

Character 368: changed from (1) to (2).

Character 701: changed from (2) to (?).

Characters 729, 730, 732, 734, 735, 737, 738, 740, 741, 742: changed from (?) to (0) based on Gardner *et al.* (2010: fig. 7).

Characters 733, 736, 739, 743: changed from (?) to (1) based on Gardner *et al.* (2010: fig. 7).

**New ratios**

Character 342

*Aetosauroides scagliai*: 0.95 (PVL 2091: Cv3)

*Amotosaurus rotfeldensis*: 0.59–1.07 (SMNS 50830: Cv3–Cv5)

*Arizonasaurus babbitti*: 1.59 (Nesbitt 2005: fig. 17a, Cv3/Cv4)

*Asilisaurus kongwe*: 0.59 (Nesbitt *et al.* 2020: fig. 22e)

*Asilisaurus kongwe*: 0.61 (Nesbitt *et al.* 2020: fig. 23a)

*Augustaburiana vatagini*: 0.53 (Sennikov 2011: fig. 3g)

*Austriadactylus cristatus*: ca. 1.00 (SMNS 56342, Cv4).

*Azendohsaurus madagaskarensis*: 0.50–0.68 (Nesbitt *et al.* 2015: fig. 11: Cv3–5); 0.76 (Nesbitt *et al.* 2015: fig. 13).

*Batrachotomus kupferzellensis*: 1.46–1.60 (MHI 1895, Cv3–Cv5)

*Boreopricea funerea*: 1.02 (Benton & Allen 1997: fig. 6a, Cv3 or 4)

*Buriolestes schultzi*: 0.19 (Müller *et al.* 2018, Cv4)

*Chanaresuchus bonapartei*: 1.32–1.59 (PULR 07: Cv3–5), 1.35–1.37 (MCZ 4037: Cv3, Cv5)

*Chasmatosuchus rossicus*: 1.89 (referred), 2.11 (*Tsylmosuchus samariensis*), 1.79 (*Tsylmosuchus jakovlevi*)

*Chasmatosuchus magnus* holotype: 1.64

*Claudiosaurus germaini*: 1.04 (MNHN MAP1, cervical 5).

*Clevosaurus hudsoni*:0.85 (O’Brien *et al.* 2018: fig. 15e: Cv3).

*Coelophysis bauri*: 0.45 (DMNH 39022)

*Decuriasuchus quartacolonia*: 0.93–1.05 (França *et al.* 2011: fig. 3a, Cv3–Cv5)

*Diandongosuchus fuyuanensis*: 1.22–1.34 (Stocker *et al.* 2017: fig. 2c: Cv3–5)

*Eoraptor lunensis*: 0.77 (PVSJ 512, Cv5)

*Erpetosuchus granti*: 1.44–2.16 (Benton & Walker 2002: fig. 3b: Cv3–5)

*Euparkeria capensis*: 1.02–1.07 (SAM-PK-5867: Cv3, Cv5)

*Fuyuanosaurus acutirostris*: 0.46 (Fraser *et al.* 2013: fig. 3: Cv5)

*Garjainia prima*: 1.21–1.40 (PIN 2394/5-11–5-13: Cv3–5)

*Gracilisuchus stipanicicorum*: 1.00 (Lecuona *et al.* 2017: fig. 9)

*Gualosuchus reigi*: 1.17–1.20 (PVL 4576: Cv3–5)

*Herrerasaurus ischigualastensis*: 0.94 (PVSJ 407, Cv3)

*Heterodontosaurus tucki*: 0.60–0.72 (SAM-PK-K1332, Cv3, Cv5)

*Hovasaurus boulei*: 1.44–1.67 (Currie 1981: fig. 11: Cv4, Cv5).

*Hyperodapedon gordoni*: <0.9 (Benton 1983: fig. 19a: Cv3, based on the height of the axial centrum)

*Hyperodapedon huxleyi*: 0.21 (Chatterjee 1974: fig. 15h: Cv3)

*Jaxtasuchus salomoni*: 0.55 (SMNS 91083: Cv5)

*Lagosuchus talampayensis*: 0.62 (PVL 3870, Cv5)

*Lagosuchus talampayensis*: 0.59 (PVL 3872, Cv5)

*Litorosuchus somnii*: 0.68–0.79 (Li *et al.* 2016: figs. 2, 4: Cv3–5)

*Lotosaurus adentus*: ca. 1.8–3.5 (Zhang 1975: plate I, Cv3, Cv4)

*Macrocnemus bassanii*: 0.80–0.88 (PIMUZ T4822: Cv3, Cv4)

*Macrocnemus fuyuanensis*: 0.77–0.79 (Scheyer *et al.* 2020b: fig. 4a: Cv3, Cv4)

*Malerisaurus* all NA: 1.10 (Nesbitt *et al.* 2021: fig. 6i, PEFO 43992).

*Malerisaurus robinsonae*: 0.90–1.04 (ISIR 150, 151: Cv3–5)

*Mandasuchus tanyauchen*: 1.28 (Butler *et al.* 2017: fig. 8, Cv4)

*Megachirella wachtleri*: 0.73 (Simões *et al.* 2018: 3D model: Cv4)

*Megapnosaurus rhodesiensis*: 0.49 (Raath 1977: plate 11a QG 174, Cv4)

*Mesosuchus browni*: 1.75–1.90 (SAM-PK-5882: Cv3–5)

*Mystriosuchus planirostris*: ca. 1.7 (Huene 1923: fig. 1: Cv5 and centrum height of Cv3)

*Nicrosaurus kapffi*: 1.60–1.90 (SMNS 12671: Cv4, Cv5)

*Nyasasaurus parringtoni*: 1.03 (Nesbitt *et al.* 2013: fig. 1i)

*Orovenator mayorum*: 1.06 (Ford & Benson 2019: 3D model in Morphosource project 412, cervical 3).

*Osmolskina* complete: 1.25 (Borsuk-Białynicka & Sennikov 2009: fig. 5f: ca. Cv5)

*“Paleorhinus” sawini*: 1.33 (TMM 31213-16)

*Pamelaria dolichotrachela*: 0.62–0.70 (ISIR 316: Cv3–5)

Panchet proterosuchid 1.34 (ISIR 1080), 1.22 (ISIR 1081), 1.33 (ISIR 1084).

*Parasuchus hislopi*: >1.14 (ISIR 42 or 43)

*Pectodens zhenyuensis*: 0.55 (Li *et al.* 2017: fig. 3: Cv5)

*Petrolacosaurus kansensis*: 0.73–0.87 (Reisz 1981: fig. 14c, h: Cv3–5)

*Prestosuchus chiniquensis*: 0.88–0.90 (UFRGS-PV-0629T, Cv3, Cv4)

*Prolacerta broomi* 0.79–1.01 (BP/1/2675: Cv4, Cv5)

*Protanystropheus antiquus*: 0.48 (SMNS 50831)

*Proterochampsa barrionuevoi*: 1.17 (Dilkes & Arcucci 2012: fig. 11c: Cv5)

*Proterosuchus alexanderi* 1.24–1.61 (NMQR 1484: Cv3, Cv 4)

*Proterosuchus fergusi*: 1.23–1.34 (BP/1/3993: Cv4, ?Cv5), 1.28 (SAM-PK-11208: Cv 5), 1.25 (SNSB-BSPG 1934 VII 514: Cv3)

*Protorosaurus speneri*: 1.46–1.57 (SNSB-BSPG 1995 I 5: Cv4, Cv5)

*Qianosuchus mixtus*: 1.49 (Li *et al.* 2006: fig. 3a, Cv5)

*Revueltosaurus callenderi*: 1.06 (Parker *et al.* 2021: fig. 8e, anteriormost vertebra)

*Rhamphorhynchus muensteri*: 0.93–0.99 (Wellnhofer 1975: fig. 6a, Cv3, Cv4)

*Rhynchosaurus articeps*: 1.45 (SHYMS 1: Cv3)

*Riojasuchus tenuisceps*: 1.42–1.90 (PVL 3827: Cv3)

*Salvator rufescens*: 3.09–3.22 (MACN-Pv Ac 0391, Cv3–Cv5)

*Sarmatosuchus otschevi*: 0.96–0.98 (PIN 2865/68: Cv3, Cv4)

*Seazzadactylus venieri*: ca. 1.00 (Dalla Vecchia 2019: fig. 3, Cv3)

*Shansisuchus shansisuchus*: ca. 1.0 (Wang *et al.* 2013: fig. 4, Cv4)

*Shringasaurus indicus*: 1.74 (ISIR 812: ?Cv5)

*Silesaurus opolensis*: 1.31 (ZPAL/Ab/III unnumbered, ?Cv5)

*Simoedosaurus lemoinei*: 0.49–0.81 (Sigogneau-Russell 1981: fig. 8: Cv 3, Cv5).

*Smilosuchus* spp.: 1.67 (USNM 18313)

*Sphenodon punctatus*: 1.17–1.36 (MorphoSource 3D skeleton: Cv3–5)

*Stenaulorhynchus stockleyi*: >0.90 to <1.06 (Huene 1938: plate III, fig. 3: Cv3)

*Tanytrachelos ahynis*: ca. 1.0 (Olsen 1979: fig. 2a: Cv4, Cv5)

*Tanystropheus* spp.: 0.62–0.79 (PIMUZ T2819: Cv3, Cv5)

*Teleocrater rhadinus*: 1.68 (NMT RB505), 1.47 (NMT RB506), 1.74 (NMT RB511), 1.52 (NMT RB512).

*Teraterpeton hrynewichorum*: 1.57 (Sues 2003: fig. 7: Cv4)

*Teyujagua paradoxa*: ca. 2.45 (UNIPAMPA 653 cast: Cv3)

*Teyumbaita sulcognathus*: 0.50–0.56 (UFRGS-PV-0232T: Cv3, Cv4)

*Ticinosuchus ferox*: 0.86 (PIMUZ T2817: Cv3)

*Trilophosaurus buettneri*: 1.31 (Spielmann *et al.* 2008: fig. 30: Cv3), ca. 1.6–1.8 (Spielmann *et al.* 2008: fig. 32: Cv5)

*Tropidosuchus romeri*: 0.85–0.91 (PVL 4601: Cv4, Cv5)

*Xilousuchus sapingensis*: 1.60–1.82 (Nesbitt *et al.* 2011: fig. 7c, e, Cv3, Cv5)

*Yarasuchus deccanensis*: 1.41–1.58 (ISIR 334)

*Youngosuchus sinensis*: 1.57 (PIN V3239: Cv5)

Discretized ratios: <0.38; 0.42-0.81; 0.85-1.10; 1.17-1.36; 1.4-1.68; 1.74-1.90; 2.11-2.16; >3.0.

Character 853

*Aetosaurus ferratus*: 0.173 (Schoch 2007: specimen 16).

*Amotosaurus rotfeldensis*:0.141 (SMNS 54783).

*Buriolestes schultzi*: 0.151 (Müller *et al.* 2018).

*Chanaresuchus bonapartei*: 0.201 (PVL 4575).

*“Chasmatosaurus” yuani*: 0.250 (IVPP V4067).

*Claudiosaurus germaini*: 0.086 (MNHN MAP1).

*Clevosaurus hudsoni*: 0.303 (Fraser 1988).

*Coelophysis bauri*: 0.079 (AMNH 7223).

*Decuriasuchus quartacolonia*: 0.158 (França *et al.* 2011).

*Dinocephalosaurus orientalis*: <0.05 (Rieppel *et al.* 2008: fig. 7).

*Doswellia kaltenbachi*: ca. 0.13–0.14 (Weems 1980: tables 2–4).

*Eoraptor lunensis*: 0.091 (PVSJ 512).

*Euparkeria capensis*: 0.154 (SAM-PK-5867).

*Gracilisuchus stipanicicorum*: 0.247 (PULR 08).

*Heterodontosaurus tucki*: 0.109 (SAM-PK-K1332).

*Hyperodapedon gordoni*: 0.400 (Benton 1983).

*Hyperodapedon huxleyi*: 0.422 (Chatterjee 1974).

*Hyperodapedon sanjuanensis*: 0.367 (MACN-Pv 18185).

*Machaeroprosopus pristinus*: 0.237 (Long & Murry 1995).

*Macrocnemus fuyuanensis*: 0.083 (Scheyer *et al.* 2020b).

*Parasuchus hislopi*: 0.202 (Chatterjee 1978).

*Proterochampsa barrionuevoi*: 0.609 (PVSJ 606).

*Proterosuchus alexanderi*: 0.117 (NMQR 1484).

*Pseudochampsa ischigualastensis*: 0.133 (PVSJ 567).

*Rhynchosaurus articeps*: 0.255 (NHMUK PV R1237/R1238).

*Salvator rufescens*: 0.158 (MACN-Pv Ac 0153).

*Scleromochlus taylori*: 0.336 (NHMUK PV R3556).

*Sphenodon punctatus*: 0.286 (MorphoSource specimen).

*Sphodrosaurus pennsylvanicus*: 0.440 (Franklin and Marshall College, North Museum 2321).

*Tanystropheus spp.*: 0.044 (Nosotti 2007).

*Tropidosuchus romeri*: 0.182 (PVL 4604).

*Youngina capensis*: 0.208 (SAM-PK-K7710a).

*Aetosauroides scagliai*

Character 100: 2.02 (Paes Neto *et al.* 2021: fig. 3).

Character 177: 108.2° (Paes Neto *et al.* 2021: fig. 12b).

*Claudiosaurus germaini*

Character 2: ca. 0.17 (MNHN MAP1).

Character 20: ca. 0.41 (Carroll 1981: fig. 15).

Character 28: ca. 3.2 (Carroll 1981: fig. 14).

Character 42: 14 or 15 (Carroll 1981: 344).

Character 75: aprox. 35 maxillary teeth and 50 dentary teeth (Carroll 1981).

Character 266: 0.07 (Carroll 1981: fig. 14b).

Character 331: ca. 2.39 (MNHN MAP1, cervical 5).

Character 351: 2.32–2.76 (Carroll 1981: fig. 13).

Character 352: 2.79 (MNHN MAP1, dorsal 14).

Character 369: 2.79 (MNHN MAP1).

Character 377: 1.19–1.32 (MNHN MAP1, caudal 2, 3).

Character 379: 0.83–0.92 (Carroll 1981: fig. 17c, caudal 1, 2).

Character 387: 1.24 (Carroll 1981: fig. 18c).

Character 414: 0.70 (MNHN MAP1).

Character 416: 0.25 (Carroll 1981: fig. 27e).

Character 424: 0.35 (Carroll 1981: fig. 27e).

Character 435: 0.64 (MNHN MAP1).

Character 446: 0.53 (MNHN MAP1).

Character 448: 0.48 (MNHN MAP1).

Character 472: 0.35 (Carroll 1981: fig. 20).

Character 489: 1.14 (Carroll 1981: fig. 20).

Character 490: 1.00 (Carroll 1981: fig. 20).

Character 490: 0.92 (Carroll 1981: fig. 21).

Character 510: 0.22 (Carroll 1981: fig. 28b).

Character 516: 0.90 (MNHN MAP1).

Character 556: 0.87 (Carroll 1981: fig. 24d).

Character 567: 0.49 (MNHN MAP1).

Character 569: 0.52 (MNHN MAP1).

Character 571: 0.87 (MNHN MAP1).

Character 574: 0.99 (MNHN MAP1).

Character 581: 0.77 (MNHN MAP1).

Character 583: 2.49 (Carroll 1981: fig. 26).

*Eifelsaurus triadicus*

Character 377: 1.35–1.51 (Sues *et al*. 2021: fig. 2).

Character 472: 0.45 (Sues *et al*. 2021: fig. 2).

*Elachistosuchus huenei*

Character 75: >26 (Sobral *et al.* 2015).

Character 100: 2.09 (Sobral *et al.* 2015: fig. 2a).

Character 266: 0.08 (Sobral *et al.* 2015: fig. 2e).

Character 351: 2.00 (Sobral *et al.* 2015: fig. 7g).

Character 410: 0.12 (Sobral *et al.* 2015: fig. 2h).

Character 731: ca. 1.50 (Sobral *et al.* 2015: fig. 2h).

Character 737: <0.70 (Sobral *et al.* 2015: fig. fig. 2h).

*Elessaurus gondwanoccidens*

Character 510: 0.25

Character 516: 1.12

Character 567: 0.29.

*Erpetosuchus* sp.

Character 55: 0.16 (3D model of Foffa *et al.* 2020).

*Feralisaurus corami*

Character 2: <0.38 (Cavicchini *et al.* 2020: fig. 2).

Character 20: <0.59 (Cavicchini *et al.* 2020: fig. 10a).

*Fraxinisaura rozynekae*

Character 100: 0.59 (Schoch & Sues 2018: fig. 4o).

Character 266: 0.10 (Schoch & Sues 2018: fig. 4e).

Character 416: 0.22 (Schoch & Sues 2018: fig. 7b).

Character 463: 0.89 (Schoch & Sues 2018: fig. 6e).

Character 510: 0.26 (Schoch & Sues 2018: fig. 7f).

*Garjainia prima*

Character 331: 1.09 and 1.31 based on complete presacral series of PIN 951/64.

Character 351: 0.97−1.19 based on the first five dorsal vertebrae of PIN 951/64.

Character 352: 0.90−1.30 based on the last five dorsal vertebrae of PIN 951/64.

Character 377: 0.98 based on PIN 951/65-26.

Character 379: 2.03 based on PIN 951/65-26.

Character 435: 0.77−0.83 based on humeri (PIN 951/65-37, 65-40) and radius (PIN 951/16).

Character 458: 0.32 based on ilium (PIN 951/8 right mounted) and femur (PIN 951/27).

Character 472: 0.55 based on pubis (PIN 951/5 left, mounted) and femur (PIN 951/27).

Character 482: 2.17 based on ilium (PIN 951/49) and ischium (PIN 951/51).

Character 489: 1.26 based on femur (PIN 951/27) and humerus (PIN 951/31).

Character 490: 0.99 based on femur (PIN 951/27) and humerus (PIN 951/31).

*Heterodontosaurus tucki*

Character 351: ca. 1.00–ca. 1.30 (Radermacher *et al.* 2021: fig. 3b).

*Hovasaurus boulei*

Character 100: 1.44 (Currie 1981: fig. 8).

Character 331: 1.67 (Currie 1981: fig. 11: Cv4).

Character 352: 1.39–1.71 (Currie 1981: table 2: D15–D20).

Character 377: 1.30 (Currie 1981: fig. 3: Ca1).

Character 379: 1.13–1.46 (Currie 1981: fig. 3: Ca1, Ca2).

Character 403: changed from (-) to (1).

Character 410: ca. 0.12 (Currie 1981: fig. 20c).

Character 414: 0.78 (MNHN MAP349).

Character 416: 0.39 (MNHN MAP349).

Character 424: 0.40 (Currie 1981: fig. 25b).

Character 435: 0.69 (MNHN MAP349).

Character 446: 0.51 (MNHN MAP316).

Character 446: 0.45 (MNHN MAP316).

Character 458: 0.13 (Currie 1981: fig. 3).

Character 463: 1.02 (Currie 1981: fig. 3).

Character 472: 0.36 (Currie 1981: fig. 3).

Character 482: 2.10 (Currie 1981: fig. 3).

Character 489: 1.23 (Currie 1981: fig. 3).

Character 490: 0.61 (MNHN MAP316).

Character 510: 0.27 (MNHN MAP316).

Character 516: 0.86 (MNHN MAP316).

Character 556: 0.47 (Currie 1981: fig. 28j).

Character 567: 0.49 (MNHN MAP337).

Character 569: 0.48 (MNHN MAP337).

Character 571: 0.79 (MNHN MAP337).

Character 574: 1.08 (MNHN MAP337).

Character 581: 0.75 (Currie 1981: fig. 4).

Character 583: 2.39 (Currie 1981: fig. 4).

Character 816: 0.39 (Currie 1981: fig. 28j).

*Huehuecuetzpalli mixtecus*

Character 2: 0.46 (Reynoso 1998: fig. 1).

Character 2: 0.44 (Reynoso 1998: fig. 2).

Character 20: 0.43 (Reynoso 1998: table 1).

Character 21: ca. 0.55 (Reynoso 1998: fig. 4).

Character 28: 3.27 (Reynoso 1998: fig. 4).

Character 42: 6 (Reynoso 1998).

Character 75: 13 (Reynoso 1998).

Character 76: 0.70 (Reynoso 1998: fig. 4).

Character 266: 0.10 (Reynoso 1998: fig. 4).

Character 377: 1.08 (Reynoso 1998: fig. 1: Ca2).

Character 380: 0.35–0.43 (Reynoso 1998: fig. 6c: Ca4, Ca5).

Character 387: 3.80 (Reynoso 1998: fig. 8).

Character 410: ≤0.12 (Reynoso 1998: fig. 8).

Character 414: 0.62 (Reynoso 1998: fig. 1).

Character 414: 0.66 (Reynoso 1998: fig. 2).

Character 416: 0.29 (Reynoso 1998: fig. 1).

Character 435: 0.82 (Reynoso 1998: table 1).

Character 446: 0.52 (Reynoso 1998: fig. 1).

Character 448: 0.30 (Reynoso 1998: fig. 9b).

Character 472: 0.38 (Reynoso 1998: fig. 2).

Character 489: 1.56 (Reynoso 1998: fig. 1).

Character 490: ca. 1.32 (Reynoso 1998: fig. 1).

Character 516: ca. 0.84 (Reynoso 1998: table 1).

Character 556: 0.45 (Reynoso 1998: fig. 9c).

Character 567: 0.62 (Reynoso 1998: table 1).

Character 569: 0.51 (Reynoso 1998: fig. 9c).

Character 571: 0.72 (Reynoso 1998: fig. 9c).

Character 574: 1.05 (Reynoso 1998: fig. 9c).

Character 581: 0.70 (Reynoso 1998: fig. 9c).

Character 583: 2.60 (Reynoso 1998: fig. 9c).

*Macrocnemus bassanii*

Character 28: 4.68 (Miedema *et al.* 2020: fig. 2a).

Character 76: 1.65 (Miedema *et al.* 2020: fig. 3a).

Character 177: 91.7º (Miedema *et al.* 2020: fig. 1b).

Character 266: 0.07 (Miedema *et al.* 2020: fig. 7a).

*Marmoretta oxoniensis*

Character 20: ca. 0.30 (Waldman & Evans 1994: fig. 8).

Character 21: ca. 0.30–0.35 (Waldman & Evans 1994: fig. 8).

Character 28: 1.94 (Evans 1991: fig. 3f).

Character 42: 7–8 (Evans 1991).

Character 75: 25–30 (Evans 1991).

Character 76: ca. 0.80 (Evans 1991: fig. 1a).

Character 100: 0.52 (Evans 1991: fig. 8f).

*Malerisaurus* all NA

Character 28: 1.43 (Nesbitt *et al.* 2021: fig. 6c).

Character 75: >13 (TTU-P 10516).

Character 266: <0.17 (Nesbitt *et al.* 2021: fig. 6h).

Character 331: 2.75–3.34 (Nesbitt *et al.* 2021: fig. 3e; TMM 31099-11).

Character 342: 1.17–1.20 (Nesbitt *et al.* 2021: fig. 4e, f).

Character 352: 1.54 (TMM 31099-11).

Character 387: 2.76 (Nesbitt *et al.* 2021: fig. 3j).

Character 416: 0.48 (Nesbitt *et al.* 2021: fig. 3l).

Character 424: 0.36 (Nesbitt *et al.* 2021: fig. 3l).

Character 435: 0.80 (TMM 31099-11).

Character 458: 0.11 (TMM 31099-11).

Character 463: >0.90 (Nesbitt *et al.* 2021: fig. 3q).

Character 482: 1.99 (Nesbitt *et al.* 2021: fig. 3q).

Character 489: 1.33 (TMM 31099-11).

Character 490: 1.38 (TMM 31099-11).

Character 510: 0.27 (TMM 31025-265).

Character 516: 0.89 (TMM 31099-11).

*Malerisaurus langstoni*

Character 331: 3.34 (TMM 31099-11).

Character 352: 1.54 (TMM 31099-11).

Character 416: 0.31 (TMM 31099-11).

Character 424: 0.27 (TMM 31099-11).

Character 435: 0.80 (TMM 31099-11).

Character 458: 0.11 (TMM 31099-11).

Character 489: 1.33 (TMM 31099-11).

Character 490: 1.38 (TMM 31099-11).

Character 516: 0.89 (TMM 31099-11).

*Orovenator mayorum*

Character 28: 3.67 (Ford & Benson 2019: 3D model in Morphosource project 412).

Character 42: 5 (Ford & Benson 2019).

Character 75: 30 (Ford & Benson 2019).

Character 100: 4.10 (Ford & Benson 2019: 3D model in Morphosource project 412).

Character 266: 0.05 (Ford & Benson 2019: 3D model in Morphosource project 412).

Character 331: 1.64 (Ford & Benson 2019: 3D model in Morphosource project 412).

Character 379: 0.78 (Ford & Benson 2019: 3D model in Morphosource project 412).

*Paliguana whitei*

Character 100: 0.75 (Ford *et al.* 2021: 3D model in Supplementary Information).

*Prestosuchus nyassicus*

Character 379: 2.73 (GPIT/RE/3831).

*Raibliania calligarisi*

Character 352: 2.00−2.37 (Dalla Vecchia 2020).

*Revueltosaurus callenderi*

Character 2: ca. 0.40 (Parker *et al.* 2021: fig. 7a).

Character 20: 0.45 (Parker *et al.* 2021: fig. 3b).

Character 21: 0.48 (Parker *et al.* 2021: fig. 3b).

Character 28: 2.33 (Parker *et al.* 2021: fig. 3b).

Character 50: 0.38 (Parker *et al.* 2021: fig. 3b).

Character 55: 1.21 (Parker *et al.* 2021: fig. 3b).

Character 75: 9 (Parker *et al.* 2021).

Character 76: 1.37 (Parker *et al.* 2021: fig. 3b).

Character 100: 1.00 (Parker *et al.* 2021: fig. 3b).

Character 263: 0.69 (Parker *et al.* 2021: fig. 3b).

Character 266: 0.23 (PEFO 34561).

Character 331: ca. 0.97 (Parker *et al.* 2021: fig. 8e).

Character 342: ca. 1.12 (Parker *et al.* 2021: fig. 8e).

Character 351: 1.48 (Parker *et al.* 2021: fig. 8g).

Character 377: 0.81 (Parker *et al.* 2021: fig. 8m).

Character 379: 1.11 (Parker *et al.* 2021: fig. 8m).

Character 387: 6.01 (Parker *et al.* 2021: fig. 9a).

Character 416: 0.46 (PEFO 34561).

Character 424: 0.49 (PEFO 34561).

Character 435: ca. 0.69 (Parker *et al.* 2021).

Character 448: ca. 0.44 (Parker *et al.* 2021: fig. 9q).

Character 458: 0.23 (Parker *et al.* 2021: fig. 10a, h).

Character 463: 1.07 (Parker *et al.* 2021: fig. 10a).

Character 472: 0.55 (Parker *et al.* 2021: appendix).

Character 482: 2.35 (Parker *et al.* 2021: fig. 10a, c).

Character 489: 1.40 (Parker *et al.* 2021: appendix).

Character 490: 1.53 (Parker *et al.* 2021: appendix).

Character 510: 0.27 (Parker *et al.* 2021: appendix).

Character 556: 0.60 (PEFO 34561).

Character 569: 0.57 (Parker *et al.* 2021: appendix).

Character 574: 0.84 (Parker *et al.* 2021: appendix).

*Rugarhynchos sixmilensis*

Character 8: changed from (0) to (?).

Character 122: changed from (2) to (?).

Characters 123, 124, 129, 692: changed from (-) to (?).

*Salvavtor rufescens*

Character 266: 0.11 (MACN-Pv Ac 1/714).

*Sphenodon punctatus*

Character 731: 1.23 (Walsh *et al.* 2009: fig. 1c).

Character 737: 0.64 (Walsh *et al.* 2009: fig. 1c).

Character 738: 1.27 (Walsh *et al.* 2009: fig. 1c).

Character 739: 1.04 (Walsh *et al.* 2009: fig. 1c).

*Sphodrosaurus pennsylvanicus*

Character 331: 1.6 (cervical 4 of Franklin and Marshall College, North Museum, no. 2321).

Character 351: 1.8 (dorsal 4 of Franklin and Marshall College, North Museum, no. 2321).

Character 352: 1.33 (dorsal 14 of Franklin and Marshall College, North Museum, no. 2321).

Character 387: 8.73–11.00 (based on estimations from both shoulder girdles of Franklin and Marshall College, North Museum, no. 2321).

Character 458: ≤0.21 (Franklin and Marshall College, North Museum, no. 2321).

Character 472: <0.34 (Franklin and Marshall College, North Museum, no. 2321).

Character 516: 0.70–0.74 (Franklin and Marshall College, North Museum, no. 2321).

Character 567: >0.35 (Franklin and Marshall College, North Museum, no. 2321).

Character 569: <0.60 (Franklin and Marshall College, North Museum, no. 2321).

*Teyujagua paradoxa*

Character 266: 0.12 (Pinheiro *et al.* 2020: fig. 15a).

*Youngina capensis*

Character 403: changed from (-) to (0).

Character 737: 0.55 (Gardner *et al.* 2010: fig. 7).

Character 738: 1.39 (Gardner *et al.* 2010: fig. 7).

Character 739: ca. 1.25 (Gardner *et al.* 2010: fig. 7).

Character 743: 1.16 (Gardner *et al.* 2010: fig. 7).

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