Supplement Information.

Modified characters of the original data matrix of Spiekman et al., 2021:

Character 47: Orbit, shape: subcircular (0); distinctly dorsoventrally taller than long (1); subtriangular, with the posterior margin of the orbit being markedly concave (2).

Character 58: Postfrontal, lacks a posterior process and does not participate in the border of the supratemporal fenestra (0); has a posterior process and participates in the border of the supratemporal fenestra (1); postfrontal is elongated and forms a large part of the margin of both the supratemporal fenestra and the orbit (2).

Character 185: Cervical vertebrae, height of neural spine of the axis: ratio between the maximum height of the neural spine and the posterior articular surface height of the centrum of the axis: 0.43-0.59 (0); 0.76-1.33 (1): 1.45-2.23 (2), ORDERED RATIO.

*Cluster analyses were reperformed.*

Character 187: Cervical vertebrae, lengths of the fourth or fifth cervical centra versus the heights of their anterior articular surfaces: 0.63-8.62 (0); 10.16-12.12 (1); 14.58-15.58 (2); 17.08-18.67 (3); 20.05-20.51 (4), ORDERED RATIO.

*Cluster analyses were reperformed.*

Character 224: Chevrons, anteroposterior length of vertebral centrum versus proximodistal length of corresponding haemal spine in anterior caudals (third to fifth caudal): 0.33-0.52 (0); 0.64-0.81 (1); 1.00-1.04 (2), ORDERED RATIO (Fig. 29).

*Cluster analyses were reperformed.*

Character 239: Limbs, flipper-like, indicated by the presence of rod-like stylopodial and zygapodial elements, simple disc-like tarsal and carpal bones, and autopodia without clearly defined ungula phalanges: absent (0); present (1).

Character 248: Humerus, total length of the humerus versus the total length of the femur: 0.63-0.71 (0); 0.76-0.80 (1); 0.84-0.91 (2); 0.97-1.05 (3); 1.15-1.19 (4) ORDERED RATIO.

*Cluster analyses were reperformed.*

Character 258: Metacarpus, length of the longest metacarpal versus length of the longest metatarsal: 0.32-0.41 (0); 0.46-0.49 (1); 0.61-0.88 (2), ORDERED RATIO.

*Cluster analyses were reperformed.*

Character 259: Metacarpus, width of the distal end of the metacarpal I versus its total length: 0.25-0.33 (0); 0.38-0.43 (1); 0.46-0.50 (2); 0.56-0.61 (3); 0.65-0.67 (4), ORDERED RATIO.

*Cluster analyses were reperformed.*

Character 267: Ilium, length of the postacetabular process measured from the most proximal point on the posterior/ventral margin of the process versus anteroposterior length of the acetabulum: 0.48-0.71 (0); 0.88-0.91 (1); 0.98-1.14 (2); 1.22-1.57 (3); 1.72-1.78 (4), ORDERED RATIO.

*Cluster analyses were reperformed.*

Character 294: Pes, foot length (articulated longest metatarsal + digit) versus tibia-fibula length: 0.60-0.68 (0); 0.79-1.04 (1); 1.12-1.16 (2); 1.34-1.56 (3); 1.96-2.04 (4), ORDERED RATIO.

Character 307: Pedal digits, ventral tubercle in unguals: absent or small (0); well-developed and extended ventral to the articular portion of the ungual (1). This character is inapplicable in taxa in which the terminal phalanx of each digit does not form an ungual.

Modified character scorings of the original data matrix of Spiekman et al., 2021:

*Youngina capensis:*

Ch. 258: 2 to 1

*Claudiosaurus germaini*:

Ch. 185: 2 to 1

Ch. 258: 2 to 1

*Czatkowiella harae*:

Ch. 187: 1 to 0

*Macrocnemus obristi*:

Ch. 286: 1 to 0

*Macrocnemus fuyuanensis*:

Ch. 50: 1 to 0

Ch. 258: 1 to 0

*Tanystropheus hydroides*:

Ch. 258: 1 to 0

GMPKU-P-1527 *Tanystropheus* cf. *hydroides*:

Ch. 258: 1 to 0

*“Tanystropheus antiquus”*:

Ch. 187: 1 to 0

*Sclerostropheus fossai*:

Ch. 187: 1 to 0

*Augustaburiania vatagini*:

Ch. 187: 1 to 0

*Langobardisaurus pandolfii*:

Ch. 187: 1 to 0

Ch. 258: 0&1 to 0

*Amotosaurus rotfeldensis*:

Ch. 258: 1 to 0

*Tanytrachelos ahynis*:

Ch. 187: 1 to 0

Ch. 258: 1 to 0

*Pectodens zhenyuensis*:

Ch. 187: 1 to 0

Ch. 258: 3 to 2

Ch. 259: 1 to 2

*Fuyuansaurus acutirostris*:

Ch. 187: 1 to 0

*Dinocephalosaurus orientalis*:

Ch. 13: 0/1 to 1

Ch. 16: 1 to 0

Ch. 17: ? to 0

Ch. 19: 1 to 0

Ch. 20: 1 to ?

Ch. 35: 2 to 1/2

Ch. 45: ? to 0

Ch. 47: 0 to 2

Ch. 50: ? to 1

Ch. 54: ? to 0

Ch. 56: ? to 0

Ch. 58: ? to 2

Ch. 59: 0 to ?

Ch. 62: ? to 1

Ch. 71: 0 to ?

Ch. 73: 1 to 2

Ch. 75: 1 to 0

Ch. 87: ? to 0

Ch. 88: ? to –

Ch. 89: ? to –

Ch. 92: 1 to 0

Ch. 93: 1 to ?

Ch. 94: ? to 0

Ch. 106: - to 0

Ch. 111: ? to 0

Ch. 112: ? to 0

Ch. 120: ? to 0

Ch. 121: ? to 0

Ch. 123: ? to 1

Ch. 127: 1 to 0

Ch. 133: ? to 0/1/2

Ch. 145: ? to 0

Ch. 146: 0 to 1

Ch. 147: ? to 0

Ch. 149: ? to 1

Ch. 161: 1 to 0/1

Ch. 169: 0 to 0/4

Ch. 176: ? to 1

Ch. 177: ? to 1

Ch. 185: 1 to 0

Ch. 188: 0/2 to 2

Ch. 189: ? to 1

Ch. 190: ? to 1

Ch. 191: ? to 1

Ch. 194: ? to 0

Ch. 202: ? to 1

Ch. 203: ? to 0/2

Ch. 205: 1 to 0

Ch. 206: ? to 0

Ch. 207: ? to 1

Ch. 209: ? to 0/1

Ch. 211: 1 to 0

Ch. 212: 0 to ?

Ch. 215: ? to 0

Ch. 216: ? to 0

Ch. 217: ? to –

Ch. 220: ? to 1

Ch. 222: ? to 0

Ch. 223: ? to 3

Ch. 224: ? to 1

Ch. 226: ? to 1

Ch. 227: ? to 1

Ch. 228: ? to 1

Ch. 229: ? to -

Ch. 230: ? to -

Ch. 231: ? to 0

Ch. 232: ? to 1

Ch. 233: ? to 1

Ch. 247: 2 to 1

Ch. 248: 3 to 2&3

Ch. 253: 0 to 3

Ch. 258: ? to 2

Ch. 259: ? to 0/1/2

Ch. 263: ? to 0

Ch. 264: 1 to 0

Ch. 265: 0 to –

Ch. 266: 0 to –

Ch. 273: ? to 0

Ch. 275: ? to 0

Ch. 276: ? to 3

Ch. 277: ? to 0

Ch. 278: ? to 0

Ch. 279: ? to 1

Ch. 280: - to 0

Ch. 285: ? to 0

Ch. 286: ? to 1

Ch. 287: 0 to 1

Ch. 307: 0 to –

*Gracilicollum latens*:

Ch. 13: 1/2/3 to 1/2

*Trilophosaurus buettneri*:

Ch. 258: 3 to 2

 *Mesosuchus browni*:

Ch. 185: 3 to 2

*Prolacerta broomi:*

Ch. 5: 0 to ?

*Teyujagua paradoxa*:

Ch. 185: 3 to 2

Updated character list:

*1) Rostrum, antorbital length (anterior tip of the skull to anterior margin of the orbit) versus total length of the skull: 0.32-0.40 (0); 0.43-0.62 (1), RATIO (Ezcurra 2016: Figs. 17 and 18).*

*2) Rostrum,* *dorsoventral height at the level of the anterior tip of the maxilla versus dorsoventral height at the level of the anterior border of the orbit: 0.20-0.27 (0); 0.32-0.48 (1); 0.56-0.78 (2), ORDERED RATIO (Ezcurra 2016: Figs. 17 and 19).*

*3) Rostrum, proportions* *at the level of the anterior border of the orbit: transversely broader than dorsoventrally tall or subequal (0);* *dorsoventrally taller than transversely broad (1) (Ezcurra 2016: Fig. 16).*

*4) Premaxilla, main body size: length of the tooth bearing margin in lateral view (in edentulous taxa the ventral margin of the premaxilla contributing to the ventral margin of the upper jaw; =main body) versus the length of the rostrum (anterior tip of the skull to the anterior border of the orbit): 0.09-0.10 (0); 0.13-0.20 (1); 0.23-0.38 (2); 0.45-0.54 (3), ORDERED RATIO (Ezcurra 2016: Fig. 17).*

*5) Premaxilla, downturned main body: absent, alveolar margin sub-parallel to the main axis of the maxilla (0); slightly, in which the alveolar margin is angled at approximately 20 degrees to the alveolar margin of the maxilla (1); strongly, prenarial process obscured by the postnarial process in lateral view (if the postnarial process is long enough) and postnarial process parallel or posteroventrally orientated with respect to the main axis of the premaxillary body (2), ORDERED (Ezcurra 2016: Figs. 16-19).*

*6) Premaxilla, angle formed between the alveolar margin and the anterior margin of the premaxillary body in lateral view: acute or right-angled (0); obtuse (1) (Ezcurra 2016: Figs. 20 and 21). This character is inapplicable in taxa with a hooked premaxilla.*

*7) Premaxilla, prenarial process: absent or incipient (0); present and less than the anteroposterior length of the main body of the premaxilla (1); present and longer than the anteroposterior length of the main body of the premaxilla (2), ORDERED (Ezcurra 2016: Figs. 17 and 21). This character is scored as inapplicable in taxa with confluent external nares.*

*8) Premaxilla, base of the prenarial process: anteroposteriorly shallow, being not much wider at its base than further distally on the process (0); anteroposteriorly deep, being much wider at its base than further distally on the process (1) (Ezcurra 2016: Figs. 12, 17, 20 and 21). This character is inapplicable in taxa that lack a prenarial process.*

*9) Premaxilla, postnarial process (=posterodorsal process, =maxillary process, =subnarial process): absent (0); short, ends well anterior to the posterior margin of the external naris (1); well-developed, forms most of the ventral border of the external naris* *or excludes the maxilla from participation in the external naris but process does not contact prefrontal (2); well-developed, forms most of the ventral border of the external naris and postnarial process of premaxilla contacts prefrontal (3), ORDERED (Ezcurra 2016: Figs. 17 and 19).*

*10) Premaxilla, postnarial process (=posterodorsal process, =maxillary process, =subnarial process): wide, plate-like (0); thin (1). This character is not applicable to taxa that lack a postnarial process (Ezcurra 2016: Fig. 20).*

*11) Premaxilla, plate-like palatal shelf or process on the medial surface (contribution to secondary palate by premaxillae): absent (0); present (1) (Ezcurra 2016: Figs. 12, 20 and 21)*

*12) Premaxilla, distinct posterodorsally to anteroventrally directed grooves terminating at the ventral margin of the bone: absent (0); present (1).*

*13) Premaxilla, number of tooth positions: 8 or more (0); 5 or 6 (1); 4 (2); 3 (3); 2 (4); 1 or edentulous (5) ORDERED (Ezcurra 2016: Figs. 16 and 17).*

*14) Premaxilla, orientation of the tooth series or the occlusal surface of premaxilla in ventral view: approximately parasagittal (0); strongly transverse and (in case of tooth-bearing premaxillae) anterior teeth covering each other in lateral view (1) (Ezcurra 2016: Fig. 21). This character is inapplicable in taxa with a hooked and beak-like premaxilla.*

*15) Premaxilla-maxilla, suture: simple continuous contact (0); notched along the ventral margin (1) (Ezcurra 2016: Figs. 17 and 19).*

*16) Premaxilla-maxilla, subnarial foramen between the elements: absent (0); present (1) (Nesbitt 2011: Figs. 14, 17 and 19). This character is inapplicable in taxa that have a ventral notch on the suture of the premaxilla and maxilla.*

*17) Premaxilla-maxilla, contact between the premaxilla and maxilla: simple abutting contact in which the premaxilla might overlap the maxilla slightly laterally (0); overlapping contact in which the maxilla considerably overlaps the premaxilla laterally (1); contact in which the premaxilla has a posteriorly directed peg on its posterolateral margin articulating with the maxilla, often accompanied by a groove (2); complex connection in which the premaxilla has posteriorly projected peg on its medial surface which locks the maxilla against the premaxilla medially (3) (Spiekman et al. 2021: Fig. 2).*

*18) Septomaxilla: present (0); absent (1) (Ezcurra 2016: Fig. 16).*

*19) Maxilla, anterior maxillary foramen: absent (0); present (1) (Ezcurra 2016: Fig. 17).*

*20) Maxilla, dorsal portion, shape: gradual transition between the dorsal and posterior margin of the maxilla and no distinct process is formed (0); the dorsal apex of the maxilla ends abruptly and its posterior margin is concave (1) (Spiekman et al. 2021: Fig. 3).*

*21) Maxilla, anterior part of the dorsal margin: convex (0); straight (1); concave (2) (Ezcurra 2016: Fig. 22).*

*22) Antorbital fenestra: absent (0); present (1).*

*23) Maxilla, maxillary fossa (=‘antorbital fossa’ sensu Rieppel et al. 2008): absent (0); or present (1) (Spiekman et al. 2021: Fig. 4). This character is inapplicable in taxa that have an antorbital fenestra.*

*24) Maxilla,* *posterior end of the horizontal process distinctly ventrally deflected from the main axis of the alveolar margin: absent (0); present (1) (Ezcurra 2016: Figs. 17 and 22).*

*25) Maxilla, alveolar margin in lateral view: straight (0); concave (1); convex (2); sigmoid, anteriorly concave and posteriorly convex (3); sigmoid, anteriorly convex, starting close to mid-length, and posteriorly concave (4) (Spiekman et al. 2021: Fig. 5; Ezcurra 2016: Figs. 16 and 19).*

*26) Maxilla, number of tooth positions: 11-17 (0); 19-40 (1). This character is inapplicable in taxa with multiple tooth rows in the maxilla.*

*27) Maxilla-jugal, anguli oris crest: absent (0); present (1) (Ezcurra 2016: Fig. 16).*

*28) Maxilla-jugal, anguli oris crest: both the jugal and the maxilla are distinctly laterally offset (0); only the jugal is distinctly laterally offset (1) (Ezcurra 2016: Fig. 16). This character is scored as inapplicable in taxa that lack an anguli oris crest.*

*29) External nares, confluent: absent (0); present (1) (Ezcurra 2016: Fig. 16, 17 and 20).*

*30) External naris, shape: sub-circular (0); oval (1) (Ezcurra 2016: Fig. 19). This character is inapplicable in taxa with confluent external nares.*

*31) External naris: located close to the anterior end of the skull (0); a thick anterior margin of the premaxilla results in the external nares being posteriorly displaced (1) (Spiekman et al. 2021: Fig. 6).*

*32) Nasal, shape of anterior margin at midline: strongly convex with anterior process, and nasal forming a partial internarial bar (0); transverse with little convexity (1) (Ezcurra 2016: Fig. 16). This character is inapplicable in taxa in which the external nares are completely separated by an internarial bar.*

*33) Nasal, antorbital recess: absent (0); or present (1) (Spiekman et al. 2021: Fig. 7).*

*34) Nasal, lateral surface: meets dorsoventrally short length of medial surface of dorsal process/portion of the maxilla (0);* *meets entire dorsoventral height of medial surface of supra-alveolar portion of maxilla (1). This character is inapplicable in taxa with an antorbital fenestra.*

*35) Lacrimal, contacts nasal and reaches external naris (0);* *contacts nasal but does not reach naris (1); or does not contact nasal or reach naris (2), ORDERED. This character is inapplicable in taxa in which the premaxilla contacts the prefrontal.*

*36) Lacrimal, naso-lacrimal duct position: opens on the posterolateral edge of the lacrimal (0); opens on the posterior surface of the lacrimal (1) (Ezcurra 2016: Fig. 19). This character is inapplicable if the prefrontal encloses part of the naso-lacrimal duct.*

*37) Jugal, anterior extension of the anterior process: anterior to the level of mid-length of the orbit (0); up to or posterior to the level of mid-length of the orbit (1).*

*38) Jugal, anterior process is dorsoventrally expanded anteriorly: absent, the anterior process tapers anteriorly and articulates with the dorsal surface of the posterior process of the maxilla (0); present, the anterior process of the jugal is expanded and partially covers the lateral surface of the posterior process of the maxilla (1) (Spiekman et al. 2021: Fig. 8).*

*39) Jugal, bulges ventrolaterally at the point where its three processes meet: absent (0); present (1) (Spiekman et al. 2021: Fig. 8). This character is scored as inapplicable in taxa that lack a posterior process of the jugal.*

*40) Jugal, multiple pits on the lateral surface of the main body: absent (0); present (1) (Ezcurra 2016: Fig. 17).*

*41) Jugal, ascending process forming the entire anterior border of the infratemporal fenestra: absent (0); present, postorbital excluded from the anterior border of the infratemporal fenestra (1) (Ezcurra 2016: Fig. 17). This character is inapplicable in taxa in which the anterior process of the squamosal possesses an extensive contact with the postorbital and contacts the jugal, and in taxa that lack an infratemporal fenestra or an ascending process on the jugal.*

*42) Jugal, posterior process: present (0); absent (1) (Spiekman et al. 2021: Fig. 9).*

*43) Jugal, length of the posterior process versus the height of its base: 0.62-2.28 (0); 2.64-3.64 (1); 4.48-4.74 (2); 5.29-5.84 (3), ORDERED RATIO (Spiekman et al. 2021: Fig. 9; Ezcurra 2016: Figs. 17 and 19). This character is inapplicable in taxa that lack a posterior process of the jugal.*

*44) Skull, dermal sculpturing on the dorsal surface of the frontals, parietals, and nasals: absent (0);* *shallow or deep pits scattered across surface and/or low ridges (1) (Ezcurra 2016: Fig. 16).*

*45) Prefrontal, subtriangular medial process: absent, nasal-frontal suture transversely broad (0); present, nasal-frontal suture strongly transversely reduced (1) (Ezcurra 2016: Fig. 7).*

*46) Prefrontal, lateral surface of the orbital margin: smooth or slight grooves present (0);* *rugose sculpturing present (1) (Ezcurra 2016: Fig. 17).*

*47) Orbit, shape: subcircular (0); distinctly dorsoventrally taller than long (1); subtriangular, with the posterior margin of the orbit being markedly concave (2).*

*48) Orbit, elevated rim: absent or incipient (0); present, orbital margin of the jugal and/or postorbital slightly elevated to form a rim (1) (Ezcurra 2016: Figs. 16 and 17).*

*49) Frontal, suture with the nasal: transverse (0); oblique, forming an angle of at least 60 degrees with the long axis of the skull and frontals entering between both nasals (1); oblique and nasals entering considerably between frontals in a non-interdigitate suture (2); frontals enter nasals medially and nasals enter frontals laterally creating a W-shaped suture (3); frontals possess a three-pronged anteromedial process that articulates with the nasals (4) (Spiekman et al. 2021: Fig. 10; Ezcurra 2016: Fig. 23 and Nesbitt 2011: Fig. 18). This character is inapplicable if the nasal is received by a slot in the frontal or the nasal does not contact the frontal.*

*50) Frontal, orbital border in skeletally mature individuals: absent or anteroposteriorly short and forms less than half of the dorsal edge of the orbit (0); anteroposteriorly long and forms at least more than half of the dorsal edge of the orbit (1) (Ezcurra 2016: Fig. 23).*

*51) Frontal, dorsal surface adjacent to sutures with the postfrontal (if present) and parietal: flat to slightly concave (0); possesses a longitudinal and deep depression (1) (Ezcurra 2016: Fig. 16).*

*52) Frontal, longitudinal groove: longitudinally extended along most of the surface of the frontal (0); anterolaterally-to-posteromedially extended along the posterior half of the frontal (1) (Ezcurra 2016: Fig. 16). This character is inapplicable in taxa that lack a longitudinal depression on the frontal.*

*53) Frontal, olfactory tract on the ventral surface of the frontal: maximum transverse constriction point well posterior to the moulds of the olfactory bulbs and posterolateral margin of the bulbs delimited by a low ridge (0); maximum transverse constriction of the olfactory tract immediately posterior to the moulds of the olfactory bulbs and posterolateral margin of the bulbs well-delimited by a thick, tall ridge (1) (Ezcurra 2016: Fig. 23). This character is inapplicable in taxa that lack olfactory bulb moulds and constriction of the olfactory tract canal.*

*54) Frontal, frontals fused to one another: absent (0); present (1) (Ezcurra 2016: Fig. 23).*

*55) Frontal, width (or width of half of a fused frontal in taxa with fused frontals): narrow, frontal is considerably longer than wide (0); very wide and plate-like, frontal is almost as wide as long (1) (Spiekman et al. 2021: Fig. 11).*

*56) Frontal, shape of contact with parietal in dorsal view:* *roughly transverse in orientation (0); frontals exhibit posterolateral processes, forming anteriorly curved U-shaped contact with parietals (1) (Ezcurra 2016: Figs. 8 and 23).*

*57) Postfrontal, suture with the frontal: anteroposteriorly or sagitally orientated (0);* *distinctly posteromedially inclined by a medial process of the postfrontal, resulting in posteriorly strongly narrowed frontal (1); distinctly posterolaterally inclined, resulting in a posteriorly expanded frontal and reduced postfrontal (2) (Spiekman et al. 2021: Fig. 12).*

*58) Postfrontal, lacks a posterior process and does not participate in the border of the supratemporal fenestra (0); has a posterior process and participates in the border of the supratemporal fenestra (1); postfrontal is elongated and forms a large part of the margin of both the supratemporal fenestra and the orbit (2).*

*59) Postfrontal, shape of dorsal surface: flat or slightly concave towards raised orbital rim (0);* *depression with deep pits (1) (Ezcurra 2016: Fig. 16). This character is inapplicable in taxa that lack a postfrontal.*

*60) Postorbital, posterior process extends close to or beyond the level of the posterior margin of the supratemporal fenestrae: absent (0); present (1) (Ezcurra 2016: Fig. 17).*

*61) Postorbital, extension of the ventral process: ends* *much higher than the ventral border of the orbit (0); ends close to or at the ventral border of the orbit (1) (Ezcurra 2016: Fig. 17).*

*62) Postorbital, length of the ventral process versus the length of the posterior process of the postorbital: 0.47-0.59 (0); 0.76-0.88 (1); 0.99-1.17 (2); 1.33-1.62 (3); 1.78-1.95 (4); 2.08-2.20 (5); 2.44-2.54 (6), ORDERED RATIO.*

*63) Postorbital-squamosal, upper temporal bar: located approximately at level of mid-height of the orbit (0); located approximately aligned to the dorsal border of the orbit (1) (Ezcurra 2016: Figs. 17 and 19). This character is inapplicable in taxa without an infratemporal fenestra and in taxa in which the upper temporal bar is very tall, reaching from the dorsal margin of the orbit to or beyond mid-height of the orbit.*

*64) Postorbital-squamosal, contact: restricted to the dorsal margin of the elements (0);* *the anterior process of the squamosal continues along the posterior margin of the ventral process of the postorbital and contacts the jugal (1) (Nesbitt 2011: Figs. 17 and 19). This character is inapplicable in taxa that lack an infratemporal fenestra.*

*65) Infratemporal fenestra: present (0); absent (1).*

*66) Squamosal, anterior process forms more than* *half of the lateral border of the supratemporal fenestra: absent (0); present (1) (Ezcurra 2016: Fig. 16). This character is inapplicable in taxa lacking a supratemporal fenestra.*

*67) Squamosal, ventral process: present (0); absent or completely confluent with anterior process (1) (Spiekman et al. 2021: Fig. 13).*

*68) Squamosal, ventral process: angle between the ventral and anterior processes of the squamosal 90 degrees or less, forming a roughly square outline (0);* *angle between the ventral and anterior processes of the squamosal more than 90 degrees, forming a gentle, widely rounded posterodorsal border of the infratemporal fenestra (1) (Ezcurra 2016: Figs. 8, 17, 18 and 24). This character is scored as inapplicable in taxa that lack a ventral process of the squamosal.*

*69) Squamosal, ventral process: forming a massive flange that covers the quadrate entirely in lateral view (0); anteroposteriorly slender (1). This character is scored as inapplicable in taxa that lack a ventral process on the squamosal.*

*70) Squamosal medial process: short, forming up to half or less of the posterior border of the supratemporal fenestra (0);* *long, forming entirely or almost entirely the posterior border of the supratemporal fenestra (1) (Ezcurra 2016: Fig. 16). This character is scored as inapplicable in taxa that lack a medial process of the squamosal.*

*71) Squamosal medial process, dorsoventrally short (0); dorsoventrally tall and plate-like, forming a tall surface of the posterior margin of the supratemporal fenestra (1) (Spiekman et al. 2021: Fig. 13). This character is scored as inapplicable in taxa that lack a medial process of the squamosal.*

*72) Squamosal, posterior process is distinct and extends posterior to the dorsal head of the quadrate: absent (0); present (1) (Ezcurra 2016: Fig. 18, 19, and 24). This character is inapplicable in taxa where the quadrate is completely covered by the squamosal in lateral view.*

*73) Supratemporal: broad element (0); slender, in parietal and squamosal trough (1); absent (2) ORDERED (Ezcurra 2016: Fig. 17).*

*74) Parietal, median contact between both parietals: suture present (0); fused with loss of suture (1) (Ezcurra 2016: Fig. 16).*

*75) Parietal, extension over interorbital region: absent or slight (0); present (1) (Ezcurra 2016: Figs. 6 and 23).*

*76) Parietal, pineal fossa on the median line of the dorsal surface: absent (0); present (1). This character should not be scored for early juveniles (Spiekman et al. 2021: Fig. 14; Ezcurra 2016: Fig. 8).*

*77) Parietal, pineal foramen in dorsal view: large (0); reduced to a small, circular pit or concavity (1); absent (2) (Ezcurra 2016: Figs. 6 and 8), ORDERED.*

*78) Parietal, position of the pineal foramen in dorsal view: enclosed by parietals and clearly on the posterior part of the bones (0); enclosed by parietals at roughly mid-length of the bones (1); enclosed by parietals on the anterior part of the bones close to the frontals (2); enclosed by both frontals and parietals (3), ORDERED (Ezcurra 2016: Figs. 6 and 8). This character is scored as inapplicable in taxa that lack a pineal foramen.*

*79) Parietal, orientation of the posterolateral process: roughly transverse (0); strongly angled posterolaterally (1) (Spiekman et al. 2021: Fig. 14).*

*80) Parietal, posterolateral process height: dorsoventrally low, usually considerably lower than the supraoccipital (0);* *dorsoventrally deep, being plate-like in occipital view and subequal to the height of the supraoccipital (1) (Ezcurra 2016: Fig. 27).*

*81) Parietal, supratemporal fossa medial to the supratemporal fenestra: absent (0); present (1) (Spiekman et al. 2021: Fig. 14).*

*82) Parietal,* *supratemporal fossa medial to the supratemporal fenestra:* *well-exposed in dorsal view and mainly dorsally or dorsolaterally facing (0); poorly exposed in dorsal view and mainly laterally facing (1) (Ezcurra 2016: Fig. 16). This character is scored as inapplicable in taxa that lack a supratemporal fossa on the parietal.*

*83) Parietal, medial extent of the supratemporal fossa:* *restricted to the lateral edge of the parietal, resulting in a broad, flat parietal table (0); expanded distinctly medially,* *resulting in a mediolaterally narrow parietal table (1); supratemporal fossae* *strongly expanded medially and only separated by a ridge running along the midline of the parietal, the sagittal crest (2), ORDERED (Spiekman et al. 2021: Fig. 14). This character is scored as inapplicable in taxa that lack a supratemporal fossa on the parietal.*

*84) Postparietal, size (pair of postparietals if they are not fused to each other):* *sheet-like, not much narrower than the supraoccipital (0);* *small, splint-like (1); absent as a separate ossification (2) ORDERED (Ezcurra 2016: Fig. 23).*

*85) Postparietal, fusion between counterparts: absent (0); present, forming an interparietal (1). This character is inapplicable in taxa that lack postparietals.*

*86) Tabular: present (0); absent (1).*

*87) Quadratojugal: absent or fused to the quadrate (0); present (1) (Ezcurra 2016: Fig. 24).*

*88) Quadratojugal, anterior process: absent, anteroventral margin of the bone rounded and the quadratojugal and jugal do not connect and therefore the lower temporal bar is incomplete (0); incipient, short anterior prong on the anteroventral margin of the bone and the quadratojugal and jugal connect and therefore the lower temporal bar is complete (1); distinctly present, in which the lower temporal bar is complete, but process terminates well posterior to the base of the posterior process of the jugal (2); distinctly present, in which the lower temporal bar is complete and participates in the posteroventral border of the infratemporal fenestra, and process terminates close to the base of the posterior process of the jugal (3), ORDERED (Ezcurra 2016: Figs. 17 and 19). This character is inapplicable in taxa that lack an infratemporal fenestra or quadratojugal.*

*89) Quadratojugal, posterior extension of the ventral end: absent, without a posteriorly arched quadratojugal (0); limited, ventral condyles of the quadrate broadly visible in lateral view (1); strongly developed, overlapping completely or almost completely the ventral condyles of the quadrate in lateral view (2), ORDERED (Ezcurra 2016: Fig. 18). This character is inapplicable in taxa lacking a quadratojugal.*

*90) Quadrate, posterior margin in lateral view: straight along entire shaft (0); continuously concave (1); sigmoidal, with a concave dorsal portion and convex ventral portion (2) (Ezcurra 2016: Fig. 24).*

*91) Quadrate, dorsal end hooked posteriorly in lateral view: absent (0); present (1) (Ezcurra 2016: Figs. 17 and 24).*

*92) Quadrate, ventral condyles: lateral and medial condyles not distinctly separated and therefore the ventral surface of the quadrate is rounded, flat, or slightly concave (0); condyles separated by a deep concavity on the ventral surface of the quadrate (1) (Spiekman et al. 2021: Fig. 15).*

*93) Quadrate, ventral condyles: subequally distally extended (0); medial condyle distinctly more distally projected than the lateral one (1) (Spiekman et al. 2021: Fig. 15).*

*94) Quadrate, pterygoid flange: anteriormost extension at about mid-height of the quadrate shaft (0); dorsally located, the anteriormost extension of the flange is at close to the dorsoventral level of the dorsal head of the quadrate (1) (Spiekman et al. 2021: Fig. 15).*

*95) Vomer, teeth: absent (0); present (1).*

*96) Vomer, teeth distribution: shagreen tooth distribution with no clear rows distinguishable (0); teeth distributed in multiple clearly defined rows (1); teeth distributed mainly in a single row, but multiple teeth present immediately anterior to the contact with the pterygoid (2); teeth distributed in a single row along entire extension (3). This character is inapplicable in taxa that lack vomerine teeth.*

*97) Palatal dentition, size (height and diameter) of teeth on the vomer: small, considerably smaller than those of the marginal dentition (0);* *relatively large, similar to those of the marginal dentition (1) (Spiekman et al. 2021: Fig. 16). This character is inapplicable in taxa lacking vomerine teeth.*

*98) Palatine, transverse extension: narrow, subequal contribution of the palatine and pterygoid to or pterygoid main component of the palate posterior to the choanae (0); broad, the palatine is the main component of the palate posterior to the choanae (1) (Ezcurra 2016: Fig. 26).*

*99) Palatine, anterior processes forming the posterior border of the choana: subequal in anterior extension or anterolateral process longer (0); anteromedial process longer (1) (Ezcurra 2016: Fig. 26).*

*100) Palatine-pterygoid, teeth on the palatine and ventral surface of the anterior ramus of the pterygoid: present (0); absent (1) (Ezcurra 2016: Figs. 13, 24 and 26).*

*101) Palatal dentition, size (height and diameter) of teeth on the palatine: small, considerably smaller than those of the marginal dentition (0); relatively large, similar to those of the marginal dentition (1) (Spiekman et al. 2021: Fig. 16; Ezcurra 2016: Figs. 25 and 26). This character is inapplicable in taxa lacking palatine teeth.*

*102) Pterygoid, teeth on the ventral surface of the anterior ramus (=palatal process), excluding tiny palatal teeth if present: present in two distinct fields (=T2 and T3 of Welman 1998) (0); present in three distinct fields* *(=T2, T3a and T3b) (1); present in three distinct fields (=T2a, T2b and T3) (2); present in one field that occupies most of the transverse width of the ramus (=T2 + T3) (3); present in only one posteromedially-to-anterolaterally orientated field (=T2) (4); present in only one field adjacent to the medial margin of the ramus (=T3) (5); present in no definable fields but the entire pterygoid is covered by a shagreen of teeth (6) (Ezcurra 2016: Figs. 25 and 26). This character is inapplicable in taxa that lack teeth in the palatine and the ventral surface of the anterior ramus of the pterygoid.*

*103) Pterygoid, number of rows on palatal tooth field T2: more than two or do not dispose on distinct rows (0); two rows parallel to each other (1); single row (2) (Ezcurra 2016: Figs. 25 and 26). This character is inapplicable if the tooth field T2 is subdivided in T2a and T2b or is absent.*

*104) Pterygoid, number of rows on palatal tooth field T3: more than two or not placed in distinct rows (0); two parallel rows (1); single row (2) (Ezcurra 2016: Figs. 25 and 26). This character is inapplicable if the tooth field T3 is subdivided into T3a and T3b or is absent.*

*105) Palatal dentition, size (height and diameter) of teeth on the ventral surface of the anterior ramus of the pterygoid: small, considerably smaller than those of the marginal dentition (0); relatively large, similar to those of the marginal dentition (1) (Spiekman et al. 2021: Fig. 16; Ezcurra 2016: Figs. 25 and 26). This character is inapplicable in taxa lacking teeth on the anterior ramus of the pterygoid.*

*106) Pterygoid, teeth on the lateral ramus (=transverse flange): absent (0); present (1) (Ezcurra 2016: Figs. 13, 25 and 26). This character is inapplicable in taxa in which most of the pterygoid is covered by shagreen teeth.*

*107) Pterygoid, distribution of teeth on the lateral ramus (=transverse flange): teeth distributed in a single row on the posterior edge (=T1 of Welman 1998) (0); teeth distributed in multiple rows (1) (Ezcurra 2016: Figs. 13, 25 and 26). This character is inapplicable in taxa that lack teeth on the lateral ramus of the pterygoid or in taxa in which shagreen teeth cover the pterygoid.*

*108) Pterygoid, anterior end of the anterior ramus: tapers to an end (0); rounded (1) (Spiekman et al. 2021: Fig. 16).*

*109) Pterygoid, lateral/distal end of the posterior margin of the lateral ramus (=transverse flange) curved posteriorly: absent (0); present (1) (Spiekman et al. 2021: Fig. 16). This character is scored as inapplicable in taxa with a strongly posterolaterally orientated lateral ramus of the pterygoid.*

*110) Ectopterygoid, lateral process is not curved posteriorly (0); lateral process is curved posteriorly but not expanded posteriorly (1); lateral process is both curved and expanded posteriorly, giving the ectopterygoid a hook-shape in dorsal or ventral view (2) (Spiekman et al. 2021: Fig. 16; Ezcurra 2016: Figs. 7 and 26), ORDERED.*

*111) Ectopterygoid, articulation with pterygoid: ectopterygoid overlaps the pterygoid ventrally (0); interlaced articulation, complex articulation between ectopterygoid and pterygoid (1) (Ezcurra 2016: Fig. 26).*

*112) Ectopterygoid, connection with pterygoid: does not reach the posterolateral corner of the lateral ramus (=transverse flange) (0); reaches the posterolateral corner of the lateral ramus (1) (Ezcurra 2016: Fig. 26). This character is scored as inapplicable in taxa in which the ectopterygoid simply overlaps the pterygoid.*

*113) Parasphenoid/parabasisphenoid, dentition on cultriform process: present (0); absent (1).*

*114) Parasphenoid/parabasisphenoid, length of the cultriform process versus its height at its anteroposterior midpoint: 4.16-5.77 (0); 9.65-9.89 (1); 10.85-12.12 (2); 13.29-13.42 (3); 20.28-21.12 (4), ORDERED RATIO.*

*115) Parasphenoid/parabasisphenoid, anterior projections of the cristae trabeculares, present (0); absent (1).*

*116) Parasphenoid/parabasisphenoid, posterodorsal portion: incompletely ossified (0); completely ossified (1).*

*117) Parasphenoid/parabasisphenoid, intertuberal plate: present (0); absent (1) (Ezcurra 2016: Figs. 10 and 28).*

*118) Parasphenoid/parabasisphenoid, recess (=median pharyngeal recess, =hemispherical sulcus, =hemispherical fontanelle): absent, the ventral floor of the parabasisphenoid posterior to the basipterygoid processes (and posterior to a potentially present intertuberal plate) is flat (0); present, the ventral floor forms a shallow depression (1); present, the ventral floor is deeply excavated (2) (Ezcurra 2016: Fig. 27), ORDERED.*

*119) Parasphenoid/parabasisphenoid, semilunar depression on the posterolateral surface of the bone: absent (0); present (1) (Ezcurra 2016: Fig. 28). This character is inapplicable in taxa in which the posterodorsal portion of the parasphenoid/parabasisphenoid is not ossified, resulting in an unossified gap between this element and the prootic.*

*120) Basisphenoid/parabasisphenoid, orientation of the body between the posterior end of the bone and the basipterygoid processes: horizontal (0); oblique, main axis posterodorsally-to-anteroventrally orientated (1) (Ezcurra 2016: Figs. 27 and 28).*

*121) Basioccipital-parasphenoid/parabasisphenoid, contact with each other in skeletally mature individuals: loose, overlapping suture (0); tightly sutured, sometimes by an interdigitated suture, or both bones fused to each other (1) (Ezcurra 2016: Fig. 28).*

*122) Basioccipital-parasphenoid/parabasisphenoid, two pneumatic foramina between the basioccipital and parabasisphenoid: absent (0); present (1) (Sobral & Müller 2019: Figs. 3 and 13).*

*123) Basioccipital-parasphenoid/parabasisphenoid, basal tubera: absent (0); present (1) (Ezcurra 2016: Fig. 27).*

*124) Basioccipital-parasphenoid/parabasisphenoid, low ridge between basal tubera: absent or very strongly reduced (0); present (1) (Spiekman et al. 2021: Fig. 17; Ezcurra 2016: Fig. 27). This character is scored as inapplicable in taxa that lack basal tubera.*

*125) Basioccipital, ventral margin: prominent embayment or ridge between basal tubera at least as transversely broad as occipital condyle (0); transversely narrow embayment or ridge between basal tubera, narrower than occipital condyle (1). This character is scored as inapplicable in taxa that lack basal tubera.*

*126) Basioccipital, articular surface of the occipital condyle: concave (0); hemispherical (1) (Ezcurra 2016: Fig. 28).*

*127) Otoccipital, fusion between opisthotic and exoccipital: absent or partial (0); present (1) (Ezcurra 2016: Fig. 27).*

*128) Exoccipital, morphology of the dorsal end: exoccipital columnar through dorsoventral height, forming transversely narrow dorsal contact with more dorsal occipital elements (0); dorsal portion of exoccipital exhibits dorsomedially inclined process that forms transversely broad contact with more dorsal occipital elements but exoccipitals do not meet on the dorsal margin of the foramen magnum (1); dorsal portion of exoccipital exhibits dorsomedially inclined process that meets the process of the opposite exoccipital on the dorsal margin of the foramen magnum, thus excluding the supraoccipital from contributing to the margin of the foramen magnum (2), ORDERED (Spiekman et al. 2021: Fig. 17). This character is inapplicable in taxa without a discernable suture between the supraoccipital and the exoccipital or taxa with a fused opisthotic-exoccipital.*

*129) Exoccipital, medial margin of their distal ends: no contact with its counterpart (0); contact with its counterpart to partially or fully exclude the basioccipital from the floor of the endocranial cavity (1) (Ezcurra 2016: Fig. 27).*

*130) Opisthotic, paroccipital processes orientation: extend laterally or slightly posterolaterally (0); deflected strongly posterolaterally at an angle of more than 20 degrees from the transverse plane of the skull (1) (Ezcurra 2016: Fig. 16).*

*131) Opisthotic, paroccipital process: ends freely (0); contacts the suspensorium (1).*

*132) Ezcurra (2016) ch. 216. Opisthotic,* *fossa immediately lateral to the foramen magnum: absent (0); present (1).*

*133) Opisthotic, ventral ramus shape: pyramidal, with a tapering distal end (0); club-shaped with a large bulbous distal head (1); columnar-like shaft of the ramus and an anteroposteriorly expanded but not a bulbous distal head (2); anteroposteriorly flattened shaft of the ramus, forming a blade-like ramus in lateral view and an anteroposteriorly expanded but not a bulbous distal head (3) (Spiekman et al. 2021: Fig. 18; Ezcurra 2016: Fig. 28).*

*134) Opisthotic, ventral ramus: extends further laterally than the lateralmost edge of the exoccipital in posterior view (0); ventral ramus completely or almost completely covered by the lateralmost edge of the exoccipital in posterior view (1) (Ezcurra 2016: Fig. 27).*

*135) Pseudolagenar recess, opening externally between the ventral surface of the ventral ramus of the opisthotic and the basal tubera: present (0); absent (1) (Ezcurra 2016: Fig. 27).*

*136) Posttemporal fenestra, size: large, roughly similar in size to the supraoccipital (0); strongly reduced in size and much smaller than the supraoccipital (1);* *absent or developed as a foramen or very narrow slit (2) ORDERED (Ezcurra 2016: Fig. 27).*

*137) Prootic, a clear crest on the lateral surface that is roughly orientated posterodorsally to anteroventrally (=crista prootica): absent (0); present (1) (Spiekman et al. 2021: Fig. 18; Ezcurra 2016: Fig. 28).*

*138) Prootic, a clear crest along the lateral surface that curves dorsally at the anterior margin of the prootic (=crista alaris): absent (0); present (1) (Spiekman et al. 2021: Fig. 18).*

*139) Prootic, paroccipital contribution: prootic does not contribute to anterior surface of paroccipital process (0); prootic contributes laterally tapering lamina to the anterior surface of the paroccipital process (1) (Spiekman et al. 2021: Fig. 18).*

*140) Laterosphenoid, ossification: absent (0); present, laterosphenoid is a narrow dorsoventrally orientated bone and lacks an anterior portion (1); present, laterosphenoid with an anterior portion located along the ventral surface of the parietal and frontals (2) (Spiekman et al. 2021: Fig. 18; Ezcurra: Fig. 28), ORDERED.*

*141) Stapes, shape: robust, with thick shaft (0); slender, rod-like shaft (1).*

*142) Stapes, stapedial foramen piercing the columellar process: present (0); absent (1).*

*143) Splenial: present (0); absent (1).*

*144) Dentary,* *height at the third alveolus of the bone (or directly posterior to the tapering anterior end of the dentary in taxa with an anteriorly edentulous dentary) versus length of the alveolar margin* *(including edentulous anterior end if present): 0.02-0.04 (0); 0.06-0.11 (1):* *0.15-0.24 (2); 0.27-0.29 (3), ORDERED RATIO (Ezcurra 2016: Figs. 17 and 18).*

*145) Dentary, shape of the tooth bearing portion (including edentulous anterior end if present): roughly straight (0);* *dorsally curved for all or most of its anteroposterior length (1);* *ventrally curved or deflected at its anterior end (2) (Ezcurra 2016: Figs. 17 and 29).*

*146) Dentary, distinct dorsoventral expansion forming a keel at the anterior end of the dentary: absent (0); present (1) (Spiekman et al. 2021: Fig. 19).*

*147) Dentary, position of the Meckelian groove on the anterior half of the bone: dorsoventral centre of the dentary (0); restricted to the ventral border (1) (Nesbitt 2011: Fig. 27).*

*148) Dentary, posterodorsal process, in which its dorsal margin is confluent with the dorsal margin of the lower jaw: absent (0); present (1) (Ezcurra 2016: Figs. 17 and 29).*

*149) Dentary, posterocentral process, in which its margins are not confluent with the dorsal or ventral margin of the lower jaw: absent (0); present (1) (Ezcurra 2016: Figs. 17 and 29).*

*150) Dentary, posteroventral process, in which its ventral margin is confluent with the ventral margin of the lower jaw: absent (0); present (1) (Ezcurra 2016: Figs. 17 and 29).*

*151) Dentary, posteroventral process length: extended posteriorly to the level of the posterodorsal and/or posterocentral processes (0); extended posteriorly beyond the level of the posterodorsal and/or posterocentral processes (1) (Ezcurra 2016: Fig. 29). This character is inapplicable in taxa that lack a posteroventral process in the dentary.*

*152) Lower jaw, external mandibular fenestra: absent (0); present (1) (Ezcurra 2016: Figs. 17 and 29).*

*153) Lower jaw, distinct dorsal process behind the alveolar margin (=coronoid process): absent, with only a slightly convex dorsal margin present behind the alveolar portion (0); present but low, not protruding dorsally behind the anterior process of the jugal (1); present and tall, protruding dorsally behind the anterior process of the jugal (2) (Ezcurra 2016: Fig. 29), ORDERED.*

*154) Separate coronoid bone: present (0); absent (1).*

*155) Surangular, lateral shelf: absent (0); present, low ridge near dorsal margin (1); present, laterally or ventrolaterally projecting shelf with a lateral edge (2) (Ezcurra 2016: Figs. 18 and 29).*

*156) Surangular, anterior surangular foramen on the lateral surface of the bone, near surangular-dentary contact: absent (0); present (1) (Ezcurra 2016: Fig. 29).*

*157) Surangular, posterior surangular foramen on the lateral surface of the bone, positioned directly anterolateral to the glenoid fossa: absent (0); present (1) (Ezcurra 2016: Fig. 29).*

*158) Surangular-angular, suture along the anterior half of the bones in lateral view: anteroposteriorly convex ventrally (0); roughly straight (1); anteroposteriorly concave ventrally (2) (Spiekman et al. 2021: Fig. 19; Ezcurra 2016: Fig. 29) ORDERED.*

*159) Angular, dorsoventral exposure on the lateral surface of the lower jaw: wide (0); forming about half of the dorsoventral height of the mandible at its greatest width (1); narrow (2) (Spiekman et al. 2021: Fig. 19; Ezcurra 2016: Fig. 29) ORDERED.*

*160) Angular, exposure on lateral mandibular surface:* *terminates distinctly anterior to the glenoid (0); extends to the glenoid (1).*

*161) Location of glenoid fossa compared to tooth row of the dentary: roughly at the same dorsoventral level as the tooth row (0); considerably ventrally displaced compared to the tooth row (1) (Spiekman et al. 2021: Fig. 19).*

*162) Articular, retroarticular process: absent (0);* *anteroposteriorly short, being poorly developed posteriorly to the glenoid fossa (1); anteroposteriorly long**, extending considerably posterior to the glenoid fossa (2) ORDERED (Ezcurra 2016: Figs. 17 and 29).*

*163) Articular, retroarticular process: not upturned (0); upturned (1) (Ezcurra 2016: Figs. 17 and 29). This character is scored as inapplicable in taxa that lack a retroarticular process.*

*164) Marginal dentition, arrangement: single row of marginal teeth (0);* *multiple zahnreihen in maxilla and dentary (1).*

*165) Marginal dentition, anterior teeth are interlocking fangs forming a fish-trap sensu Rieppel (2002): absent (0); present (1) (Spiekman et al. 2021: Fig. 19). This character is inapplicable in taxa with an edentulous premaxilla.*

*166) Marginal dentition, occlusion of marginal teeth: single-sided overlap (excluding potentially present interlocking fish-trap dentition anteriorly) (0); flat occlusion (1); teeth interlocking tightly (2) (Ezcurra 2016: Fig. 14). This character is inapplicable in taxa in which multiple tooth rows are present on the marginal dentition.*

*167) Marginal dentition, posterior extent of mandibular and maxillary tooth rows: subequal (0); maxillary teeth extending further posteriorly (1).*

*168) Marginal dentition, posteriormost dentary teeth: on the anterior half of lower jaw (0); on the posterior half of lower jaw (1) (Ezcurra 2016: Fig. 17).*

*169) Marginal dentition, tooth implantation: subthecodont (=protothecodont) (0); ankylothecodont (teeth fused to the bone at the base of the crown by bony ridges and the root can be discerned; there is continuous tooth replacement) (1); pleurodont (2); acrodont (teeth fused to the bone in adults so that no root can be discerned) (3); thecodont (4) (Ezcurra 2016: Figs. 12, 14 and 22).*

*170) Marginal dentition, multiple maxillary and dentary tooth crowns* *distinctly mesiodistally expanded above the root: absent (0); present (1) (Ezcurra 2016: Fig. 14).*

*171) Marginal dentition, maxillary teeth: straight or very slightly recurved (0); distinctly recurved (1) (Ezcurra 2016: Fig. 14). This character is not applicable in taxa with maxillary teeth that expand above the root or that possess multiple tooth rows in the maxilla.*

*172) Marginal dentition, serrations on the maxillary/dentary crowns: absent (0);* *distinctly present on the distal margin and usually apically restricted, low or absent on the mesial margin (1); present and distinct on both margins (2) (Ezcurra 2016: Fig. 14).*

*173) Marginal dentition, multiple maxillary or dentary tooth crowns with longitudinal labial or lingual striations or grooves: absent (0); present (1) (Ezcurra 2016: Fig. 14).*

*174) Marginal dentition, tooth shape at crown base of the maxillary teeth: circular (0); labiolingually compressed (1); labiolingually wider than mesiodistally long (2) (Spiekman et al. 2021: Fig. 20).*

*175) Marginal dentition, morphology of crown base: all tooth crowns form a single, pointed or rounded crown (0); at least some tooth crowns form a flattened platform with pointed cusps (1); at least some tooth crowns have three, mesiodistally arranged cusps (2).*

*176) Cervical, dorsal, sacral and caudal vertebrae, notochordal canal piercing the centrum: present throughout ontogeny (0); absent in adults (1) (Ezcurra 2016: Fig. 31).*

*177) Presacral vertebrae, at least one or more cervical or anterior dorsal with parallelogram-shaped centra in lateral view**, in which the anterior articular surface is situated higher than the posterior one: absent (0); present (1) (Ezcurra 2016: Figs. 11 and 33).*

*178) Cervical vertebrae, maximum height of postaxial anterior or middle cervical neural spines: considerably taller than the posterior articular surface of the centrum (0); approximately equally tall as the posterior articular surface of the centrum (1); considerably shorter than the posterior articular surface of the centrum (2); low neural spines* *are only present at the anterior and posterior ends of the vertebrae but are completely or virtually lost at their anteroposterior midpoints (3); neural spine is completely reduced or lost (4) (Spiekman et al. 2021: Fig. 21; Ezcurra 2016: Fig. 11), ORDERED.*

*179) Cervical vertebrae, shape of* *distal margin of anterior and middle cervical postaxial neural spines in lateral view: slightly convex (0);* *completely straight along anteroposterior length (1); concave (2) (Spiekman et al. 2021: Fig. 22). This character is inapplicable in taxa that have reduced the neural spine of their anterior and mid cervicals completely or at their anteroposterior midpoint.*

*180) Cervical vertebrae, distal expansion of the* *anterior to middle postaxial cervical neural spines (not mammillary process): absent (0); present, gradual transverse expansion of the distal half of the neural spine (1); present, but transverse expansion is* *restricted to the distal end of the neural spine (=spine table) (2) (Spiekman et al. 2021: Fig. 22). This character is inapplicable in taxa that have reduced the neural spine of their anterior and mid cervicals completely.*

*181) Presacral vertebrae, type of articular surface: opisthocoelous (0);* *procoelous (1); amphicoelous (2); acoelous (3). This character is inapplicable in taxa that have a notochordal canal running through their centra.*

*182) Presacral vertebrae, postaxial intercentra: present (0); absent (1).*

*183) Cervical vertebrae, centrum of atlas in skeletally mature individuals: separate from axial intercentrum (0); fused to axial intercentrum (1) (Ezcurra 2016: Fig. 30).*

*184) Cervical vertebrae, proatlas elements dorsal to atlantal neural arches: present (0); absent or fused with atlantal neural arch (1) (Spiekman et al. 2021: Fig. 23).*

*185) Cervical vertebrae, height of neural spine of the axis: ratio between the maximum height of the neural spine and the posterior articular surface height of the centrum of the axis: 0.43-0.59 (0); 0.76-1.33 (1): 1.45-2.23 (2), ORDERED RATIO (Ezcurra 2016: Fig. 30).*

*186) Cervical vertebrae, shape of the neural spine of the axis in lateral view:* *expanded posterodorsally or the height of the anterior portion is equivalent to the posterior height (0); expanded anterodorsally (1) (Ezcurra 2016: Fig. 30).*

*187) Cervical vertebrae,* *lengths of the fourth or fifth cervical centra versus the heights of their anterior articular surfaces: 0.63-8.62 (0); 10.16-12.12 (1); 14.58-15.58 (2); 17.08-18.67 (3); 20.05-20.51 (4), ORDERED RATIO (Ezcurra 2016: Fig. 15).*

*188) Cervical vertebrae,* *diapophysis and parapophysis of anterior to middle cervical postaxial vertebrae: single facet or both situated on the same process (0);* *situated on different processes and well-separated (1); situated on different processes and nearly touching (2) (Ezcurra 2016: Fig. 30).*

*189) Cervical vertebrae, laminae extending posteriorly from the base of the dia –and/or parapophysis in anterior and middle postaxial cervical vertebrae: absent (0); present (1) (Ezcurra 2016: Fig. 30).*

*190) Cervical vertebrae, epipophysis in postaxial cervicals: absent (0); present in at least the third to fifth cervical vertebrae (1) (Ezcurra 2016: Figs. 30 and 33).*

*191) Cervical vertebrae, posterior extension of epipophysis: not extended posterior to the postzygapophysis (0);* *overhanging the postzygapophysis posteriorly (1) (Spiekman et al. 2021: Fig. 24). This character is inapplicable in taxa that lack epipophyses on their cervical vertebrae.*

*192) Cervical vertebrae, anterior cervical vertebrae (presacral vertebrae 3-5) postzygapophyses: postzygapophyseal trough (sensu Rieppel 2001) formed by a well-developed posteriorly extending shelf (=transpostzygapophyseal lamina) that in some cases bears a notch on its posterior end: absent (0); present (1) (Spiekman et al. 2021: Fig. 25).*

*193) Cervical vertebrae, neural spine base of anterior postaxial cervical vertebrae: anteroposteriorly elongate, subequal in length to the neural arch (0); anteroposteriorly shortened, spine restricted to posterior half of neural arch (1). This character is inapplicable in taxa that have completely reduced the neural spine of their anterior and mid cervicals.*

*194) Cervical vertebrae, orientation of the* *anterior margin of the neural spine of anterior and middle postaxial cervical vertebrae: straight or posterodorsally inclined (0);* *anterodorsally inclined at an angle of more than 60 degrees from the horizontal plane (1);* *anterodorsally inclined at an angle of less than 60 degrees from the horizontal plane (2) (Ezcurra 2016: Figs. 30 and 33), ORDERED. This character is inapplicable in taxa that have completely reduced the neural spine of their anterior and mid cervicals.*

*195) Cervical vertebrae, total number: six or fewer (0); between seven and 10 (1); between 11 and 13 (2); more than 13 (3), ORDERED.*

*196) Cervical vertebrae, presence of a foramen on the ventral surface of the centrum around the anteroposterior midpoint: absent (0); present (1) (Spiekman et al. 2021: Fig. 26).*

*197) Cervical vertebrae, anterior to mid postaxial cervical vertebrae, shape of ventral surface in the coronal plane excluding keel: rounded or curved (0); ventral face flattened (1).*

*198) Cervical vertebrae,* *neural canal of anterior to mid cervical vertebrae separated from vertebral centrum (0); neural canal* *enters into a cavity of the vertebral centrum (1) (Spiekman et al. 2020b: Fig. 32).*

*199) Cervical ribs, shape: short, being less than two times the length of its respective vertebra, and tapering at a high angle to the neck (0);* *short, being less than two times the length of its respective vertebra, and shaft parallel to the neck (1);* *very long, at least some ribs being more than two times the length of its respective vertebra, and parallel to the neck (2) (Spiekman et al. 2021: Fig. 27; Nesbitt 2011: Figs. 28 and 30).*

*200) Cervical ribs, anterior free-ending process (=accessory process) on anterior surface of anterior cervical ribs: absent (0); present and short, not reaching anterior to the prezygapophyses of the corresponding vertebra when in articulation (1); present and long, extending anterior to the prezygapophyses of the corresponding vertebra when in articulation (2) (Spiekman et al. 2021: Fig. 27; Ezcurra 2016: Fig. 30), ORDERED.*

*201) Presacral vertebrae, mammillary processes (sensu Ezcurra & Butler 2015b) occurring in the posterior cervical to mid-dorsal vertebrae: absent (0); present (1) (Ezcurra 2016: Figs. 31, 32 and 34).*

*202) Dorsal vertebrae, shape of distal margin of anterior to middle dorsal neural spines in lateral view: slightly convex in lateral view (0); completely straight along anteroposterior length in lateral view (1) (Spiekman et al. 2021: Fig. 28). This character is inapplicable in taxa that possess mammillary processes.*

*203) Dorsal vertebrae, distal expansion of the dorsal neural spines (not mammillary process) of the anterior to mid dorsal vertebrae: absent (0); present, gradual transverse expansion of the distal half of the neural spine (1); present, but transverse expansion is restricted to the distal end of the neural spine (=spine table) (2) (Spiekman et al. 2021: Fig. 28). This character is inapplicable in taxa that bear mammillary processes on their dorsal vertebrae.*

*204) Dorsal vertebrae, total number of dorsal vertebrae: ≤24 (0); ≥25 (1).*

*205) Dorsal vertebrae, length versus height of the centrum at the level of its posterior articular surface in posterior dorsals: 0.83-1.25 (0); 1.36-1.88 (1); 2.16-2.20 (2); 2.31-2.40 (3); 2.53-2.76 (4), ORDERED RATIO.*

*206) Dorsal vertebrae, lateral fossa on the centrum below the neurocentral suture: absent (0); present (1) (Ezcurra 2016: Figs. 31 and 34).*

*207) Dorsal vertebrae, development of the transverse process in middle dorsals: short, projecting only slightly beyond the lateral surface of the neural arch (0); long (1) (Ezcurra 2016: Fig. 32).*

*208) Dorsal vertebrae,* *hyposphene-hypantrum accessory intervertebral articulation in middle-posterior dorsals: absent (0); present (1) (Ezcurra 2016: Figs. 31 and 32).*

*209) Dorsal vertebrae, dorsally opening pit lateral to the base of the neural spine: absent (0); shallow (fossa) (1); developed as a deep pit (2) ORDERED (Ezcurra 2016: Fig. 34).*

*210) Dorsal vertebrae, fan-shaped neural spine in lateral view: absent (0); present (1).*

*211) Dorsal vertebrae, height of neural spines in mid-dorsals: tall, greater in dorsoventral height than anteroposterior length (0); long and low, approximately similar in dorsoventral height and anteroposterior length or less in height than in length (1).*

*212) Dorsal vertebrae, position of parapophysis* *(or ventral margin of dorsal synapophysis) in posterior dorsals: positioned partially on lateral margin of centrum (0);* *positioned entirely on neural arch (1).*

*213) Dorsal ribs, proximal end of anterior dorsal ribs: holocephalous (one facet) (0); dichocephalous (two facets) (1); tricephalous (three facets) (2).*

*214) Dorsal ribs, proximal end of middle dorsal ribs: dichocephalous (0); holocephalous (1). This character is inapplicable in taxa that have holocephalous anterior dorsal ribs since these imply the presence of holocephalous middle dorsal ribs.*

*215) Sacral ribs, anteroposterior length of the first primordial sacral rib versus the second primordial sacral rib in dorsal view: primordial sacral rib one is longer anteroposteriorly than primordial sacral rib two (0); primordial sacral rib two is about the same length or longer anteroposteriorly than primordial sacral rib one (1).*

*216) Sacral ribs, second rib shape: single unit (0); bifurcates distally into anterior and posterior processes (1) (Ezcurra 2016: Fig. 35).*

*217) Sacral ribs, morphology of posterior process: pointed bluntly (0); pointed sharply (1). (Ezcurra 2016: Fig. 35). This character is inapplicable in taxa without a bifurcated second sacral rib.*

*218) Sacral and caudal vertebrae, transverse processes/ribs of sacral and anterior caudal vertebrae in skeletally mature individuals: rib/transverse process and vertebra unfused (0); rib/transverse process and vertebra fused to each other (1) (Ezcurra 2016: Fig. 35).*

*219) Caudal vertebrae, length of the transverse process + rib versus length across zygapophyses in anterior caudal vertebrae (third to fifth caudal): 0.62-1.28 (0); 1.62-1.77 (1); 1.90-2.00 (2); 2.50-2.60 (3), ORDERED RATIO (Ezcurra 2016: Fig. 35).*

*220) Caudal vertebrae**, height versus maximum anteroposterior length of anterior caudal neural spine (measured in one of the first five caudals): 0.42-0.83 (0); 1.00-1.60 (1); 2.00-2.24 (2); 2.39-2.53 (3); 2.93-3.07 (4), ORDERED RATIO.*

*221) Caudal vertebrae, orientation of transverse processes: base of process perpendicular to the long axis of the vertebra or slightly posterolaterally angled (0); processes distinctly angled posterolaterally from base (1).*

*222) Chevrons, curvature of haemal spines in mid-caudal vertebrae: no curvature or posterior curvature (0); anterior curvature present (1).*

*223) Chevrons, shape of haemal spine: tapers along its anteroposterior length (0); maintains breadth along its length (1); gradually broadens distally (2); broadens abruptly distally, forming an inverted T shape (3).*

*224) Chevrons, anteroposterior length of vertebral centrum versus proximodistal length of corresponding haemal spine in anterior caudals (third to fifth caudal): 0.33-0.52 (0); 0.64-0.81 (1); 1.00-1.04 (2), ORDERED RATIO (Spiekman et al. 2021: Fig. 29).*

*225) Heterotopic ossifications: absent in a minimum of 5 individuals (0); present (1) (Spiekman et al. 2021: Fig. 30).*

*226) Scapulocoracoid, both bones fuse with each other in skeletally mature individuals: present (0); absent (1) (Ezcurra 2016: Fig. 36).*

*227) Scapulocoracoid, the anterior margin at the level of the suture between both bones: roughly continuous margin (0); distinct notch present (1);* *large fenestra between scapula and coracoid (scapulocoracoidal fenestra) present (2) (Spiekman et al. 2021: Fig. 31; Ezcurra 2016: Fig. 36).*

*228) Scapula, scapular blade dorsally or posterodorsally orientated with a rectangular outline (0);* *blade is largely posteriorly directed and semi-circular in outline with a continuously curved anterior/dorsal margin (1) (Spiekman et al. 2021: Fig. 31).*

*229) Scapula, anterior margin of the scapular blade in lateral view, excluding the margin of a potentially present scapulocoracoidal fenestra: straight or convex along entire length (0); distinctly concave (1) (Ezcurra 2016: Fig. 36). This character is inapplicable in taxa that have a semicircular scapular blade.*

*230) Scapula, constriction distal to the glenoid: minimum anteroposterior length greater than half the proximodistal length of the scapula (0); minimum anteroposterior length less than half but more than a quarter of the proximodistal length of the scapula (1);* *minimum anteroposterior length less than a quarter of the proximodistal length of the scapula (2) (Ezcurra 2016: Figs. 36 and 37), ORDERED. This character is inapplicable in taxa that have a semi-circular scapular blade.*

*231) Scapula, supraglenoid foramen: absent (0); present (1).*

*232) Coracoid, posterior border in lateral view: unexpanded posteriorly (0); moderately expanded posteriorly (1); strongly expanded posteriorly - the entire border, not only the posteroventral region as is the case in the postglenoid process - and, as a result, the articulated scapula and coracoid are L-shaped in lateral view (in taxa in which the scapular blade is not semi-circular in shape) (2), ORDERED (Ezcurra 2016: Fig. 37).*

*233) Cleithrum: present (0); absent (1).*

*234) Interclavicle: present (0); absent (1) (Ezcurra 2016: Fig. 15).*

*235) Interclavicle, long anterior process, resulting in a cross-shaped interclavicle in ventral or dorsal view: present (0); absent (1) (Ezcurra 2016: Fig. 38). This character is inapplicable in taxa that lack an ossified interclavicle.*

*236) Interclavicle, anterior margin with a median notch: absent (0); present (1) (Ezcurra 2016: Fig. 38). This character is inapplicable in taxa that lack an ossified interclavicle.*

*237) Interclavicle, webbed between lateral and posterior processes: present, proximal half of the bone subtriangular or diamond-shaped (0); absent, sharp angles between processes (1) (Ezcurra 2016: Fig. 38). This character is inapplicable in taxa that lack an ossified interclavicle.*

*238) Interclavicle, posterior ramus: little change in width along entire length (0); gradual transverse expansion present (1) (Ezcurra 2016: Fig. 38). This character is inapplicable in taxa that lack an ossified interclavicle.*

*239) Limbs, flipper-like, indicated by the presence of rod-like stylopodial and zygapodial elements, simple disc-like tarsal and carpal bones, and autopodia without clearly defined ungula phalanges: absent (0); present (1).*

*240) Long bone histology, fibrolamellar bone tissue in the cortex: absent (0); present (1).*

*241) Humerus, torsion between proximal and distal ends: approximately 45 degrees or more (0); 35 degrees or less (1) (Ezcurra 2016: Fig. 39).*

*242) Humerus, transverse width of the proximal end versus total length of the bone in skeletally mature individuals: 0.11-0.33 (0); 0.38-0.46 (1); 0.56-0.68 (2), ORDERED RATIO (Ezcurra 2016: Fig. 39).*

*243) Humerus, conical process on the proximal surface, placed immediately adjacent to the base of the deltopectoral crest: absent (0); present (1) (Ezcurra 2016: Fig. 39).*

*244) Humerus, ventral margin of the deltopectoral crest developed as a thick subcilindrical tuberosity that is well-differentiated from the thinner dorsal margin: present (0); absent (1) (Ezcurra 2016: Fig. 39).*

*245) Humerus, entepicondyle size in skeletally mature individuals: moderately large (0); strongly developed (1) (Ezcurra 2016: Fig. 39).*

*246) Humerus, entepicondylar foramen: present (0); absent (1) (Ezcurra 2016: Fig. 39).*

*247) Humerus, ectepicondylar region: foramen present (0); foramen absent, supinator process and groove present (1); supinator process, groove or foramen absent (2) (Ezcurra 2016: Fig. 39).*

*248) Humerus,* *total length of the humerus versus the total length of the femur: 0.63-0.71 (0); 0.76-0.80 (1); 0.84-0.91 (2); 0.97-1.05 (3); 1.15-1.19 (4) ORDERED RATIO.*

*249) Ulna, olecranon process: absent, not ossified or very low in skeletally mature individuals (0); present (1) (Ezcurra 2016: Fig. 40).*

*250) Ulna, lateral tuber (=radius tuber) on the proximal portion: absent in skeletally mature individuals (0); present (1) (Nesbitt 2011: Figs. 40 and 31).*

*251) Radius, total length versus total length of the humerus: 0.53-0.72 (0); 0.81-0.92 (1); 1.01-1.07 (2); 1.40-1.46 (3), ORDERED RATIO (Ezcurra 2016: Fig. 15).*

*252) Carpals, perforating foramen between intermedium and ulnare: present (0); absent in skeletally mature individuals (1). This character is inapplicable in taxa that lack an intermedium.*

*253) Centrale of the manus of skeletally mature individuals: both the lateral and medial centrale are present (0); only the lateral centrale is present (1); only the medial centrale is present (2); both are absent (3).*

*254) Carpals, pisiform: present (0); absent in skeletally mature individuals (1) (Ezcurra 2016: Fig. 40).*

*255) First distal carpal: present (0); absent in skeletally mature individuals (1).*

*256) Carpals, distal carpal five: absent in skeletally mature individuals (0); present (1) (Ezcurra 2016: Fig. 40).*

*257) Manus, longest metacarpal + digit: longer than humeral length (0); subequal to or shorter than humeral length (1).*

*258) Metacarpus,* *length of the longest metacarpal versus length of the longest metatarsal: 0.32-0.41 (0); 0.46-0.49 (1); 0.61-0.88 (2), ORDERED RATIO.*

*259) Metacarpus,* *width of the distal end of the metacarpal I versus its total length: 0.25-0.33 (0); 0.38-0.43 (1); 0.46-0.50 (2); 0.56-0.61 (3); 0.65-0.67 (4), ORDERED RATIO (Ezcurra 2016: Fig. 40).*

*260) Metacarpus, metacarpal IV: longer than metacarpal III (0); equal to or shorter than metacarpal III (1) (Ezcurra 2016: Fig. 40).*

*261) Manual digits, second phalanx of manual digit II: shorter than the first phalanx of manual digit II (0); longer than the first phalanx of manual digit II (1) (Nesbitt 2011: Fig. 32).*

*262) Manual digits, unguals length: about the same length or shorter than the last non-ungual phalanx of the same digit (0); distinctly longer than the last non-ungual phalanx of the same digit (1). This character is inapplicable in taxa in which the terminal phalanx of each digit does not form an ungual.*

*263) Manual digits, number of phalanges in digit IV: five (0); four (1) (Nesbitt 2011: Fig. 32).*

*264) Ilium, preacetabular process: absent or incipient (0); present, being considerably anteroposteriorly shorter than its dorsoventral height (1); present, being* *longer than two thirds of its height (2), ORDERED.*

*265) Ilium, shape of preacetabular process: rounded (0); approximately straight-sided with a distinct angle between the anterior and dorsal margins (1). This character is inapplicable in taxa that lack a preacetabular process on the ilium.*

*266) Ilium, anterior process/tuber on the anterior margin of the ilium: anterior process/tuber absent or incipient (0); clearly defined anteriorly projecting tuber on the anterior margin of the preacetabular process (1) (Spiekman et al. 2021: Fig. 32). This character is inapplicable in taxa that lack a preacetabular process on the ilium.*

*267) Ilium, length of the postacetabular process measured from the most proximal point on the posterior/ventral margin of the process versus anteroposterior length of the acetabulum: 0.48-0.71 (0); 0.88-0.91 (1); 0.98-1.14 (2); 1.22-1.57 (3); 1.72-1.78 (4), ORDERED RATIO (Ezcurra 2016: Fig. 41).*

*268) Ilium, main axis of the postacetabular process in lateral or medial view: posterodorsally orientated (0); mainly posteriorly orientated (1) (Ezcurra 2016: Figs. 9 and 41).*

*269) Ilium, caudifemoralis brevis muscle origin on the* *lateroventral surface of the postacetabular process: not dorsally or laterally rimed by a brevis shelf (0); dorsally rimed by a low brevis shelf (1) (Ezcurra 2016: Fig. 9).*

*270) Ilium, supra-acetabular crest: crest absent, anterodorsal margin of acetabulum similar in development to posterodorsal margin (0); prominent anterodorsal lamina frames the anterodorsal margin of the acetabulum (1).*

*271) Ilium, shape of supra-acetabular margin: dorsalmost margin of acetabulum is unsculptured (0); prominent, bulbous rugosity superior to acetabulum (1). This character is inapplicable in taxa that lack a distinct supra-acetabular crest.*

*272) Ilium, anteroventral process extending from anterior margin of pubic peduncle: absent (0); present, process draping across anterior surface of pubis (1).*

*273) Pubis-ischium, thyroid fenestra: absent (0); present (1) (Ezcurra 2016: Fig. 41).*

*274) Pubis, lateral surface, development of a lateral tubercle (sensu Vaughn 1955): present (0); absent (1).*

*275) Pubis, pubic apron: absent, symphysis extended along the ventral margin of the pelvic girdle and visible in lateral view (0); present, symphysis restricted anteriorly and obscured by the pubic shaft in lateral view (1) (Ezcurra 2016: Fig. 41).*

*276) Ischium, maximal length versus anteroposterior length of the acetabulum: 1.46-1.57 (0); 1.67-1.77 (1); 1.86-1.98 (2); 2.06-2.23 (3); 2.51-2.89 (4), ORDERED RATIO.*

*277) Ischium, symphysis raised on a distinct low peduncle: absent (0); present (1) (Ezcurra 2016: Fig. 41).*

*278) Ischium,* *distinct concavity or constriction on the posterior half of the ventral margin of the ischium, thus separating a distinct posterior process from the rest of the ischium: absent (0); present (1) (Spiekman et al. 2021: Fig. 32; Ezcurra 2016: Fig. 41).*

*279) Femur, proximal articular surface in skeletally mature individuals:* *well-ossified, being flat or convex (0); partially ossified, being concave and sometimes with a circular pit (1) (Ezcurra 2016: Fig. 42).*

*280) Femur,* *attachment of the caudifemoralis musculature on the posterior surface of the bone: crest-like and with intertrochanteric fossa (=internal trochanter), and convergent with proximal end (0);* *crest-like and with intertrochanteric fossa (=internal trochanter), and not convergent with proximal end (1); crest-like and without intertrochanteric fossa (=fourth trochanter), and not convergent with proximal end (2) (Ezcurra 2016: Figs. 42 and 43). This character is inapplicable in taxa without a distinct process for the attachment of the caudifemoralis musculature on the femur.*

*281) Femur, distal condyles: prominent, strong dorsoventral expansion (in sprawling orientation) restricted to the distal end (0); not projecting markedly beyond shaft and expand gradually if there is any expansion (1) (Ezcurra 2016: Fig. 43).*

*282) Femur, distal articular surface: uneven,* *lateral (=fibular) condyle projecting distally distinctly beyond medial (=tibial) condyle (0); both condyles prominent distally and approximately at same level (1); both condyles do not project distally (distal articular surface concave or almost flat) (2) (Ezcurra 2016: Figs. 42 and 43).*

*283) Femur, anterior extensor groove: absent, anterior margin of the bone straight or convex in distal view (0); present, anterior margin of the bone concave in distal view (1) (Ezcurra 2016: Fig. 42).*

*284) Femur, shape of lateral (=fibular) condyle in distal view: lateral surface is rounded and mound-like (0); lateral surface is triangular and sharply pointed (1) (Ezcurra 2016: Fig. 42).*

*285) Femur, length of tibia relative to length of femur: tibia shorter than, or subequal to, femur in length (0); tibia longer than femur (1).*

*286) Femur, shape in lateral view: femoral shaft exhibits sigmoidal curvature (0); femoral shaft linear with slight ventrodistal curvature (1).*

*287) Fibula, transverse width at mid-length: subequal to transverse width of the tibia (0); distinctly narrower than transverse width of the tibia (1) (Ezcurra 2016: Fig. 15).*

*288) Fibula, distal end in lateral view: angled anterodorsally (asymmetrical) (0); rounded or flat (symmetrical) (1) (Ezcurra 2016: Fig. 44, Nesbitt 2011: Fig. 41).*

*289) Proximal tarsals, articulation between astragalus and calcaneum: roughly flat (0); concavoconvex with concavity on the astragalus (1); fused (2) (Ezcurra 2016: Fig. 45).*

*290) Astragalus, posterior groove: present (0); absent (1) (Nesbitt 2011: Fig. 46).*

*291) Distal tarsals, pedal centrale: present or partially fused to the astragalus in mature individuals (0); absent as a separate ossification, being either unossified or fused to the astragulus in skeletally mature individuals (1) (Ezcurra 2016: Figs. 45 and 46).*

*292) Distal tarsals of skeletally mature individuals, distal tarsal 1 and 2: both present (0); only one of the two elements is present (1); both absent (2), ORDERED.*

*293) Distal tarsals, distal tarsal 5: present (0); absent in skeletally mature individuals (1).*

*294) Pes, foot length (**articulated fourth metatarsal and digit) versus tibia-fibula length: 0.60-0.68 (0); 0.79-1.04 (1); 1.12-1.16 (2); 1.34-1.56 (3); 1.96-2.04 (4), ORDERED RATIO (Ezcurra 2016: Fig. 15).*

*295) Proximal tarsals, foramen for the passage of the perforating artery between the astragalus and calcaneum (=perforating foramen): present (0); absent in skeletally mature individuals (1) (Ezcurra 2016: Fig. 45).*

*296) Metatarsus, configuration: metatarsals diverging from ankle (0); compact, metatarsals I-IV tightly bunched (1) (Ezcurra 2016: Fig. 46).*

*297) Metatarsus,* *length of metatarsal I versus metatarsal III: 0.36-0.43 (0); 0.48-0.51 (1); 0.54-0.63 (2); 0.67-0.75 (3); 0.82-0.84 (4), ORDERED RATIO (Ezcurra 2016: Fig. 46).*

*298) Metatarsus, length of the metatarsal II versus length of the metatarsal IV: 0.55-0.67 (0); 0.70-0.76 (1); 0.80-0.86 (2); 0.89-0.91 (3); 0.94-1.02 (4), ORDERED RATIO (Ezcurra 2016: Fig. 46).*

*299) Metatarsus,* *length of metatarsal IV versus length of metatarsal III: 0.88-1.00 (0); 1.03-1.08 (1); 1.13-1.22 (2); 1.25-1.26 (3), ORDERED RATIO (Ezcurra 2016: Fig. 46).*

*300) Metatarsus, metatarsal V with a hook-shaped proximal end: absent (0); present, with* *a gradually medially curved proximal process (1); present,* *with an abruptly medially flexed proximal process and, as a result, the metatarsal acquires a L-shape in dorsal or ventral view (2) (Ezcurra 2016: Fig. 46).*

*301) Metatarsus, dorsal prominence separated from the proximo-medial surface by a concave gap in metatarsal V: absent (0); present (1) (Ezcurra 2016: Fig. 46, Nesbitt 2011: Fig. 47). This character is inapplicable in taxa that lack a hook-shaped metatarsal V.*

*302) Metatarsus, metatarsal V outer process on the proximal lateral margin: absent, smooth curved margin (0); present, prominent pointed process (1).*

*303) Metatarsus, metatarsal V lateral plantar tubercle: absent (0); present (1) (Ezcurra 2016: Fig. 46).*

*304) Metatarsus,* *metatarsal V medial plantar tubercle: absent (0); present (1) (Ezcurra 2016: Fig. 46).*

*305) Metatarsus,* *length of metatarsal IV versus the proximodistal length of metatarsal V: 1.25-1.90 (0); 2.19-2.57 (1); 2.83-3.25 (2); 3.65-5.15 (3), ORDERED RATIO.*

*306) Pedal digits,* *phalanx V-1: subequal to or shorter than other non-ungual phalanges (0);* *metatarsal-like, considerably longer than other non-ungual phalanges (1).*

*307) Pedal digits, ventral tubercle in unguals: absent or small (0); well-developed and extended ventral to the articular portion of the ungual (1). This character is inapplicable in taxa in which the terminal phalanx of each digit does not form an ungual.*