

List of characters and taxa deleted from each data set

2011

Brown, C. M., Boyd, C. A. and Russell, A. P., 2011. A new basal ornithopod dinosaur (Frenchman Formation, Saskatchewan, Canada), and implications for late Maastrichtian ornithischian diversity in North America.

Char:

140. Distal portions of anterior dorsal rib

139. Brevis shelf angled medially

137. Foramen in the prefrontal positioned dorsomedial to the articulation surface for the palpebral that opens into the orbit:

136. Posterior half of ventral edge of jugal offset ventrally and covered laterally with obliquely inclined ridges:

135. Presence and structure of a horizontal ridge on the maxilla

133. Dorsolaterally directed process on the lateral surface of the surangular

131. Presence of a Y-shaped indentation on the dorsal edge of opisthotics

130. Frontals wider across posterior end than at midorbital level

129. Palpebral dorsoventrally flattened and rugose along the medial and distal edges:

97. Three or more phalanges in manual digit V

96. Three phalanges in manual digit IV

Butler, R. J., Jin, L.-Y., Chen, J. and Godefroit, P., 2011. The postcranial osteology and phylogenetic position of the small ornithischian dinosaur Changchunsaurus parvus from the Quantou Formation (Cretaceous: Aptian-Cenomanian) of Jilin Province, north-eastern China

Char:

172. Subtriangular process, form and position:

155. Humeral shaft form, in anterior or posterior view

146. Gastralia

114. Premaxillary teeth increase in size posteriorly

100. Ventral flange on dentary

86. Pterygovomerine keel, length

49. Postorbital, orbital margin

27. Eminence on the rim of the buccal emargination of the maxilla near the junction with the jugal

24. Maxilla, prominent anterolateral boss articulates with the medial premaxilla

5. Rostral bone, ventrolateral processes

Burns, M. E., Currie, P. J., Sissons, R. L. and Arbour, V. M., 2011. Juvenile specimens of *Pinacosaurus grangeri* Gilmore, 1933 (Ornithischia: Ankylosauria) from the Late Cretaceous of China, with comments on the specific taxonomy of *Pinacosaurus*.

Char:

61. Acetabulum:

50. Predentary ventral process short (relative to other thyreophorans):

21. Pterygoid foramen

19. Paired premaxillary, maxillary, and nasal sinuses

17. Median palatal keel composed of the vomer and pterygoid:

14. Nasal septum dividing the respiratory passage into two separate bony canals

Carballido, J. L., Rauhut, O. W. M., Pol, D. and Salgado, L., 2011. Osteology and phylogenetic relationships of *Tehuelchesaurus benitezii* (Dinosauria, Sauropoda) from the Upper Jurassic of Patagonia

Char:

243. Metatarsal V, length

81. Posterior cervical neural spine, laterally expanded and wider than the centra

78. The lateral profile of neural spines on posterior cervical vertebrae

58. Replacement teeth per alveolus, number:

51. Dentary symphysis, orientation:

47. Basisphenoid/quadratoquadrate contact

44. Basal tubera, breadth

40. Crista prootica, size

34. Pterygoid, quadratoquadrate flange size

31. Quadratoquadrate fossa, orientation:

25. Supratemporal fenestra, maximum diameter

23. Supratemporal fenestra:

17. Frontals, midline contact (symphysis):

15. Postorbital, posterior process

Eddy, D. R. and Clark, J. A., 2011. New information on the cranial anatomy of *Acrocanthosaurus atokensis* and its implications for the phylogeny of Allosauroidea (Dinosauria: Theropoda)

Char:

175. Astragalus, anterior base of ascending process

164. Femur, muscle scar situated medially on anterior surface of distal femur:

163. Femur, oblique ligament groove on posterior surface of head:

156. Pubis, strongly expanded pubic boot:

150. Ilium, lateral wall of iliac brevis fossa:

143. Radius, shape of radial external tuberosity and ulnar internal tuberosity

124. Sacral vertebrae, fenestrae between sacral neural spines

123. Sacral vertebrae, number:

97. Articular, ridge dividing mandibular glenoid:

92. Dentary teeth, number:

83. Epipterygoid, dorsal region, shape

73. Braincase, basisphenoid recess, form

54. Frontal, contribution to midline nasal crest

44. Postorbital, cross-section of ventral process

40. Postorbital, dorsal boss, extent of vascular groove

11. Maxilla, dorsal view, orientation with respect to counterpart

Farke, A. A., Ryan, M. J., Barrett, P. M., Tanke, D. H., Braman, D. R., Loewen, M. A. and Graham, M. R., 2011. A new centrosaurine from the Late Cretaceous of Alberta, Canada, and the evolution of parietal ornamentation in horned dinosaurs.

A. Char:

97. Pes, metatarsal proportions

96. Femur-tibia proportion:

94. Femur, morphology of greater and lesser trochanters

93. Ischium, orientation of shaft

91. Pubis and ischium, morphology of contributions to acetabulum

90. Pubis, position and length of postpubic rod

89. Pubis, prepubic process

88. Ilium, relative lengths of pubic and ischial peduncles

87. Ilium, lateral eversion of dorsal margin:

- 86. Manal and pedal penultimate phalanges, shape
- 85. Manual and pedal unguals, shape
- 84. Clavicle
 - 81. Sacrum, longitudinal sulcus on ventral surface
 - 80. Dorsal vertebrae, shape of centra
 - 79. Atlantal rib
 - 78. Axis, neural spine shape and orientation
 - 77. Cervical vertebrae, formation of syncervical
- 68. Epiparietal, locus P7
- 67. Epiparietal, locus P6 shape
- 66. Epiparietal, locus P6
- 65. Epiparietal, locus P5 shape
- 64. Epiparietal, locus P5
- 56. Marginal ossification crossing squamosal-parietal contact
- 48. Parietal, rim on medial margin of dorsotemporal fenestra:
 - 40. Parietal, rostral extent on dorsum of skull relative to occipital condyle
 - 32. Palpebral, shape
- 10. Cudoventral oral margin, composition of ventral angle
- B. Char:
 - 97. Pes, metatarsal proportions:
 - 96. Femur-tibia proportion
 - 94. Femur, morphology of greater and lesser trochanters
 - 93. Ischium, orientation of shaft
 - 91. Pubis and ischium, morphology of contributions to acetabulum
 - 90. Pubis, position and length of postpubic rod
 - 89. Pubis, prepubic process
 - 88. Ilium, relative lengths of pubic and ischial peduncles
 - 87. Ilium, lateral eversion of dorsal margin
 - 86. Manal and pedal penultimate phalanges, shape
 - 85. Manual and pedal unguals, shape
 - 84. Clavicle:
 - 81. Sacrum, longitudinal sulcus on ventral surface
 - 80. Dorsal vertebrae, shape of centra
 - 79. Atlantal rib
 - 78. Axis, neural spine shape and orientation
 - 77. Cervical vertebrae, formation of syncervical
 - 68. Epiparietal, locus P7:
 - 67. Epiparietal, locus P6 shape
 - 66. Epiparietal, locus P6
 - 65. Epiparietal, locus P5 shape
 - 64. Epiparietal, locus P5
 - 61. Epiparietal, shape of locus P3
 - 56. Marginal ossification crossing squamosal-parietal contact
 - 48. Parietal, rim on medial margin of dorsotemporal fenestra

- 40. Parietal, rostral extent on dorsum of skull relative to occipital condyle
- 32. Palpebral, shape
- 10. Cudoventral oral margin, composition of ventral angle

Longrich, N. R., 2011. *Titanoceratops ouranos*, a giant horned dinosaur from the late Campanian of New Mexico.

Char:

- 94. Parietal posterior bar:
- 75. Transversely arched vascular trace across the anterior surface of the nasal horn core
- 66. Sternum, shape
- 55. Exoccipital, number of exits for cranial nerves X, XI, XII
- 53. Frontal, contribution to exit for c.n. I
- 40. Parietal, accessory fenestra medial to the rostral end of the infratemporal fenestra
- 38. Parietal fenestra, orientation

Longrich, N. R., Tokaryk, T. and Field, D. J., 2011. Mass extinction of birds at the Cretaceous-Paleogene (K-Pg) boundary

Char:

- 219. Coracoid, glenoid laterally or dorsolaterally oriented
- 218. Coracoid, medial surface of triosseal canal with a prominent crescentic scar ventrally bounding a fossa
- 212. Coracoid, acrocoracoid medial fossa
- 189. Tibia, distal-most mediolateral width:
- 186. Tibia/tarsal formed condyles
- 177. Femur, posterior projection of the lateral border of the distal end, continuous with lateral condyle
- 172. Femur, fossa for insertion of lig. capitis femoris:
- 154. Manual digit II, phalanx 2, 'internal index process' (Stegmann, 1978)
- 132. Ulna, dorsal cotyla convex
- 131. Ulna, cotylae
- 84. Furcula, dorsal (omal) tip:
- 80. Clavicles:
- 47. Mandibular symphysis, symphysial foramen/foramina:

46. Mandibular symphysis, symphysial foramina:

40. Quadratojugal, cluster of pneumatic foramina on posterior surface of the tip of dorsal process:

37. Quadratojugal, dorsal process, development of intercotylar incisure between prootic and squamosal cotylae

26. Osseous interorbital septum (mesethmoid):

6. Tooth crown serration

Norman, D. B., Crompton, A. W., Butler, R. J., Porro, L. B. and Charig, A. J., 2011. The Lower Jurassic ornithischian dinosaur *Heterodontosaurus tucki* Crompton & Charig, 1962: cranial anatomy, functional morphology, taxonomy, and relationships.

Char:

221. U-shaped cervical/pectoral collars composed of contiguous keeled osteoderms

212. Pedal digit 4 phalangeal number:

210. Metatarsal arrangement: 0, compact, closely appressed to one another along 50–70% of their length, spread distally

205. Lateral condyle of distal femur, position and size in ventral view

204. Posterior (flexor) intercondylar groove of the femur

197. Femoral shape in medial/lateral view

191. Body of the pubis, massive and dorsolaterally rotated so that obturator foramen is obscured in lateral view

190. Body of pubis, size

189. Reduction of postpubic shaft:

182. Ischial shaft

180. Ischium, shape of shaft

172. Subtriangular process, form and position

171. Subtriangular process extending medially from the dorsal margin of the iliac blade

170. Dorsal margin of the ilium in lateral view:

169. In dorsal view preacetabular process of the ilium expands mediolaterally towards its distal end

167. Preacetabular process, lateral deflection

161. Manual digits 2–4

160. Manual digit 3, number of phalanges

158. Metacarpals 1 and 5: 0, substantially shorter in length than metacarpal 3; 1, subequal in length to metacarpal 3
155. Humeral shaft form, in anterior or posterior view
154. Deltopectoral crest development:
151. Scapula acromion shape:
148. Sternal plates, shape:
146. Gastralia:
145. Sternal segments of the anterior dorsal ribs
144. Chevron shape:
143. Elongate tail (59 or more caudals):
142. Proximal caudal neural spines
141. Anterior caudal vertebrae, length of transverse processes relative to neural spine height:
140. Posterior sacral ribs are considerably longer than anterior sacral ribs
136. Articulation between the zygapophyses of dorsal vertebrae
134. Cervicals 4–9, form of central surfaces
132. Fusion between the intercentrum of the atlas and the neural arches
125. Peg-like tooth located anteriorly within dentary, lacks denticles, strongly reduced in size
124. Heterodont dentary dentition
122. Position of maxillary/dentary primary ridge
119. Apicobasally extending ridges on lingual/labial surfaces of maxillary/dentary crowns confluent with marginal denticles
114. Premaxillary teeth increase in size posteriorly
110. Mandibular osteoderm
108. Node-like ornamentation of the dentary and angular
107. Retroarticular process:
100. Ventral flange on dentary
95. Predentary, ventral process
94. Tip of predentary in lateral view
93. Predentary, oral margin

- 88. Pterygoquadrate rami, posterior projection of ventral margin
- 87. Pterygoid–maxilla contact at posterior end of tooth row
- 86. Pterygovomerine keel, length
- 85. Dorsoventrally deep (deeper than 50% of snout depth) median palatal keel formed of the vomers, pterygoids, and palatines
- 82. Basal tubera, shape
- 80. Basisphenoid:
 - 79. Basioccipital, contribution to the border of the foramen magnum
 - 78. Supraoccipital, contribution to dorsal margin of foramen magnum
- 76. Paroccipital processes, proportions
- 74. Frontal and parietal dorsoventral thickness
- 73. Enlarged tubercle row on the posterior squamosal
- 72. Postorbital–squamosal tubercle row
- 71. Postorbital–squamosal bar
- 70. Composition of the posterior margin of the parietosquamosal shelf
- 69. Parietosquamosal shelf, extended posteriorly as distinct frill
- 67. Parietal septum, form
- 66. Supratemporal fenestrae, anteroposteriorly elongated
- 65. Supratemporal fenestrae
- 62. Paraquadratic foramen, position:
- 60. Paraquadratic foramen or notch, size
- 59. Quadrate shaft
- 58. Quadrate lateral ramus
- 57. Prominent oval fossa on pterygoid ramus of quadrate
- 56. Quadratojugal, transverse width
- 55. Quadratojugal, orientation:
- 54. Quadratojugal, ventral margin
- 51. Postorbital–parietal contact
- 50. Postorbital
- 49. Postorbital, orbital margin

- 48. Jugal–quadratojugal contact
- 47. Jugal, posterior ramus
- 45. Jugal–squamosal contact above infratemporal fenestra
- 44. Jugal, form of postorbital process
- 43. Jugal–postorbital joint
- 41. Node-like ornamentation on jugal, mostly on, or ventral to, the jugal–postorbital bar
- 40. Jugal boss
- 39. Epijugal:
 - 38. Jugal (or jugal–epiugal) ridge dividing the lateral surface of the jugal into two planes
- 37. Position of maximum widening of the skull:
 - 36. Widening of the skull across the jugals, chord from frontal orbital margin to extremity of jugal is more than minimum interorbital width:
- 33. Free palpebral, length, relative to anteroposterior width of orbit
- 28. Slot in maxilla for lacrimal
- 25. Maxilla, accessory anterior process
- 24. Maxilla, prominent anterolateral boss articulates with the medial premaxilla
- 21. External antorbital fenestra
- 18. External naris size:
 - 12. Overlap of the dorsal process of the premaxilla onto the nasal
- 8. Oral margin of the premaxilla
- 5. Rostral bone, ventrolateral processes
- 4. Rostral bone, anteriorly keeled and ventrally pointed:
 - 3. Neomorphic rostral bone, anterior to premaxilla
- 2. Skull length (rostrum–quadrate):
 - 1. Skull proportions

Pol, D., Garrido, A. and Cerdá, I. A., 2011. A new sauropodomorph dinosaur from the Early Jurassic of Patagonia and the origin and evolution of the sauropod-type Sacrum.

Char:

- 261. Ascending process of astragalus
- 255. Lateral surface of distal tibia

- 251. Cnemial crest
- 244. Fossa trochanterica
- 235. Tuberosity lateral to femoral head ligament
- 228. Pubis/femur length
- 211. Acetabular fossa proportions
- 185. Distal carpal V
- 182. Maximum linear dimensions of the ulnare and radiale
- 119. Cervical epiphyses
- 107. Tooth implantation
- 83. Splenial mylohyoid foramen#
- 42. Extension of postorbital posterior branch
- 40. Rostral ramus of jugal
- 4. Anterior margin of premaxilla

Pol, D., Rauhut, O. W. M. and Becerra, M., 2011. A Middle Jurassic heterodontosaurid dinosaur from Patagonia and the evolution of heterodontosaurids.

Char:

- 172. Subtriangular process, form and position
- 146. Gastralia
- 86. Pterygovomerine keel, length:
- 24. Maxilla, prominent anterolateral boss articulates with the medial premaxilla:

Santucci, R. M. and Arruda-Campos, A. C., 2011. A new sauropod (Macronaria, Titanosauria) from the Adamantina Formation, Bauru Group, Upper Cretaceous of Brazil and the phylogenetic relationships of Aeolosaurini

Char:

- 241. Length proportions of the prezygapophyses with respect to the centrum length in middle caudal vertebrae
- 240. Haemal arches with double articular facets set in a concave posterodorsal surface
- 239. Postzygapophyses located on the anterior half of the centrum on anterior and middle caudal vertebrae
- 238. Prezygapophyses curved downward on anteriormost caudal vertebrae
- 237. Articular facets of the prezygapophyses on anterior and middle caudal vertebrae

236. Anterior margin of the anterior caudal vertebrae

235. Apex of the convexity of the posterior articulation on anterior and middle caudal vertebrae

144 'Forked' chevrons, distribution:

138 Distalmost biconvex caudal centra, number

133 Middle caudal neural spines, orientation

131 Anterior and middle caudal centra, shape

120 Anterior caudal centra, length

119 Anterior caudal centra, pneumatopores (pleurocoels):

2012

Allain, R., Xaisanavong, T., Richir, P. and Khentavong, B., 2012. The first definitive Asian spinosaurid (Dinosauria: Theropoda) from the Early Cretaceous of Laos

Species:

Chilantaisaurus. Irritator. Spinosaurus. Carcharodontosaurus. Dubreuillosaurus. Ichthyovenator. Segisaurus. Aerosteon. Liliensternus.

Char:

156. Ischial shaft

135. Ilium/pubis length ratio:

114. Furcula

92. Cervical pleurocoels

76. Crown serrations

75. Crown recurvature

72. Diastemata within the premaxillary rosette

71. Premaxillary tooth 1, size

34. Lacrimal anterior and ventral rami, angle of divergence

5. Supratemporal fossa:

Carballido, J. L., Salgado, L., Pol, D., Canudo, J. I. and Garrido, A., 2012. A new basal rebbachisaurid (Sauropoda, Diplodocoidea) from the Early Cretaceous of the Neuquén Basin; evolution and biogeography of the group

Species:

Gongxianosaurus shibeiensis. *Amygdalodon patagonicus*. *Isanosaurus attavipachi*.
Vulcanodon karibaensis. *Chinshakiangosaurus chunghoensis*. *Venenosaurus dicrocei*.
Cedarosaurus weiskopfae. *Erketu ellisoni*. *Nemegtosaurus mongoliensis*. *Malarguesaurus florenciae*. *Zapalasaurus bonapartei*. *Rayosaurus agrioensis*. *Cathartesaura anaerobica*.
Tapuiasaurus macedoi. *Trigonosaurus pricei*. *Tendaguria tanzaniensis*. *Wintonotitan wattsi*.
Amazonsaurus maranhensis. *Histriasaurus bocardeli*. *Suwassea emiliae*. *Rebbachisaurus garasbae*. *Brachytrachelopan messai*. *Lessemsaurus sauropoides*. *Euhelopus zdanskyi*.
Brachiosaurus altithorax. *Ligabuesaururs lenzai*. *Argentinosaurus hunculensis*.

Char:

341. Unguals of pedal digit II and III, proximal dimensions

340. Pedal digit IV ungual, development:

323. Distal tarsals 3 and 4:

318. Astragalus, foramina at base of ascending process

312. Tibial distal posteroventral process, size:

278. Manual nonungual phalanges, shape:

269. Carpal bones, shape:

250. Ridge on the ventral surface of the sternal plate

239. Scapular acromion length:

227. Chevrons: persisting throughout at least 80% of tail

221. Distalmost biconvex caudal centra, number: 10 or fewer

200. Anterior caudal transverse processes, proximal depth

183. Sacral vertebrae contributing to acetabulum:

178. Cervical ribs, angle between the capitulum and tuberculum:

117. Cervical centra, small notch in the dorsal margin of the posterior articular surface:

99. Teeth, orientation

98. Lateral plate:

93. Coronoid, size:

92. Splenial posterodorsal process

85. Dentary, tuberocity on labial surface near symphysis:

81. Dentary, depth of anterior end of ramus:

80. Occipital region of skull, shape

77. Basisphenoid, sagital ridge between basipterygoid processes

- 76. Basisphenoid/quadrata contact
- 62. Palatine, lateral ramus shape:
- 61. Pterygoid, sutural contact with ectopterygoid
- 59. Pterygoid, quadrata flange size
- 33. Postorbital, posterior margin articulating with the squamosal
- 30. Prefrontal-Frontal contact width
- 23. Ventral edge of anterior surface of the quadratojugal
- 6. Maxilla, foramen anterior to the preantorbital fenestra
- 4. Premaxilla, external surface:

Carrano, M. T., Benson, R. B. J. and Sampson, S. D., 2012. The phylogeny of Tetanuriae (Dinosauria: Theropoda).

Species:

Shaochilong. Piveteausaurus. Poekilopleuron. Saurophaganax. Shidaisaurus. Siamotyrannus. Angaturama. Chuandongocoelurus. Chilantaisaurus. Elaphrosaurus. Condorraptor. CV00214. Lourinhanosaurus. Magnosaurus. Megaraptor. Metriacanthosaurus. Duriavenator. Eocarcharia. Irritator. Australovenator.

Char:

- 334. Astragalus, prominent proximolateral extension
- 328. Fibula, size of proximal end relative to width of proximal tibia:
- 321. Tibia, anterolateral process of lateral condyle:
- 260. Manual unguals, proximal height:width ratio:
- 244. Ulna, crest extending distally along posterior surface from olecranon process:
- 241. Radius, development of medial biceps tubercle:
- 228. Coracoid, prominent fossa on ventral surface posteroventral to glenoid (subglenoid fossa):
- 205. Caudal vertebrae, anterior, centrodiapophyseal laminae on neural arch:
- 154. Maxillary teeth, mid-tooth spacing:
- 152. Premaxillary teeth, size of tooth 1 relative to others:
- 151. Premaxillary teeth, spacing:

146. Teeth, maxillary and dentary, serrations:

94. Basioccipital, width of basal tubera relative to occipital condyle width:

49. Lacrimal, angle between anterior and ventral rami:

Cau, A., Dalla Vecchia, F. M. and Fabbri, M., 2012. Evidence of a new carcharodontosaurid from the Upper Cretaceous of Morocco

Species:

MPM 2594. *Rugops*. *Shaochilong*. *Spinosaurus*. *Eocarcharia*. *Irritator*. *Deltadromeus*. *Abelisaurus*.

Char:

775. Lacrimal brow, form:

763. Tooth crown, height to crown base length ratio of tallest fully erupted crown:

721. Premaxilla-maxilla articulation, shape in lateral view

720. Maxilla, contribution to the narial fossa

719. Premaxilla, nasal process, inclination

709. Ulna, robustness relative to tibiotarsus:

698. Maxilla/jugal articulation, inclination in lateral view

675. Caudal vertebrae, median and posterior transverse processes, dorsal surface

642. Quadratojugal, additional process that overlaps posteroventrally the quadrate

634. Nasal, premaxillary process, anterodorsal end, notch

582. Ventral margin of the antorbital fossa

579. Maxilla, posterior ramus, inclination of ventral margin under jugal articulation (lateral view):

576. Dorsal vertebrae, middle parapophyses, position:

570. Quadrate, proximodistal (dorsoventral) diameter:

568. Dorsal vertebrae, anterior neural spines, inclination

567. Metatarsal IV, distal end, shape in distal view:

563. Prootic, foramen of facial nerve (anterior nerve VII), shape

559. Maxillary teeth, lingual surface, apicobasally elongate depression/s or eminence:

521. Quadrate, distal condyles, helical groove, development:

490. Maxilla/dentary, alveoli, shape in apical view:

487. Premaxilla, participation to the nasal crest:

485. Premaxilla, narial fossa, development

462. Lacrimal, angle between the anterodorsal and the ventral rami in lateral view:

424. Premaxilla, palatal shelf, incisive foramen at mid-length of the medial articulation:

413. Maxillary and dentary teeth, distal serration, shape of denticles:

385. Maxilla, maxillary fenestra, dorsal margin, position

23 Maxilla, palatal shelf, ventral surface

7. Premaxillae in adult:

Choiniere, J. N., Forster, C. A. and de Klerk, W. J., 2012. New information on *Nqwebasaurus thwazi*, a coelurosaurian theropod from the Early Cretaceous (Hauterivian?) Kirkwood Formation in South Africa

Species:

Stokesosaurus langhami. *Unenlagia comahuensis*. *Rahonavis ostromi*. *Anserimimus planinya*. *Eoraptor lunensis*. *Beipiaosaurus inexpectus*. *Beishanlong grandis*. *Cryolophosaurus ellioti*. *Daspletosaurus torosus*. EK troodontid. *Epidexipteryx hui*. *Gigantoraptor erlianensis*. *Giganotosaurus carolinii*. *Parvicursor remotus*. *Patagonykus puertai*. *Piatnitzkysaurus floresi*. *Proceratosaurus bradleyi*. *Rinchenia mongoliensis*.

Char:

551. Tuber along extensor surface of MtII

515. Fibular crest (ridge on lateral side of tibia for connection with fibula)

424. Ilium pneumaticity

378. Crest extending along posterior surface of ulnar shaft from olecranon process

352. Coracoid foramen

332. Lateral gastralia segment

- 321. Centrodiapophyseal laminae of anterior caudal vertebrae
- 301. Notarium of dorsal vertebrae
- 291. Postzygapophyses of the dorsal vertebrae in posterior view
- 283. Posterior dorsal vertebrae, basal webbing of neural spines
- 247. Form of enamel wrinkles
- 217. Palatal teeth
- 170. Form of dorsal tympanic recess
- 165. Anterior tympanic recess in the braincase
- 158. Basal tubera
- 144. Vestibular and Cochlear branches of CN VIII
- 136. Basisphenoid bulla
- 130. Occipital region of the skull faces
- 101. Anteromedial corner of supratemporal fossa
- 31. Dorsal border of the internal antorbital fenestra lateral view
- 29. Ascending process of maxilla

D'Emic, M. D., 2012. The early evolution of titanosauriform sauropod dinosaurs

Species:

Qiaowanlong. Erketu. Atlasaurus. Abydosaurus.

Char:

- 51. Sacrocostal yoke
- 38. Anterior dorsal centra, articular face shape
- 25. Cervical vertebrae, epiphysial prezygapophyseal lamina, morphology:
- 17. Presacral vertebrae, pneumatopores in centra (pleurocoels):
- 10. Dentary, posteroventral process, shape
- 4. Lacrimal, anteriorly projecting vertical plate of bone
- 3. Premaxilla, small, finger-like, vertically orientated premaxillary process near anteromedial corner of external naris
- 2. Premaxilla–maxilla suture, shape
- 1. Posterolateral process of premaxilla and lateral process of maxilla, shape

Fanti, F., Currie, P. J. and Badamgarav, D., 2012. New Specimens of Nemegtomaia from the Baruungoyot and Nemegt Formations (Late Cretaceous) of Mongolia

Species:

Machairasaurus leptonychus. Nomina gobiensis.

Char:

159. Length of metatarsal I constituting

130. Metacarpal II relative to metacarpal III

107. Ossified uncinate processes on dorsal ribs

18. Subnarial process of nasal

Godefroit, P., Bolotsky, Y. L. and Lauters, P., 2012. A new saurolophine dinosaur from the latest Cretaceous of Far Eastern Russia

Species:

Hadrosaurus foulkii. Lophorhoton atopus.

Char:

175. Morphology of the pedal unguals:

172. Lateral profile of the caudoventral margin of the fourth trochanter:

171. Degree of curvature of the distal half of the femoral shaft:

166. Orientation of the craniocaudal axis of the pubic peduncle (perpendicular to its articular margin) relative to the ischial shaft:

165. Relative orientation of the acetabular and caudodorsal margins of the iliac peduncle of the ischium:

153. Morphology of the ischial peduncle:

152. Morphology of the ischial peduncle:

144. Manual digit I:

127. Ratio between the length of the lateral margin of the facet for the scapular articulation and the length of the lateral margin of the glenoid

122. Development of the postzygapophyseal processes of cranial and middle cervical vertebrae:

115. Palpebral (supraorbital) bone:

107. Ectopterygoid-jugal contact:

104. Lateroventral corner of the supraoccipital deeply inset into the exoccipital, so that the latter is 'locked' between two short flanges that project medially above lateral end of the supraoccipital-exoccipital contact:

100. Orientation of the basipterygoid processes of the basisphenoid (measured as the angle between the ventral margins of both processes):

99. Length of basioccipital constriction

77. Morphology of the ventral surface of the quadrate

65. Morphology of the lateral emargination of the ectopterygoid shelf:

63. Length of the ectopterygoid shelf relative to the total rostrocaudal length of the alveolar margin of the maxilla

61. Large rostral maxillary foramen

60. Number of maxillary foramina ventral and rostral to the jugal articulation (excluding large rostrodorsal or rostrolateral foramen):

58. Morphology of the jugal articulation surface

47. Elongation of premaxillary caudodorsal process:

42. Premaxillary oral margin with a double layer morphology consisting of an external denticle-bearing layer and an internal layer of thickened bone, set back slightly from the oral margin, and separated from the denticular layer by a deep sulcus bearing vascular foramina:

38. Position of the angular in the mandible

35. Surangular foramen

34. Morphology of the rostrodorsal process of the surangular

33. Separation between the dentary tooth row and the coronoid process:

15. Extension of predentary denticulate margin

11. Overall morphology of the maxillary marginal denticles

10. Maximum number of functional teeth per alveolus in the maxillary occlusal plane:

8. Overall morphology of dentary marginal denticles

Han, F.-L., Barrett, P. M., Butler, R. J. and Xu, X., 2012. Postcranial anatomy of *Jeholosaurus shangyuanensis* (Dinosauria, Ornithischia) from the Lower Cretaceous Yixian Formation of China.

Species:

BMNH A100. *Echinodon becklesii*. *Yandusaurus hongheensis*. *Zephyrosaurus schaffi*.
Koreanosaurus. *Yueosaurus*. *Stenopelix valdensis*. *Micropachycephalosaurus hongtuyi*.
Tianyulong. *Talenkauen santacrucensis*. *Pisanosaurus mertii*. *Lycorhinus angustidens*.

Emausaurus ernstii. *Chaoyangosaurus youngi*. *Liaoceratops yanzigouensis*. *Albalophosaurus yamaguchiorum*.

Char:

172. Subtriangular process, form and position

146. Gastralalia:

100. Ventral flange on dentary

86. Pterygovomerine keel, length:

27. Eminence on the rim of the buccal emargination of the maxilla near the junction with the jugal:

5. Rostral bone, ventrolateral processes

McDonald, A. T., 2012. Phylogeny of basal iguanodonts (Dinosauria: Ornithischia): an update

A. Species:

Glishades ericksoni. *Nanyangosaurus zhugeii*. *Ratchasimasaurus suranareae*. *Cedrorestes crichtoni*. *Planicoxa venenica*. *Osmakasaurus depressus*. *Hypselospinus fittoni*. *Callovosaurus leedsi*. *Camptosaurus valdensis*. *Kangnasaurus coetzeei*. *Elrhazosaurus nigeriensis*. *Valdosaurus canaliculatus*. *Hippodraco scutodens*. *Theiophytalia kerri*. *Dakotadon lakotaensis*. *Owenodon hoggii*. *Fukuisaurus tetoriensis*. *Kukufeldia tilgatensis*.

Char:

135. Metatarsals III and IV, deep caudolateral notch on MT III for the reception of a prominent process of MT IV

110. Ilium, preacetabular process, twisting along its length such that the dorsal surface of the ilium becomes the lateral surface of the cranial end of the process:

92. Maxillary teeth, number and morphology of ridges on labial surface of crown

87. Dentary teeth, number and morphology of ridges on lingual surface of crown

B. Species:

Glishades ericksoni. *Nanyangosaurus zhugeii*. *Probactrosaurus mazongshanensis*. NHMUK R3741. *Delapparentia turolensis*. *Jintasaurus meniscus*. *Telmatosaurus transsylvanicus*. *Lophorhothon atopus*. *Ratchasimasaurus suranareae*. *Callovosaurus leedsi*. *Camptosaurus valdensis*. *Kangnasaurus coetzeei*. *Elrhazosaurus nigeriensis*. *Valdosaurus canaliculatus*. NHMUK R8676. *Cedrorestes crichtoni*. *Planicoxa venenica*. *Osmakasaurus depressus*. *Draconyx loureiroi*. *Hypselospinus fittoni*. *Iguanacolossus fortis*.

Char:

135. Metatarsals III and IV, deep caudolateral notch on MT III for the reception of a prominent process of MT IV

108. Manus, digit III, number of phalanges

90. Maxillary teeth, ridges on labial surface of crown:

85. Dentary teeth, ridges on lingual surface of crown

McDonald, A. T., Espilez, E., Mampel, L., Kirkland, J. I. and Alcala, L., 2012. An unusual new basal iguanodont (Dinosauria: Ornithopoda) from the Lower Cretaceous of Teruel, Spain

Species:

Tanius sinensis. *Nanyangosaurus zhugeii*. *Claosaurus agilis*. *Lophorhothon atopus*.

Hadrosaurus foulkii. *Glishades ericksoni*. *Probactrosaurus mazongshanensis*.

Penelopognathus weishampeli. *Ratchasimasaurus suranareae*. *Jintasaurus meniscus*.

NHMUK R3741. *Delapparentia turolensis*. *Callovosaurus leedsi*. *Camptosaurus valdensis*.

Muttaburrasaurus langdoni. *Kangnasaurus coetzeei*. *Elrhazosaurus nigeriensis*. *Valdosaurus canaliculatus*. *Cedrorestes crichtoni*. *Planicoxa venenica*. *Osmakasaurus decessus*.

Hypselospinus fittoni. *Owenodon hoggii*. NHMUK R8676. *Draconyx loureiroi*.

Char:

134. Metatarsals III and IV, deep caudolateral notch on MT III for the reception of a prominent process of MT IV

108. Manus, digit III, number of phalanges:

85. Dentary teeth, ridges on lingual surface of crown

Osi, A., Prondvai, E., Butler, R. and Weishampel, D. B., 2012. Phylogeny, histology and inferred body size evolution in a new rhabdodontid dinosaur from the Late Cretaceous of Hungary.

Species:

Yueosaurus. *Koreanosaurus*. *Micropachycephalosaurus hongtuyanensis*. *Stenopelix valdensis*. *Wannanosaurus yansiensis*. *Rhabdodon priscus*. *Mochlodon suessi*. *Mochlodon vorosi*. *Othnieliosaurus consors*. *Anabisetia saldiviae*. *Stormbergia dangershoeki*.

Pisanosaurus mertii. *Marasuchus lilloensis*. *Eocursor parvus*. *Zalmoxes shqiperorum*.

NHMUKRUA. *Echinodon becklesii*. *Fruitadens haagarorum*.

Char:

173. Brevis shelf & fossa

147. Ossified clavicles

87. Pterygoid–maxilla contact at posterior end of tooth row

1. Skull proportions

Rubilar-Rogers, D., Otero, R. A., Yury-Yanez, R. E., Vargas, A. O. and Gutstein, C. S., 2012. An overview of the dinosaur fossil record from Chile.

Species:

A. chilensis. *T.colberti*. *Nemegtosaurus*. *Rebbachisaurus*. *Nigersaurus*. *Barosaurus*.
Vulcanodon. *Haplocanthosaurus*.

Char:

- 162. Humeral midshaftcross-section, shape
- 144. 'Forked' chevrons,distribution
- 138. Distalmost biconvexcaudal centra, number
- 133. Middle caudalneural spines, orientation
- 131. Anterior and middlecaudal centra, shape
- 120. Anterior caudalcentra, length
- 119. Anterior caudalcentra, pneumatopores (pleurocoels):
- 110. Sacral vertebraecontributing to acetabulum
- 76. Teeth, longitudinal grooves on lingual aspect
- 74. Replacementteeth per alveolus, number:
- 57. Dentarysymphysis, orientation
- 52. Basisphenoid–quadratecontact
- 38. Pterygoid,quadrate flange size
- 35. Quadratefossa, orientation
- 25. Supratemporalfenestra
- 17. Postorbital,posterior process

Ruiz-Omenaca, J. I., Canudo, J. I., Cuenca-Bescos, G., Cruzado-Caballero, P., Gasca, J. M. and Moreno-Azanza, M., 2012. A new basal ornithopod dinosaur from the Barremian of Galve, Spain.

Species:

Stormbergia dangershoeki. *Marasuchus lilloensis*. *Stenopelix valdensis*. *Gideonmantellia amosanjuanae*. *Talenkauen santacruzensis*. *Micropachycephalosaurus hongtuyanensis*. *Tianyulong*. *Othnieliosaurus consors*. *Anabisetia saldiviae*. *Lycorhinus angustidens*. *Eocursor parvus*. *Pisanosaurus mertii*. BMNH A100. *Echinodon becklesii*. *Fruitadens haagarorum*. *Zephyrosaurus schaffi*. *Bugenasaura infernalis*. *Yandusaurus hongheensis*.

Char:

- 172. Subtriangular process, form and position
- 146. Gastralia: 0. Present; 1. Absent.

86. Pterygovomerine keel, length

Senter, P., Kirkland, J. I., DeBlieux, D. D., Madsen, S. and Toth, N., 2012. New dromaeosaurids (Dinosauria: Theropoda) from the Lower Cretaceous of Utah, and the evolution of the dromaeosaurid tail.

Species:

Dromaeosaurus. Utahraptor. Yurgovuchia. Shanag. Graciliraptor. Hesperonychus. Sinovenator. Sinusonasus. Geminiraptor. Byronosaurus. Borogovia. IGM 100 44. Xixiasaurus. Tanycolagreus. Coelurus. Deinocheirus. Archaeornithomimus. Segnosaurus. Erlkosaurs. Therizinosaurus. Chirostenotes. Hagryphus. Elmisaurs. Nanshiungosaurus. Suzhousaurus. Neimongosaurus. Alvarezsaurus. Parvicursor. Alxasaurus. Nothronychus. Erliansaurus. Patagonykus. Mononykus. Anserimimus. Rahonavis. Unenlagia.

Char:

391. Distinct notch demarcating proximal end of flexor tubercle of pedal ungual II in lateral view

386. Phalanges of pedal digit III not blocky (proximal phalanx length \geq 2x diameter)

383. Pedal phalanx II-2 with distinct shaft or waist between proximal cotyles

380. Total length of pedal phalanx II-1

372. Shaft of MT IV round or thicker dorsoventrally

371. Metatarsal III contributes to proximal surface

365. Distal end of metatarsal I

364. Shaft of metatarsal I

345. Popliteal fossa on distal end of femur open

328. Obturator process does not contact pubis

317. Shafts of pubis and ischium not in contact

310. Pubic apron

300. Pubic peduncle of ilium craniocaudally longer (0) or shorter (1)

298. Dorsal margin of postacetabular iliac blade

289. Anteroventral corner of preacetabular ala of ilium

286. Preacetabular portion of ilium

266. Manual phalanx II-1

257. Medial ligament pits of manual phalanges

240. Distal articular surface of ulna

- 235. Radius straight
- 231. Width of distal humeral expansion
- 189. Anterior caudal centra craniocaudally
- 186. Last sacral centrum with flat posterior articulation surface
- 114. Labial face of dentary.
- 69. Frontal edge smooth in region of lacrimal suture

Senter, P., Kirkland, J. I. and DeBlieux, D. D., 2012. *Martharaptor greenriverensis*, a new theropod dinosaur from the Lower Cretaceous of Utah.

Species:

Dromaeosaurus. Utahraptor. Yurgovuchia. Adasaurus. Microraptor gui. Microraptor zhaoianus. CAGS Microraptor zhaoianus. Graciliraptor. IGM 100 44. Borogavia. Mahakala. Rahonavis. Unenlagia. Hesperonychus. Cryptovolans. Deinocheirus. Martharaptor. Nanshiungosaurus. Suzhousaurus. Segnosaurus. Neimongosaurus. Erlikosaurus. Alvarezsaurus. Anserimimus. Archaeornithomimus. Oviraptor. Nemegtomaia. Rinchenia. Chirostenotes. Hagryphus. Elmisaurus.

Char:

- 391. Distinct notch demarcating proximal end of flexor tubercle of pedal ungual II
- 386. Phalanges of pedal digit III not blocky
- 383. Pedal phalanx II-2 with distinct shaft or waist between proximal cotyles and distal condylar eminence
- 380. Total length of pedal phalanx II-1
- 372. Shaft of MT IV
- 364. Shaft of metatarsal I
- 309. Lateral tubercle about halfway down pubic shaft absent
- 298. Dorsal margin of postacetabular iliac blade straight
- 289. Anteroventral corner of preacetabular ala of ilium
- 196. Caudotheca (term introduced in reference 3: network of elongated prezygapophyses and hemal arches in the tails of dromaeosaurids),
- 143. Longitudinal groove on labial surface of maxillary and dentary tooth crowns
- 69. Frontal edge smooth in region of lacrimal suture

Thompson, R. S., Parish, J. C., Maidment, S. C. R. and Barrett, P. M., 2012. Phylogeny of the ankylosaurian dinosaurs (Ornithischia: Thyreophora).

Species:

Texasetes pleurohalio. *Zhejiangosaurus lishuiensis*. *Dyoplosaurus acutosquamatus*.
Stegopelta landerensis. *Struthiosaurus languedocensis*. *Minotaurasaurus ramachandrani*.
Polacanthus foxii. *Polacanthus rugwickensis*. *Gobisaurus domoculus*. *Pawpawsaurus cambelli*. *Anoplosaurus curtonotus*. *Hoplitosaurus marshi*.

Char:

169. Form of caudal plates:

167. Form of ossicles in sacral armour:

159. Parasagittal row of keeled osteoderms situated on the dorsal aspect of the trunk

133. Ratio of the length of metacarpal V to metacarpal III

32. Proportions of jugal orbital ramus

27. Palpebral shape

25. Maxillary tooth row position

2013

Araujo, R., Castanhinha, R., Martins, R. M. S., Mateus, O., Hendricks, C., Beckmann, F., Schell, N. and Alves, L. C., 2013. Filling the gaps of dinosaur eggshell phylogeny: Late Jurassic theropod clutch with embryos from Portugal.

Species:

CV00214. ML1188. IPFUB Gui Th 4. ML565. *Piveteausaurus*. *Poekilopleuron*.
Proceratosaurus. *Shaochilong*. *Spinosaurus*. *Siamotyrannus*. *Eocarcharia*. *Duriavenator*.
Dubreuillosaurus. *Angaturama*. *Chilantaisaurus*. *Chuandongocoelurus*. *Irritator*.
Australovenator. *Magnosaurus*. *Streptospondylus*. *Xuanhanosaurus*. *Megaraptor*.
Metriacanthosaurus. *Monolophosaurus*.

Char:

355. Maxilla, shape of promaxillary fenestra in lateral view

334. Astragalus, prominent proximolateral extension: absent (0); present (1)

328. Fibula, size of proximal end relative to width of proximal tibia: < 75% (0), ≥ 75% (1)

321. Tibia, anterolateral process of lateral condyle: absent or horizontal projection (0), prominent, curves ventrally (1)

260. Manual ungual I, length:height ratio: < 2.5x (0), > 2.5x (1)

244. Ulna, crest extending distally along posterior surface from olecranon process: absent (0), present (1)

241. Radius, development of medial biceps tubercle: small or indistinct (0), hypertrophied (1)

228. Coracoid, prominent fossa on ventral surface posteroventral to glenoid (subglenoid fossa): absent (0); present (1)
210. Gastralia, posteriormost gastral segments: separate (0), united into single, boomerang-shaped elements (1)
205. Caudal vertebrae, anterior, centrodiapophyseal laminae on neural arch: weak or lacking (0), as prominent as in dorsal vertebrae, defining deep infradiapophyseal fossa that penetrates neural arch (pneumatic) (1)
154. Maxillary teeth, mid-tooth spacing: adjacent (0), with diastemata (1)
152. Premaxillary teeth, size of tooth 1 relative to others: subequal (0), smaller (1)
151. Premaxillary teeth, spacing: even (0), paired and spaced (1)
146. Teeth, maxillary and dentary, serrations: present (0), absent (1)
141. Teeth, curvature: present, marked (0), reduced or absent (1)
94. Basioccipital, width of basal tubera relative to occipital condyle width: \geq (0), < (1)
91. Basioccipital, sharp dorsoventrally oriented lamina situated immediately ventral to occipital condyle: absent (0), present (1)
49. Lacrimal, angle between anterior and ventral rami: $\sim 90^\circ$ (0), < 75° (1)
- Arbour, V. M. and Currie, P. J., 2013. Euoplocephalus tutus and the diversity of ankylosaurid dinosaurs in the Late Cretaceous of Alberta, Canada, and Montana, USA.
- A. Species:
- Dyoplosaurus acutosquameus. Nodocephalosaurus kirtlandensis
- Char:
169. Form of caudal plate:
167. Form of ossicles in sacral armour
166. Sacral shield of fused osteoderms
165. Form of pectoral spikes
164. Pectoral spikes
163. Form of the cervical bands
160. Large, laterally compressed plates on the dorsal aspect of the trunk
159. Parasagittal row of keeled osteoderms situated on the dorsal aspect of the trunk
152. Oblique ridge on lateral femoral shaft, distal to anterior trochanter
150. Separation of femoral head from greater trochanter:

- 149. Angle between long axis of femoral head and long axis of shaft
- 147. Shape of ischium
- 144. Prepubic process
- 139. Form of the preacetabular portion of the ilium:
 - 138. Orientation of the preacetabular portion of the ilium
 - 133. Ratio of the length of metacarpal V to metacarpal III
 - 132. Shape of the radial condyle of humerus round / proximal end of radius in end-on view
- 127. Contact between sternal plates
- 124. Orientation of the acromion process of scapula
- 123. Form of the scapula acromion process
- 119. Size of coracoid glenoid relative to scapula glenoid
- 110. Persistence of transverse processes down the length of the caudal series:
 - 108. Length of transverse processes relative to neural spine height in proximal caudals
 - 105. Longitudinal groove in ventral surface of the sacrum
- 104. Paravertebrae
- 99. Longitudinal keel on ventral surface of dorsal centra
- 98. Ratio of anteroposterior (dorsal vertebra) centrum length to posterior centrum height:
- 95. Dimensions of cervical vertebrae centra:
- 87. Shape of quadratojugal 'horn':
- 85. Shape of postorbital/squamosal 'horn'
- 80. A single large medial polygon of ornamentation in the parietal region:
- 78. Cranial armour pattern
- 74. Position of glenoid for quadrate relative to mandibular axis
- 70. Shape of dorsal margin of the dentary in lateral view
- 69. Depth of the dentary symphysial ramus relative to half the maximum depth of the mandibular ramus in lateral view:
- 66. Number of dentary teeth
- 64. Cingula on maxillary and/or dentary teeth
- 60. Degree of endocranial flexure
- 56. Length of basisphenoid relative to the basioccipital

- 44. Contact between basipterygoid processes and pterygoid
- 43. Direction of the pterygoid flange
- 42. Contact between pterygoids
- 37. Form of quadrate mandibular extremity
- 32. Proportions of jugal orbital ramus
- 29. Anterior and posterior supraorbitals (recognizable by distinct regions of ornamentation above the orbit)
- 28. Form of palpebral articulation
- 27. Palpebral shape
- 25. Maxillary tooth row position

B. Species:

Dyoplosaurus acutusquamatus

Char:

169. Form of caudal plate:

167. Form of ossicles in sacral armour

166. Sacral shield of fused osteoderms

165. Form of pectoral spikes

164. Pectoral spikes

160. Large, laterally compressed plates on the dorsal aspect of the trunk

159. Parasagittal row of keeled osteoderms situated on the dorsal aspect of the trunk

152. Oblique ridge on lateral femoral shaft, distal to anterior trochanter

150. Separation of femoral head from greater trochanter:

147. Shape of ischium

146. Size of pubic contribution to acetabulum

144. Prepubic process

139. Form of the preacetabular portion of the ilium:

138. Orientation of the preacetabular portion of the ilium

134. Manual digit number

133. Ratio of the length of metacarpal V to metacarpal III

132. Shape of the radial condyle of humerus round / proximal end of radius in end-on view

- 127. Contact between sternal plates
- 126. Distal end of scapula shaft
- 124. Orientation of the acromion process of scapula
- 123. Form of the scapula acromion process
- 119. Size of coracoid glenoid relative to scapula glenoid
- 110. Persistence of transverse processes down the length of the caudal series:
 - 108. Length of transverse processes relative to neural spine height in proximal caudals
- 105. Longitudinal groove in ventral surface of the sacrum
- 104. Paravertebrae
- 99. Longitudinal keel on ventral surface of dorsal centra
- 98. Ratio of anteroposterior (dorsal vertebra) centrum length to posterior centrum height:
- 95. Dimensions of cervical vertebrae centra:
- 87. Shape of quadratojugal 'horn':
- 85. Shape of postorbital/squamosal 'horn'
- 80. A single large medial polygon of ornamentation in the parietal region:
- 78. Cranial armour pattern
- 74. Position of glenoid for quadrate relative to mandibular axis
- 70. Shape of dorsal margin of the dentary in lateral view
- 69. Depth of the dentary symphysial ramus relative to half the maximum depth of the mandibular ramus in lateral view:
- 66. Number of dentary teeth
- 64. Cingula on maxillary and/or dentary teeth
- 61. Direction of occipital condyle
- 60. Degree of endocranial flexure
- 56. Length of basisphenoid relative to the basioccipital
- 44. Contact between basipterygoid processes and pterygoid
- 43. Direction of the pterygoid flange
- 42. Contact between pterygoids
- 37. Form of quadrate mandibular extremity
- 32. Proportions of jugal orbital ramus

29. Anterior and posterior supraorbitals (recognizable by distinct regions of ornamentation above the orbit)

28. Form of palpebral articulation

27. Palpebral shape

25. Maxillary tooth row position

C. Species:

Dyoplosaurus acutusquamatus

Char:

169. Form of caudal plate:

167. Form of ossicles in sacral armour

166. Sacral shield of fused osteoderms

165. Form of pectoral spikes

164. Pectoral spikes

160. Large, laterally compressed plates on the dorsal aspect of the trunk

159. Parasagittal row of keeled osteoderms situated on the dorsal aspect of the trunk

152. Oblique ridge on lateral femoral shaft, distal to anterior trochanter

150. Separation of femoral head from greater trochanter:

147. Shape of ischium

146. Size of pubic contribution to acetabulum

144. Prepubic process

139. Form of the preacetabular portion of the ilium:

138. Orientation of the preacetabular portion of the ilium

134. Manual digit number

133. Ratio of the length of metacarpal V to metacarpal III

132. Shape of the radial condyle of humerus round / proximal end of radius in end-on view

127. Contact between sternal plates

126. Distal end of scapula shaft

124. Orientation of the acromion process of scapula

123. Form of the scapula acromion process

119. Size of coracoid glenoid relative to scapula glenoid

- 110. Persistence of transverse processes down the length of the caudal series:
- 108. Length of transverse processes relative to neural spine height in proximal caudals
- 105. Longitudinal groove in ventral surface of the sacrum
- 104. Paravertebrae
- 99. Longitudinal keel on ventral surface of dorsal centra
- 98. Ratio of anteroposterior (dorsal vertebra) centrum length to posterior centrum height:
- 95. Dimensions of cervical vertebrae centra:
- 87. Shape of quadratojugal 'horn':
- 85. Shape of postorbital/squamosal 'horn'
- 80. A single large medial polygon of ornamentation in the parietal region:
- 78. Cranial armour pattern
- 74. Position of glenoid for quadrate relative to mandibular axis
- 70. Shape of dorsal margin of the dentary in lateral view
- 69. Depth of the dentary symphysial ramus relative to half the maximum depth of the mandibular ramus in lateral view:
- 66. Number of dentary teeth
- 64. Cingula on maxillary and/or dentary teeth
- 61. Direction of occipital condyle
- 60. Degree of endocranial flexure

Brusatte, S. L. and Benson, R. B. J., 2013. The systematics of Late Jurassic tyrannosauroids (Dinosauria: Theropoda) from Europe and North America.

Species:

Tehuelchesaurus benitezii. Tastavinsaurus sanzi. Venenosaurus dicrocei. Cedarosaurus. Chubutisaurus insignis. Wintonotitan wattsi. Suuwassea emiliae. Amazonsaurus maranhensis. Zapalasaurus bonapartei. Histriasaurus bocardeli. Comahuesaurus windhanseni. Rayosaurus agrioensis. Rebbachisaurus garasbae. Amygdalodon patagonicus. Isanosaurus attavipachi. Chinshakiangosaurus chunghoensis.

Char:

- 312. Tibial distal posteroventral process, size
- 278. Manual nonungual phalanges, shape
- 227. Chevrons: persisting throughout at least 80% of tail

- 221. Distalmost biconvex caudal centra, number
- 200. Sacral vertebrae contributing to acetabulum:
- 178. Cervical ribs, angle between the capitulum and tuberculum:
- 169. Middle and posterior dorsal neural arches, spinodiapophyseal lamina (SPDL) and spinopostzygapophyseal lamina (ISPOL) contact
- 104. Enamel surface texture
- 98. Lateral plate
- 93. Coronoid, size:
- 92. Splenial posterodorsal process:
- 85. Dentary, tuberocity on labial surface near symphysis
- 80. Occipital region of skull, shape
- 62. Palatine, lateral ramus shape
- 4. Premaxilla, external surface

Cau, A., Dalla Vecchia, F. M. and Fabbri, M., 2013. A thick-skulled theropod (Dinosauria, Saurischia) from the Upper Cretaceous of Morocco with implications for carcharodontosaurid cranial evolution.

Species:

Sauroniops. Rugops. Shaochilong. Eocarcharia. Abelisaurus. Deltadromeus. Cryolophosaurus. Rajasaurus.

Char:

- 817. Frontal, dorsoventrally expanded preorbital (prefrontal+lacrimal) facet, deepest point, position:
- 815. Frontal, nasal processes, extent of nasal overlap
- 811. Frontal, prefrontal facet, position:
- 775. Lacrimal brow, form:
- 770. Dorsal vertebrae, middle and posterior hyposphene, development:
- 763. Tooth crown, height to crown base length ratio of tallest fully erupted crown: more
- 675. Caudal vertebrae, median and posterior transverse processes, dorsal surface:
- 646. Occipital condyle, dorsal groove, size
- 642. Quadratojugal, additional process that overlaps posteroventrally the quadrate:

579. Maxilla, posterior ramus, inclination of ventral margin under jugal articulation (lateral view)

570. Quadrate, proximodistal (dorsoventral) diameter:

567. Metatarsal IV, distal end, shape in distal view:

543. Surangular, posterior end, lateral groove:

521. Quadrate, distal condyles, helical groove, development

490. Maxilla/dentary, alveoli, shape in apical view

413. Maxillary and dentary teeth, distal serration, shape of denticles

385. Maxilla, maxillary fenestra, dorsal margin, position

Coria, R. A., Moly, J. J., Reguero, M., Santillana, S. and Marenssi, S., 2013. A new ornithopod (Dinosauria; Ornithischia) from Antarctica

Species:

Trinisaura santamartaensis. *Micropachycephalosaurus hongtuyanensis*. *Stenopelix valdensis*.

BMNH A100. *Echinodon becklessi*. *Stormbergia dangershoeki*. *Emausaurus ernstii*.

Lycorhinus angustidens. *Pisanosaurus mertii*. *Yandusaurus hongheensis*. *Othnieliosaurus consors*. *Anabisetia saldiviae*.

Char:

172. Subtriangular process, form and position:

146. Gastralia: 0. Present; 1. Absent

86. Pterygovomerine keel, length:

D'Emic, M. D., 2013. Revision of the sauropod dinosaurs of the Lower Cretaceous Trinity Group, southern USA, with the description of a new genus

Species:

Atlasaurus. *Astrophocaudia*. *Venenosaurus*.

Char:

93. Metacarpal IV, articulation for metacarpal V, shape:

66. Anterior and middle chevrons, articular facets

60. Middle caudal vertebrae, neural spines, orientation

51. Sacrocostal yoke:

38. Anterior dorsal centra, articular face shape

25. Cervical vertebrae, epiphysis, morphology:

17. Presacral centra, pneumatopores in centra (pleurocoels)

1. Posterolateral process of premaxilla and lateral process of maxilla, shape

Evans, D. C., Schott, R. K., Larson, D. W., Brown, C. M. and Ryan, M. J., 2013. The oldest North American pachycephalosaurid and the hidden diversity of small-bodied ornithischian dinosaurs

Species:

Colepioccephale lambei. *Stegoceras novomexicanum*. *Astrocephale gobiensis*.

Char:

47. Large, conical node projects laterally from jugal

46. Squamosal, several nodes drawn out into long spikes

38. Extensive intersquamosal joint posterior to parietal

26. Skull: relatively short, rostrum has a convex profile

24. Quadratojugal fossa

23. Pterygoid-basisphenoid plate

19. Postorbital-jugal bar, position of descending process of postorbital

16. Postorbital-squamosal bar, form:

13. Pubic body:

12. Ischial pubic peduncle, shape:

8. Sternal shape

4. Humeral shaft form:

Farke, A. A. and Sertich, J. J. W., 2013. An abelisauroid theropod dinosaur from the Turonian of Madagascar.

Species:

Spinostropheus. *Velocisaurus*. *Rahiolisaurus*. *Genyodectes*. *Genusaurus*. *Dahalokely*.

Indosaurus. *Kryptops*. *Berberosaurus*. *Camarillasaurus*. *Laevisuchus*.

Char:

160. Shape of anterior margin of iliac preacetabular process

113. Infradiapophyseal fossa of middle and caudal dorsal vertebrae

103. Shape of postaxial cervical zygapophyses

80. Size of largest maxillary tooth

79. Transverse flattening of lateral maxillary teeth

Godefroit, P., Cau, A., Hu, D.-Y., Escuillie, F., Wu, W.-H. and Dyke, G., 2013. A Jurassic avian dinosaur from China resolves the early phylogenetic history of birds

Species:

Eosinopteryx. Aurornis. Tsaagan. Unenlagia comahuensis. Unenlagia paynemili.
Pelecanimimus. Saurornitholestes langstoni. Schizooura. Troodon. Tugulusaurus. Zanabazar.
Byronosaurus. Austroraptor. Dromaeosaurus. Dubreuillosaurus. Erlicosaurus. Graciliraptor.
Incisivosaurus. Jianchangornis. Neuquenraptor. NGMC 91. Oviraptor philoceratops.
Parvicursorinae indet IGN 100 9. Shanag. Shenzhousaurus. Zuolong. Sinusonasus.
Beipiaosaurus. Bonapartenykus. Epidendrosaurus. Mononykus. Nothronychus graffami.
Patagonykus. Patagopteryx.

Char:

1498

1497

1495

1494

1492-1481

1479-1462

1460

1458-1454

1448

1442

1441. Quadrate, shaft, proximal half, inclination relative to rest of shaft

1443

1429

1427

1425

1420. Maxilla, maxillary fenestra, anterior half, overlapped by lateral lamina of antorbital fossa

1419-1417

1415-1403

(1403. Dentary, first tooth, position: in the anterior end (0); posteriorly inset (1).

1414. Coracoid, ventrolateral surface, texture: smooth (0); skulptured (1). (Ref. 81).

1415. Caudal vertebrae, anterior centra, lateral surface, anterior half, subcircular depression: absent (0); present (1).)

1401-1399

1397,1396

1383

1380. Manual unguals, flexor process;

1379. Manual unguals, flexor process, shape

1378, 1377

1370, 1367, 1366

1362. Lacrimal, ventral process, medially inset relative to dorsal process:

1360, 1358

1348-1346

1343-1329

1326-1320

1317, 1316

1314-1310

1308-1302

1299

1295-1292

1290

1287, 1286, 1284, 1283

1280-1260, 1256

1254, 1253, 1248, 1244

U,UC describtion lost

Loewen, M. A., Irmis, R. B., Sertich, J. J. W., Currie, P. J. and Sampson, S. D., 2013. Tyrant dinosaur evolution tracks the rise and fall of Late Cretaceous oceans.

Species:

Piatnitzkysaurus floresi. Coelurus fragilis. Alectrosaurus olseni. Juratyrant langhami. Stokesosaurus clevelandi. DPF tyrannosaurid B. Alioramus remotus. Zhuchengtyrannus magnus. Sinotyrannus kazuoensis. Eotyrannus lengi. Proceratosaurus bradleyi. Kileskus

aristotocus. Pelecanimimus polydon. Utahraptor ostrommaysorum. Bagaraatan ostromi. Dryotosaurus aquilunguis.

Char:

436. Ischium, shaft curvature

410. Ilium, dorsal extent of supraacetabular ridge:

244. Dentary, primary neurovascular foramina, arrangement:

217. Palatine, position of the posterior edge of the posterior pneumatic recess compared to the posterior edge of the dorsal process:

201. Parabasisphenoid, basisphenoid recess, inflation of the dorsal surface of the recess:

53. Nasal, dorsal ornamentation

34. Maxilla, broad mediolaterally expanded palatal shelf, ventral border:

28. Maxilla, anterior margin, premaxillary suture on body of maxilla in lateral view:

Lu, J.-C., Currie, P. J., Xu, L., Zhang, X.-L., Pu, H.-Y. and Jia, S.-H., 2013. Chicken-sized oviraptorid dinosaurs from central China and their ontogenetic implications

Species:

Gigantoraptor. Machairasaurus. Heyuannia.

Char:

172. Metacarpal I expanded ventrally to cover ventral surface of metacarpal II

167. Lateral surface of dentary smooth (0); bearing a deep fossa, sometimes with associated pneumatopore (1)

159. Length of metatarsal I constituting:

130. Metacarpal II relative to metacarpal III:

107. Ossified uncinate processes on dorsal ribs

18. Subnarial process of nasal

Lu, J.-C., Yi, L.-P., Zhong, H. and Wei, X.-F., 2013. A new oviraptorosaur (Dinosauria: Oviraptorosauria) from the Late Cretaceous of Southern China and its paleoecological implications.

Species:

Machairasaurus. Heyuannia. Nankangia.

Char:

172. Metacarpal I expanded ventrally to cover ventral surface of metacarpal II

159. Length of metatarsal I constituting:

130. Metacarpal II relative to metacarpal III

107. Ossified uncinate processes on dorsal ribs:

18. Subnarial process of nasal:

Mannion, P. D., Upchurch, P., Barnes, R. N. and Mateus, O., 2013. Osteology of the Late Jurassic Portuguese sauropod dinosaur *Lusotitan atalaiensis* (Macronaria) and the evolutionary history of basal titanosauriforms

Species:

Australodocus. *Dongyangosaurus*. *Pelorosaurus becklesii*. *Sauroposeidon*. *Sonorasaurus*. *Tendaguria*. *Xianshanosaurus*. *Ligabuesaurus*. *Liubangosaurus*. *Janenschia*. *Angolatitan*. *Aragosaurus*.

Char:

203. First caudal rib, expands anteroposteriorly towards its distal end, forming an 'anchor' shape in dorsal view

143. Dorsal centra, lateral pneumatic foramen

135. Middle cervical neural spines, dorsal surface with mediolaterally orientated midline ridge flanked by small fossae at its anterior and posterior ends

123. Middle cervical centra, lateral pneumatic fossa/foramen extends almost to the posterior end of the centrum, leaving only a thin strip of bone

H:1-13, 75-114

B: 14-35, 36-74, 115-end

McGarrity, C. T., Campione, N. E. and Evans, D. C., 2013. Cranial anatomy and variation in *Prosaurolophus maximus*(Dinosauria: Hadrosauridae).

Species:

Hadrosaurus foulkii. *Lophorhoton atopus*.

Char:

175. Morphology of the pedal unguals

172. Lateral profile of the caudoventral margin of the fourth trochanter

171. Degree of curvature of the distal half of the femoral shaft
166. Orientation of the craniocaudal axis of the pubic peduncle (perpendicular to its articular margin) relative to the ischial shaft:
165. Relative orientation of the acetabular and caudodorsal margins of the iliac peduncle of the ischium
153. Morphology of the ischial peduncle
152. Morphology of the ischial peduncle: relatively large and dorsoventrally deep (longer than wide), subconical, with a proximal region that is only slightly craniocaudally wider than the distal end of the process
144. Manual digit I: presence of metacarpal I and one ungual phalanx
127. Ratio between the length of the lateral margin of the facet for the scapular articulation and the length of the lateral margin of the glenoid
122. Development of the postzygapophyseal processes of cranial and middle cervical vertebrae
115. Palpebral (supraorbital) bone:
107. Ectopterygoid-jugal contact
104. Lateral ventral corner of the supraoccipital deeply inset into the exoccipital, so that the latter is 'locked' between two short flanges that project medially above lateral end of the supraoccipital-exoccipital contact:
100. Orientation of the basipterygoid processes of the basisphenoid (measured as the angle between the ventral margins of both processes):
99. Length of basioccipital constriction:
77. Morphology of the ventral surface of the quadrate
65. Morphology of the lateral emargination of the ectopterygoid shelf
63. Length of the ectopterygoid shelf relative to the total rostrocaudal length of the alveolar margin of the maxilla:
61. Large rostral maxillary foramen
60. Number of maxillary foramina ventral and rostral to the jugal articulation (excluding large rostrodorsal or rostral-lateral foramen):
58. Morphology of the jugal articulation surface
47. Elongation of premaxillary caudodorsal process
42. Premaxillary oral margin with a double layer morphology consisting of an external denticle-bearing layer and an internal layer of thickened bone, set back slightly from the oral margin, and separated from the denticular layer by a deep sulcus bearing vascular foramina

38. Position of the angular in the mandible:

35. Surangular foramen

34. Morphology of the rostrodorsal process of the surangular:

33. Separation between the dentary tooth row and the coronoid process

15. Extension of predentary denticulate margin

11. Overall morphology of the maxillary marginal denticles

10. Maximum number of functional teeth per alveolus in the maxillary occlusal plane:

8. Overall morphology of dentary marginal denticles:

Novas, F. E., Agnolin, F. L., Ezcurra, M. D., Porfiri, J. and Canale, J. I., 2013. Evolution of the carnivorous dinosaurs during the Cretaceous: the evidence from Patagonia.

Species:

Eocarcharia. Santanaraptor. Kileskus. Proceratosaurus. Eotyrannus. Spinosaurus. Irritator. Shaochilong. Megaraptor. Carcharodontosaurus iguidensis. Orkoraptor.

Char:

286. Sacrum, position of ventral margin of posterior articular face of sacral vertebra five in lateral view:

247. Coracoid, ventral portion to the glenoid

245. Ilium, lateral surface of ilium with large external foramina and internal pneumatic spaces

145. Manual unguals, ventral margin of manual unguals I and II

144. Manual unguals, lateral grooves of manual unguial of digit I:

139. Manual phalanx I-1, proximal end:

132. Metacarpal II, at least half of proximal end closely appressed to metacarpal III:

127. Ulna, shape of the olecranon process

O'Connor, J. K. and Zhou, Z.-H., 2013. A redescription of Chaoyangia beishanensis (Aves) and a comprehensive phylogeny of Mesozoic birds.

Species:

Songlingornis. Ambiortus. Limenavis. Elsornis. Eoalulavis. Eocathayornis. Eoenantiornis. Otogornis. Vescornis. Vorona. Hollanda. Vegavis. Chaoyangia. Concornis. Neuquenornis. Iberomesornis. Jianchangornis. Apsaravis. Liaoningornis. Patagopteryx. Gansus. Baptornis varneri. Enaliornis. Eoconfuciusornis. Changchengornis. Jinzhouornis zhangjiyingia. Confuciusornis dui. Shenzhouraptor. Jixiangornis

Char:

240. Distal end of metatarsal II strongly curved medially

223. Proximal end of metatarsus

206. Caudal projection of the lateral border of the distal end of the femur, proximal and contiguous to the ectocondylar tubercle/tibiofibular crest

194. Pubic pedicel

170. Major digit (II), phalanx 1, "internal index process" (Stegmann, 1978) on caudodistal edge

147. Ulna, dorsal cotyla strongly convex

146. Ulna, cotylae:

115. Sternum, coracoidal sulci spacing on cranial edge

108. Sternum

102. Costal surface of scapular blade with prominent longitudinal furrow

101. Proximal end of scapula, pit between acromion and humeral articular facet (scapular fossa):

100. Scapula, acromion process

99. Scapula, acromion process

98. Scapular acromion costolaterally wider than deeper

94. Supraceracoid nerve foramen, location relative to dorsal coracoidal fossa

93. Coracoid, medial surface, strongly depressed elongate furrow at the level of the passage of n. supracoracoideus

90. Distinctly convex lateral margin of coracoid

77. Cranial end of pygostyle with a pair of laminar, ventrally projected processes:

71. Procoelous caudals:

68. Convex caudal articular surface of the synsacrum

65. Synsacrum, procoelous articulation with last thoracic centrum (deeply concave facet of synsacrum receives convex articulation of last thoracic centrum):

59. Wide vertebral foramen in the mid-caudal thoracic vertebrae, vertebral foramen/articular cranial surface ratio (vertical diameter) larger than 0.40

48. Teeth:

45. Rostral mandibular fenestra

- 43. Cranial extent of splenial:
- 39. Mandibular symphysis, symphyseal foramen/foramina
- 38. Mandibular symphysis, symphyseal foramina
- 37. Deeply notched rostral end of the mandibular symphysis
- 33. Osseous interorbital septum (mesethmoid):
- 21. Contact between the quadratojugal and squamosal
- 15. Contact between vomer and premaxilla

Prieto-Marquez, A. and Wagner, J. R., 2013. *Sauropodus morrisi*, a new species of hadrosaurid dinosaur from the Late Cretaceous of the Pacific coast of North America.

Species:

Wulagasaurus dongi. *Telmatosaurus transsylvanicus*. Two Medicine OUT. *Protohadros byrdi*. *Jaxartosaurus aralensis*. *Kerberosaurus manakini*. *Kritosaurus navajovius*. *Hadrosaurus foulkii*. *Eolambia caroljonesa*. *Equijubus normani*. *Gryposaurus monumentensis*. *Aralosaurus tuberiferus*. UTEP OUT. *Lambeosaurus laticaudus*. *Gilmoreosaurus mongoliensis*. *Pararhabdodon isonensis*. *Parasaurolophus tubicen*.

Char:

157. Basisphenoid. Short median ventral process located between the basipterygoid processes of the basisphenoid (BS4, <http://www.morphbank.net>Show/?id=461389>; Gates & Sampson, 2007: character 79):

83. Nasal. Position of the summit of the nasal arch crest relative to the caudodorsal margin of the narial foramen (NS9, <http://www.morphbank.net>Show/?id=461296>):

82. Nasal. Caudal end of the nasals forming a pair of small and short processes that insert between the frontals at the sagittal plane of the skull roof (NS8, <http://www.morphbank.net>Show/?id=461295>; Gates & Sampson, 2007: character 65, in part):

74. Premaxilla. Dorsolateral flange at approximately mid-length of the mediolaterally compressed caudoventral process of the premaxilla (PMX16, <http://www.morphbank.net>Show/?id=461286>; Gates & Sampson, 2007):

Prieto-Marquez, A., Dalla Vecchia, F. M., Gaete, R. and Galobart, A., 2013. Diversity, relationships, and biogeography of the lambeosaurine dinosaurs from the European Archipelago, with description of the new aralosaurin *Canardia garonnensis*

Species:

Jaxartosaurus aralensis. *Blasisaurus canudo*. *Hadrosaurus foulkii*. *Canardia akripaeceps*. *Pararhabdodon isonensis*. *Tanios sinensis*. *Aralosaurus tuberiferus*. *Parasaurolophus tubicen*.

Char:

265. Ridge on the plantar surface of pedal unguals (PES7,
<http://www.morphbank.net>Show/?id=461796>

261. Metatarsal I (modified from Norman, 2002, character 66):

260. Distal tarsals II and III (Horner et al., 2004, character 102):

258. Tibia. Extension of the cnemial crest of the tibia (TB,
<http://www.morphbank.net>Show/?id=461788>; Godefroit et al., 2000, character 31):

256. Femur. Degree of curvature of the distal half of the femoral shaft (FM1,
<http://www.morphbank.net>Show/?id=461786>; Norman, 2002, character 62):

250. Ischium. Relative position of the dorsal acetabular margin of the pubic peduncle (IS7,
<http://www.morphbank.net>Show/?id=461779>; Prieto-Márquez, 2010a, character 269):

243. Pubis. Depth/width proportions of the iliac peduncle of the pubis (PB10,
<http://www.morphbank.net>Show/?id=461770>; Prieto-Márquez, 2010a, character 261):

241. Pubis. Length/width ratio of the ischial peduncle of the pubis (PB8,
<http://www.morphbank.net>Show/?id=461768>; Prieto-Márquez, 2010a, character 259):

240. Pubis, obturator foramen (PB7, <http://www.morphbank.net>Show/?id=461767>;
modified from Horner et al., 2004, character 97):

236. Pubis. Depth of the dorsoventral expansion of the distal region of the prepubic process
relative to the width of the acetabular margin of the pubis (PB3,
<http://www.morphbank.net>Show/?id=461763>; Prieto-Márquez, 2010a, character 254):

235. Pubis. Geometry of the dorsoventral expansion of the prepubic process of the pubis (in
lateral or medial views) (PB2, <http://www.morphbank.net>Show/?id=461760>,
<http://www.morphbank.net>Show/?id=461761>, and
<http://www.morphbank.net>Show/?id=461762>; modified in part from Wagner, 2001):

232. Ilium. Position of the medial sacral ridge within the medial surface of the central plate
of the ilium (IL19, <http://www.morphbank.net>Show/?id=461756>; Prieto-Márquez, 2010a,
character 249):

229. Ilium. Rostrocaudally-oriented median ridge on the laterodorsal surface of the
postacetabular process (IL16, <http://www.morphbank.net>Show/?id=461752>; Prieto-
Márquez, 2010a, character 246):

214. Proximodistal length of manual palanx II1 relative to that of II2 (MN8,
<http://www.morphbank.net>Show/?id=461734>; modified from You et al., 2003, character
55):

213. Shape of manual ungual II (MN7, <http://www.morphbank.net>Show/?id=461733>;
Norman, 2002, character 53, in part):

212. Length/width proportions of manual phalanx III1 (MN6, <http://www.morphbank.net>Show/?id=461732>; modified from Prieto-Márquez et al., 2006, character 114):

210. Elongation of the manus exemplified by elongation of metacarpals II through IV, measured as the ratio between the length of metacarpal III and the width of its mid-shaft (MN3, <http://www.morphbank.net>Show/?id=461729>; modified from Horner et al., 2004, character 84):

209. Manual digit I (Norman, 2002, character 49) (MN2, <http://www.morphbank.net>Show/?id=461728>):

208. Composition of the carpus (MN1, <http://www.morphbank.net>Show/?id=461727>; adapted from Horner et al., 2004, character 86):

200. Scapula. Cranial extension of the rostroradial region of the scapula (bearing the coracoid facet), measured as a ratio between the distance from the coracoid joint and the cranial end of the pseudoacromion process and the height between this and the ventral apex of the glenoidal facet (SCP8, <http://www.morphbank.net>Show/?id=461719>; Prieto-Márquez, 2010a, character 217):

178. Depth of the skull (ratio between the skull height along caudal margin of quadrate and distance from rostral predentary tip to the level of the caudal margin of quadrate) (SK1; modified from You et al., 2003, character 1):

164. Degree of excavation of the caudal region of the circumnarial fossa (CMN3, <http://www.morphbank.net>Show/?id=461410>; Horner et al., 2004, character 32):

150. Pterygoid. Ventral extension of the lamina located ventral to the central buttress of the pterygoid (PLT2, <http://www.morphbank.net>Show/?id=461398>; Prieto-Márquez et al., 2006, character 75):

149. Pterygoid. Elevation of the proximodorsal region of the quadrate wing of the pterygoid (PLT1, <http://www.morphbank.net>Show/?id=461397>; Prieto-Márquez et al., 2006, character 72):

148. Exoccipital. Caudal extension of the exoccipital-supraoccipital shelf above the foramen magnum (EX1, <http://www.morphbank.net>Show/?id=461395>; modified from Godefroit et al., 2004, character 24)

147. Lateralophenoid. Extreme reduction of the length of the postorbital process of the lateralophenoid to 25% or less the length of the mediadorsal flange of this element (LS2, <http://www.morphbank.net>Show/?id=461392>; modified from Prieto-Márquez et al., 2006, character 76):

144. Basisphenoid. Short median ventral process located between the basipterygoid processes of the basisphenoid (BS4, <http://www.morphbank.net>Show/?id=461389>; Gates and Sampson, 2007, character 79)

142. Basisphenoid. Developement of the alar process of the basisphenoid (BS2, <http://www.morphbank.net>Show/?id=461387>; Prieto-Márquez, 2010a, character 155):
141. Basioccipital. Length of basioccipital constriction (BO3, <http://www.morphbank.net>Show/?id=461385>; Godefroit, Zan and Jin, 2001):
140. Basioccipital. Participation of the basioccipital in the ventral margin of the foramen magnum (BO1, <http://www.morphbank.net>Show/?id=461383>; Weishampel et al., 1993, character 24):
136. Frontal platform extending caudodorsally to form a finger-shaped buttress under nasal crest (F11; Bell, 2011):
131. Frontal. Triangular rostral projection ending into narrow apex (F10; new character):
115. Prefrontal. Inclusion of the prefrontal in the circumnarial fossa (PF4, <http://www.morphbank.net>Show/?id=461354> and <http://www.morphbank.net>Show/?id=461355>; Wagner, 2001):
113. Prefrontal. Deep fossa on the ventral surface of the rostrodorsal corner of the orbit, rostrodorsal orbital margin being squared and slightly projected rostrodorsally (PF7; after Campione and Evans, 2011):
102. Jugal. Morphology of the ventral margin located between the caudoventral and quadratojugal flanges (J10, <http://www.morphbank.net>Show/?id=461339>; modified from Weishampel et al., 1993, character 18):
94. Lacrimal. Ventral margin of the lacrimal with a prominent convexity rostral to the jugal notch (LC2, <http://www.morphbank.net>Show/?id=461326>; Prieto-Márquez, 2010a, character 102):
92. Maxilla. Position of the central region of the arcuate row of special foramina on the medial side of the maxilla (MX17, <http://www.morphbank.net>Show/?id=461321>; Prieto-Márquez, 2010a, character 100):
84. Maxilla. Acute embayment between jugal facet and ectopterygoid shelf, caused by continuation of ectopterygoid ridge into ascending border that curves dorsocaudally
80. Maxilla, rostrodorsal margin bearing a prominent subrectangular flange that rises vertically above the rostroventral process (MX19):
74. Nasal. Position of the summit of nasal arch crest relative to the caudodorsal margin of the narial foramen (NS9, <http://www.morphbank.net>Show/?id=461296>; Prieto-Márquez, 2010, character 83):
73. Nasal. Mediolateral breath of caudal nasal processes that insert in between the frontals at sagittal plane of the skull (N10; new):

72. Nasal. Caudal end of nasals forming a pair of processes that insert between the frontals at the sagittal plane of the skull roof (NS8, <http://www.morphbank.net>Show/?id=461295>; Gates and Sampson, 2007, character 65, in part):

71. Nasal. Caudal end of the nasals forming a pair of finger-like process on top of the frontals and centered around the sagittal plane of the skull roof (NS7, <http://www.morphbank.net>Show/?id=461294>; Gates and Sampson, 2007, character 65, in part):

69. Nasal. Location of the rostral end of the dorsal process of the nasal relative to the rostral margin of the narial foramen (NS5, <http://www.morphbank.net>Show/?id=461292>; Prieto-Márquez, 2010a, character 79):

68. Nasal. Morphology of the nasal contact with the caudodorsal region of the medial premaxillary process at the caudal margin of the narial foramen (NS4, <http://www.morphbank.net>Show/?id=461291>; Prieto-Márquez, 2010a, character 78):

64. Premaxilla. Orientation of the medial process relative to the lateral process around the narial foramen (PMX20, new):

63. Premaxilla. Orientation of the medial process relative to the lateral process around the narial foramen (PMX20, new):

61. Premaxilla. One or more foramina on the rostromedial surface of the premaxilla (PMX17; Prieto-Márquez, 2010b, character 287):

60. Premaxilla. Dorsolateral flange at approximately mid-length of the mediolaterally compressed lateral process of the premaxilla (PMX16, <http://www.morphbank.net>Show/?id=461286>; Gates and Sampson, 2007):

53. Premaxilla. Premaxillary accessory foramen entering rostrally through the rostral fossa, located rostral to the premaxillary foramen (PMX7, <http://www.morphbank.net>Show/?id=461273>; Horner et al., 2004, character 24):

51. Premaxilla. Accessory rostral fossa located lateral to the rostral fossa and rostrolateral to the circumnarial fossa, parallel to the lateral border of the oral margin (PMX9, <http://www.morphbank.net>Show/?id=461275>):

45. Prearticular bone (PRAR, <http://www.morphbank.net>Show/?id=461261>; Prieto-Márquez, 2010a, character 59):

41. Surangular. Accessory foramen located rostrodorsal to the main surangular foramen (SA3, <http://www.morphbank.net>Show/?id=461255>; Kobayashi and Azuma, 2003, character 15):

32. Dentary. Caudodorsal margin of the coronoid process projected dorsally into a sharp point (DT13, <http://www.morphbank.net>Show/?id=461246>; Prieto-Márquez, 2010a, character 44):

16. Predentary. Ratio between the predentary maximum mediolateral width and the maximum rostrocaudal length along the lateral process (PDT1,
<http://www.morphbank.net>Show/?id=461224>; modified from Horner et al., 2004, character 13):

14. Maxillary tooth crowns, position of the primary ridge (MXTH6,
<http://www.morphbank.net>Show/?id=461220> and
<http://www.morphbank.net>Show/?id=461221>; modified from You et al., 2003 character 36):

11. Increase in the number of tooth positions in the maxilla relative to the dentary (MXTH3,
<http://www.morphbank.net>Show/?id=461217>; modified from Wagner, 2001):

Tschopp, E. and Mateus, O., 2013. The skull and neck of a new flagellicaudatan sauropod from the Morrison Formation and its implication for the evolution and ontogeny of diplodocid dinosaurs.

Species:

None

Char:

None

Zanno, L. E. and Makovicky, P. J., 2013. Neovenatorid theropods are apex predators in the Late Cretaceous of North America.

Species:

Angaturama. Chilantaisaurus. Chuandongocoelurus. Piveteausaurus. Poekilopleuron. Siamotyrannus. Shidaisaurus. Xuanhanosaurus. Tyrannotitan. Streptospondylus. Siats meekerorum. S zigongensis. Magnosaurus. Dubreuillosaurus. Duriavenator. Australovenator. Eocarcharia. Fukuiraptor. Irritator. Saurophaganax. Megaraptor. Metriacanthosaurus. Lourinhanosaurus. Elaphrosaurus. Proceratosaurus. Shaochilong.

Char:

343. Metatarsal III, relative proportions of shaft:

334. Astragalus, prominent proximolateral extension

328. Fibula, size of proximal end relative to width of proximal tibia

321. Tibia, anterolateral process of lateral condyle

260. Manual unguals, proximal height

244. Ulna, crest extending distally along posterior surface from olecranon process

241. Radius, development of medial biceps tubercle

228. Coracoid, prominent fossa on ventral surface posteroventral to glenoid (subglenoid fossa)

210. Gastralia, posteriormost gastral segments

205. Caudal vertebrae, anterior, centrodiapophyseal laminae on neural arch

154. Maxillary teeth, mid-tooth spacing:

152. Premaxillary teeth, size of tooth 1 relative to others

151. Premaxillary teeth, spacing:

146. Teeth, maxillary and dentary, serrations

94. Basioccipital, width of basal tubera relative to occipital condyle width

91. Basioccipital, sharp dorsoventrally oriented lamina situated immediately ventral to occipital condyle

49. Lacrimal, angle between anterior and ventral rami

2014

Arbour, V. M., Currie, P. J. and Badamgarav, D., 2014. The ankylosaurid dinosaurs of the Upper Cretaceous Baruungoyot and Nemegt formations of Mongolia.

Species:

None

Char:

151. Accessory postorbital ossification:

141. Shape of respiratory passage:

138. Form of caudal osteoderms:

134. Form of sacral armour

132. Parasagittal row of keeled osteoderms situated on the dorsal aspect of the trunk:

125. Oblique ridge on lateral femoral shaft, distal to anterior trochanter:

123. Separation of femoral head from greater trochanter:

120. Shape of ischium:

116. Form of the preacetabular portion of the ilium

115. Orientation of the preacetabular portion of the ilium:

111. Manual digit number

110. Ratio of the length of metacarpal V to metacarpal III:

- 109. Shape of the radial condyle of humerus round / proximal end of radius in end-on view
- 104. Contact between sternal plates
- 103. Distal end of scapula shaft:
 - 101. Orientation of the acromion process of scapula
 - 96. Size of coracoid glenoid relative to scapula glenoid
 - 87. Persistence of transverse processes down the length of the caudal series
 - 86. Direction of the transverse processes of proximal caudals
- 84. Longitudinal groove in ventral surface of the sacrum:
- 83. Paravertebrae
- 78. Longitudinal keel on ventral surface of dorsal centra:
- 77. Ratio of anteroposterior [dorsal] centrum length to posterior centrum height
- 74. Dimensions of cervical vertebrae centra
- 59. Position of glenoid for quadrate relative to mandibular axis:
- 57. Shape of dorsal margin of the dentary in lateral view:
- 56. Depth of the dentary symphysial ramus relative to half the maximum depth of the mandibular ramus in lateral view:
- 53. Number of dentary teeth
- 47. Form of the cranial nerve foramina IX-XII
- 44. Length of basisphenoid relative to the basioccipital:
- 23. Proportions of jugal orbital ramus
- 21. Anterior and posterior supraorbitals (recognisable by distinct regions of ornamentation above the orbit):
- 19. Maxillary tooth row position

Arbour, V. M., Burns, M. E., Sullivan, R. M., Lucas, S. G., Cantrell, A. K., Fry, J. and Suzao, T. L., 2014. A new ankylosaurid dinosaur from the Upper Cretaceous (Kirtlandian) of New Mexico with implications for ankylosaurid diversity in the Upper Cretaceous of western North America

Species:

Dyoplosaurus acutusquamatus.

Char:

- 158. New character: Accessory postorbital ossification

- 148. New character: Shape of respiratory passage
- 145. Form of caudal osteoderms
- 140. Form of sacral armour
- 139. Sacral shield of fused osteoderms
- 137. Parasagittal row of keeled osteoderms situated on the dorsal aspect of the trunk
- 130. Oblique ridge on lateral femoral shaft, distal to anterior trochanter
- 128. Separation of femoral head from greater trochanter:
- 125. Shape of ischium
- 121. Form of the preacetabular portion of the ilium:
- 120. Orientation of the preacetabular portion of the ilium
- 116. Manual digit number:
- 115. Ratio of the length of metacarpal V to metacarpal III
- 114. Shape of the radial condyle of humerus round / proximal end of radius in end-on view
- 109. Contact between sternal plates:
- 108. Distal end of scapula shaft
- 106. Orientation of the acromion process of scapula
- 101. Size of coracoid glenoid relative to scapula glenoid
- 92. Persistence of transverse processes down the length of the caudal series:
- 91. Direction of the transverse processes of proximal caudals
- 89. Longitudinal groove in ventral surface of the sacrum
- 88. Paravertebrae
- 83. Longitudinal keel on ventral surface of dorsal centra
- 82. Ratio of anteroposterior [dorsal] centrum length to posterior centrum height
- 79. Dimensions of cervical vertebrae centra
- 75. Mandibular osteoderm
- 71. Modified: Shape of quadratojugal horn in dorsal view
- 64. Modified: Frontonasal and/or frontoparietal cranial ornamentation:
- 60. Position of glenoid for quadrate relative to mandibular axis
- 58. Shape of dorsal margin of the dentary in lateral view

57. Depth of the dentary symphysial ramus relative to half the maximum depth of the mandibular ramus in lateral view:

54. Number of dentary teeth:

48. Form of the cranial nerve foramina IX-XII

45. Length of basisphenoid relative to the basioccipital:

24. Proportions of jugal orbital ramus:

22. Anterior and posterior supraorbitals (recognisable by distinct regions of ornamentation above the orbit):

20. Maxillary tooth row position:

Barrett, P. M., Butler, R. J., Mundil, R., Scheyer, T. M., Irmis, R. B. and Sanchez-Villagra, M. R., 2014. A palaeoequatorial ornithischian and new constraints on early dinosaur diversification

Species:

Pisanosaurus mertii. *Stormbergia dangershoeki*. *Othnieliosaurus consors*. *Yandusaurus hongheensis*. *Zephyrosaurus schaffi*. *Micropachycephalosaurus hongtuyi*. *Stenopelix valdensis*. *Wannanosaurus yansiensis*. *Koreanosaurus*. *Yueosaurus*. *Laquintasaura*. *Talenkauen santacrucensis*. *Tianyulong*. *Albalophosaurus yamaguchiorum*. *Lycorhinus angustidens*. BMNH A100. *Anabisetia saldiviae*. *Marasuchus lilloensis*.

Char:

172. Subtriangular process, form and position:

146. Gastralia:

86. Pterygovomerine keel, length:

Brusatte, S. L., Lloyd, G. T., Wang, S. C. and Norell, M. A., 2014. Gradual assembly of avian body plan culminated in rapid rates of evolution across the dinosaur-bird transition.

Species:

Balaurus bondoc. *Graciliraptor luijatunensis*. *Hesperonychus elizabethae*. *Pyroraptor olympius*. *Rahonavis ostromi*. *Pedopenna*. *Epidendrosaurus*. *Epidexipteryx*. *Incisivosaurus gauthieri*. *Iaceornis marshii*. *Limenavis patagonica*. *Hongshanornis longicrest*. *Liaoningornis longidigitus*. *Baptornis*. *Songlingornis*. *Pengornis houi*. *Oviraptor philoceratops*. *Nanshiungosaurus brevispinus*. *Therizinosaurus*. *Sinotyrannus*. *Proceratosaurus bradleyi*. *Eotyrannus lengi*. *Bistahieversor*. *Teratophoneus*. *Coelurus fragilis*. *Tanycolagreus*. *Tugulusaurus*. *Bicentenaria*. *Mirischia*. *Qiupalong*. *Kinnareemimus*. *Kileskus*. *Archaeornithomimus asiaticus*. *Anserimimus planinyaicus*. *Xixianykus*. *Linhenykus*. *Ceratonykus*. *Bonapartenykus*. *Albinykus*. *Albertonykus*. *Parvicursor*. *Alvarezsaurus calvoi*. *Patagonykus puertai*. *Achillesaurus*. *Austroraptor*. *Shanag ashile*. *Mahakala omnogovae*. *Atrociraptor marshalli*. *Utahraptor*. *Saurornithoides mongoliensis*. *Zanabazar junior*. *Xixiasaurus*. *Byronosaurus jaffei*. *Dromaeosaurus albertensis*. EK troodontid IGM 100 slash 44. *Gobipteryx*. *Vorona*. IGM 100 slash 1126. IGM 100 slash

1323. *Patagopteryx deferrariisi*. *Aurornis*. *Eosinopteryx*. *Neuquenornis Volans*. *Concornis*.
Ichthyornis. *Microvenator celer*. *Alxasaurus elesitaiensis*. *Neimongosaurus*. *Erliansaurus*.
Suzhousaurus. *Beishanlong*, *Juratyrant*. *Nothronychus*. *Enigmosaurus*. *Neuquenraptor plus*
Unenlagia. *Tianyuraptor ostromi*. *Microraptor zhaoianus*. *Juravenator starki*. *Pelecanimimus*
polydon. *Xiongguanlong*. *Erlikosaurus andrewsi*. *Nqwebasaurus*. *Tsaagan mangas*.
Jinfengopteryx elegans. *Yanornis martini*. *Shenzhousaurus orientalis*. *Appalachiosaurus*.
Alioramus. *Rinchenia mongoliensis*. *Saurornitholestes langsto*. *Ingenia yanshani*. *Apsaravis*
ukhaana. *Dryptosaurus*, *Appalachiosaurus*. *Zuolong*. *Cathayornis*. *Beipiaosaurus*.
Segnosaurus galbinensis.

Char:

Character 779: Basisphenoid, inflated basisphenoidal bulla:

Character 455: Feathers, filamentous integumentary structures

Character 449: Braincase, V-shaped opening between basal tubera

Character 412: Femur, posterior projection of the lateral border of the distal end,

continuous with lateral condyle:

Character 396: Manual digit II, phalanx 2, internal index process on posterodistal edge

Character 377: Ulna, dorsal cotyla, form: convex

Character 376: Ulna, cotylae, orientation of dorsal (lateral) and ventral (medial) cotylae:

Character 329: Clavicles, fusion:

Character 305: Lower jaw, anterior external mandibular fenestra:

Character 302: Mandibular symphysis, symphyseal foramina, number:

Character 295: Quadrato, cluster of pneumatic foramina on the posterior surface of the tip
of the dorsal process:

Character 254: Surangular, anteroventral extension divides external mandibular fenestra by
contacting angular anteriorl

Burns, M. E. and Currie, P. J., 2014. External and internal structure of ankylosaur (Dinosauria, Ornithischia) osteoderms and their systematic relevance

B. Species:

None

Char:

(90) Specialized tail club knob osteoderms:

(89) Multiple parasagittal rows of post-cervical osteoderms

(83) External rugosity profile of skeletally mature osteoderms

(80) External cortical histology of skeletally mature osteoderms:

(71) Keel height:

(68) Dimensions of largest osteoderm

(67) Caudal osteoderms

(58) Acetabulum:

(50) Predentary ventral process short (relative to other thyreophorans):

(21) Pterygoid foramen:

(19) Paired premaxillary, maxillary, and nasal sinuses

(17) Median palatal keel composed of the vomer and pterygoid

(14) Nasal septum dividing the respiratory passage into two separate bony canals

D. Species:

None

Char:

(64) Multiple parasagittal rows of post-cervical osteoderms

(63) Anteroposteriorly elongate osteoderm fused to the ventrolateral side of the mandible in adults:

(56) Haversian bone

(55) External cortical histology of skeletally mature osteoderms

(51) Keels of caudal osteoderms taller than those of thoracic osteoderms

(50) Triangular caudal osteoderms with excavated basal surfaces

(49) Margin of osteoderms

(46) Keel height:

(43) Dimensions of largest osteoderm:

(42) Caudal osteoderms

(40) Gular osteoderms

(39) Cranial osteoderms

(30) Narial openings ringed by osteoderms

(19) Basipterygoid process of the basisphenoid

(18) Paraoccipital process rotated into frontal plane

(10) Nasal openings placed posteriorly:

(5) Premaxillary (= tomial) notch

Carballido, J. L. and Sander, P. M., 2014. Postcranial axial skeleton of *Europasaurus holgeri* (Dinosauria, Sauropoda) from the Upper Jurassic of Germany: implications for sauropod ontogeny and phylogenetic relationships of basal Macronaria.

Species:

Chinshakiangosaurus chunghoensis. *Lessemsaurus sauropoides*. *Amygdalodon patagonicus*.
Isanosaurus attavipachi. *Barapasaurus tagorei*. *Cetiosaurus oxoniensis*. *Zapalasaurus bonapartei*. *Rayosaurus agrioensis*. *Cathartesaura anaerobica*. *Malarguesaurus floreniae*.
Nemegtosaurus mongoliensis. *Venenosaurus dicrocei*. *Cedarosaurus*. *Erketu ellisoni*.
Amazonsaurus maranhensis. *Histriasaurus bocardeli*. MOS 1-4

Char:

318. Astragalus, foramina at base of ascending process:

312. Tibial distal posteroventral process, size:

278. Manual nonungual phalanges, shape:

250. Ridge on the ventral surface of the sternal plate

239. Scapular acromion length:

227. Chevrons:

221. Distalmost biconvex caudal centra, number

200. Anterior caudal transverse processes, proximal depth:

183. Sacral vertebrae contributing to acetabulum

178. Cervical ribs, angle between the capitulum and tuberculum

104. Enamel surface texture:

98. Lateral plate

93. Coronoid, size

92. Splenial posterodorsal process:

81. Dentary, depth of anterior end of ramus:

80. Occipital region of skull, shape

62. Palatine, lateral ramus shape

33. Postorbital, posterior margin articulating with the squamosal

6. Maxilla, foramen anterior to the preantorbital fenestra

Choiniere, J. N., Clark, J. M., Norell, M. A. and Xu, X., 2014. Cranial osteology of *Haplocheirus solliers* Choiniere et al., 2010 (Theropoda: Alvarezsauroidea).

Species:

Tarbosaurus bataar. *Abelisaurus comahuensis*. *Acrocanthosaurus atokensis*. *Aerosteon riocoloradensis*. *Afrovenator abakensis*. *Alxasaurus elesitaiensis*. *Anserimimus planinyauchus*.
Dromaeosaurus albertensis. *Dubreuillosaurus valesdunensis*. *Duriavenator hesperis*. EK

troodontid. Eocarcharia dinops. Eoraptor lunensis. Epidexipteryx hui. Erlikosaurus andrewsi. Hagryphus giganteus. Garudimimus brevipes. Giganotosaurus carolinii. Gigantoraptor erlianensis. Gorgosaurus libratus. Ingenia yanshinii. Irritator challengerii. Juravenator starki. Kileskus aristotocus. Limusaurus inextricabilis. Mahakala omnogovae. Sinovenator changii. Sinraptor dongi. Stokesosaurus langhami. Tsaagan mangas. Tugulusaurus faciles. Zanabazar junior. Pelecanimimus polyodon. Proceratosaurus bradleyi. Shenzhousaurus orientalis. Saurornithoides mongoliensis. Parvicursor remotus. Patagonykus puertai. Piatnitzkysaurus floresi. Rahonavis ostromi. Nominingia gobiensis. Nothronychus graffami. Avimimus portentosus. Beipiaosaurus inexpectus. Buitreraptor gonzalezorum. Albertonykus borealis. Alvarezsaurus calvoi. Apsaravis ukhaana.

Char:

371. Crest extending along posterior surface of ulnar shaft from olecranon process

345. Coracoid foramen

325. Lateral gastral segment

314. Centrodiapophyseal laminae of anterior caudal vertebrae

294. Notarium of dorsal vertebrae

276. Posterior dorsal vertebrae, basal webbing of neural spines

210. Palatal teeth

165. Form of dorsal tympanic recess

160. Anterior tympanic recess in the braincase

31. Dorsal border of the internal antorbital fenestra lateral view

29. Ascending process of maxilla

Choiniere, J. N., Clark, J. M., Forster, C. A., Norell, M. A., Eberth, D. A., Erickson, G. M., Chu, H.-J. and Xu, X., 2014. A juvenile specimen of a new coelurosaur (Dinosauria: Theropoda) from the Middle-Late Jurassic Shishugou Formation of Xinjiang, People's Republic of China.

Species:

Nominingia gobiensis. Nothronychus graffami. Parvicursor remotus. Patagonykus puertai. Saurornitholestes langstoni. Segnosaurus galboensis. Unenlagia plus Neuquenraptor. Tugulusaurus faciles. Tanycolagreus topwilsoni. Stokesosaurus langhami. Mahakala omnogovae. Ingenia yanshinii. Irritator challengerii. Hagryphus giganteus. Gigantoraptor erlianensis. Falcarius utahensis. Epidexipteryx hui. EK troodontid. Alvarezsaurus calvoi. Alxasaurus elesitaiensis. Anserimimus planinya, Apsaravis ukhaana. Albertonykus borealis. Aerosteon riocoloradensis. Dromaeosaurus albertensis. Dubreuillosaurus valesdunensis. Duriavenator hesperis. Eocarcharia dinops. Eoraptor lunensis. Erlikosaurus andrewsi. Daspletosaurus torosus. Oviraptor philoceratops. Pelecanimimus polyodon.

Piatnitzkysaurus floresi. *Proceratosaurus bradleyi*. *Incisivosaurus gauthieri*. *Juravenator starki*. *Kileskus aristotocus*. *Tarbosaurus bataar*. *Tawa hallae*.

Raptorex kriegsteini. *Rinchenia mongoliensis*. *Sapeornis chaoyangensis*. *Saurornithoides mongoliensis*. *Scipionyx samniticus*. *Shenzhousaurus orientalis*. *Sinornithosaurus millenii*. *Sinornithoides youngi*. *Byronosaurus jaffeei*. *Carcharodontosaurus saharicus*. *Garudimimus brevipes*. *Giganotosaurus carolinii*. *Gorgosaurus libratus*. *Mapusaurus roseae*. *Masiakasaurus knopflii*. *Megalosaurus bucklandii*.

Char:

537. Metatarsal I

528. Fossa on anterior surface of mesial base of ascending process of astragalus, sometimes bearing accessory fenestrations

518. Position of insertion of m. iliofibularis on fibular shaft

510. Fibular crest distal extension

507. Fibular crest (ridge on lateral side of tibia for connection with fibula)

499. Anteroposterior length of proximal end of tibia in proximal view

452. Pubic apron

428. Preacetabular portion of ilium

418. Dorsal margin of ilium

417. Ilium pneumaticity

406. Length of third manual digit

404. Penultimate phalanx of the second finger

389. Distal end of Mc I

384. Rectangular buttress on ventrolateral surface of proximal end of Mc I

371. Crest extending along posterior surface of ulnar shaft from olecranon process

345. Coracoid foramen

325. Lateral gastral segment

314. Centrodiapophyseal laminae of anterior caudal vertebrae

305. Pygostyle

303. Sacral neural arch pneumaticity

301. Fenestrae between neural spines of sacral vertebrae

294. Notarium of dorsal vertebrae

- 284. Postzygapophyses of the dorsal vertebrae in posterior view
- 280. Transverse processes of anterior dorsal vertebrae
- 276. Posterior dorsal vertebrae, basal webbing of neural spines
- 263. Prezygapophyseal-epipophyseal lamina on dorsal surface of neural arch
- 240. Form of enamel wrinkles
- 232. Shape of dentary teeth
- 227. Maxillary tooth implantation
- 221. Maxillary tooth direction
- 210. Palatal teeth
- 186. Labial face of dentary
- 180. Dentary symphyseal fusion
- 165. Form of dorsal tympanic recess
- 160. Anterior tympanic recess in the braincase
- 153. Basal tubera
- 152. Form of infracondylar fossa of occipital condyle
- 138. Basisphenoid between basal tubera and basipterygoid processes
- 134. Basisphenoid bulla
- 128. Occipital region of the skull faces
- 119. Ectopterygoid
- 99. Anteromedial corner of supratemporal fossa
- 95. Supraorbital shelf formed mostly by an additional ossification (palpebral)
- 87. Frontal postorbital process (dorsal view):
- 41. Medial surface of maxillary paradental (interdental) plates
- 31. Dorsal border of the internal antorbital fenestra lateral view
- 29. Ascending process of maxilla
- 6. Premaxillary-maxillary suture
- 4. Premaxillae

Farke, A. A., Maxwell, W. D., Cifelli, R. L. and Wedel, M. J., 2014. A ceratopsian dinosaur from the Lower Cretaceous of western North America, and the biogeography of Neoceratopsia.

Species:

Unescoceratops. Gryphoceratops. Helioceratops. Turanoceratops. Zhuchengceratops. Koreaceratops. Ajkaceratops. Asiaceratops. Zuniceratops. Xuanhuaceratops.

Char:

- 151. Base (lower half) of the coronoid process vertical (0) or steeply inclined (>40%).
- 146. Coronoid process notch wide (0) or constricted notch (1).
- 141. Ridge along the caudoventral edge of squamosal absent (0) or present (1).
- 142. Occipital surface of supraoccipital flat, convex, or with midline ridge (0) or with midline depression along base of midline ridge (1).
- 94. Premaxillary teeth with carinae, and in some cases serrations (0) or premaxillary teeth peglike, crown without carinae (1).
- 91. Surface of prearticular and articular below glenoid smooth (0) or with wide, semicircular ventral process near medial face of glenoid (1).
- 6. Rostral bone forming beak absent (0) or present (1).

Foth, C., Tischlinger, H. and Rauhut, O. W. M., 2014. New specimen of Archaeopteryx provides insights into the evolution of pennaceous feathers

Species:

Tanycolagreus. Coelurus. Deinocheirus. Archaeornithomimus. Anserimimus. Erlansaurus. Nanshiungosaurus. Neimongosaurus. Segnosaurus. Alxasaurus. Therizinosaurus. Protarchaeopteryx. Elmisaurus. IGM100 slash 44. Rahonavis. Achillobator. Utahraptor. Atrociraptor. Hagryphus. Microvenator. Patagonykus. Alvarezsaurus. Parvicursor. Graciliraptor. Balaur. Yixianosaurus. Pedopenna. Hesperonychus. Pyroraptor. Albinykus. Neuquenornis. Patagopteryx. Cathayornis. Concornis. Gobipteryx. Vorona. Songlingornis. Iaceornis. Limenavis. Liaoningornis. Unenlagia. Eosinopteryx. Jinfengopteryx. Falcarius. Beipiaosaurus. Nothronychus

Char:

- 540. V---shaped Opening between basal tubera remnants
- 532. Metatarsal I distal End of trochlea proximally placed
- 517. Tibia/tarsal formed condyles, intercondylar groove mediolaterally broad
- 516. Tibia/tarsal Formed condyles gradual sloping
- 510. Femur, Posterior projection of the lateral border of the distal end
- 496. Manual Digit II, Phalanx 2, Internal index process on posterodistal edge
- 479. Ulna, Dorsal cotyla convex

478. Ulna, Cotylae dorsoventrally adjacent
474. Humerus, Ventral condyle length of long axis of condyle
472. Humerus, Distal end, compressed anteroposteriorly and flared
470. Humerus, Distal condyles subround
469. Humerus, Long axis of dorsal condyle at low angle to humeralaxis
460. Humerus, Anterior surface, well---developed fossa on midline
441. Furcula, Laterally excavated
424. Thoracic vertebrae, parapophyses rostral to transverse processes
418. Mandibular symphysis, symphyseal foramen/foramina
412. Quadrato, Cluster of pneumatic foramina on posterior surface of the tip of dorsal process
346. Ischium, shape:
345. Ilium, Pubic peduncle:
326. Distal End of metatarsal I Reduced in size relative to distal ends of other
323. Phalanges Of pedal digit III Not blocky
322. Pubic Peduncle of ilium
317. Dorsal Margin of postacetabular iliac blade straight
277. Medial Ligament pits of manual phalanges
220. Preacetabular Portion of ilium parasagittal
196. Metatarsal I attenuates

Godefroit, P., Sinitza, S. M., Dhouailly, D., Bolotsky, Y. L., Sizov, A. V., McNamara, M. E., Benton, M. J. and Spagna, P., 2014. A Jurassic ornithischian dinosaur from Siberia with both feathers and scales

Species:

Pisanosaurus mertii. *Stormbergia dangershoeki*. *Eocursor parvus*. *Echinodon becklesii*.
Yandusaurus hongheensis. *Zephyrosaurus schaffi*. *Micropachycephalosaurus hongtuyi*.
Wannanosaurus yansiensis. *Koreanosaurus*. *Yueosaurus*. *Stenopelix valdensis*.

Char:

(172) Subtriangular process, form and position

(146) Gastralia:

(86) Pterygovomerine keel, length

Gorscak, E., O'Connor, P. M., Stevens, N. J. and Roberts, E. M., 2014. The basal titanosaurian *Rukwatitan bisepultus* (Dinosauria, Sauropoda) from the middle Cretaceous Galula Formation, Rukwa Rift Basin, southwestern Tanzania

Species:

Vulcanodon. *Phuwiangosaurus*. *Tangvayosaurus*. *Diamantinasaurus*. *Rukwatitan*.
Andesaurus. *Isisaur*. *Barosaurus*. *Haplocanthosaurus*. *Rebbachisaurus*. *Alamosaurus*.
Neuquensaurus. *Opisthocoelicaudia*.

Char:

(144) Forked chevrons, distribution

Lacovara, K. J., Lamanna, M. C., Ibicatu, L. M., Poole, J. C., Schroeter, E. R., Ullmann, P. V., Voegele, K. K., Boles, Z. M., Carter, A. M., Fowler, E. K., Egerton, V. M., Moyer, A. E., Coughenour, C. L., Schein, J. P., Harris, J. D., Martinez, R. D. and Novas, F. E., 2014. A gigantic, exceptionally complete titanosaurian sauropod dinosaur from southern Patagonia, Argentina.

Species:

Tehuelchesaurus benitezii. *Tastavinsaurus sanzi*. *Venenosaurus dicrocei*. *Cedarosaurus*.
Chubutisaurus insignis. *Wintonotitan wattsi*. *Suuwassea emiliae*. *Amazonsaurus maranhensis*. *Zapalasaurus bonapartei*. *Histriasaurus bocardeli*. *Comahuesaurus windhanseni*. *Rayosaurus agrioensis*. *Rebbachisaurus garasbae*. *Amygdalodon patagonicus*. *Isanosaurus attavipachi*. *Chinshakiangosaurus chunghoensis*.

Char:

312. Tibial distal posteroventral process, size

278. Manual nonungual phalanges, shape

227. Chevrons: persisting throughout at least 80% of tail

221. Distalmost biconvex caudal centra, number

200. Sacral vertebrae contributing to acetabulum:

178. Cervical ribs, angle between the capitulum and tuberculum:

169. Middle and posterior dorsal neural arches, spinodiapophyseal lamina (SPDL) and spinopostzygapophyseal lamina (ISPOL) contact

104. Enamel surface texture

98. Lateral plate

93. Coronoid, size:

92. Splenial posterodorsal process:

85. Dentary, tuberocity on labial surface near symphysis

80. Occipital region of skull, shape

62. Palatine, lateral ramus shape

4. Premaxilla, external surface

Lamanna, M. C., Sues, H.-D., Schachner, E. R. and Lyson, T. R., 2014. A new large-bodied oviraptorosaurian theropod dinosaur from the latest Cretaceous of western North America

Species:

Caenagnathasia martinsoni. *Elmisaurus elegans*. *Leptorhynchos gaddisi*. *Chirosstenotes pergracilis*. *Machairasaurus leptonychus*. *Hagryphus giganteus*. *Elmisaurus rarus*. *Nomingia gobiensis*. *Epichirostenotes curriei*. *Macrophalangia Canadensis*. *Ojoraptorsaurus boerei*. *Shixinggia oblita*. *Similicaudipteryx yixianensis*. *Caudipteryx dongi*. Alberta dentary morph 3. *Caenagnathus sternbergi*. *Nankangia jiangxiensis*. *Ganzhousaurus nankangensis*.

Microvenator celer.

Char:

230. Proximolateral edge of metatarsal IV attenuated into pointed process:

228. Pubic process of ischium, ‘hooked’ anterodistal extension

227. Proximodorsal extensor ‘lip’ on manual unguals

219. Posteroventral branch of dentary twisted so that lateral surface of branch faces somewhat ventrally:

218. Groove on ventrolateral edge of angular to receive posteroventral branch of dentary:

205. Metatarsal III:

201. Ischiadic peduncle of pubis with prominent medial fossa:

200. Manual phalanx I-1:

199. Metacarpal I: proportionately broad

186. Dentary symphysis bearing an hourglass-shaped ventral depression

159. Length of metatarsal I constituting

158*. Arctometatarsus:

121. Posteroventral process of the coracoid

107. Ossified uncinate processes on the dorsal ribs

Lee, M. S. Y., Cau, A., Naish, D. and Dyke, G., 2014. Morphological clocks in palaeontology, and a mid-Cretaceous origin of crown Aves.

Species:

Chaoyangia. Ambiortus. Baptornis varneri. Boluochia. Enaliornis. Didactylornis. Hollanda. Jixiangornis. Liaoningornis. Limenavis. Jianchangornis. Otogornis. Neuquenornis. Shenzhouraptor. Vorona. Songlingornis. Zhongornis. Vegavis. Waimanu. Parahesperornis. Rahonavis. Elsornis. Eoalulavis. Eocathayornis. Gansus. Iberomesornis. Concornis.

Char:

241. Digit IV phalanges in distal view, medial trochlear rim enlarged with respect to lateral trochlear rim:

223. Proximal end of metatarsus

218. Proximal end of the fibula

210. Round proximal articular surface of tibiotarsus

208. Fossa for the femoral origin of m. tibialis cranialis

206. Caudal projection of the lateral border of the distal end of the femur, proximal and contiguous to the ectocondylar tubercle/tibiofibular crest

194. Pubic pedicel:

192. Ischiadic terminal processes forming a symphysis

108. Sternum

102. Costal surface of scapular blade with prominent longitudinal furrow

101. Proximal end of scapula, pit between acromion and humeral articular facet (scapular fossa)

99. Scapula, acromion process

98. Scapular acromion costolaterally wider than deeper

94. Supraceracoid nerve foramen, location relative to dorsal coracoidal fossa:

77. Cranial end of pygostyle with a pair of laminar, ventrally projected processes:

68. Convex caudal articular surface of the synsacrum

60. Hyposphene-hypantrum accessory intervertebral articulations in the thoracic vertebrae:

59. Wide vertebral foramen in the mid-caudal thoracic vertebrae, vertebral foramen/articular cranial surface ratio (vertical diameter) larger than 0.40

48. Teeth: serrated crowns

39. Mandibular symphysis, symphyseal foramen/foramina

38. Mandibular symphysis, symphyseal foramina

35. Dentary tooth implantation:

33. Osseous interorbital septum (mesethmoid):

21. Contact between the quadratojugal and squamosal

Li, L.-G., Li, D.-Q., You, H.-L. and Dodson, P., 2014. A new titanosaurian sauropod from the Hekou Group (Lower Cretaceous) of the Lanzhou-Minhe Basin, Gansu Province, China

A. Species:

Atlasaurus. Australodocus. Baotianmansaurus. Astrophocaudia. Cloverly titanosauriform. Fukuititan. Fusuisaurus. Abydosaurus. Gobititan. HMN MB dot R dot 2091 dot 1 slash 30. , Huanghetitan, Huanghetitan ruyangensis, Janenschia, Jiangshanosaurus, Angolatitan, Aragosaurus, Galveosaurus, Dongyangosaurus, Erketu, Liubangosaurus, Malarguesaurus, Venenosaurus, Wintonotitan, Xianshanosaurus, Tehuelchesaurus, Tendaguria, Yongjinglong, Sauroposeidon, Sonorasaurus, Brontomerus

Char:

C235. Ulna, orientation of anteromedial process:

- C209. Anterior–middle chevrons, lateral bulges close to distal ends of chevron blades:
- C203. First caudal rib, expands anteroposteriorly towards its distal end, forming an ‘anchor’ shape in dorsal view
- C199. Middle caudal neural spines, in lateral view, widen anteroposteriorly (approximately doubling) from their base to their summit
- C168. Middle-posterior dorsal neural spines, midline prespinal lamina (forming distinct ridge) along proximal (lower) half of neural spine
- C143. Dorsal centra, lateral pneumatic foramen
- C135. Middle cervical neural spines, dorsal surface with mediolaterally orientated midline ridge flanked by small fossae at its anterior and posterior ends
- C123. Middle cervical centra, lateral pneumatic fossa/foramen extends almost to the posterior end of the centrum, leaving only a thin strip of bone
- C103. Dentary, posteroventral process, shape
- C86. Supratemporal fenestra, lateral exposure
- C51. Ulna, ratio of maximum mediolateral width of proximal end (equivalent to anteromedial arm) to maximum anteroposterior width of proximal end (equivalent to anterolateral arm)

B. Species:

Erketu

Atlasaur

Qiaowanlong

Char:

51Sacrocostal yoke:

38Anterior dorsal centra, articular face shape:

25Cervical vertebrae, epipophyseal prezygapophyseal lamina, morphology

17Presacral vertebrae, pneumatopores in centra (pleurocoels):

1Posterolateral process of premaxilla and lateral process of maxilla, shape:

C. Species:

Amygdalodon patagonicus. Isanosaurus attavipachi. Gongxianosaurus shibeiensis. Vulcanodon karibaensis. Venenosaurus dicrocei. Cedarosaurus. Tendaguria tanzaniensis. Malarguesaurus florenciae. Argentinosaurus hunculensis. Erketu ellisoni. Suwassea emiliae. Zapalasaurus bonapartei. Chinshakiangosaurus chunghoensis. Galvesaurus herreroi. Tehuelchesaurus benitezii. Tastavinsaurus sanzi. Rayososaurus agrioensis. Cathartesaura anaerobica

Char:

341Unguals of pedal digit II and III, proximal dimensions

340 Pedal digit IV ungual, development

323 Calcaneum:

312 Tibial distal posteroventral process, size

278 Manual nonungual phalanges, shape:

269 Carpal bones, shape:

250 Ridge on the ventral surface of the sternal plate:

239 Scapular acromion length:

- 227 Chevrons: persisting throughout at least 80% of tail (0); disappearing by caudal 30 (1).
- 221 Distalmost biconvex caudal centra, number
- 200 Anterior caudal transverse processes, proximal depth:
- 183 Sacral vertebrae contributing to acetabulum
- 178 Cervical ribs, angle between the capitulum and tuberculum:
- 104 Enamel surface texture:
- 98 Lateral plate
- 93 Coronoid, size:
- 92 Splenial posterodorsal process
- 85 Dentary, tuberocity on labial surface near symphysis
- 81 Dentary, depth of anterior end of ramus:
- 80 Occipital region of skull, shape:
- 62 Palatine, lateral ramus shape
- 4 Premaxilla, external surface

Li, Z.-H., Zhou, Z.-H., Wang, M. and Clarke, J. A., 2014. A new specimen of large-bodied basal enantiornithine *Bohaiornis* from the Early Cretaceous of China and the inference of feeding ecology in Mesozoic birds

Species:

Jianchangornis microdonta. *Cathayornis yandica*. *Concornis lacustris*. *Shenqiornis mengi*.
Propteryx fengningensis. *Songlingornis linghensis*.

Char:

- 188. Tibia, distal-most mediolateral width
- 176. Femur, posterior projection of the lateral border of the distal end, continuous with lateral condyle
- 171. Femur, fossa for insertion of lig. capititis femoris:
- 153. Manual digit II, phalanx 2, "internal index process" (Stegmann, 1978) on posterodistal edge
- 131. Ulna, dorsal cotyla convex
- 130. Ulna, cotylae
- 79. Clavicles:
- 46. Mandibular symphysis, symphysial foramen/foramina
- 45. Mandibular symphysis, symphysial foramina
- 39. Quadrato, cluster of pneumatic foramina on posterior surface of the tip of dorsal process

36. Quadrate, dorsal process, development of intercotylar incisure between prootic and squamosal cotylae

25. Osseous interorbital septum (mesethmoid):

5. Tooth crown serration

Longrich, N. R., 2014. The horned dinosaurs Pentaceratops and Kosmoceratops from the upper Campanian of Alberta and implications for dinosaur biogeography

Species:

Mercuriceratops geminii. Williams Fork chasmosaurine. Pentaceratops priscus.

Turanoceratops tardabilis, Ojoceratops fowleri. Tatankaceratops sacrisonorum.

Char:

179. Sternum, long and narrow (0) short and broad

161. Teeth, roots covered in sheath of alveolar bone:

141. Ectopterygoid, contributes to palate and contacts the jugal (0) or reduced and does not contact jugal

136. Frontal, contribution to exit for c.n. I

135. Basioccipital, basipterygoid processes project anteroventrally (0) or ventrally (1)

113. Parietal posterior bar, anterior margin a thin plate or lamina (0) or thickened, parietal bar rodlike

85. Squamosals, vertical dorsal lamina arising from the posterior blade of the squamosal: present (0) or absent (1)

60. Horns, anteriorly directed in lateral view (0) or anterodorsally directed, base of horn core projecting at an angle of $\geq 45^\circ$ to the horizontal (1)

39. Maxilla, posterior dentigerous process short (0) or elongate, bearing at least four teeth (1)

37. Maxilla, maxillary sinus: absent (0) or present (1).

Lu, J.-C., Yi, L.-Q., Brusatte, S. L., Yang, L., Li, H. and Chen, L., 2014. A new clade of Asian Late Cretaceous long-snouted tyrannosaurids

Species:

Teratophoneus. Sinotyrannus. Dryotosaurus. Juratyrant. Kileskus

Char:

313) Ilium, width of notch between preacetabular process and pubic peduncle

311) Ilium, mound-like eminence on lateral surface of pubic peduncle

310) Ilium, brevis fossa, orientation

308) Ilium, linear ridge dorsal to acetabulum on the lateral surface of the blade, dorsal extent

277) Pubis, obturator notch, form

271) Pubis, pubic tubercle, position

140) Palatine, jugal process, location of contact surface for lacrimal

Niedzwiedzki, G., Brusatte, S. L., Sulej, T. and Butler, R. J., 2014. Basal dinosauriform and theropod dinosaurs from the mid-late Norian (Late Triassic) of Poland: implications for Triassic dinosaur evolution

Species:

Lagerpeton chanarensis. *Dromomeron romeri*. *Dromomeron gregorii*. *Marasuchus lilloensis*. *Eucoelophysoides baldwini*. *Staurikosaurus pricei*. *Chindesaurus bryansmalli*. *Pisanosaurus mertii*. ZPAL V 39 slash 33 Pelvis. ZPAL V 39 slash 45 Tibia. ZPAL V 39 slash 35 Scapulo dash coracoid. ZPAL V 39 slash 47 Femur. ZPAL V 39 slash 46 Fibula

Char:

319: Fibula, notch on anterior surface of proximal fibula

318: Femur, shape of trochanteric crest

317: Scapula, distinct ridge centred on medial surface of blade

272) Astragalus, dorsally expanded process on the posterolateral portion of the tibial facet:

247) Femur, anteromedial corner of the distal end:

246) Femur, crista tibiofibularis (fibular condyle of Sereno & Arcucci 1994):

245) Femur, anterior surface of the distal portion:

233) Femur, anterolateral side of the femoral head:

229) Femur, femoral head in medial and lateral views:

109) Extensive planar wear facets across multiple maxillary/dentary teeth:

20) Maxilla, dentition

10) Premaxillary teeth, serrations

Porfiri, J. D., Novas, F. E., Calvo, J. O., Agnolin, F. L., Ezcurra, M. D. and Cerda, I. A., 2014. Juvenile specimen of Megaraptor (Dinosauria, Theropoda) sheds light about tyrannosauroid radiation

Species:

Santanaraptor. Eocarcharia. Chilantaisaurus. Eotyrannus. Irritator. Spinosaurus. Kileskus. Orkoraptor. Shaochilong. Carcharodontig. Tyrannotitan. Proceratosaurus. Australovenator. Aerosteon.

Char:

283. Sacrum, position of ventral margin of posterior articular face of sacral vertebra five in lateral view

245. Ilium, lateral surface of ilium with large external foramina and internal

pneumatic spaces:

132. Metacarpal II, at least half of proximal end closely appressed to metacarpal III:

Prieto-Marquez, A., 2014. Skeletal morphology of *Kritosaurus navajovius* (Dinosauria: Hadrosauridae) from the Late Cretaceous of the North American south-west, with an evaluation of the phylogenetic systematics and biogeography of Kritosaurini.

Species:

Tanis sinensis. Kerberosaurus manakini. Big Bend UTEP 37 dot 7. Wulagasaurus dongi. Kritosaurus horneri. Gilmoreosaurus mongoliensis. Hadrosaurus foulki. Lophorhothon atopus. Naashoibitosaurus ostromi.

Char:

264. Morphology of the pedal unguals (PES6,
<http://www.morphbank.net>Show/?id=461795>;

Norman 2002, character 67):

261. Metatarsal I (modified from Norman, 2002, character 66):

260. Distal tarsals II and III (Horner et al., 2004, character 102):

258. Tibia. Extension of the cnemial crest of the tibia (TB,
<http://www.morphbank.net>Show/?id=461788>; Godefroit et al. 2000, character 31)

257. Femur. Lateral profile of the caudoventral margin of the fourth trochanter of the femur (FM2, <http://www.morphbank.net>Show/?id=461787>; modified from Wagner 2001):

256. Femur. Degree of curvature of the distal half of the femoral shaft (FM1,
(<http://www.morphbank.net>Show/?id=461786>; Norman 2002, character 62):

253. Ischium. Degree of ventral projection of the distal expansion of the ischium (expressed as the ratio between the length of the ischial shaft and the length of the distal ventral expansion) (IS10, <http://www.morphbank.net>Show/?id=461783>; Evans & Reisz 2007, character 90):

247. Ischium. Relative orientation of the acetabular and caudodorsal margins of the iliac peduncle of the ischium

243. Pubis. Depth/width proportions of the iliac peduncle of the pubis (PB10, <http://www.morphbank.net>Show/?id=461770>; Prieto-Márquez 2010a, character 261)

240. Pubis, obturator foramen (PB7, <http://www.morphbank.net>Show/?id=461767>; modified from Horner et al. 2004, character 97)

239. Pubis. Morphology of the acetabular margin, ventral to the lateral edge of the iliac peduncle (PB6, <http://www.morphbank.net>Show/?id=461766>; Prieto-Márquez 2010a, character 257)

232. Ilium. Position of the medial sacral ridge within the medial surface of the central plate of the ilium (IL19, <http://www.morphbank.net>Show/?id=461756>; Prieto-Márquez 2010a, character 249)

214. Proximodistal length of manual palanx II1 relative to that of II2 (MN8, <http://www.morphbank.net>Show/?id=461734>; modified from You et al. 2003, character 55):

213. Shape of manual ungual II (MN7, <http://www.morphbank.net>Show/?id=461733>; Norman 2002, character 53, in part)

210. Elongation of the manus exemplified by elongation of metacarpals II through IV, measured as the ratio between the length of metacarpal III and the width of its mid-shaft (MN3, <http://www.morphbank.net>Show/?id=461729>; raw data from Prieto-Márquez 2008:690; modified from Horner et al. 2004, character 84)

209. Manual digit I (Norman 2002, character 49) (MN2, <http://www.morphbank.net>Show/?id=461728>):

208. Composition of the carpus (MN1, <http://www.morphbank.net>Show/?id=461727>; adapted from Horner et al. 2004, character 86)

187. Sternum. Length of the “handle-like” caudolateral process of the sternal relative to that of the craniomedial plate (excluding the caudoventral process) (ST, <http://www.morphbank.net>Show/?id=461706>; modified from Prieto-Márquez et al. 2006, character 100)

182. Height of the neural spine relative to that of the centrum of the tallest caudal dorsal or sacral vertebrae (in adults) (DRS1, <http://www.morphbank.net>Show/?id=461703>; raw data from Prieto-Márquez 2008:628; modified from Norman, 2002, character 41)

171. Palpebral (supraorbital) bone (PLP, <http://www.morphbank.net>Show/?id=461422>; Norman, 2002, character 13)

170. Caudal extension of the hook-like nasal process on the caudoventral region of helmet-shaped hollow supracranial crests (CRS6, <http://www.morphbank.net>Show/?id=461421>; Prieto-Márquez 2010a, character 186)

169. Hollow crest-snout angle along the dorsal margin of the premaxilla in lateral view (in adults) (CRS5, <http://www.morphbank.net>Show/?id=461420>; Evans 2007, character 13):
167. Relative contribution of the nasal and premaxilla in the formation of hollow supracranial crests (CRS3, <http://www.morphbank.net>Show/?id=461415>; Wagner 2001 and modified in part from Evans & Reisz 2007, character 11):
159. Communication between the external bony naris, the lateral diverticulum and the common median chamber (Evans 2006)
158. Location of the lateral diverticulum relative to the common median chamber (Weishampel 1981):
155. Degree of closure of the nasal passage on the lateral crest surface between the caudoventral process of the premaxilla and the nasal (NPS3, <http://www.morphbank.net>Show/?id=461405>; Evans 2007, character 15)
144. Basisphenoid. Short median ventral process located between the basipterygoid processes of the basisphenoid (BS4, <http://www.morphbank.net>Show/?id=461389>; Gates & Sampson 2007, character 79)
143. Basisphenoid. Ventral transverse caudal ridge between the basipterygoid processes of the basisphenoid (BS3, <http://www.morphbank.net>Show/?id=461388>; Gates & Sampson 2007, character 78)
141. Basioccipital. Length of basioccipital constriction (BO3, <http://www.morphbank.net>Show/?id=461385>; Godefroit et al. 2001)
140. Basioccipital. Participation of the basioccipital in the ventral margin of the foramen magnum (BO1, <http://www.morphbank.net>Show/?id=461383>; Weishampel et al. 1993, character 24):
130. Frontal. Median cleft separating the two striated tongues of the frontal platform (F5, <http://www.morphbank.net>Show/?id=461373>; Evans & Reisz 2007, character 40, in part):
120. Postorbital. Morphology of the caudal end of the caudal process of the postorbital at its articulation with the squamosal (PO5, <http://www.morphbank.net>Show/?id=461363>; Evans & Reisz 2007, character 35):
92. Maxilla. Position of the central region of the arcuate row of special foramina on the medial side of the maxilla (MX17, <http://www.morphbank.net>Show/?id=461321>; Prieto-Márquez 2010a, character 100):
81. Maxilla. Trapezoid lateral profile of rostrodorsal region of maxilla with extensive lateral exposure under lacrimal (MX18; new):
75. Nasal. Mediolateral breath of caudal nasal processes that insert in between the frontals at sagittal plane of the skull (N10; new):
72. Nasal. Caudoventral region of nasal, in hollow supracranial crest, ventrally recurved and hook-shaped, with a rostral process that inserts under the caudoventral process of the

premaxilla (NS6, <http://www.morphbank.net>Show/?id=461293>; Prieto-Márquez 2010a, character 80)

60. Premaxilla. Premaxillary caudodorsal process has an accessory rostroventral flange that overlaps the lateral surface of the nasal in the rostral region of a supracranial crest (PMX14, <http://www.morphbank.net>Show/?id=461282>); Evans & Reisz 2007, character 18):

59. Premaxilla. Morphology of the caudal region of the caudoventral process of the adult premaxilla: mediolaterally compressed and triangular (PMX13, <http://www.morphbank.net>Show/?id=461279>)

47. Prearticular bone (PRAR, <http://www.morphbank.net>Show/?id=461261>; Prieto-Márquez 2010a, character 59)

43. Surangular. Accessory foramen located rostrodorsal to the main surangular foramen (SA3, <http://www.morphbank.net>Show/?id=461255>)

29. Dentary. Lingual projection symphyseal region of the dentary (measured as a ratio between the labiolingual extension of the symphyseal region and the maximum labiolingual width of the dentary) (DT6; raw data from Prieto-Márquez 2008:356–357; modified from Prieto-Márquez 2010a, character 38)

15. Maxillary tooth crowns, position of the primary ridge (MXTH6, <http://www.morphbank.net>Show/?id=461220> and <http://www.morphbank.net>Show/?id=461221>; modified from You et al., 2003 character 36):

12. Increase in the number of tooth positions in the maxilla relative to the dentary (MXTH3, <http://www.morphbank.net>Show/?id=461217>; modified from Wagner 2001)

Saegusa, H. and Ikeda, T., 2014. A new titanosauriform sauropod (Dinosauria: Saurischia) from the Lower Cretaceous of Hyogo, Japan

Species:

Atlasaurus. Tambatitanis amicitiae. Qiaowanlong. Erketu.

Char:

51Sacrocostal yoke: absent (0); present (1).

38Anterior dorsal centra, articular face shape:

25Cervical vertebrae, epiphysial prezygapophyseal lamina, morphology

17Presacral vertebrae, pneumatopores in centra (pleurocoels):

1Posterolateral process of premaxilla and lateral process of maxilla, shape:

Sanchez-Hernandez, B. and Benton, M. J., 2014. Filling the ceratosaur gap: a new ceratosaurian theropod from the Early Cretaceous of Spain

Species:

Spinostropheus. *Genusaurus*. *Noasaurus*. *Velocisaurus*. *Camarillasaurus*. *Deltadromeus*.

Char:

88. Accessory fossa on dorsal surface of postaxial cervical transverse processes

82. Anterior prongs on postaxial cervical epiphyses:

70. Visibility of paradental plates in medial view:

68. Number of maxillary teeth:

8. Palatal process of maxilla

Tortosa, T., Buffetaut, E., Vialle, N., Dutour, Y., Turini, E. and Cheylan, G., 2014. A new abelisaurid dinosaur from the Late Cretaceous of southern France: palaeobiogeographical implications

Species:

Indosaurus. *Ilokelesia*. *Genyodectes*. *La Boucharde* abelisaurid. *Austrocheirus*.

Berberosaurus. *Caramillasaurus*. *Abelisaurus*. *Dahalokely*. *Rugops*. *Skorpiovenator*.

Spinostropheus. *Tarascosaurus*, *Velocisaurus*. *Xenotarsosaurus*. MCF dash PVPH dash 237

abelisaurid. *Pourcieux* abelisaurid. *Laevisuchus*. *Deltadromeus*. *Noasaurus*. *Quilmesaurus*.

Pycnonemosaurus. *Genusaurus*. *Ligabueino*.

Char:

331- Metatarsal IV, width of distal end:

323- Calcaneum, anterior view:

314- Astragalus, width of the ascending process:

306- Tibia, scar of the ascending process of the astragalus in astragalar facet

302- Tibia, fibular crest:

290- Femur, lesser trochanter:

287- Ischia, cross-sectional shape of the shaft (paired):

283- Pubis, transverse width of blade-shaped medial portion on the distal half of the shaft:

264- Ilium, orientation of the anterior margin of the preacetabular process:

250- Metacarpal III, dorsal margin of the distal articular condyles protruded directly above the collateral ligament pits

245- Metacarpal II, closely appressed to metacarpal III

218- Chevron, Anterior processes on proximal end:

207- Anterior caudal vertebrae, anterior projections on “T-shaped” transverse processes:

206- Anterior caudal vertebrae, anterior projection on distally expanded transverse processes:

199- Sacral vertebrae, transverse process of at least mid-sacrals in adult:

187- Anterior dorsal vertebrae, ventral surface of the centra:

179- Cervical ribs:

172- Postaxial cervical vertebrae, accessory fossa on dorsal surface of transverse processes

127- Splenial, posterior edge (anterior margin of the internal mandibular fenestra):

120- Orbitosphenoid, anterior margin of the CN II foramen:

117- Basisphenoid, orientation of basipterygoid processes

110- Exoccipital-opisthotic, groove located ventrally to the columellar recess:

109- Exoccipital-opisthotic, paroccipital processes, tip projection:

108- Exoccipital-opisthotic, orientation of paroccipital processes

105- Prootic, position of the CN V2,3 foramen relative to the plan passing through medial base of the nuchal crest and the basipterygoid process tip

104- Prootic, well-marked groove extending anteriorly to the CN V2,3:

100- Jugal, extremely dorsoventrally expanded below orbits

99- Jugal, posterior rim of the antorbital fossa

96- Quadratojugal, overlap onto quadrate posteriorly

76- Postorbital-squamosal contact, morphology of the dorsal margin

75- Postorbital-squamosal contact, direction of the dorsal margin

68- Postorbital, dorsal margin

44- Nasal, antorbital fossa

42- Nasal, row of foramina on dorsal surface

36- Maxilla, transverse flattening of lateral teeth

34- Maxilla-jugal contact: suture oblique, with its main axis subhorizontal

26- Maxilla, palatal process:

24- Maxilla, shape of promaxillary fenestra:

13- Premaxilla-maxilla teeth, pronounced size difference

8- Premaxilla-maxilla, visibility of interdental/paradental plates

Xing, H., Wang, D.-Y., Han, F.-L., Sullivan, C., Ma, Q.-Y., He, Y.-M., Hone, D. W. E., Yan, R.-H., Du, F.-M. and Xu, X., 2014. A new basal hadrosauroid dinosaur (Dinosauria: Ornithopoda) with transitional features from the Late Cretaceous of Henan Province, China

Species:

Kerberosaurus manakini. *Jaxartosaurus aralensis*. *Pararhabdodon isonensis*. *Lophorhothon atopus*. *Tanius sinensis*. *Shuangmiaosaurus gilmorei*. *Nanyangosaurus zhugeii*. *Jintasaurus meniscus*. *Claosaurus agilis*. *Eolambia caroljonesa*. *Gilmoreosaurus mongoliensis*. *Nanningosaurus dashiensis*. *Protohadros byrdi*. *Telmatosaurus transsylvanicus*. *Zhanghenglong yangchengensis*. *Aralosaurus tuberiferus*.

Char:

166. Position of the caudalmost end of the nasal of adult lambeosaurine dinosaurs in lateral view (corresponding with Prieto-Marquez and Wagner, 2009 character 195):

18. Comparison between the number of maxillary alveoli (N_m) and dentary ones (N_d) in adult specimens (corresponding with Prieto-Marquez and Wagner, 2009 character 18)

Zhou, S., Zhou, Z.-H. and O'Connor, J., 2014. A new piscivorous ornithuromorph from the Jehol Biota. Species:

Vorona berivotrensis. *Songlingornis linghensis*. *Jeholornis*.

Char:

172. Femur, fossa for insertion of lig. capititis femoris

154. Manual digit II, phalanx 2, 'internal index process' (Stegmann, 1978) on posterodistal edge

131. Ulna, cotylae

80. Clavicles

47. Mandibular symphysis, symphysial foramen/foramina

46. Mandibular symphysis, symphysial foramina

40. Quadrato, cluster of pneumatic foramina on posterior surface of the tip of dorsal process

37. Quadrato, dorsal process, development of intercotylar incisure between prootic and squamosal cotylae

26. Osseous interorbital septum (mesethmoid):

6. Tooth crown serration:

2015

Boyd, C. A., 2015. The systematic relationships and biogeographic history of ornithischian dinosaurs

Species: Notohypsilophodon. Macrogyphosaurus. Stormbergia. Thescelosaurus garbanii. Talenkauen. Yueosaurus. Stenopelix. Micropachycephalosaurus. Valdosaurus. Callovosaurus. Elrhazosaurus. Atlascopcosaurus. Koreanosaurus. Qantassaurus. Anabisetia. Asilisaurus. Sanjuansaurus. Echinodon. Emausaurus. Thescelosaurus assiniboiensis. Scelidosaurus. Marasuchus. Fruitadens. Pisanosaurus. Yandusaurus. Leaellynasaura. Lycorhinus. Tianyulong. Wannanosaurus. Abrictosaurus. Eocursor. Kaiparowits Orodromine .

Char:

247 Four functional digits in the pes (0), three functional digits in the pes (1).

241 Medial distal tarsal does not cover any part of the proximal surface of metatarsal II (0), medial distal tarsal covers at least a portion of the proximal surface of metatarsal II (1).

239 Three or more distal tarsals present (0), two or less distal tarsals present (1).

226 Angle between the articular facets for the tibia and fibula

226 Femur shorter than or equal to tibia in length (0), femur longer than tibia (1).

221 Fourth trochanter entirely on the proximal half of the femur (0), fourth trochanter placed at or below midshaft of the femur (1).

220 Insertion scar of m

217 Lesser trochanter of femur consists of a prominent crest (0), lesser trochanter similar in width to the greater trochanter and separated from it by a wide cleft (1), lesser trochanter narrow and closely appressed to the greater trochanter (2)

213 Lateral surface of the greater trochanter of femur convex (0), lateral surface of the greater trochanter flattened (1)

200 Pubic peduncle of ischium larger than iliac peduncle (0), peduncles subequal or iliac peduncle larger than pubic peduncle (1)

195 Anterior process of the pubis present

194 Pubis anteroventrally facing (0), pubis vertically oriented (1), pubis posteroventrally rotated.

192 Pubic peduncle of the ilium more robust than the ischial peduncle and expands in lateral view (0), pubic peduncle of the ilium tapers distally and is smaller than the ischial peduncle (1)

187 Anterior tip of the preacetabular process of the ilium situated posterior to the anterior tip of the pubic peduncle of the ilium

163 Ovoid fossa positioned anteroventral to the glenoid fossa on the coracoid absent (0), present (1)

159 Minimum thickness of scapular neck less than 20% maximum length of the scapula (0), minimum width of neck greater than 20% maximum length of the scapula (1)

152 Caudal neural spines positioned entirely over their respective caudal centra (0), caudal neural spines extend beyond their own centrum

125 Maxillary crowns low and spade-like, rectangular, or triangular (0), maxillary crowns high and diamond-shaped (1), maxillary crowns laterally flattened and posteriorly recurved (2), maxillary crowns conical (3)

123 Distribution of enamel on maxillary and dentary teeth

114 Ridges absent on dentary teeth

98 Angle between the base and long axis of the braincase

91 Antorbital fossa rounds smoothly onto maxilla

83 The length of the mandible posterior to the coronoid

72 ventral process of the predentary

70 Oral margin of the predentary smooth (0), oral margin denticulate (1)

67 Total length of frontals

62 Synovial socket for the head of the laterosphenoid position

44 Quadratojugal contacts the quadrate

4 Oral margin of the premaxilla smooth (0), denticulate (1).

Boyd, C. A. and Pagnac, D. C., 2015. Insight on the anatomy, systematic relationships, and age of the Early Cretaceous ankylopellexian dinosaur *Dakotadon lakotaensis*

Species:

Lanzhousaurus magnidens. *Barilium dawsoni*. *Osmakasaurus depressus*. *Iguanacolossus fortis*. *Tanius sinensis*. *Claosaurus agilis*. *Kangnasaurus coetzeei*. *Lophorhothon atopus*. *Lurdusaurus arenatus*. *Hadrosaurus foulkii*. *Planicoxa venenica*. *Jintasaurus meniscus*. *Cedrorestes crichtoni*. *Callovosaurus leedsi*. *Camptosaurus valdensis*. *Draconyx loureiroi*. *Elrhazosaurus nigeriensis*. *Glishades ericksoni*. NHMUKR 8676. NHMUKR 3741. NHMUKR 1831. *Hypselospinus fittoni*. *Gongpoquansaurus mazongshanensis*. *Nanyangosaurus zhugeii*. *Ratchasimasaurus suranareae*. *Owenodon hoggii*. *Penelopognathus weishampeli*. *Delapparentia turolensis*. *Valdosaurus canaliculatus*. *Uteodon aphanoecetes*. *Koshisaurus katsuyama*. *Muttaburrasaurus langdoni*.

Char:

85. Dentary teeth, ridges on lingual surface of crown:

90. Maxillary teeth, ridges on labial surface of crown

108. Manus, digit III, number of phalanges

134. Metatarsals III and IV, deep caudolateral notch on MT III for the reception of a prominent process of MT IV

Canale, J. I., Novas, F. E. and Pol, D., 2015. Osteology and phylogenetic relationships of Tyrannotitan chubutensis Novas, de Valais, Vickers-Rich and Rich, 2005 (Theropoda: Carcharodontosauridae) from the Lower Cretaceous of Patagonia, Argentina

Species: Tyrannotitan

Char:

63- Jugal, lateral view, relative heights of quadratojugal prongs

64- Jugal, lateral view, small accessory prong between dorsal and ventral prong of quadratojugal process

85- Pterygoid, medial view, fossae penetrating the quadrate and ectopterygoid rami

86- Pterygoid, medial view, angle of medial process with respect to angle of vomeropalatine ramus

90- Epapterygoid, dorsal region, shape

97- Prearticular, mylohyoid foramen

128- Sacrum: ventrally concave in lateral view and medially compressed

130- Caudal vertebrae, pneumatic openings (pleurocoels or foramina)

134- Scapula, acromion process, size

138- Radius and ulna, development of radial external tuberosity and ulnar internal tuberosity

139- Radius, shaft

140- Radius, development of medial biceps tubercle

141- Ulna, length relative to minimum circumference

163- Femur fibular fossa in distal view.

Carballido, J. L., Pol, D., Parra Ruge, M. L., Padilla Bernal, S., Paramo-Fonseca, M. E. and Etayo-Serna, F., 2015. A new Early Cretaceous brachiosaurid (Dinosauria, Neosauropoda) from northwestern Gondwana (Villa de Leiva, Colombia).

Species:

Barosaurus latus. Brachytrachelopan messai. Rebbachisaurus garasbae. Rayososaurus agrioensis. Comahuesaurus windhansi. Histriasaurus bocardeli. Amazonsaurus maranhensis. Opisthocoelicaudia skarzynskii. Zapalasaurus bonapartei. Cathartesaura anaerobica. Andesaurus delgadoi. Argentinosaurus hunculensis. Malarguesaurus florencae. Tendaguria tanzaniensis. Erketu ellisoni. Abydosaurus mcintoshii. Padillasaurus leivaensis. Brachiosaurus altithorax. Lusotitan. Venenosaurus dicrocei. Cedarosaurus weiskopfe. Vulcanodon karibaensis. Isanosaurus attavipachi. Amygdalodon patagonicus. Gongxianosaurus shibeiensis. Wintonotitan wattsi. Ligabuesaururs lenzai. Nemegtosaurus mongoliensis. Tapuiasaurus macedoi. Trigonosaurus pricei. Suwassea emiliae. Demandasaurus darwini. Tehuelchesaurus benitezii. Galvesaurus herreroi.

Char:

(359) Anterior and middle caudal vertebrae, blind fossae in lateral centrum:

(353) Maxillary teeth, shape:

(352) Dentary, posteroventral process shape

(350) Premaxilla, small finger-like, vertically oriented premaxillary process near anteromedial corner of external naris:

(349) Premaxilla-maxilla suture, shape

(348) Middle to posterior dorsal vertebrae, small fossa anterior to anteroventral to the pleurocoel:

(341) Unguals of pedal digit II and III, proximal dimensions:

- (340) Pedal digit IV ungual, development:
- (323) Distal tarsals 3 and 4:
- (322) Calcaneum:
- (321) Astragalus, transverse length:
- (312) Tibial distal posteroventral process, size:
- (291) Ischium, elongate muscle scar on proximal end:
- (278) Manual nonungual phalanges, shape:
- (276) Manual digits II and III, phalangeal number:
- (269) Carpal bones, shape:
- (251) Ratio of maximum length of sternal plate to the humerus length:
- (250) Ridge on the ventral surface of the sternal plate:
- (239) Scapular acromion length:
- (227) Chevrons:
- (221) Distalmost biconvex caudal centra, number:
- (204) Anterior caudal centra, length:
- (200) Anterior caudal transverse processes, proximal depth:
- (194) Anterior caudal centra, pleurocoels
- (191) First caudal neural arch, coel on lateral aspect of neural spine:
- (183) Sacral vertebrae contributing to acetabulum:
- (178) Cervical ribs, angle between the capitulum and tuberculum:
- (129) Middle and posterior cervical vertebrae, articular surface of zygapophyses:
- (104) Enamel surface texture:
- (98) Lateral plate:
- (93) Coronoid, size:
- (92) Splenial posterodorsal process:
- (85) Dentary, tuberocity on labial surface near symphysis:
- (84) Dentary, cross-sectional shape of symphysis:
- (80) Occipital region of skull, shape:
- (77) Basisphenoid, sagittal ridge between basipterygoid processes:

- (76) Basisphenoid/quadrata contact:
- (62) Palatine, lateral ramus shape:
- (61) Pterygoid, sutural contact with ectopterygoid:
- (59) Pterygoid, quadrata flange size:
- (33) Postorbital, posterior margin articulating with the squamosal :
- (30) Prefrontal-Frontal contact width:
- (23) Ventral edge of anterior surface of the quadratojugal:
- (6) Maxilla, foramen anterior to the preantorbital fenestra :
- (4) Premaxilla, external surface:

Evans, D. C. and Ryan, M. J., 2015. Cranial anatomy of *Wendiceratops pinhornensis* gen. et sp. nov., a centrosaurine ceratopsid (Dinosauria: Ornithischia) from the Oldman Formation (Campanian), Alberta, Canada, and the evolution of ceratopsid nasal ornamentation

Species: *Turanoceratops tardabilis*

Char:

7. Premaxilla, recess along ventral portion of septum

67. Epiparietal, locus P6 shape:

Fanti, F., Cau, A., Cantelli, L., Hassine, M. and Auditore, M., 2015. New information on *Tataouinea hannibalis* from the Early Cretaceous of Tunisia and implications for the tempo and mode of rebbachisaurid sauropod evolution

Species:

Amazonasaurus maranhensis. *Zapalasaurus bonapartei*. *Histriasaurus boscarolli*.
Comahuesaurus windhausenii. *Rebbachisaurus garasbae*. *Cathartesaura anaerobica*.
Katepensaurus goicoecheai. *Tataouinea hannibalis*. *Brachytrachelopan mesai*.

Char:

341. Unguals of pedal digit II and III, proximal dimensions

340. Pedal digit IV ungual, development

339 Pedal ungual I, shape:

338 Pedal ungual I, shape

337 Pedal digit I ungual, length

335 Pedal unguals, orientation

334 Pedal digits II-IV, penultimate phalanges, development

- 333 Pedal nonungual phalanges, shape
- 332 Metatarsal V, length
- 330 Metatarsals III and IV, minimum transverse shaft diameters
- 329 Metatarsal I and V proximal condyle, size
- 328 Metatarsal I, minimum shaft width
- 326 Metatarsal I distal condyle, transverse axis orientation
- 324 Metatarsus, posture
- 323 Distal tarsals 3 and 4
- 322 Calcaneum
- 321 Astragalus, transverse length:
- 320 Astragalus, posterior fossa shape
- 318 Astragalus, foramina at base of ascending process
- 314 Fibula, lateral trochanter:
- 313 Fibula, proximal tibial scar, development:
- 312 Tibial distal posteroventral process, size
- 311 Tibia, distal breadth
- 307 Femur, distal condyles articular surface shape
- 306 Femur, distal condyles orientation
- 305 Femur, distal condyles relative transverse breadth
- 304 Femur head position:
- 301 Femur midshaft, transverse diameter:
- 300 Femur, lesser trochanter:
- 294 Ischia, anteroposterior pubic pedicel width divided the total length of the ischium
- 292 Ischial blade, shape
- 287 Pubic apron, shape
- 285 Pubis length respect to ischium
- 283 Ilium, preacetabular process orientation
- 281 Ilium, dorsal margin shape
- 280 Ilium, ischial peduncle size

- 278 Manual nonungual phalanges, shape
- 276 Manual digits II and III, phalangeal number
- 274 Metacarpal I distal condyle, transverse axis orientation
- 269 Carpal bones, shape
- 267 Radius, distal condyle orientation
- 266 Radius, distal breadth:
- 265 Radial distal condyle, shape
- 264 Ulna, length-to-proximal breadth ratio
- 263 Ulnar olecranon process, development
- 261 Ulnar proximal condyle, shape
- 259 Humeral, lateral margin
- 258 Humeral distal condyle, shape
- 257 Humeral distal condyles, articular surface shape
- 255 Humeral midshaft cross-section, shape
- 254 Humeral deltopectoral crest, shape
- 253 Humeral deltopectoral attachment, development
- 252 Humerus-to-femur ratio:
 - 251 Ratio of maximum length of sternal plate to the humerus length
- 250 Ridge on the ventral surface of the sternal plate
- 248 Prominent posterolateral expansion of the sternal plate producing a kidney-shaped profile in dorsal view
- 247 Sternal plate, shape:
 - 246 Coracoid, infraglenoid lip:
 - 245 Coracoid, Infraglenoid deep groove
 - 243 Coracoid, anteroventral margin shape
 - 242 Coracoid, proximodistal length:
 - 241 Scapular blade, cross-sectional shape at base:
 - 240 Glenoid scapular orientation:
 - 239 Scapular acromion length:
 - 237 Scapula, ventral margin with a well developed ventro medial process

231 Scapular blade, orientation respect to coracoid articulation:

230 Scapular acromion process, size

229 Posture: bipedal

228 Posterior chevrons, distal contact

227 Chevrons

226 Chevron haemal canal, depth

223 Forked chevrons with anterior and posterior projections

222 Distalmost biconvex caudal centra, length-to height ratio

221 Distalmost biconvex caudal centra, number:

218 Posterior caudal centra, shape

217 Posterior Caudals centra, articular face shape:

214 Posterior caudal vertebrae, neural spine strongly displaced posteriorly:

211 Middle caudal vertebrae, location of the neural arches:

210 Middle caudal centra, articular face shape:

200 Anterior caudal transverse processes, proximal depth

191 First caudal neural arch, coel on lateral aspect of neural spine

189 Caudal transverse processes:

188 Caudal bone texture

183 Sacral vertebrae contributing to acetabulum

182 Sacrum, sacricostal yoke

181 Sacral vertebrae, number

180 Anterior dorsal ribs, cross-sectional shape

179 Dorsal ribs, proximal pneumatopores:

178 Cervical ribs, angle between the capitulum and tuberculum

176 Posterior dorsal vertebra, posterior centrodiapophyseal lamina (PCDL):

175 Posterior dorsal vertebrae, neural spine:

173 Posterior dorsal vertebrae, transverse processes

169 Middle and posterior dorsal neural arches, spinodiapophyseal lamina (SPDL) and spinopostzygapophyseal lamina (ISPOL) contact

168 Middle and posterior dorsal neural spines, lateral spinopostzygapophyseal lamina (ISPOL):

167 Anterior dorsal vertebrae, spinopostzygapophyseal lamina (SPOL)

165 Middle and posterior dorsal vertebrae, accessory spinodiapophyseal lamina:

164 Middle and posterior dorsal vertebrae, spinodiapophyseal lamina (SPDL):

159 Middle and posterior dorsal neural arches, anterior centroparapophyseal lamina (ACPL):

157 Middle and posterior dorsal neural spines orientation:

155 Middle and posterior dorsal vertebrae, neural canal in anterior view:

150 Middle to posterior dorsal centra, ventral surface:

147 Anterior and middle dorsal centra, pleurocoels

146 Anterior dorsal centra, articular face shape

143 Dorsal vertebrae, single not bifid neural spines, single prespinal lamina (PRSL):

141 Posterior dorsal neural spines, spinoprezygapophyseal lamina (SPRL)

140 Anterior and middle dorsal neural spines, spinoprezygapophyseal lamina (SPRL)

131 Posterior cervical vertebrae, neural spine shape:

130 Posterior cervical vertebrae, lateral profile of the neural spine:

121 Anterior cervical vertebrae, prespinal lamina:

118 Cervical vertebrae, neural arch lamination:

117 Cervical centra, small notch in the dorsal margin of the posterior articular surface

111 Cervical centra, articulations

104 Enamel surface texture:

99 Teeth, orientation:

98 Lateral plate:

93 Coronoid, size

92 Splenial posterodorsal process:

90 Adductor fossa, medial wall depth

89 Surangular ridge separating adductor and articular fossae:

81 Dentary, depth of anterior end of ramus

80 Occipital region of skull, shape:

77 Basisphenoid, sagital ridge between basipterygoid processes:

76 Basisphenoid/quadrata contact:
70 Basal tubera, anteroposterior depth:
66 Paroccipital process, ventral non-articular process:
63 Epipterygoid:
62 Palatine, lateral ramus shape
61 Pterygoid, sutural contact with ectopterygoid:
60 Pterygoid, palatine ramus shape:
59 Pterygoid, quadrata flange size:
54 Quadrata fossa, orientation:
52 Quadrata fossa:
51 Laterotemporal fenestra, anterior extension:
49 Supratemporal fossa, lateral exposure:
48 Supratemporal region, anteroposterior length
46 Supratemporal fenestra, long axis orientation
40 Parietal occipital process, dorsoventral height
33 Postorbital, posterior margin articulating with the squamosal
31 Postorbital, ventral process shape:
30 Prefrontal-Frontal contact width
29 Prefrontal, anterior process
24 Squamosal contribution to the supratemporal fenestra
23 Ventral edge of anterior surface of the quadratojugal
21 Quadratojugal, anterior process length
15 Lacrimal, anterior process:
11 Antorbital fossa:
6 Maxilla, foramen anterior to the preantorbital fenestra
5 Maxillary border of external naris, length:

Gianechini, F. A., Pesteguia, S., Landini, W., Finotti, F., Valieri, R. J. and Zandonai, F., 2015.
New abelisaurid remains from the Anacleto Formation (Upper Cretaceous), Patagonia,
Argentina.

Species:

Genusaurus. Genyodectes. Deltadromeus. Indosaurus. Kryptops. Spinostropheus. Velocisaurus. MPCN dash PV 69. Laevisuchus. Dahalokely. Rugops. Noasaurus. Berberosaurus

Char:

- 159. Orientation of ischial peduncle of ilium
- 112. Orientation of prezygapophyses in caudal half of dorsal vertebral series in cranial view:
- 102. Accessory fossa on dorsal surface of postaxial cervical transverse processes
- 95. Anterior prongs on postaxial cervical epiphyses
- 93. Anteroposterior position of cervical neural spines
- 82. Visibility of paradental plates in medial view
- 79 Transverse flattening of lateral maxillary teeth:
- 78. Pronounced size difference between premaxillary and maxillary teeth
- 76. Number of maxillary teeth:
- 13. Row of foramina on dorsal nasal surface
- 8. Palatal process of maxilla

Han, F.-L., Forster, C. A., Clark, J. M. and Xu, X., 2015. A new taxon of basal ceratopsian from China and the early evolution of Ceratopsia

Species: Koreaceratops. Unescoceratops.

Char:

- 126. Dentary, coronoid process, size of notch

He, Y.-M., Makovicky, P. J., Wang, K., Chen, S.-Q., Sullivan, C., Han, F.-L. and Xu, X., 2015. A new leptoceratopsid (Ornithischia, Ceratopsia) with a unique ischium from the Upper Cretaceous of Shandong Province, China.

Species: Gideonmantellia. Stormbergia. Parksosaurus. Xuanhuaceratops. Helioceratops. Koreaceratops. Stenopelix. Ischiceratops. Zhuchengceratops. Udanoceratops. Minmi. Gargoyleosaurus. Abrictosaurus. Tianyulong. Yandusaurus. Changchunsaurus. Chaoyangsaurus. Liaoceratops. Hongshanosaurus. Bagaceratops. Euoplocephalus. Emausaurus. Wannanosaurus. Yamaceratops. Homalocephale. Archaeoceratops. Scutellosaurus.

Char:

- 345 Astragalus and calcaneum are indistinguishably fused to one another
- 343 Pendent fourth trochanter, rod-like with subparallel anterior and posterior surfaces
- 326 Cnemial crest on tibia:

252 Deltpectoral crest, length

233 Parascapular spine:

221 Anterior caudal neural spine end, shape

204 Prolonged middle cervical centra (posterior centra reduced):

131 Posteroventral dermal plate, position:

117 Pterygoid-ectopterygoid articular relation: ectopterygoid

83 Postfrontal: present (0); absent (1).

32 Maxilla, prominent anterolateral boss articulates with the medial premaxilla

Hu, H., O'Connor, J. K. and Zhou, Z.-H., 2015. A new species of Pengornithidae (Aves: Enantiornithes) from the Lower Cretaceous of China suggests a specialized scansorial habitat previously unknown in early birds.

Species: Shenzhouraptor. Jixiangornis. Rahonavis. Didactylornis. Chaoyangia. Jinzhouornis. Concornis. Elsornis. Eoalulavis. Eocathayornis. Vorona. Liaoningornis. Songlingornis. Ambiorhynchus. Neuquenornis. Otogornis. Iberomesornis. Limenavis. Boluochia. Hollanda. Enaliornis. Baptornis varneri. Vegavis. Hesperornis. Parahesperornis. Baptornis advenus.

Char:

241. Digit IV phalanges in distal view, medial trochlear rim enlarged with respect to lateral trochlear rim

239. Metatarsal III, trochlea in plantar view, proximal extent of lateral and medial edges of trochlea

235. Relative position of metatarsal trochleae: trochlea III more distal than trocheleae II and IV

223. Proximal end of metatarsus: plane of articular surface perpendicular to longitudinal axis of metatarsus

218. Proximal end of the fibula: prominently excavated by a medial fossa

210. Round proximal articular surface of tibiotarsus

208. Fossa for the femoral origin of m. tibialis cranialis

206. Caudal projection of the lateral border of the distal end of the femur, proximal and contiguous to the ectocondylar tubercle/tibiofibular crest

194. Pubic pedicel: cranoventrally projected

192. Ischiadic terminal processes forming a symphysis
170. Major digit (II), phalanx 1, "internal index process" (Stegmann, 1978) on caudodistal edge
147. Ulna, dorsal cotyla strongly convex
146. Ulna, cotylae
117. Sternal costal processes
108. Sternum
102. Costal surface of scapular blade with prominent longitudinal furrow
101. Proximal end of scapula, pit between acromion and humeral articular facet (scapular fossa)
99. Scapula, acromion process
98. Scapular acromion costolaterally wider than deeper
94. Supracoracoid nerve foramen, location relative to dorsal coracoidal fossa
80. Uncinate process, orientation: perpendicular to rib
77. Cranial end of pygostyle with a pair of laminar, ventrally projected processes
73. Free caudals, length of transverse processes: approximately equal to, or greater than, centrum width
70. Free caudal vertebral count: more than 35 (0); 35-26 (1); 25 - 20 (2); 19-9 (3); 8 or less (4).
68. Convex caudal articular surface of the synsacrum
63. Notarium
60. Hypophene-hypantrum accessory intervertebral articulations in the thoracic vertebrae
53. Postaxial cervical epiphyses

- 48.Tooth
39. Mandibular symphysis, symphyseal foramen/foramina
38. Mandibular symphysis, symphyseal foramina
35. Dentary tooth implantation: teeth in individual sockets
33. Osseous interorbital septum (mesethmoid)
31. Pterygoid, articular surface for basipterygoid process: concave “socket”, or short groove enclosed by dorsal and ventral flanges
- 21.Contact between the quadratojugal and squamosal
15. Contact between vomer and premaxilla

McPhee, B. W., Bonnan, M. F., Yates, A. M., Neveling, J. and Choiniere, J. N., 2015. A new basal sauropod from the pre-Toarcian Jurassic of South Africa: evidence of niche-partitioning at the sauropodomorph-sauropod boundary?

Species:

Pulanesaura. Unaysaurus. Vulcanodon. Blikanasaurus. Chindesaurus. Glacialisaurus. Isanosaurus. Leonerasaurus. Leyesaurus. Eucnemesaurus. Gongxianosaurus. Guaibasaurus. Chromogisaurus. Seitaad. Mussaurus. Plateosauravus. Antetonitrus. Barapasaurus. Cetiosaurus. Spinophorosaurus. Staurikosaurus. Panphagia.

Char:

360. Shape of the unguals of pedal digits two and three
350. Angle formed by the anterior and anteromedial borders of metatarsal IV:
268. Orientation of distal third of the blades of the pubic apron
260. Anterior end of ventrolateral ridge bounding brevis fossa
244. Shape of the unguals of manual digits two and three:
204. Width of dorsal expansion of the scapula
196. 'Weaponized' dermal spikes on tail:
180. Deep, medially-directed pit excavating the surface of the non-articulating gap of the first primordial sacral rib:

163. Separation of lateral surfaces of anterior dorsal neural arches under transverse processes:

156. Contribution of the paradiapophyseal lamina to the margin of the anterior chonos in mid-dorsal vertebrae:

151. Shape of the posterior dorsal centra

129. Dorsal excavation of the cervical parapophyses

103. Splenial-angular joint

60. Medial margin of supratemporal fossa:

3. Relative height of the rostrum at the posterior margin of the naris:

McPhee, B. W., Choiniere, J. N., Yates, A. M. and Viglietti, P. A., 2015. A second species of *Eucnemesaurus* Van Hoepen, 1920 (Dinosauria, Sauropodomorpha): new information on the diversity and evolution of the sauropodomorph fauna of South Africa's lower Elliot Formation (latest Triassic).

Species:

Chindesaurus. *Chromogisaurus*. *Glacialisaurus*. *Gongxianosaurus*. *Eucnemesaurus fortis*.
Eucnemesaurus entaxonis. *Guaibasaurus*. *Isanosaurus*. *Leonerasaurus*. *Lessemsaurus*.
Panphagia. *Pantydraco*. *Patagosaurus*. *Blikanasaurus*. *Staurikosaurus*. *Mussaurus*.

Char:

347. Angle formed by the anterior and anteromedial borders of metatarsal IV

265. Orientation of distal third of the blades of the pubic apron

257. Anterior end of ventrolateral ridge bounding brevis

241. Shape of the unguals of manual digits two and three:

202. Width of dorsal expansion of the scapula

180. Deep, medially-directed pit excavating the surface of the non-articulating gap of the first primordial sacral rib

156. Contribution of the paradiapophyseal lamina to the margin of the anterior chonos in mid-dorsal vertebrae:

151. Shape of the posterior dorsal centra:

136. Shape of the epiphyses:

124. Position of axial prezygapophyses

103. Splenial-angular joint:

3. Relative height of the rostrum at the posterior margin of the naris

Norman, D. B., 2015. On the history, osteology, and systematic position of the Wealden (Hastings group) dinosaur *Hypsosaurus fittoni* (Iguanodontia: Styracosterna).

Spices: *Hypsosaurus fittoni*. *Barilium dawsoni*. *Batyrosaurus rozhdestvenskyi*. *Levnesovia Transoxiana*.

Char:

None

Parsons, W. L. and Parsons, K. M., 2015. Morphological variations within the ontogeny of *Deinonychus antirrhopus* (Theropoda, Dromaeosauridae).

Species:

Microvenator celer. *Microraptor zhaoianus*. *Graciliraptor luijatunensis*. *Hesperonychus elizabethae*. *Pyroraptor olympius*. *Rahonavis ostromi*. *Balaurus Bondoc*. *Atrociraptor marshalli*. *Utahraptor*. *Incisivosaurus gauthieri*. *Unenlagia*. *Unenlagia comahuensis*. *Unenlagia paynemili*. *Neuquenraptor argentinas*. *Shanag ashile*. *Mahakala omnogovae*. *Mononykus olecranus*. *Patagonykus puertai*. *Albinykus*. *Alvarezsaurus calvoi*. *Coelurus fragilis*. *Liaoningornis longidigitus*. *Pedopenna*. *Epidendrosaurus*. *Epidexipteryx MCZ 8791*. *Iaceornis marshii*. *Limenavis patagonica*. *Baptornis*. *Vorona*. *Songlingornis*. *Hesperornis*. *Haplocheirus*. *Anserimimus planinya*. *Tarbosaurus baatar*. *Segnosaurus galbinensis*. *Alxasaurus elesitaiensis*. *Archaeornithomimus asiaticus*. *Huaxiagnathus orientalis*. *Sinosauroptryx prima*. *Compsognathus longipes*. *Juravenator starki*. *Gobipteryx*. *Neuquenornis Volans*. *Patagopteryx deferrariisi*. *Eotyrannus lengi*. *Pengornis houi*. *Pelecanimimus polyodon*. *Harpymimus okladnikovi*. *EK troodontid IGM 100 slash 44*. *Jinfengopteryx elegans*. *Neuquenraptor plus*. *Unenlagia*. *Xixiasaurus*. *Byronosaurus jaffei*. *Shenzhousaurus orientalis*. *Cathayornis*. *Concornis*. *Erlikosaurus andrewsi*. *Adasaurus mongoliensis*. *Achillobator giganticus*. *Saurornitholestes langstoni*. *Austroraptor*. *Rinchenia mongoliensis*. *Proceratosaurus bradleyi*.

Char:

Character 477: (Turner et al., 2009) Accessory longitudinal ridge on anterolateral side of the distal end of metatarsal IV

Character 476: Anterior (dorsal) surface of metatarsal III

Character 460: [NEW] Filamentous integumentary structures (stage 1 feathers)

Character 458: [NEW] Ulna, size of proximal cotylae

Character 454: [NEW] V-shaped opening between basal tubera remnants

Character 446: [NEW] Metatarsal I

Character 442: [NEW] Posterior extension of caudal chevrons

Character 440: [NEW] Coracoid fenestra

Character 439: [NEW] Middle to posterior caudal formed condyles, intercondylar groovevertebrae

Character 424: (CEA 06 187) Tibia/tarsal

Character 423: (CEA 06 186) Tibia/tarsal formed condyles

Character 417: (CEA 06 177) Femur, posterior projection of the lateral border of the distal end, continuous with lateral condyle

Character 401: (CEA 06 154; Clarke and Chiappe, 2001) Manual digit II, phalanx 2, internal index process on posterodistal edge

Character 393: (CEA 06 145) Metacarpal I, anterior surface

Character 382: (CEA 06 132) Ulna, dorsal cotyla convex

Character 381: (CEA 06 131) Ulna, cotylae

Character 377: (CEA 06 127) Humerus, ventral condyle

Character 375: (CEA 06 125) Humerus, distal end, compressed anteroposteriorly and flared dorsoventrally

Character 373: (CEA 06 123) Humerus, distal condyles

Character 372: (CEA 06 122) Humerus, long axis of

Character 361: (CEA 06 111) Humerus, anterior surface, well-developed fossa on midline making proximal articular surface appear V-shaped in proximal viewdorsal condyle

Character 341: (CEA 06 90) Coracoid, lateral margin

Character 336: (CEA 06 83) Furcula, laterally excavated

Character 334: (CEA 06 80) Clavicles

Character 316: (CEA 06 57) Thoracic vertebrae, parapophyses

Character 310: (CEA 06 50) Anterior external mandibular fenestra

Character 307: (CEA 06 47) Mandibular symphysis, symphyseal foramen/foramina

Character 300: (CEA 06 40) Quadrato, cluster of pneumatic foramina on posterior surface of the tip of dorsal process

Character 257: Surangular, anteroventral extension divides external mandibular fenestra by contacting angular anteriorly

Character 226: Dorsal edge of postacetabular blade (Novas, 2004)

Character 210: Shaft diameter of manual phalanx I-1

Character 206: Metatarsal I

Character 152: Unguals on all digits

Character 142: Olecranon process

Character 114: Last sacral centrum

Character 69: Labial face of dentary (Russell and Dong, 1993)

Rauhut, O. W. M., Carballido, J. L. and Pol, D., 2015. A diplodocid sauropod dinosaur from the Late Jurassic Canadon Calcereo Formation of Chubut, Argentina

Species:

Amazonsaurus maranhensis. *Chinshakiangosaurus chunghoensis*. *Antetonitrus ingenipes*.
Lessemsaurus sauropoides. *Isanosaurus attavipachi*. *Vulcanodon karibaensis*. *Zapalasaurus bonapartei*. *Calcareo Diplodocid*. *Barosaurus latus*. *Malarguesaurus florenciae*.
Histriasaurus bocardeli. *Rayosaurus agrioensis*. *Rebbachisaurus garasbae*. *Cathartesaura anaerobica*. *Nemegtosaurus mongoliensis*. *Suwassea emiliae*. *Gongxianosaurus shibeiensis*.
Amygdalodon patagonicus. *Venenosaurus dicrocei*. *Erketu ellisoni*. *Tendaguria tanzaniensis*.
Wintonotitan wattsi. *Trigonosaurus pricei*. *Barapasaurus tagorei*. *Cetiosaurus oxoniensis*.
Bellusaurus sui. *Galvesaurus herreroi*. *Tehuelchesaurus benitezii*. *Abydosaurus mcintoshii*.
Cedarosaurus weiskopfe. *Chubutisaurus insignis*. *Tastavinsaurus sanzi*. *Mendozasaurus neguyelap*. *Andesaurus delgadoi*. *Argentinosaurus hunculensis*. *Epachthosaurus sciuttoi*.
Opisthocoelicaudia skarzynskii. *Comahuesaurus windhanseni*. *Trigonosaurus pricei*.
Euhelopus zdanskyi. *Suwassea emiliae*. *Ligabuesaururs lenzai*. *Demandasaurus darwini*.
Brachytrachelopan messai. *Losillasaurus giganteus*.

Char:

(359) Anterior and middle caudal vertebrae, blind fossae in lateral centrum

(357) Middle and posterior dorsal vertebral centra, keel

(355) Cervical vertebrae, epiphyses shape: stout, pillar-like expansions above

(353) Maxillary teeth, shape

(352) Dentary, posteroventral process shape

(350) Premaxilla, small finger-like, vertically oriented premaxillary process near anteromedial corner of external naris

(349) Premaxilla-maxilla suture, shape

(348) Middle to posterior dorsal vertebrae, small fossa anterior to anteroventral to the Pleurocoel

(341) Unguals of pedal digit II and III, proximal dimensions

(340) Pedal digit IV ungual, development

(322) Calcaneum

(323) Distal tarsals 3 and 4:

(321) Astragalus, transverse length

- (318) Astragalus, foramina at base of ascending process
- (314) Fibula, lateral trochanter
- (312) Tibial distal posteroventral process, size
- (291) Ischium, elongate muscle scar on proximal end
- (278) Manual nonungual phalanges, shape
- (276) Manual digits II and III, phalangeal number
- (269) Carpal bones, shape
- (251) Ratio of maximum length of sternal plate to the humerus length
- (250) Ridge on the ventral surface of the sternal plate
- (239) Scapular acromion length
- (237) Scapula, ventral margin with a well developed ventro medial process
- (228) Posterior chevrons, distal contact
- (227) Chevrons
- (221) Distalmost biconvex caudal centra, number
- (204) Anterior caudal centra, length
- (200) Anterior caudal transverse processes, proximal depth
- (197) Anterior and middle caudal vertebrae, triangular lateral process on the neural spine
- (194) Anterior caudal centra, pleurocoels
- (191) First caudal neural arch, coel on lateral aspect of neural spine
- (189) Caudal transverse processes
- (183) Sacral vertebrae contributing to acetabulum
- (178) Cervical ribs, angle between the capitulum and tuberculum
- (169) Middle and posterior dorsal neural arches, spinodiapophyseal lamina (SPDL) and spinopostzygapophyseal lamina (ISPOL) contact
- (131) Posterior cervical vertebrae, neural spine shape
- (129) Middle and posterior cervical vertebrae, articular surface of zygapophyses
- (117) Cervical centra, small notch in the dorsal margin of the posterior articular surface
- (104) Enamel surface texture
- (99) Teeth, orientation

- (98) Lateral plate
- (93) Coronoid, size
- (92) Splenial posterodorsal process
- (85) Dentary, tuberosity on labial surface near symphysis
- (84) Dentary, cross-sectional shape of symphysis
- (81) Dentary, depth of anterior end of ramus
- (80) Occipital region of skull, shape
- (62) Palatine, lateral ramus shape
- (33) Postorbital, posterior margin articulating with the squamosal
- (6) Maxilla, foramen anterior to the preantorbital fenestra
- (4) Premaxilla, external surface

Shibata, M., Jintasakul, P., Azuma, Y. and You, H.-L., 2015. A new basal hadrosauroid dinosaur from the Lower Cretaceous Khok Kruat Formation in Nakhon Ratchasima Province, Northeastern Thailand.

Species:

Hypselospinus fittoni. *Barilium dawsoni*. *Batyrosaurus rozhdestvenskyi*. *Levnesovia Transoxiana*. *Sirindhorna khoratensis*

Char:

None

Wang, M., Li, D.-Q., O'Connor, J. K., Zhou, Z.-H. and You, H.-L., 2015. Second species of enantiornithine bird from the Lower Cretaceous Changma Basin, northwestern China with implications for the taxonomic diversity of the Changma avifauna.

Species:

CAGS dash IG dash 04 dash CM dash 023. *Dunhuangia cuii*. *Qiliania*. *Baptornis varneri*. *Vegavis*. *Boluochia*. *Vorona*. *Neuquenornis*. *Gansus*. *Enaliornis*. *Fortunguavis*

Char:

223. Proximal end of metatarsus:

208. Fossa for the femoral origin of m. tibialis cranialis.

206. Caudal projection of the lateral border of the distal end of the femur, proximal and contiguous to the ectocondylar tubercle/tibiofibular crest

194. Pubic pedicel:

192. Ischiadic terminal processes forming a symphysis

170. Major digit (II), phalanx 1, internal index process on caudodistal edge

108. Sternum:

102. Costal surface of scapular blade with prominent longitudinal furrow

101. Proximal end of scapula, pit between acromion and humeral articular facet (scapular fossa)

99. Scapula, acromion process:

94. Supracoracoid nerve foramen, location relative to dorsal coracoidal fossa

73. Free caudals, length of transverse processes:

63. Notarium:

48. Teeth.

39. Mandibular symphysis, symphyseal foramen/foramina

38. Mandibular symphysis, symphyseal foramina:

33 Osseous interorbital septum (mesethmoid):

21. Contact between the quadratojugal and squamosal:

15. Contact between vomer and premaxilla

Wang, M., Zheng, X.-T., O'Connor, J. K., Lloyd, G. T., Wang, X.-L., Wang, Y., Zhang, X.-M. and Zhou, Z.-H., 2015. The oldest record of Ornithuromorpha from the Early Cretaceous of China

Species:

Fortunguavis. Qiliansia. Archaeornithura. Parahongshanornis. Boluochia, Concornis. Eoalulavis. Neuquenornis. Vescornis. Vorona. Jianchangornis. Songlingornis. Apsaravis. Enaliornis. Baptornis varneri. Vegavis. Piscivoravis. Patagopteryx. Hesperornis. Parahesperornis. Baptornis advenus.

Char:

241. Digit IV phalanges in distal view, medial trochlear rim enlarged with respect to lateral trochlear rim:

240. Distal end of metatarsal II strongly curved medially:

239. Metatarsal III, trochlea in plantar view, proximal extent of lateral and medial edges of trochlea:

235. Relative position of metatarsal trochleae:

223. Proximal end of metatarsus:

211. Tibiotarsus, proximal articular surface:

210. Round proximal articular surface of tibiotarsus:

208. Fossa for the femoral origin of m. tibialis cranialis

206. Caudal projection of the lateral border of the distal end of the femur, proximal and contiguous to the ectocondylar tubercle/tibiofibular crest

194. Pubic pedicel:

192. Ischiadic terminal processes forming a symphysis

180. Preacetabular process of ilium twice as long as postacetabular process

170. Major digit (II), phalanx 1, internal index process on caudodistal edge.

147. Ulna, dorsal cotyla strongly convex.

146. Ulna, cotylae

108. Sternum:

102. Costal surface of scapular blade with prominent longitudinal furrow:

101. Proximal end of scapula, pit between acromion and humeral articular facet (scapular fossa)

99. Scapula, acromion process: projected cranially surpassing the articular surface for coracoid (facies articularis coracoidea; Baumel and Witmer, 1993)

94. Supraceracoid nerve foramen, location relative to dorsal coracoidal fossa:

91. Broad, deep fossa on the dorsal surface of the coracoid (dorsal coracoidal fossa)

73. Free caudals, length of transverse processes

71. Procoelous caudals

68. Convex caudal articular surface of the synsacrum:

65. Synsacrum, procoelous articulation with last thoracic centrum (deeply concave facet of synsacrum receives convex articulation of last thoracic centrum)

63. Notarium

60. Hypophene-hypantrum accessory intervertebral articulations in the thoracic vertebrae

59. Wide vertebral foramen in the mid-caudal thoracic vertebrae, vertebral foramen/articular cranial surface ratio (vertical diameter) larger than 0.40

53. Postaxial cervical epiphyses

48. Teeth: serrated crowns (0); unserrated crowns (1)

43. Cranial extent of splenial:

39. Mandibular symphysis, symphyseal foramen/foramina

38. Mandibular symphysis, symphyseal foramina

- 35. Dentary tooth implantation
- 33. Osseous interorbital septum (mesethmoid)
- 21. Contact between the quadratojugal and squamosal
- 15. Contact between vomer and premaxilla

Wilson, J. A. and Allain, R., 2015. Osteology of *Rebbachisaurus garasbae* Lavocat, 1954, a diplodocoid (Dinosauria, Sauropoda) from the early Late Cretaceous-aged Kem Kem beds of southeastern Morocco.

Species:

Histriasaurus. *Nopcsaspondylus*. *Rebbachisaurus*. *Demandasaurus*. *Comahuesaurus*.
Rayosaurus. *Supersaurus*. *Amargasaurus*. *Brachytrachelopan*. *Cathartesaura*. *Zapalasaurus*.
Supersaurus. *Australodocus*. *Dinheirosaurus*. *Amazonasaurus*.

Char:

- 167. Femur, pronounced ridge on posterior surface between greater trochanter and head
- 163. Ischium, elongate muscle scar on proximal end

- 156. Iliac preacetabular process, shape

- 150. Humerus of mature specimens, midshaft cross-section, shape

- 149. Scapular acromion length:

- 148. Scapula, fossa associated with the acromial notch

- 123. Anterior caudal neural arches, spinodiapophyseal lamina (spdl):

- 122. Anterior caudal neural arches, postspinal lamina

- 121. Anterior caudal neural arches, prespinal lamina

- 115. Anterior caudal neural spines with triangular lateral processes

- 114. Caudal neural spines, elliptical depression between spinodiapophyseal lamina and postspinal lamina on lateral neural spine:

- 109. Posterior dorsal neural arches, spinoparapophyseal lamina (sppl)

- 107. Posterior dorsal neural arches, centroprezygapophyseal lamina (cprl), shape

- 106. Posterior dorsal vertebrae, parapophysis, position with respect to mid-sagittal plane

- 105. Mid- and posterior dorsal neural arches, prezygoparapophyseal lamina (prpl):

- 101. Mid- and posterior dorsal neural arches, centroprezygapophyseal fossa depth:

- 100. Mid- and posterior dorsal vertebrae, parapophysis, position with respect to

Prezygapophyses

- 93. Dorsal pneumatopores (pleurocoels):
- 84. Mid-cervical neural spines, height:
- 78. Anterior cervical vertebrae, height-to-length ratio
- 74. Cervical vertebrae, pleurocoel complexity
- 70. Presacral bone texture
- 45. Basipterygoid processes, shape
- 41. Supratemporal fenestra, maximum diameter:
- 18. Frontals, midline contact (symphysis):

Xing, L., Miyashita, T., Currie, P. J., You, H. and Dong, Z., 2015. A new basal eusauropod from the Middle Jurassic of Yunnan, China, and faunal compositions and transitions of Asian sauropodomorph dinosaurs.

Species:

Vulcanodon. Haplocanthosaurus. Amargasaurus. Rebbachisaurus. Alamosaurus. Isisaurus. Losillasaurus. Lirainosaurus. Yuanmousaurus. Nebulasaurus. Nigersaurus. Nemegtosaurus. Barosaurus

Char:

- 338. Contribution of supraoccipital to the margin of foramen magnum.
- 336. Frontoparietal fenestra
- 271. Projected line (chord) of long axis of ischium body in articulation with ilium (U259):

230. Cross-sectional shape of humerus at mid-shaft (W162):

223. Ridge on ventral surface of sternal plate (U213):

222. Ratio of maximum length of sternal plate

191. Morphology of distal caudal vertebral bodies (W135):

136. Orientation of spinous processes of cranial thoracic vertebrae (U158):..

134. Morphology of ventral surfaces of cranial thoracic vertebral bodies (U126):

103. Longitudinal grooves on lingual face of tooth (W76):

77. Cross-sectional morphology of basipterygoid processes (U51):

74. Region between basipterygoid processes (W51, U55):

68. Morphology of crista prootica (W45, U49):

51. Orientation of quadrate fossa (W35):

47. Orientation of rostral process of quadratojugal in lateral view (U26):

40. Ratio of maximum diameter of supratemporal fenestra:diameter of foramen magnum(W27, U41, C10, S30)

27. Squamosal (= caudal) process of postorbital (W17):

Xing, L., Miyashita, T., Zhang, J.-P., Li, D.-Q., Ye, Y., Sekiya, T., Wang, F.-P. and Currie, P. J., 2015. A new sauropod dinosaur from the Late Jurassic of China and the diversity, distribution, and relationships of mamenchisaurids.

Species:

Mamenchisaurus constructus. *Mamenchisaurus sinocanadorum*. *Qijianglong*. *Nebulasaurus*. *Spinophorosaurus*. *Atlasaurus*. *Turiasaurus*. *Yuanmousaurus*. *Lirainosaurus*. *Isisaurus*. *Losillasaurus*. *Opisthocoelicaudia*. *Rebbachisaurus*. *Mamenchisaurus anyuensis*. *Omeisaurus maoianus*. *Amargasaurus*. *Haplocanthosaurus*.

Char:

(336) Frontoparietal fenestra

(271) Projected line (chord) of long axis of ischium body in articulation with ilium (U259):

(136) Orientation of spinous processes of cranial thoracic vertebrae (U158):

(89) Size of coronoid (W64):

(47) Orientation of rostral process of quadratojugal in lateral view (U26)

(40) Ratio of maximum diameter of supratemporal fenestra: