

A New Global Palaeobiogeographical Model for the late Mesozoic and early Tertiary

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APPENDIX 1

Semi-strict Supertree of Late Jurassic and Cretaceous Archosaurs

The present cladistic palaeobiogeographical analysis was performed with the information provided by Late Jurassic and Cretaceous archosaurs (i.e. crocodylomorphs, pterosaurs, and dinosaurs). The employment of several independent phylogenies of archosaur lineages would reduce sampling failures and weak phylogenetic signals for certain clades, which are potential causes of artificial results in a TRA (Turner et al. 2009). The phylogenetic evidence provided by Late Jurassic and Cretaceous archosaurs was introduced to this analysis through a semi-strict supertree (Goloboff and Pol 2002) constructed in TNT 1.1 (Goloboff et al. 2008). The topologies recovered by several independent cladistic analyses have been employed in order to perform this supertree (see below). The phylogenetic relationships among the main lineages of Archosauria and Dinosauria were reconstructed according to the analysis of Sereno (1991) and Sereno (1997), respectively. The resulted semi-strict supertree was composed of 557 archosaur taxa (see Appendix 2).

In order to perform the semi-strict supertree the topologies recovered in 33 independent phylogenetic analyses were employed (see below). Some taxonomic units were pruned from selected topologies because of their conflictive phylogenetic position with more comprehensive analyses employed here. A few outgroup taxa were included in the employed topologies in order to link the different phylogenies. Finally, a few biogeographically important taxa were added by hand following strong qualitative statements raised by previous authors based on synapomorphies. The

authors of the phylogenies used here are enumerated and their main ingroups and modifications in their topology are detailed in the following:

(1) Benson et al. (2009): Spinosauroidae and Allosauroidae. The high-level taxonomic unit Abelisauridae was replaced by *Carnotaurus* and the strict reduced consensus of the analysis of these authors was employed. The Majiacum spinosaurid was included within a polytomy at the base of Spinosauridae following Hone et al. (2010). The purported spinosaurid shed teeth from the Late Jurassic of Tendaguru (Tanzania) (Buffetaut 2008) were not included in our analyses because they could belong to the anterior teeth of a *Ceratosaurus*-like animal (cf. Fowler 2007). *Concavenator* was added within a polytomy at the base of Carcharodontosauria (Neovenatoridae + Carcharodontosauridae; Benson et al. (2009)) following Ortega et al. (2010). The sauropodomorphs *Plateosaurus* and *Jobaria* were included as outgroups.

(2) Bonaparte et al. (2006): Titanosauriformes: *Vulcanodon*, *Ligabuesaurus*, and *Phuwiangosaurus* were pruned from the original topology because of their conflictive position with respect to other titanosauriform phylogenies employed here.

(3) Brochu (2006): Eusuchia. The high-level taxonomic units Alligatoroidea and Crocodylinae were replaced by *Alligator* and *Crocodylus porosus*, respectively. In the case of the genus *Crocodylus*, all monospecific terminals were merged into *Crocodylus porosus*.

(4) Brusatte et al. (2010): Tyrannosauroidae.

(5) Butler et al. (2010): Ornithischia. The high-level taxonomic units Rhabdodontidae, Dryosauridae, Coronosauria/Leptoceratopsidae, Ankylopollexia, Psittacosauridae, Stegosauria, Ankylosauria, and Pachycephalosauridae were replaced by *Zalmoxes*, *Dryosaurus*, *Triceratops*, *Iguanodon*, *Psittacosaurus mongoliensis*, *Stegosaurus armatus*, *Ankylosaurus*, and *Pachycephalosaurus*, respectively. *Stenopelix* was re-positioned within a polytomy at the base of Marginocephalia due to the equivocal position of this taxon following Butler and Sullivan (2009).

(6) Calvo et al. (2007): Euiguanodontia. *Scutellosaurus* and *Heterodontosaurus* were pruned because their conflictive position with the more comprehensive analysis of Butler et al. (2010). The high-level taxonomic unit Marginocephalia was replaced by *Triceratops*.

(7) Canale et al. (2009): Abelisauroidea. The high-level taxonomic units Coelophysoidea, Carcharodontosauridae, and Spinosauroidea were replaced by “*Syntarsus*”, *Carcharodontosaurus*, and *Spinosaurus*, respectively. An isolated tibia from the Maastrichtian of France (Allain and Pereda-Suberbiola 2003) was included into a polytomy at the base of Carnotaurinae because of the presence of a hatched-shaped cnemial crest on the proximal end of tibia, character considered as a synapomorphy of this abelisaurid clade (Canale et al. 2009; Ezcurra et al. 2010a). The Aussie abelosauroid (= Aussie *Allosaurus*) was included in a polytomy at the base of Abelisauroidea following the paper of Agnolin et al. (2010). La Paloma abelisaurid was included into a polytomy at the base of Abelisauridae following Rauhut et al. (2003). *Genusaurus* was added as a Carnotaurini because of the presence of a hatched-shaped cnemial crest on the proximal end of tibia (Juarez-Valieri et al. 2007), character considered as a synapomorphy of this abelisaurid clade (Canale et al. 2009; Ezcurra et al. 2010a). *Diplodocus* was added as outgroup.

(8) Carballido et al. (2010): Diplodocoidea.

(9) Carballido et al. (in press): Titanosauriformes. The La Paloma titanosaur was added within a polytomy at the base of Titanosauria following Rauhut et al. (2003).

(10) Company et al. (2005): Notosuchia. The Thalattosuchia, some eusuchians and non-mesoeucrocodylians were pruned from the original topology because of their conflictive position with respect to other more comprehensive crocodylomorph phylogenies employed here. Accordingly, *Gobiosuchus* and *Lomasuchus* remain as successive sister-taxa of Notosuchia.

(11) Cruzado-Caballero et al. (2010): Hadrosauroidea. The hadrosaurine taxa and *Amurosaurus* were pruned from the original topology because of their conflictive position with respect to other more comprehensive hadrosauroid phylogenies employed here.

(12) Curry-Rogers (2005): Titanosauriformes. The saltasaurine and nemegtosaurid region of the strict-consensus tree of this study was used in order to ensemble the semi-strict supertree. The other taxa of this study were pruned because of the massive polytomy present in the strict-consensus tree. *Jainosaurus* was added as the sister-taxon of the Malagasy Taxon B following Wilson et al. (2009).

(13) Dalla Vecchia (2009): Hadrosauroidea. *Prosaurolophus* spp. was replaced by *Prosaurolophus maximus*. The lambeosaurine taxa, *Taninus*, *Eolambia*, *Jinzhousaurus*, *Probactrosaurus*, and *Equijubus* were pruned from the original topology because of their conflictive position with respect to other hadrosauroid phylogenies employed here. The Mulichinco hadrosauroid was added within a polytomy at the base of Hadrosauroidea following Coria et al. (2010). *Zalmoxes* was added as outgroup.

(14) Delfino et al. (2008): Neosuchia. The high-level taxonomic units Crocodyloidea, Alligatorioidea, and Gavialoidea were replaced by *Crocodylus porosus*, *Alligator*, and *Gavialis*, respectively.

(15) Fiorelli and Calvo (2007): Crocodylomorpha. *Orthosuchus*, the Fruita Form, and all the mesoeucrocodylian were pruned from the semi-strict tree of this study because of their conflictive position with more up-dated phylogenies of the group (i.e. Pol et al. 2009).

(16) Hocknull et al. (2009): Titanosauriformes. The non-titanosaurian titanosauriforms were pruned from the topology of the strict consensus of this study because of their conflictive position with more up-dated phylogenies of the group (i.e. Carballido et al. (in press)).

(17) Hu et al. (2009): Coelurosauria.

(18) Ksepka and Norell (2010): Eusauropoda.

(19) Longrich and Currie (2009): Alvarezsaurioidea. *Falcarius* and *Avimimus* were included as successive outgroups and *Haplocheirus* was added as the most basal alvarezsaurid following Choiniere et al. (2010). *Heptasteornis* was included within a polytomy at the base of Mononykinae following Naish and Dyke (2004).

(20) Mateus et al. (2009): Stegosauria. The La Amarga stegosaurian was added within a polytomy at the base of Stegosauria following Bonaparte (1996).

(21) Maryanska et al. (2004): Pachycephalosauria. The high-level taxonomic units Ceratopsia and Ornithopoda were replaced by *Triceratops* and *Hypsilophodon*, respectively.

(22) Norman (2004): Iguanodontia. The species *Iguanodon atherfieldensis* was replaced by the genus *Mantellisaurus* following Paul (2008). *Valdosaurus* and *Kangnasaurus* were included into a polytomy within Dyrosauridae together with *Dryosaurus* following Ruiz-Omeñaca et al. (2007).

(23) Novas et al. (2009): Coelurosauria. The non-unenlagiine taxa were pruned from the topology recovered in this analysis.

(24) Osi and Makadi (2009): Ankylosauria. *Cedarpetta* was added within a polytomy at the base of Ankylosauria following Vickarious et al. (2004). *Huayangosaurus* was replaced by *Stegosaurus armatus*.

(25) Pol et al. (2009): Crocodylomorpha. The high-level taxonomic unit Metriorhynchidae was replaced by *Metriorhynchus superciliosus*. *Pabweshi* was added within a polytomy at the base of Baurusuchidae following Wilson et al. (2001). The single taxonomic unit *Sarcosuchus* was decoupled into the two sister-species *Sarcosuchus imperator* and *Sarcosuchus hartti* following Buffetaut and Taquet (1977).

(26) Prieto-Marquez and Norell (2010): Hadrosauroidea.

(27) Rose (2007): Titanosauriformes. The high-level taxonomic unit Theropoda was replaced by *Allosaurus*.

(28) Royo-Torres et al. (2006): Eusauropoda. The strict-consensus tree of this study was employed to resolve the phylogenetic intrarrelationships within Turiasauria and all other terminals were pruned because of their conflictive position with respect to other eusauropod phylogenies employed here. *Tehuelchesaurus* was included as outgroup for the Turiasauria clade following the study of Carvallido et al. (in press).

(29) Sereno and Larsson (2009): Crocodylomorpha. The strict-consensus of this study was employed only for the neosuchian region of the tree and some goniopholids were pruned. Non-neosuchian taxa and some goniopholids were not included because of their conflictive phylogenetic position with the results of Pol et al. (2009), which resulted in a massive polytomy within Mesoeucrocodylia in the semi-strict supertree. The genus *Sarcosuchus* was replaced by *Sarcosuchus imperator*.

(30) Sues and Averianov (2009): Ceratopsia. *Stegoceras* was replaced by *Stegoceras edmontoni*.

(31) Wang et al. (2009): Pterosauria. *Mythunga* was included within a polytomy at the base of Anhangueridae following Kellner et al. (2010). *Ornithosuchus* was replaced by *Gracilisuchus* and *Protosuchus* in order to depict a monophyletic Pseudosuchia. The polytomy at the base of Ornithodira among *Herrerasaurus*, *Scleromochlus*, and Pterosauria was resolved nesting *Scleromochlus* as the sister-taxon of Pterosauria following Ezcurra et al. (2010b). Additionally, *Allosaurus* was included as the sister-taxon of *Herrerasaurus* and *Marasuchus* as the sister-taxon of the latter clade, constituting as a whole a outgroup of Pterosauria.

(32) Wilson et al. (2003): Ceratosauria. The non-ceratosaurian taxa were pruned because of their conflictive phylogenetic position with other theropod phylogenies employed here. *Velocisaurus* was added within Noosauridae following Carrano and Sampson (2008).

(33) Xu et al. (2010): Ceratopsia. *Ajkaceratops* was included into a polytomy together with *Bagaceratops* and *Protoceratops* following the statement of Osi et al. (2010): “these similarities suggest that *Ajkaceratops* is a coronosaurian, close to bagaceratopsids and basal to the *Zuniceratops*/Ceratopsidae clade.” *Psittacosaurus major* was included within the genus *Psittacosaurus* following Sereno et al. (2007).

Programs employed to perform TRA analyses (COMPONENT 2.0 and TreeMap 1.0; Page 1993, 1995) cannot deal with polytomized phylogenetic trees and data-sets larger than 100 taxa because of software constraints. Thus, the following pruning criteria for polytomized nodes and merging of taxa with redundant geographic distribution were applied for the semi-strict supertree:

Late Jurassic.—(Fig. S1) (1) *Tuojiangosaurus* was chosen from the polytomy at the base of Stegosauria. (2) *Pterodactylus* was considered as a monospecific terminal in order to resolve the polytomy with the species of *Germanodactylus*. (3) *Haplocanthosaurus* was pruned in order to include Diplodocoidea. (4) *Theriosuchus* (EU) and *Goniopholis stovalli* (NA) were pruned in order to include *Alligatorium* (EU) and *Sunosuchus* (AS).

Berriasian-Hauterivian.—(Fig. S2) (1) *Jobaria* was used instead of *Histriasaurus* because of the geographic distribution of the latter is redundant with that of Turiasauria. (2) *Theriosuchus* (EU and AS) was chosen instead of *Bernissartia* (EU) and *Alligatorium* (EU) because of its wider distribution.

Barremian.—(Fig. S3) (1) *Theriosuchus* (EU and AS) was chosen instead of *Bernissartia* (EU) and *Alligatorium* (EU) because of its wider distribution.

Aptian-Albian.—(Fig. S4) (1) *Erketu*, *Qiawanlong*, *Phuwiangosaurus*, *Paluxysaurus*, and *Abydosaurus* were pruned in order to include *Wintonotitan* and *Chubutisaurus*. (2) *Protoarchaeopteryx* was pruned because its temporal and geographic distribution is redundant with that of *Incisivosaurus*. (3) *Genusaurus* was pruned in order to include the Aussie abelisauroid and *Ligabueino*. (4) *Jinzhouosaurus*, *Penelopognathus*, *Equijubus*, *Probactrosaurus*, *Eolambia*, and *Altirhinus* were pruned in order to include *Ouranosaurus*. (5) Both species of *Tenontosaurus* were pruned in order to include *Muttaborrasaurus*. (6) *Psittacosaurus major* was not included in order to

incorporate the other species of the genus to the time-sliced tree. (7) *Phobator* was excluded instead of *Noripterus*. (8) *Rugosuchus* was pruned instead of *Susisuchus*. (9) *Theriosuchus*, *Pachycheilosuchus*, and *Goniopholis simus* were not included instead of *Bernissartia* and the Glen Rose Form.

Cenomanian-Santonian.—(Fig. S5) (1) *Alvarezsaurus* was chosen instead of *Achillesaurus*. (2) *Nothronychus* was chosen instead of *Erliansaurus* because of the North American distribution of the former. (3) *Giganotosaurus* was chosen instead of *Mapusaurus*. (4) *Epachtosaurus* was chosen instead of *Neuquensaurus* and *Gondwanatitan*. (5) *Mendozasaurus* was chosen instead of *Futalognkosaurus*. (6) *Eolambia* was chosen instead of *Protohadros*. (7) *Lophorothon* was chosen instead of *Bactrosaurus* due to its North American distribution because we have *Gilmoresaurus*, *Shuangmiaosaurus*, and *Aralosaurus* from Asia. (8) *Isisfordia* was pruned from this time-sliced tree because was the only Australasian taxa included in our analysis of Cenomanian-Santonian age.

Campanian-Maastrichtian.—(Fig. S6) (1) The Saltosaurinae was included instead of *Isisaurus*, *Aeolosaurus*, *Alamosaurus*, *Opisthocoelicaudia*, and *Pellegrinisaurus*. (2) *Chirostenotes* was chosen instead of *Hagryphus*. (3) *Caenagnathus* was chosen instead of *Avimimus*. (4) All the Asiatic oviraptorosaurian were merged into a single terminal between *Caenagnathus* and *Chirostenotes*. (5) The Mononykinae and *Albertonykus* were fused into a single North American-Asiatic terminal. (6) *Nanshiungosaurus* and *Therizinosaurus* were merged into the single terminal Therizinosauridae. (7) *Tyrannosaurus*, *Daspletosaurus*, and the Utah were fused in the terminal “North American derived tyrannosaurids.” (8) *Gorgosaurus*, *Albertosaurus*, *Biestahievorsor*, and *Applachiosaurus* were merged into the single terminal “North American basal tyrannosaurids.” (9) *Aucasaurus* and *Carnotaurus* were fused within Carnotaurini. (10) *Velafrons* and *Amurosaurus* were pruned in order to include *Nipponosaurus* and *Hypacrosaurus altispinus*. (11) *Corythosaurus* spp. and *Hypacrosaurus stebingeri* were fused into a single terminal. (12) *Jaxartosaurus* was

pruned in order to include *Pararhabdodon* and *Tsintaosaurus*. (13) *Kritosaurus* was pruned in order to include the only known South American hadrosaurid *Secernosaurus*. (14) *Lophorhothon* and *Tethyshadros* were pruned in order to include *Telmatosaurus*. (15) *Talenkauen* and *Zalmoxes* were pruned in order to include the *Gasparinisaura* + *Parksosaurus* clade. (16) *Triceratops* was fused with *Centrosaurus* into a single terminal. (17) *Bagaceratops* and *Protoceratops* were merged within a single terminal. (18) *Zhuchengceratops* was pruned in order to include *Leptoceratops* and *Udanoceratops*. (19) Within the terminal “North American Leptoceratopsidae” were included *Leptoceratops*, *Prenoceratops*, *Montanoceratops*, and *Cerasinops*. (20) *Wannanosaurus*, *Goyocephale* and *Homalocephale* were fused within the single terminal “Asian basal pachycephalosaurians.” (21) *Tylocephale* was pruned in order to include *Pachycephalosaurus* and *Prenocephale*. (22) The terminal “North American derived pachycephalosaurians” was created to include *Pachycephalosaurus*, *Stegoceras*, *Ornathotolus*, and *Stygimoloch*. (23) *Brachyuranochampsia*, *Eutretauranosuchus*, *Thoracosaurus*, *Leidyosuchus*, *Borealosuchus*, and *Prodiplocynodon* were merged within Crocodylia. (24) *Gobiosuchus* and *Zaarasuchus* were merged within the single terminal Gobiosuchidae.

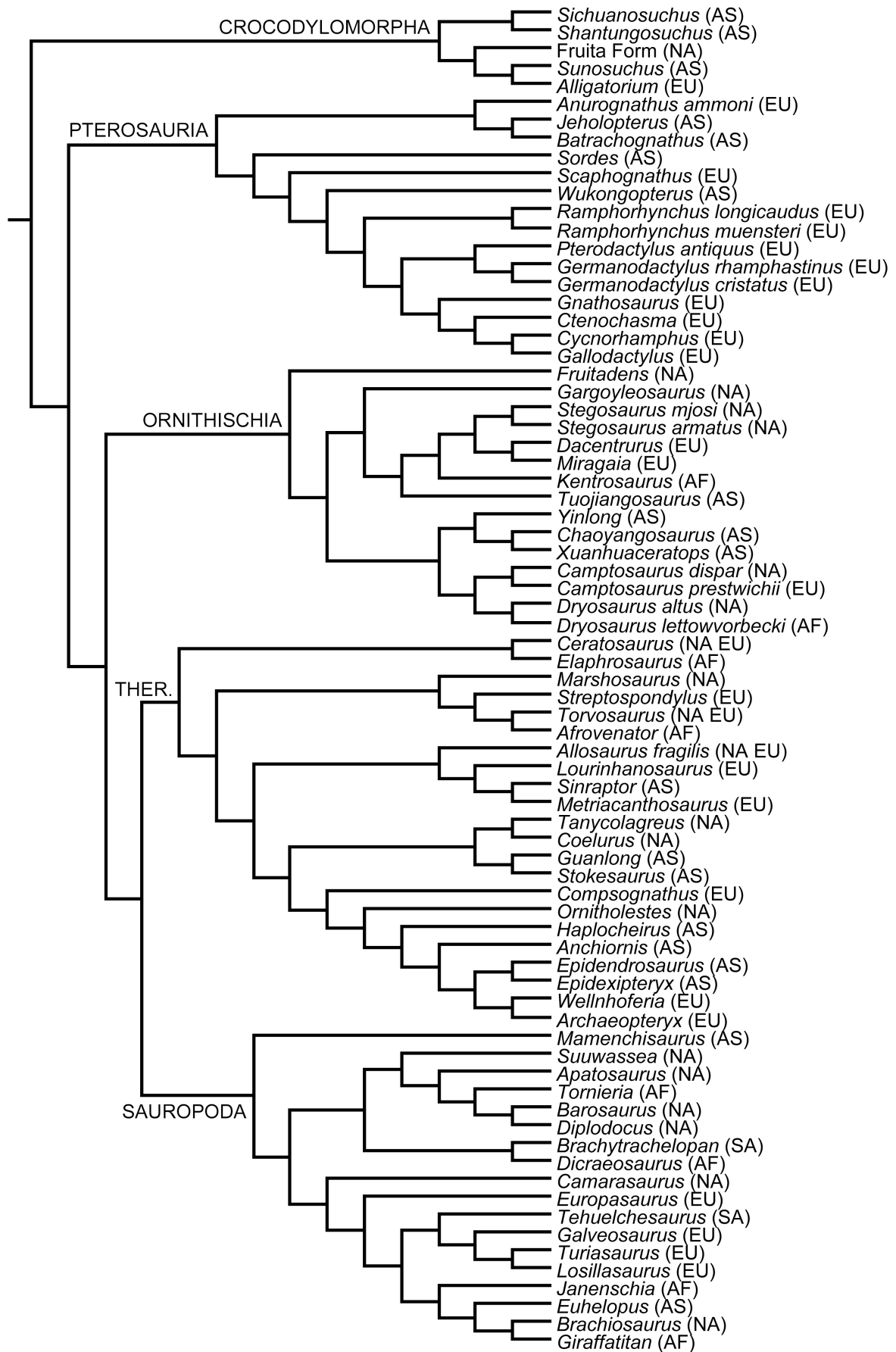


FIGURE S1. Late Jurassic time-slice cladogram (75 taxa). Abbreviations: AF, Africa; AS, Asia; EU, Europe; NA, North America; SA, South America; THER, Theropoda.

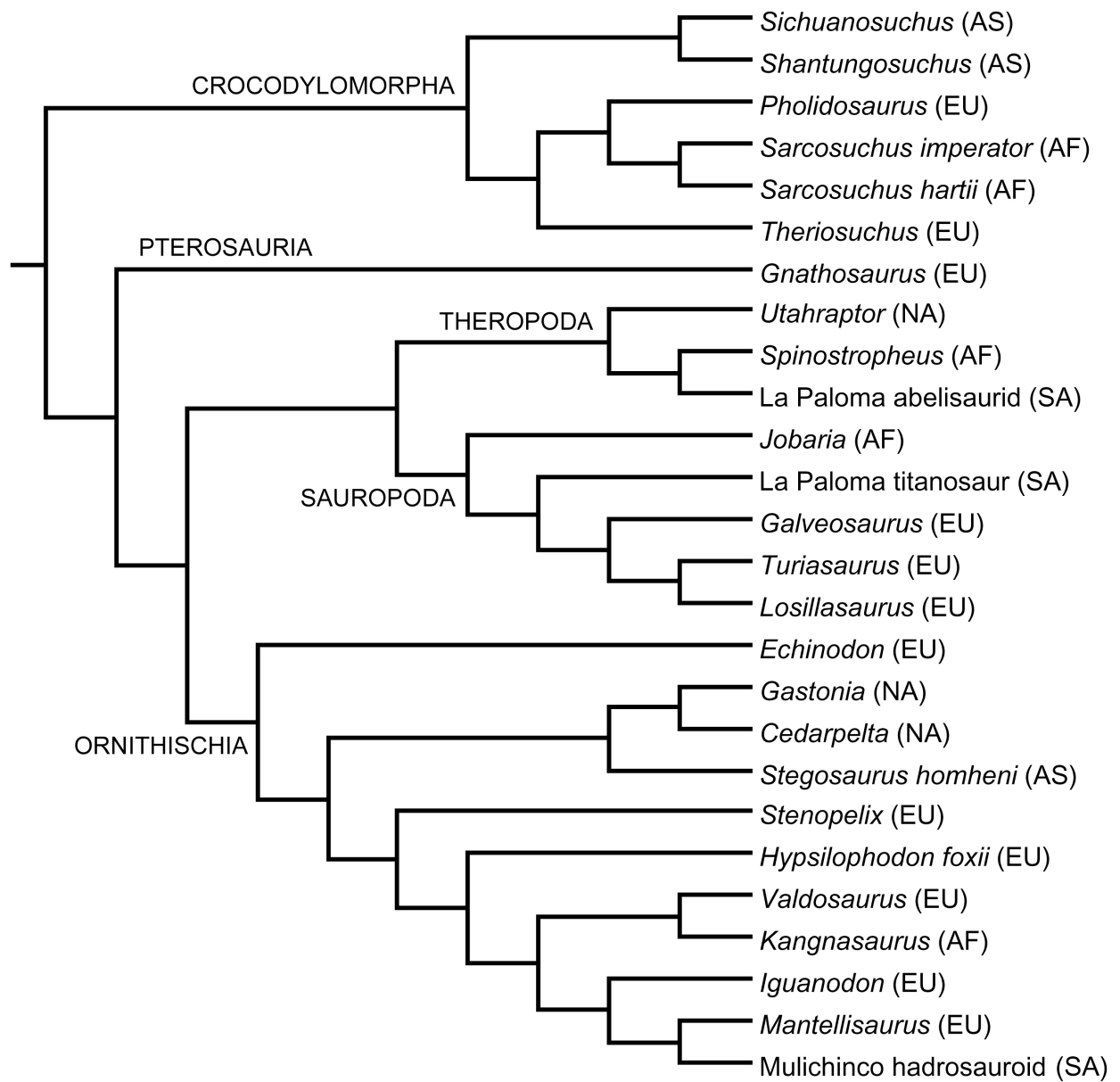


FIGURE S2. Berriasian-Hauterivian time-slice cladogram (26 taxa). Abbreviations: AF, Africa; AS, Asia; EU, Europe; NA, North America; SA, South America; THR, Theropoda.

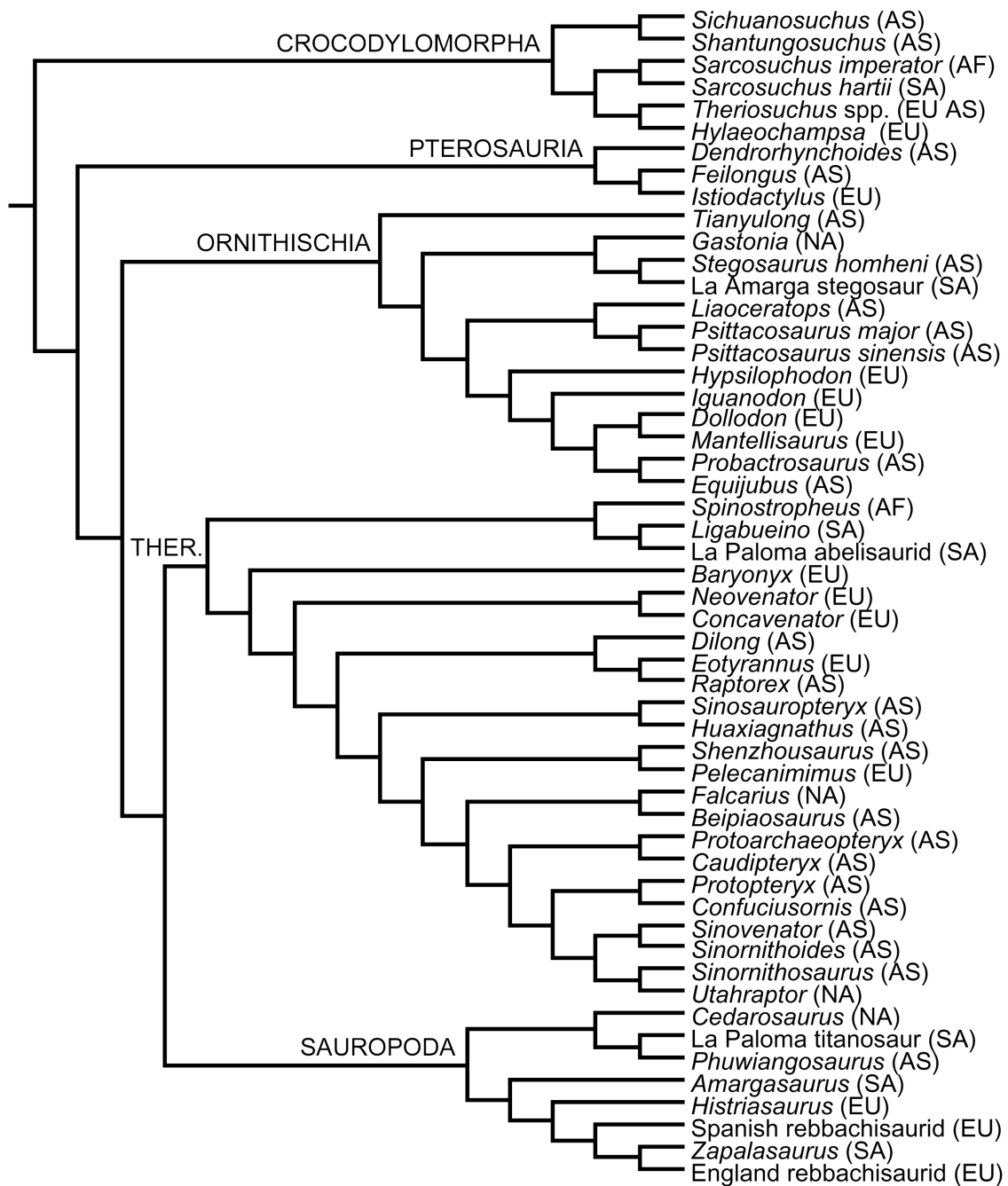


FIGURE S3. Barremian time-slice cladogram (53 taxa). Abbreviations: AF, Africa; AS, Asia; EU, Europe; NA, North America; SA, South America; THER, Theropoda.

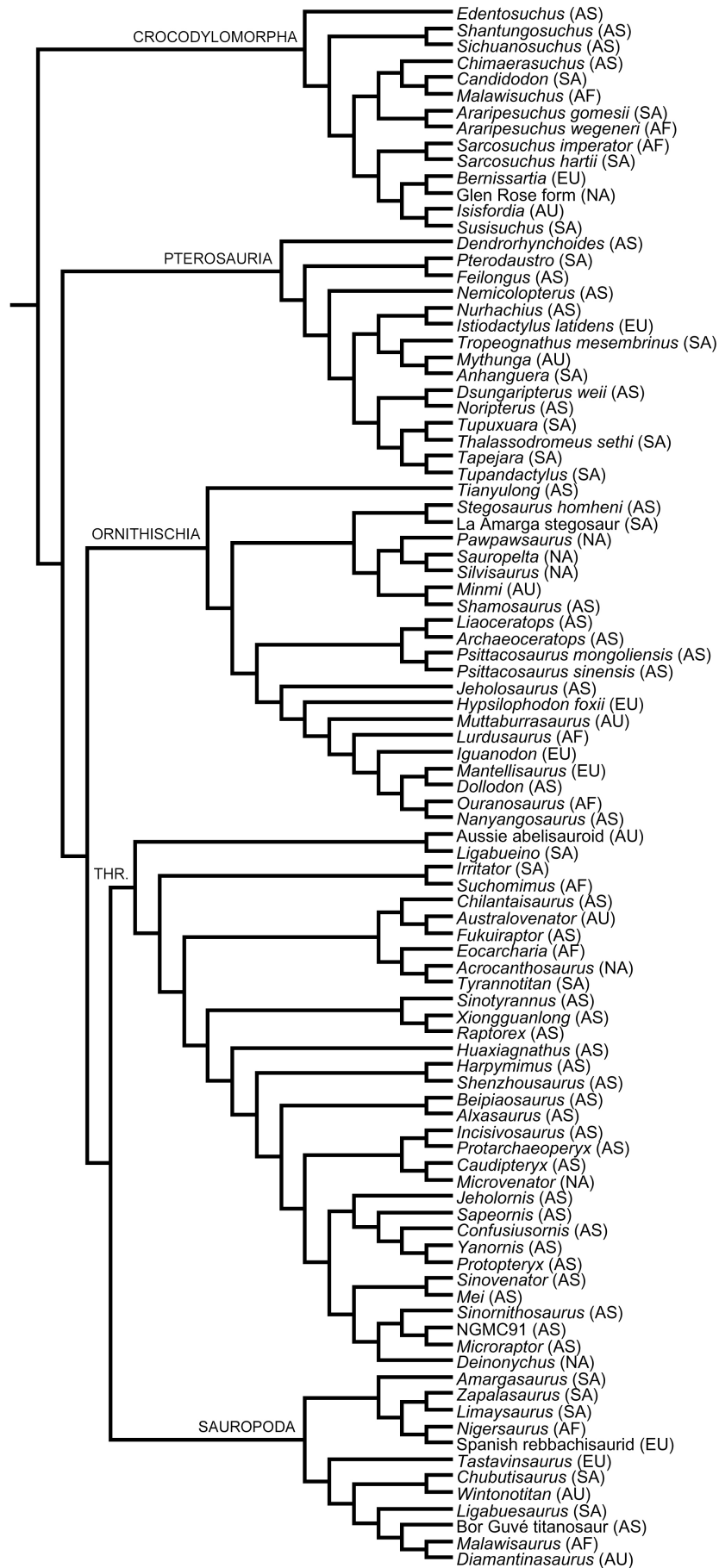


FIGURE S4. Aptian-Albian time-slice cladogram (95 taxa). Abbreviations: AF, Africa; AS, Asia; AU, Australasia; EU, Europe; NA, North America; SA, South America; THR, Theropoda.

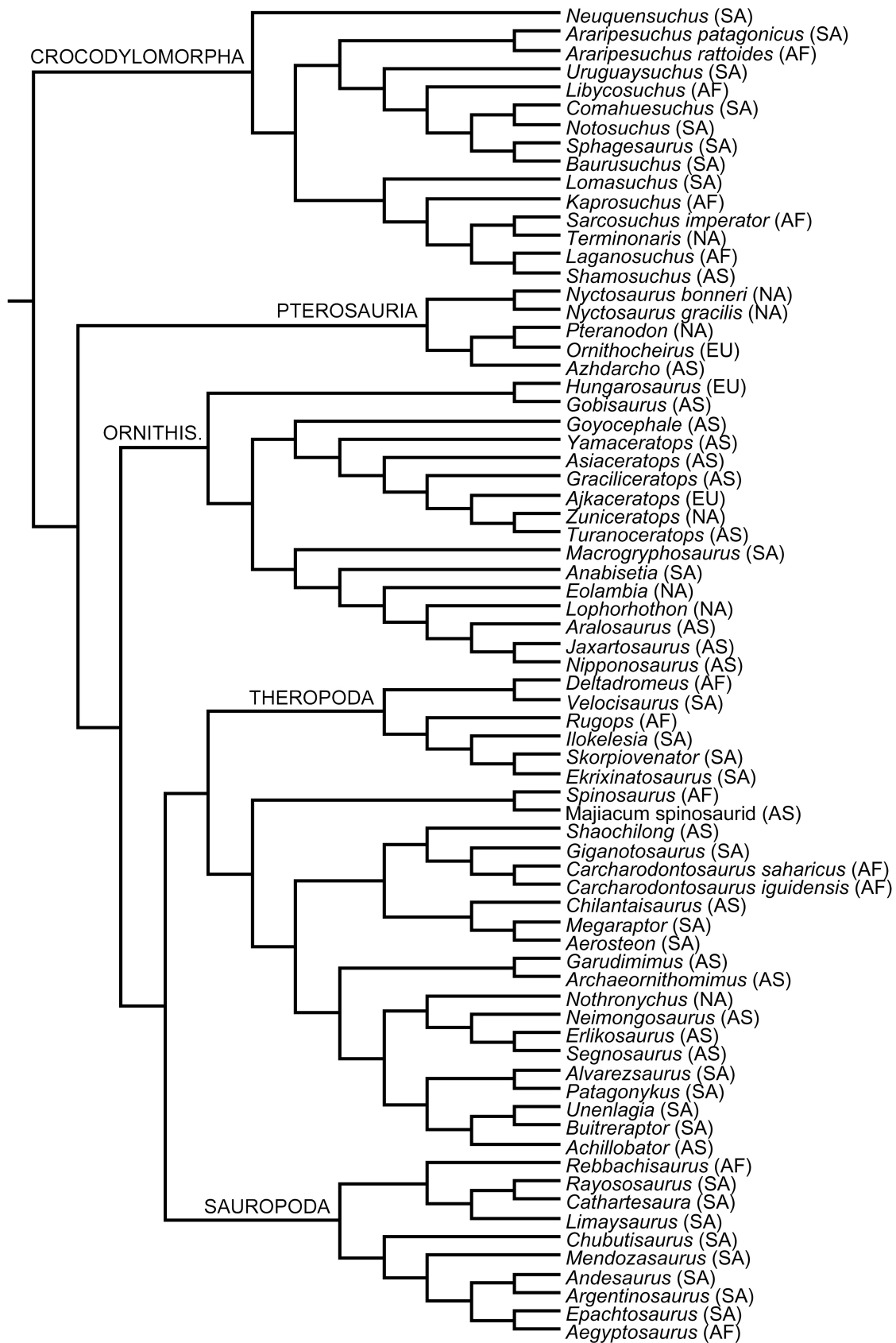


FIGURE S5. Cenomanian-Santonian time-slice cladogram (73 taxa). Abbreviations: AF, Africa; AS, Asia; EU, Europe; NA, North America; ORNITHIS, Ornithischia; SA, South America.

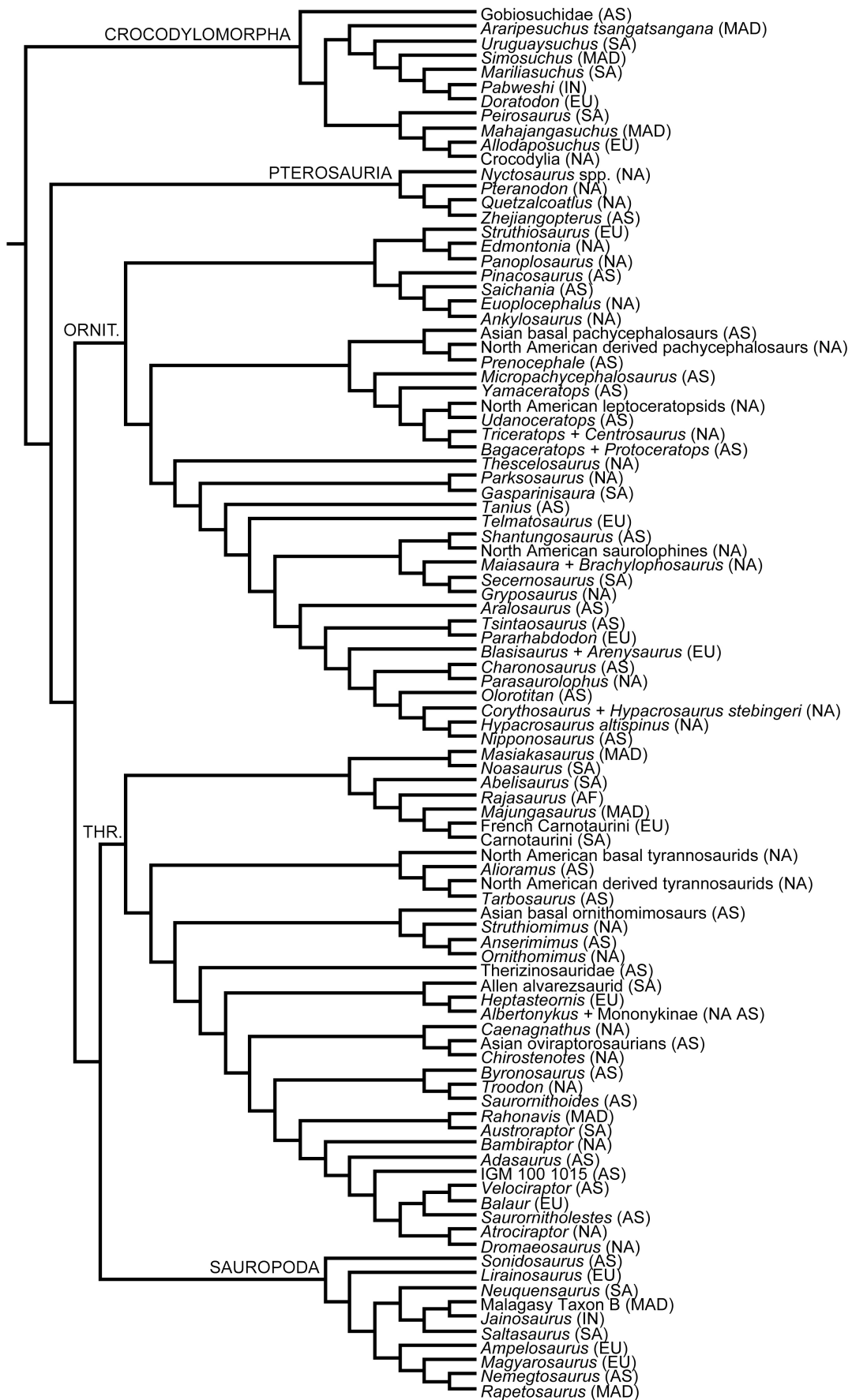


FIGURE S6. Campanian-Maastrichtian time-slice cladogram (96 taxa). Abbreviations: AF, Africa; AS, Asia; EU, Europe; IN, India; MAD, Madagascar; NA, North America; ORNIT, Ornithischia; SA, South America; THR, Theropoda.

Geographic and Temporal Distribution of the Archosaur Genera and Species used at each Time-slice

Abbreviations: AS, Asia; AU, Australasia; EU, Europe; IN, India; MAD, Madagascar; NA, North America; PBDB, The Paleobiology Database; SA, South America.

Crocodylomorpha

Alligatorium: EU (Late Jurassic) Martin et al. (2010)

Allodaposuchus: EU (late Campanian-early Maastrichtian) PBDB

Araripesuchus buitreiraensis: SA (Cenomanian) Makovicky et al. (2005)

Araripesuchus gomesii: SA (Albian) PBDB: entry for Romualdo Formation

Araripesuchus patagonicus: SA (Cenomanian) Leanza et al. (2004)

Araripesuchus tsangatsangana: MAD (Maastrichtian) PBDB: entry for *Masiakasaurus*

Araripesuchus wegneri: AF (Aptian-Albian) PBDB

Baurusuchus pachecoi: SA (Turonian-Santonian) PBDB

Bernissartia: EU (Berriasian-early Aptian) PBDB

Borealosuchus: NA (Campanian-Maastrichtian) PBDB

Brachyuranochampsia: NA (late Campanian) PBDB

Candidodon: SA (Aptian-Albian) Carvalho and Campos (1988)

Chimaerasuchus: AS (Aptian-Albian) PBDB

Comahuesuchus: SA (Santonian) PBDB

Diplocynodon sp.: specimens from the latest Cretaceous of NA were not included PBDB

Doratodon: EU (early Campanian) PBDB

Edentosuchus: AS (late Aptian-Albian) PBDB

Eothenacosaurus: NA (Maastrichtian) Brochu (2004)

Eutretauranosuchus: NA (Late Jurassic) PBDB

Fruita Form: NA (Late Jurassic) PBDB (Fruita)

Glen Rose Form: NA (Albian) Rogers (2003)

Gobiosuchus: AS (Campanian) Martin et al. (2010)

Goniopholis simus: EU (late Barremian-early Aptian) PBDB: entry for Bernissart locality

Goniopholis stovalli: NA (Late Jurassic) PBDB

Hylaeochampsia: EU (Barremian) Clark and Norell (1992)

Isisfordia: AU (late Albian-early Cenomanian) PBDB

Kaprosuchus: AF (Cenomanian) PBDB

Laganosuchus: AF (Cenomanian) PBDB

Leidyosuchus: NA (Campanian) PBDB

Libycosuchus: AF (late Coniacian-Santonian) PBDB

Lomasuchus: SA (Santonian) PBDB (entry for Bajo de la Carpa Formation)

Mahajangasuchus: MAD (Maastrichtian) PBDB

Malawisuchus: AF (Aptian) Martin et al. (2010)

Mariliasuchus: SA (Campanian-Maastrichtian) Carvalho and Bertini (1999)

Neuquensuchus: SA (Santonian) PBDB

Notosuchus: SA (Santonian) PBDB

Pabweshi: IN (Maastrichtian) Wilson et al. (2001)

Pachycheilosuchus: NA (early Albian) PBDB

Peirosaurus: SA (late Maastrichtian) PBDB

Pholidosaurus: EU (Berriasian) PBDB

Prodiplocynodon: NA (Maastrichtian) PBDB

Rugosuchus: AS (Aptian-Albian) Wu et al. (2001)

Sarcosuchus imperator: AF (early Berriasian-early Cenomanian) PBDB

Sarcosuchus hartti: SA (Early Cretaceous) Buffetaut and Taquet (1977)

Shamosuchus: AS (Turoanian-Santonian) PBDB

Shantungosuchus: AS (Valanginian-Albian) PBDB

Sichuanosuchus: AS (Late Jurassic-Early Cretaceous) Wu et al. (1997)

Simosuchus: MAD (Maastrichtian) PBDB

Sphagesaurus: SA (Turonian-Santonian) PBDB

Sunosuchus: AS (Late Jurassic) PBDB

Susisuchus: SA (Aptian) Salisbury et al. (2003)

Terminonaris: NA (Cenomanian-Turonian) Martin et al. (2010)

Theriosuchus: EU (Late Jurassic and Maastrichtian) PBDB, Martin et al. (2010); AS (Barremian-Aptian) PBDB

Thoracosaurus neocesariensis: NA (Campanian-Maastrichtian) PBDB

Uruguaysuchus: SA (Santonian-Campanian) PBDB

Zaraasuchus: AS (Campanian) Martin et al. (2010)

Pterosauria

Anhanguera: SA (early Albian) PBDB

Anurognathus: EU (Late Jurassic) PBDB

Azhdarcho: AS (Turonian) PBDB

Batrachognathus: AS (Late Jurassic) PBDB

Ctenochasma: EU (Late Jurassic) PBDB

Cycnorhamphus: EU (Late Jurassic) PBDB

Dendrorhynchoides: AS (Barremian-early Aptian) PBDB

Dsungaripterus: AS (Aptian-Albian) PBDB

Feilongus: AS (Barremian-early Aptian) PBDB

Gallodactylus: EU (Late Jurassic) (Bennett 1996)

Germanodactylus cristatus: EU (Late Jurassic) PBDB

Germanodactylus rhamphastinus: EU (Late Jurassic) PBDB

Gnathosaurus: EU (Late Jurassic-Berriasian) PBDB

Istiodactylus: EU (late Barremian-early Aptian) PBDB

Jeholopterus: AS (Late Jurassic) He et al. (2004)

Mythunga: AU (middle-late Albian) PBDB

Nemicolopterus: AS (Aptian) Wang et al. (2008)

Noriopterus: AS (Aptian-Albian) PBDB

Nurhachius: AS (Aptian) PBDB

Nyctosaurus bonneri: NA (late Santonian-early Campanian) PBDB

Nyctosaurus gracilis: NA (late Santonian-early Campanian) PBDB

Ornithocheirus: EU (early Cenomanian-early Campanian) PBDB

Phobetor: AS (Aptian-Albian) PBDB

Pteranodon: NA (Coniacian-Campanian) PBDB (record from Japan not included)

Pterodactylus antiquus: EU (Late Jurassic) PBDB

Pterodactylus kochi: EU (Late Jurassic) PBDB

Pterodaustro: SA (Albian) PBDB

Quetzalcoatlus: NA (Maastrichtian) PBDB

Rhamphorhynchus longicaudus: EU (Late Jurassic) PBDB

Rhamphorhynchus muensteri: EU (Late Jurassic) PBDB

Scaphognathus: EU (Late Jurassic) PBDB

Sordes: AS (Late Jurassic) PBDB

Tapejara: SA (Aptian-Albian) PBDB

Thalassodromeus: SA (early Albian) PBDB

Tropeognathus: SA (Aptian) PBDB

Tupandactylus: SA (Aptian-Albian) Campos and Kellner (1997)

Tupuxuara: SA (early Albian) PBDB

Wukongopterus: AS (Late Jurassic) PBDB

Zhejiangopterus: AS (early Campanian) PBDB

Ornithischia

Ajkaceratops: EU (Santonian) Osi et al. (2010)

Altirhinus: AS (Albian) PBDB

Amurosauros: AS (Maastrichtian) PBDB

Anabisetia: SA (Cenomanian-Turonian) PBDB

Ankylosaurus: NA (Maastrichtian) PBDB

Aralosaurus: AS (Santonian-Campanian) PBDB

Archaeoceratops: AS (Aptian-Albian) You et al. (2010); PBDB

Arenysaurus: EU (Maastrichtian) PBDB

Asiaceratops: AS (early Cenomanian) PBDB

Bactrosaurus: AS (Turonian-Santonian) PBDB

Bagaceratops: AS (Campanian) PBDB

Blasisaurus: EU (Maastrichtian) Cruzado-Caballero et al. (2010)

Brachylophosaurus: NA (Campanian) PBDB

Camptosaurus dispar: NA (Late Jurassic) PBDB

Camptosaurus prestwichii: EU (Late Jurassic) PBDB

Cedarpetta: NA (Berriasian-Hauterivian) Vickarious et al. (2004)

Centrosaurus: NA (Campanian) PBDB

Cerasinops: NA (Campanian) PBDB

Chaoyangosaurus: AS (Late Jurassic) Zhao et al. (1999)

Charonosaurus: AS (Maastrichtian) PBDB

Corythosaurus: NA (Campanian) PBDB

Dollodon: EU (Barremian-early Aptian) PBDB

Chungkingosaurus: AS (Late Jurassic) Mateus et al. (2009)

Dacentrurus: EU (Late Jurassic) Mateus et al. (2009)

Dryosaurus altus: NA (Late Jurassic) PBDB

Dryosaurus lettowvorbecki: AF (Late Jurassic) PBDB

Echinodon: EU (Berriasian) PBDB

Edmontonia: NA (Campanian-Maastrichtian) PBDB

Edmontosaurus: NA (Campanian-Maastrichtian) PBDB

Eolambia: NA (late Albian-early Cenomanian) PBDB

Equijubus: AS (Barremian-Aptian) PBDB

Euoplocephalus: NA (Campanian-Maastrichtian) PBDB

Gargoyleosaurus: NA (Late Jurassic) PBDB

Gasparinisaura: SA (Campanian) PBDB

Gastonia: NA (Berresian-Barremian) Vickaryous et al. (2004); PBDB

Gigantspinosauros: AS (Late Jurassic) Mateus et al. (2009)

Gilmoreosaurus: AS (Turonian-Santonian) PBDB

Gobisaurus: AS (Turonian) PBDB

Goyocephale: AS (Santonian-Maastrichtian) PBDB

Graciliceratops: AS (Cenomanian-Santonian) PBDB

Gryposaurus: NA (Campanian) PBDB

Homalocephale: AS (Campanian-Maastrichtian) PBDB

Hungarosaurus: EU (Santonian) PBDB

Hypacrosaurus altispinus: NA (Campanian-Maastrichtian) PBDB

Hypacrosaurus stebingeri: NA (Campanian) PBDB

Hypsilophodon: EU (late Hauterivian-Aptian) PBDB

Iguanodon: EU (Valanginian-Aptian) PBDB

Jaxartosaurus: AS (Coniacian-Santonian) PBDB

Jeholosaurus: AS (early Aptian) PBDB

Jinzhouosaurus: AS (Aptian) Zhou (2006)

Kangnasaurus: AF (Berriasian-Hauterivian) Goodwin et al. (1999)

Kentrosaurus: AF (Late Jurassic) Mateus et al. (2009)

Kritosaurus: NA (Campanian) PBDB

La Amarga stegosaur: SA (Barremian-early Aptian) Novas (2009)

Lambeosaurus: NA (Campanian) PBDB

Lophorhodon: NA (Campanian) PBDB

Leptoceratops: NA (Campanian-Maastrichtian) PBDB

Liaoceratops: AS (Barremian-early Aptian) PBDB

Lurdusaurus: AF (Albian) PBDB

Macrogyphosaurus: SA (Turonian-Coniacian) Novas (2009)

Maiasaura: NA (Campanian) PBDB

Mantellisaurus: EU (Hauterivian-Aptian) PBDB

Micropachycephalosaurus: AS (Campanian) PBDB

Minmi: AU (Aptian-Albian) Molnar (1996)

Miragaia: EU (Late Jurassic) Mateus et al. (2009)

Montanoceratops: NA (early Maastrichtian) PBDB

Mulichinco hadrosauroid: SA (late Valangianian) Coria et al. (2010)

Muttaborrasaurus: AU (Aptian-Albian) Agnolin et al. (2010)

Nanyangosaurus: AS (Albian) PBDB

Nipponosaurus: AS (Santonian-Campanian) PBDB

Olorotitan: AS (Maastrichtian) PBDB

Ouranosaurus: AF (Albian) PBDB

Ornatolithus: NA (late Campanian) Maryanska et al. (2004)

Pachycephalosaurus: NA (Campanian-Maastrichtian) PBDB

Panoplosaurus: NA (Campanian) PBDB

Paranthodon: AF (Late Jurassic) Mateus et al. (2009)

Pararhabdodon: EU (Maastrichtian) PBDB

Parasaurolophus: NA (Campanian) PBDB

Parksosaurus: NA (early Maastrichtian) PBDB

Pawpawsaurus: NA (late Albian) PBDB

Penelopognathus: AS (Albian) PBDB

Pinacosaurus: AS (Campanian) PBDB

Prenocephale: AS (late Campanian-early Maastrichtian) Maryanska et al. (2004)

Prenoceratops: NA (late Campanian) PBDB

Probactrosaurus: AS (Barremian-Albian) PBDB

Prosaurolophus: NA (Campanian) PBDB

Protoceratops: AS (Campanian) Lambert et al. (2001)

Protrohadros: NA (Cenomanian) Head (1998)

Psittacosaurus major: AS (late Barremian-early Aptian) PBDB

Psittacosaurus mongoliensis: AS (late Barremian-Aptian) PBDB

Psittacosaurus sinensis: AS (Aptian) PBDB

Saichania: AS (Campanian-Maastrichtian) PBDB

Saurolophus: NA (Campanian-Maastrichtian) PBDB

Sauropelta: NA (Aptian-Albian) PBDB

Secernosaurus: SA (Campanian-Maastrichtian) PBDB

Shantungosaurus: AS (Campanian) PBDB

Shamosaurus: AS (Aptian-Albian) PBDB

Shuangmiaosaurus: AS (Cenomanian-Turonian) PBDB

Silvisaurus: NA (Aptian) PBDB

Stegoceras edmontonense: NA (Maastrichtian) Maryanska et al. (2004)

Stegoceras validus: NA (Campanian) PBDB

Stegosaurus armatus: NA (Late Jurassic) Mateus et al. (2009)

Stegosaurus homheni: AS (Valanginian-Aptian) Mateus et al. (2009)

Stegosaurus mjosi: NA (Late Jurassic) Mateus et al. (2009)

Stenopelix: EU (Berriasian) PBDB

Struthiosaurus: EU (early Campanian) PBDB

Stygomoloch: NA (late Campanian) PBDB

Tanius: AS (Campanian) PBDB

Telmatosaurus: EU (Maastrichtian) PBDB

Tenontosaurus dossi: NA (late Aptian) PBDB

Tenontosaurus tilletti: NA (Aptian-Albian) PBDB

Tethyshadros: EU (Campanian-Maastrichtian) PBDB

Thescelosaurus: NA (Campanian-Maastrichtian) PBDB

Tianyulong: AS (late Barremian-early Aptian) PBDB

Triceratops: NA (Maastrichtian) PBDB

Tsintaosaurus: AS (Campanian) PBDB

Talenkauen: SA (Maastrichtian) PBDB

Tuojiangosaurus: AS (Late Jurassic) Mateus et al. (2009)

Turanoceratops: AS (late Turonian-Coniacian) PBDB

Tylocephale: AS (Campanian) PBDB

Udanoceratops: AS (Campanian) PBDB

Valdosaurus: EU (Berriasian-Valanginian) PBDB

Velafrons: NA (Campanian) Gates et al. (2007)

Wannanosaurus: AS (early Maastrichtian) PBDB

Xuanhuaceratops: AS (Late Jurassic) PBDB

Yamaceratops: AS (Cenomanian-Campanian) PBDB

Yinlong: AS (Late Jurassic) PBDB

Zalmoxes: EU (Campanian-Maastrichtian) PBDB

Zhuchengceratops: AS (Campanian) PBDB

Zuniceratops: NA (middle Turonian) PBDB

Sauropoda

Abydosaurus: NA (Albian) Chure et al. (2010)

Aegyptosaurus: AF (early Cenomanian) PBDB

Aeolosaurus: SA (Campanian-Maastrichtian) PBDB

Alamosaurus: NA (Campanian-Maastrichtian) PBDB

Amargasaurus: SA (Barremian-early Aptian) PBDB

Ampelosaurus: EU (late Campanian-Maastrichtian) PBDB

Andesaurus: SA (Cenomanian) PBDB

Apatosaurus: NA (Late Jurassic) PBDB

Argentinosaurus: SA (Cenomanian) PBDB

Barosaurus: NA (Late Jurassic) PBDB

Bor Guvé titanosaur: AS (late Early Cretaceous) Ksepka and Norell (2010)

Brachiosaurus: NA (Late Jurassic) PBDB

Brachytrachelopan: SA (Late Jurassic) Carballido et al. (in press)

Camarasaurus: NA (Late Jurassic) PBDB

Cathartesaura: SA (Turonian-Coniacian) Carballido et al. (2010)

Cedarosaurus: NA (Barremian) PBDB

Chubutisaurus: SA (Albian-Cenomanian) PBDB

Diamantinasaurus: AU (late Albian) PBDB

Dicraeosaurus: AF (Late Jurassic) PBDB

Diplodocus: NA (Late Jurassic) PBDB

England rebbachisaurid: EU (Barremian) Carballido et al. (2010)

Epachthosaurus: SA (Cenomanian) Novas (2009)

Erketu: AS (late Early Cretaceous) Ksepka and Norell (2010)

Euhelopus: AS (Late Jurassic) PBDB

Europasaurus: EU (Late Jurassic) PBDB

Futalongkosaurus: SA (Turonian-Coniacian) Calvo et al. (2007)

Galveosaurus: EU (Tithonian-Berriasian) Canudo et al. (2010)

Giraffatitan: AF (Late Jurassic) PBDB

Gondwanatitan: SA (Turonian-Santonian) PBDB

Haplocanthosaurus: NA (Late Jurassic) PBDB

Histriasaurus: EU (Hauterivian-Barremian) Carballido et al. (2010)

Isisaurus: IN (Maastrichtian) PBDB

Jainosaurus: IN (Maastrichtian) Wilson et al. (2009)

Janenschia: AF (Late Jurassic) PBDB

Jobaria: AF (Hauterivian-Barremian) Upchurch et al. (2004)

La Paloma titanosaur: SA (Hauterivian-Barremian) Rauhut et al. (2003)

Ligabuesaurus: SA (early Albian) PBDB

Limaysaurus: SA (Aptian-Cenomanian) Carballido et al. (2010)

Lirainosaurus: EU (Campanian) PBDB

Losillasaurus: EU (Tithonian-Berriasian) Canudo et al. (2010)

Magyarosaurus: EU (Maastrichtian) PBDB

Malawisaurus: AF (Aptian) Curry Rogers (2005)

Malagasy Taxon B: MAD (Campanian-Maastrichtian) Curry Rogers (2005)

Mamenchisaurus: AS (Late Jurassic) PBDB

Mendozasaurus: SA (late Coniacian-late Santonian) PBDB

Nemegtosaurus: AS (Campanian-Maastrichtian) PBDB

Neuquensaurus: SA (Santonian-Campanian) Powell (2003)

Nigersaurus: AF (Aptian-Albian) Carballido et al. (2010)

Opisthocoelicaudia: AS (Campanian-Maastrichtian) PBDB
Paluxysaurus: NA (late Aptian) PBDB
Pellegrinisaurus: SA (Campanian-Maastrichtian) PBDB
Phuwiangosaurus: AS (Barremian-Aptian) PBDB
Qiaowanlong: AS (Aptian-Albian) PBDB
Rapetosaurus: MAD (Maastrichtian) PBDB
Rayososaurus: SA (Cenomanian) Carballido et al. (2010)
Rebbachisaurus: AF (Cenomanian) Carballido et al. (2010)
Rocasaurus: SA (Campanian-Maastrichtian) Martinelli and Foriasepi (2004)
Saltasaurus: SA (late Campanian-Maastrichtian) PBDB
Sonidosaurus: AS (Campanian-Maastrichtian) PBDB
Spanish rebbachisaurid: EU (Barremian-Aptian) Carballido et al. (2010)
Suuwassea: NA (Late Jurassic) PBDB
Tastavinsaurus: EU (early Aptian) PBDB
Tehuelchesaurus: SA (Late Jurassic) Carballido et al. (in press)
Tornieria: AF (Late Jurassic) PBDB
Turiasaurus: EU (Tithonian-Berriasian) Canudo et al. (2010)
Wintonotitan: AU (late Albian) PBDB
Zapalasaurus: SA (Barremian-Aptian) Carballido et al. (2010)

Theropoda

Abelisaurus: SA (Campanian) Novas (2009)
Achillesaurus: SA (Santonian) PBDB
Achillobator: AS (Cenomanian-Turonian) PBDB
Acrocanthosaurus: NA (Aptian-Albian) Benson (2009)
Adasaurus: AS (early Maastrichtian) Norell and Makovicky (2004)

Aerosteon: SA (Santonian) PBDB

Afrovenator: AF (Middle-Late Jurassic) PBDB

Albertonykus: NA (Maastrichtian) PBDB

Albertosaurus: NA (Campanian-Maastrichtian) Brusatte et al. (2010)

Alioramus: AS (Maastrichtian) Brusatte et al. (2010)

Allosaurus fragilis: NA EU (Late Jurassic) PBDB; Malafaia et al. (2007)

Alvarezsaurus: SA (Santonian) PBDB

Alxasaurus: AS (Aptian) PBDB

Anchiornis: AS (Late Jurassic) PBDB

Anserimimus: AS (Maastrichtian) PBDB

Appalachiosaurus: NA (Campanian) Brusatte et al. (2010)

Archaeopteryx: EU (Late Jurassic) PBDB

Archaeornithomimus: AS (Turonian-Santonian) PBDB

Atrociraptor: NA (late Campanian-early Maastrichtian) PBDB

Aucasaurus: SA (Campanian) PBDB

Aussie abelisauroid: AU (Albian-Aptian) PBDB

Australovenator: AU (Albian) PBDB

Austroraptor: SA (Campanian-Maastrichtian) PBDB

Avimimus: AS (Campanian) PBDB

Balaur: EU (Maastrichtian) PBDB

Bambiraptor: NA (Campanian) PBDB

Baryonyx: EU (Barremian) Benson (2009)

Beipiaosaurus: AS (late Barremian-early Aptian) PBDB

Bistahieversor: NA (Campanian-Maastrichtian) Brusatte et al. (2010)

Buitreraptor: SA (Cenomanian) Makovicky et al. (2005)

Byronosaurus: AS (Campanian-Maastrichtian) PBDB

Caenagnathus: NA (Campanian) PBDB
Carcharodontosaurus: AF (Cenomanian) Benson (2009)
Carnotaurus: SA (Campanian) PBDB
Caudipteryx: AS (late Barremian-early Aptian) PBDB
Ceratosaurus: NA EU (Late Jurassic) PBDB
Chilantaisaurus: AS (Aptian-Turonian) Benson (2009)
Chirostenotes: NA (Campanian) PBDB
Citipati: AS (Campanian-Maastrichtian) PBDB
Coelurus: NA (Late Jurassic) PBDB
Compsognathus: EU (Late Jurassic) PBDB
Concavenator: EU (late Barremian) Ortega et al. (2010)
Conchoraptor: AS (middle Campanian) PBDB
Confuciusornis: AS (late Barremian-early Aptian) PBDB
Daspletosaurus: NA (Campanian) Brusatte et al. (2010)
Deinocheirus: AS (early Maastrichtian) PBDB
Deinonychus: NA (Aptian-Albian) PBDB
Deltadromeus: AF (Cenomanian) PBDB
Dilong: AS (Barremian) Brusatte et al. (2010)
Dromaeosaurus: NA (Campanian) PBDB
Dryptosaurus: NA (Maastrichtian) Brusatte et al. (2010)
Ekrixinatosaurus: SA (Cenomanian) Novas (2009)
Elaphrosaurus: AF (Late Jurassic) PBDB
Elmisaurus: AS (Campanian-Maastrichtian) PBDB
Eocarcharia: EF (Aptian-Albian) PBDB
Eotyrannus: EU (Barremian) Brusatte et al. (2010)
Epidendrosaurus: AS (Late Jurassic) PBDB

Epidexipteryx: AS (Late Jurassic) PBDB

Erliansaurus: AS (Turonian-Santonian) PBDB

Erlikosaurus: AS (Cenomanian-Turonian) PBDB

Falcarius: NA (Barremian) PBDB

French Canotaurini: EU (Campanian) Allain and Pereda-Suberbiola (2003)

Fukuiraptor: AS (Aptian-Albian) Benson (2009)

Gallimimus: AS (Campanian-Maastrichtian) PBDB

Garudimimus: AS (Cenomanian-Turonian) PBDB

Genusaurus: EU (Albian) PBDB

Giganotosaurus: SA (Cenomanian) Benson (2009)

Gorgosaurus: NA (Campanian) Brusatte et al. (2010)

Guanlong: AS (Late Jurassic) Brusatte et al. (2010)

Hagryphus: NA (late Campanian) PBDB

Harpymimus: AS (Albian) PBDB

Haplocheirus: AS (Late Jurassic) Choiniere et al. (2010)

Heptasteornis: EU (Maastrichtian) Naish et al. (2004)

Heyuannia: AS (Maastrichtian) PBDB

Huaxiagnathus: AS (Barremian-Aptian) PBDB

IGM 100 42: AS (Campanian-Maastrichtian) PBDB

IGM 100 1015: AS (Campanian) PBDB

Ilokelesia: SA (Turonian) Novas (2009)

Incisivosaurus: AS (Aptian-Albian) PBDB

Ingenia: AS (Campanian-Maastrichtian) PBDB

Irritator: SA (Albian) Benson (2009)

Jeholornis: AS (Aptian) PBDB

Khaan: AS (Campanian-Maastrichtian) PBDB

La Paloma abelisaurid: SA (Hauterivian-Barremian) Rauhut et al. (2003)

Ligabueino: SA (Barremian-early Aptian) Novas (2009)

Lourinhanosaurus: EU (Late Jurassic) PBDB

Majiacum spinosaurid: AS (late Coniacian-late Santonian) Hone et al. (2010)

Majungasaurus: MAD (Maastrichtian) PBDB

Mapusaurus: SA (Cenomanian) Benson (2009)

Marshosaurus: NA (Late Jurassic) Benson (2009)

Masiakasaurus: MAD (Maastrichtian) PBDB

Megaraptor: SA (Turonian) Novas (2009)

Mei: AS (early Aptian) PBDB

Metriacanthosaurus: EU (Late Jurassic) Benson (2009)

Microraptor: AS (Aptian) PBDB

Microvenator: NA (Albian) PBDB

Mononykus: AS (Campanian-Maastrichtian) PBDB

Nanshiungosaurus: AS (Campanian-Maastrichtian) PBDB

Neimongosaurus: AS (Turonian-Santonian) PBDB

Neovenator: EU (Barremian) Benson (2009)

NGMC 91: AS (Aptian) PBDB

Noasaurus: SA (Maastrichtian) PBDB

Nothronychus: NA (Turonian) PBDB

Ornitholestes: NA (Late Jurassic) PBDB

Ornithomimus: NA (Campanian-Maastrichtian) PBDB

Oviraptor: AS (Campanian) PBDB

Parvicursor: AS (Campanian) PBDB

Patagonykus: SA (Turonian) Novas (1996)

Pelecanimimus: EU (Barremian) PBDB

Protarchaeopteryx: AS (late Barremian-early Aptian) PBDB

Protopteryx: AS (late Barremian-early Aptian) PBDB

Rahonavis: MAD (Maastrichtian) PBDB

Rajasaurus: IN (Maastrichtian) PBDB

Raptorex: AS (Barremian-Aptian) Brusatte et al. (2010)

Rinchenia: AS (Maastrichtian) PBDB

Rugops: AF (Cenomanian) PBDB

Sapeornis: AS (Aptian) PBDB

Saurornithoides: AS (Campanian) PBDB

Saurornitholestes: NA (Campanian) PBDB

Segnosaurus: AS (Turonian-Santonian) PBDB

Shaochilong: AS (Turonian) PBDB

Shenzhousaurus: AS (late Barremian-early Aptian) PBDB

Shuvuuia: AS (Campanian-Maastrichtian) PBDB

Sinornithoides: AS (Barremian-Aptian) PBDB

Sinornithosaurus: AS (late Barremian-early Aptian) PBDB

Sinosauropteryx: AS (Barremian) PBDB

Sinotyrannus: AS (Albian) Brusatte et al. (2010)

Sinovenator: AS (late Barremian-early Aptian) PBDB

Sinraptor: AS (Late Jurassic) PBDB

Skorpiovenator: SA (Cenomanian) Canale et al. (2009)

Spinosaurus: AF (Cenomanian) Benson (2009)

Spinostropheus: AF (Berriasian-Barremian) Carrano and Sampson (2008)

Stokesaurus: EU (Late Jurassic) Brusatte et al. (2010)

Streptospondylus: EU (Middle-Late Jurassic) PBDB

Struthiomimus: NA (Campanian-Maastrichtian) PBDB

Suchomimus: AF (Aptian) Benson (2009)
Tarbosaurus: AS (Maastrichtian) Brusatte et al. (2010)
Tanycolagreus: NA (Late Jurassic) PBDB
Therizinosaurus: AS (Maastrichtian) PBDB
Torvosaurus: NA EU (Late Jurassic) PBDB
Troodon: AS (Campanian-Maastrichtian) PBDB
Tugrik alvarezsaur: AS (Campanian) PBDB
Tyrannosaurus: NA (Maastrichtian) Brusatte et al. (2010)
Tyrannotitan: SA (Albian) Benson (2009)
Unenlagia: SA (Turonian-Coniacian) Makovicky et al. (2005)
Utah taxon: NA (Campanian) Brusatte et al. (2010)
Utahraptor: NA (Barriasian-Barremian) Norell and Makovicky (2004); PBDB
Velociraptor: AS (Campanian) PBDB
Velocisaurus: SA (Santonian) PBDB
Wellnhoferia: EU (Late Jurassic) PBDB
Yanornis: AS (Aptian) PBDB
Xiongguanlong: AS (Albian) Brusatte et al. (2010)
YPM 1049: NA (Maastrichtian) Longrich and Currie (2009)

TNT File including the Trees neccesaries to construct the Archosaur Semi-strict Supertree

xread
1 557
Syntarsus 1
Abelisaurus 1
Achillobator 1
Acrocanthosaurus 1
Adasaurus 1
Alamosaurus 1
Opisthocoelicaudia 1
Alligator 1
Crocodylus_porosus 1
Allodaposuchus 1
Hylaeochampsa 1

Allosaurus 1
Altirhinus 1
Eolambia 1
Alvarezsaurus 1
Alxasaurus 1
Amargasaurus 1
Dicraeosaurus 1
Amurosaurus 1
Velfrons 1
Simosuchus 1
Anchiornis 1
Andesaurus 1
Anserimimus 1
Ornithomimus 1
Apatosaurus 1
Diplodocus 1
Suuwassea 1
Aralosaurus 1
Araripesuchus_buitreraensis 1
Araripesuchus_wegeneri 1
Araripesuchus_gomesii 1
Araripesuchus_tsangatsangana 1
Araripesuchus_patagonicus 1
Archaeoceratops 1
Archaeopteryx 1
Wellnhoferia 1
Archaeornithomimus 1
Eosuchus_lerichei 1
Eosuchus_minor 1
Atrociraptor 1
Bactrosaurus 1
Edmontosaurus_regalis 1
Bambiraptor 1
Barapasaurus 1
Barosaurus 1
Baurusuchus_pachecoi 1
Beipiaosaurus 1
Camarasaurus 1
Bor_Guve_titanosaur 1
Sonidosaurus 1
Borealosuchus 1
Brachiosaurus 1
Cedarosaurus 1
Paluxysaurus 1
Giraffatitan 1
Abydosaurus 1
Brachylophosaurus 1
Maiasaura 1
Brachytrachelopan 1
Bretesuchus 1
Byronosaurus 1
Caenagnathus 1
Avimimus 1
Camptosaurus 1
Candidodon 1
Carnotaurus 1
Aucasaurus 1

Cathartesaura 1
Limaysaurus 1
Caudipteryx 1
Centrosaurus 1
Ceratosaurus 1
Ligabueino 1
Cetiosaurus 1
Xuanhuaceratops 1
Charonosaurus 1
Chilantaisaurus 1
Chubutisaurus 1
Chungkingosaurus 1
Huayangosaurus 1
Citipati 1
Compsognathus 1
Sinosauropteryx 1
Confusiusornis 1
Corythosaurus_casuarius 1
Corythosaurus_intermedius 1
Crocodylus_acer 1
Brachyuranochampsia 1
Dacentrurus 1
Miragaia 1
Deinocheirus 1
Deinonychus 1
Diamantinasaurus 1
Dilong 1
Dilophosaurus 1
Dollosuchus 1
Dormaal_crocodyloid 1
Asiatosuchus_grangeri 1
Crocodylus_affinis 1
Dromaeosaurus 1
Utahraptor 1
Dryosaurus 1
Dubreuillosaurus 1
Afrovenator 1
Duriavenator 1
Sokotosuchus 1
Edmontia 1
Panoplosaurus 1
Edmontosaurus_annectens 1
Elaphrosaurus 1
Elmisaurus 1
Hagryphus 1
Chirostenotes 1
Emausaurus 1
Eocarcharia 1
Eogavialis 1
Protohadros 1
Eothoracosaurus 1
Eotyrannus 1
Epachthosaurus 1
Epidendrosaurus 1
Epidexipteryx 1
Equijubus 1

Erketu 1
Qiaowanlong 1
Erlikosaurus 1
Therizinosaurus 1
Euhelopus 1
Mamenchisaurus 1
Euoplocephalus 1
Ankylosaurus 1
Gastonia 1
Euparkeria 1
Marasuchus 1
Herrerasaurus 1
Pisanosaurus 1
Eocursor 1
Lesothosaurus 1
Stormbergia 1
Agilisaurus 1
Hexinlusaurus 1
Anabisetia 1
Hypsilophodon 1
Jeholosaurus 1
Talenkauen 1
Thescelosaurus 1
Tenontosaurus_dossi 1
Tenontosaurus_tilletti 1
Yinlong 1
Liaoceratops 1
Chaoyangosaurus 1
Micropachycephalosaurus 1
Stenopelix 1
Wannanosaurus 1
Homalocephale 1
Gasparinisaura 1
Parksosaurus 1
Scutellosaurus 1
Scelidosaurus 1
Echinodon 1
Fruitadens 1
Tianyulong 1
Heterodontosaurus 1
Lycorhinus 1
NHM_RU_A100 1
Europasaurus 1
Eutretauranosuchus 1
Falcarius 1
Ferganasaurus 1
Fruita_Form 1
Fukuiraptor 1
Australovenator 1
Gaciliceratops 1
Bagaceratops 1
Protoceratops 1
Gallimimus 1
Galveosaurus 1
Gargoyleosaurus 1
Garudimimus 1
Gavialis 1

Gavialosuchus_americanus 1
Genusaurus 1
Majungasaurus 1
Gilmoresaurus 1
Gobiosuchus 1
Gobisaurus 1
Shamosaurus 1
Goyocephale 1
Gracilisuchus 1
Terrestrisuchus 1
Dibothrosuchus 1
Protosuchus 1
Hemiprotosuchus 1
Kayentasuchus 1
Edentosuchus 1
Zosuchus 1
Sichuanosuchus 1
Hsisosuchus 1
Uruguaysuchus 1
Notosuchus 1
Mariliasuchus 1
Chimaerasuchus 1
Sphagesaurus 1
Malawisuchus 1
Libycosuchus 1
Lomasuchus 1
Peirosaurus 1
Theriosuchus 1
Alligatorium 1
Pachycheilosuchus 1
Goniopholis_simus 1
Goniopholis_stovalli 1
Calsoyasuchus 1
Sunosuchus 1
Glen_Rose_Form 1
Shamosuchus 1
Rugosuchus 1
Isisfordia 1
Argochampsia 1
Leidyosuchus 1
Diplocynodon 1
Steneosaurus 1
Pelagosaurus 1
Metriorhynchus_casamiquelai 1
Metriorhynchus_superciliosus 1
Geosaurus_araucanensis 1
Geosaurus_suevicus 1
Dakosaurus_maximus 1
Dakosaurus_andiniensis 1
Pholidosaurus 1
Rhabdognathus 1
Dyrosaurus 1
Hyposaurus 1
Sarcosuchus_imperator 1
Terminonaris 1
Gryposaurus_latidens 1
Gryposaurus_notabilis 1

Haplocanthosaurus 1
Harpyimimus 1
Histriasaurus 1
Huaxiagnathus 1
Hungarosaurus 1
Hypacrosaurus_altispinus 1
Hypacrosaurus_stebingeri 1
IGM_100_1015 1
Iguanodon 1
Ikanogavialis 1
Gryposuchus 1
Siquisiquesuchus 1
Ilokelesia 1
Ingenia 1
Heyuannia 1
Isisaurus 1
Jaxartosaurus 1
Jeholornis 1
Jinzhousaurus 1
Penelopognathus 1
Probactrosaurus 1
Nanyangosaurus 1
Jobaria 1
Kentisuchus 1
Khaan 1
Conchoraptor 1
Kritosaurus 1
Secernosaurus 1
Lambeosaurus_lambeii 1
Lambeosaurus_magnicristatus 1
Leptoceratops 1
Udanoceratops 1
Prenoceratops 1
Ligabuesaurus 1
Phuwiangosaurus 1
Loricatosaurus 1
Losillasaurus 1
Turiasaurus 1
Poekilopleuron 1
Lurdusaurus 1
Malawisaurus 1
Mantellisaurus 1
Dollodon 1
Mapusaurus 1
Giganotosaurus 1
Carcharodontosaurus 1
Comahuesuchus 1
Marshosaurus 1
Megaraptor 1
Aerosteon 1
Mei 1
Mendozasaurus 1
Microraptor 1
NGMC91 1
Microvenator 1
Minmi 1

Monolophosaurus 1
Eustreptospondylus 1
Mononykus 1
Shuvuuia 1
Montanoceratops 1
Muttaborrasaurus 1
Neimongosaurus 1
Nemegtosaurus 1
Rapetosaurus 1
Neovenator 1
Neuquensaurus 1
Saltasaurus 1
Nigersaurus 1
Noasaurus 1
Masiakasaurus 1
Nothronychus 1
Erliaensaurus 1
Nanshiungosaurus 1
Olorotitan 1
Omeisaurus 1
Gondwanatitan 1
Ornatolithus 1
Ornitholestes 1
Scleromochlus 1
Anurognathus 1
Batrachognathus 1
Dendrorhynchoides 1
Jeholopterus 1
Austriadactylus 1
Sordes 1
Preondactylus 1
Scaphognathus 1
Dorygnathus 1
Wukongopterus 1
Dimorphodon 1
Eudimorphodon_cromptonellus 1
Eudimorphodon_ranzii 1
Raeticodactylus 1
Caviramus 1
Peteinosaurus 1
Eudimorphodon_rosenfeldi 1
Campylognathoides_liasicus 1
Campylognathoides_zitteli 1
Rhamphorhynchus_muensteri 1
Rhamphorhynchus_longicaudus 1
Pterodactylus_kochi 1
Pterodactylus_antiquus 1
Germanodactylus_cristatus 1
Germanodactylus_rhamphastinus 1
Gnathosaurus 1
Ctenochasma 1
Pterodaustro 1
Feilongus 1
Gallodactylus 1
Cycnorhamphus 1
Nyctosaurus_gracilis 1
Nyctosaurus_bonneri 1

Nemicolopterus 1
Pteranodon 1
Istiodactylus 1
Nurhachius 1
Ornithocheirus 1
Tropeognathus 1
Ananguera_santanae 1
Ananguera_blittersdorffi 1
Ananguera_piscator 1
Dsungaripterus 1
Phobetor 1
Noripterus 1
Tupuxuara 1
Thalassodromeus 1
Tapejara 1
Tupandactylus 1
Quetzalcoatlus 1
Azhdarcho 1
Zhejiangopterus 1
Ouranosaurus 1
Oviraptor 1
Pararhabdodon 1
Tsintaosaurus 1
Parasaurolophus_cryptocristatus 1
Parasaurolophus_walkerii 1
Paratomistoma_courtii 1
Patagonykus 1
Patagosaurus 1
Pawpawsaurus 1
Pelecanimimus 1
Piatnitzkysaurus 1
Condoraptor 1
Pinacosaurus 1
Pristichampsus 1
Prodiplocynodon 1
Asiatosuchus_germanicus 1
Prosaurolophus_maximus 1
Protarchaeopteryx 1
Incisivosaurus 1
Tanius 1
Protopteryx 1
Yanornis 1
Psittacosaurus_mongoliensis 1
Psittacosaurus_sinensis 1
Rahonavis 1
Rebbachisaurus 1
Rinchenia 1
IGM_100_42 1
Rugops 1
Saichania 1
Sapeornis 1
Saurolophus_osborni 1
Saurolophus_angustirostris 1
Sauropelta 1
Segnosaurus 1
Shantungosaurus 1
Shaochilong 1

Shenzhousaurus 1
Shuangmiaosaurus 1
Lophorhynchon 1
Shunosaurus 1
Silvisaurus 1
Sinornithoides 1
Sinornithosaurus 1
Sinovenator 1
Sinraptor 1
Metriacanthosaurus 1
Siwalik_Gavialis 1
Skorpiovenator 1
Ekrixinatosaurus 1
Spanish_rebbachisaurid 1
Spinosaurus 1
Irrirator 1
Stegosaurus_armatus 1
Stegosaurus_mjosi 1
Stegosaurus_homheni 1
Streptospondylus 1
Magnosaurus 1
Struthiomimus 1
Struthiosaurus 1
Stygimoloch 1
Stegoceras_validus 1
Stegoceras_edmontoni 1
Suchomimus 1
Baryonyx 1
Susisuchus 1
Tanycolagreus 1
Coelurus 1
Guanlong 1
Tastavinsaurus 1
Telmatosaurus 1
Tethyshadros 1
Thoracosaurus_macrorhynchus 1
Thoracosaurus_neocesariensis 1
Tomistoma_cairense 1
Tomistoma_lusitanica 1
Gavialosuchus_eggenburgensis 1
Tomistoma_schlegelii 1
Tornieria 1
Torvosaurus 1
Megalosaurus 1
Triceratops 1
Turanoceratops 1
Troodon 1
Saurornithoides 1
Tuojiangosaurus 1
Paranthodon 1
Gigantspinosaurus 1
Kentrosaurus 1
Tylocephale 1
Prenocephale 1
Pachycephalosaurus 1
Tyrannotitan 1

Tyrannosaurus 1
Gorgosaurus 1
Unenlagia 1
Buitreraptor 1
Velociraptor 1
Balaur 1
Saurornitholestes 1
Wintonotitan 1
Xuanhanosaurus 1
Yamaceratops 1
Zalmoxes 1
Zapalasaurus 1
Zuniceratops 1
Orthosuchus 1
Bernissartia 1
Iberosuchus 1
Zaraasuchus 1
Macrogryphosaurus 1
Tarbosaurus 1
Utah_taxon 1
Daspletosaurus 1
Alioramus 1
Albertosaurus 1
Biestahievorsor 1
Appalachiosaurus 1
Raptorex 1
Xiongguanlong 1
Dryptosaurus 1
Stokesaurus 1
Kileskus 1
Proceratosaurus 1
Sinotyrannus 1
England_rebbachisaurid 1
Rayososaurus 1
Plateosaurus 1
Tazoudasaurus 1
Tehuelchesaurus 1
Janenschia 1
Argentinosaurus 1
Futalongkosaurus 1
Arenysaurus 1
Blasisaurus 1
Nipponosaurus 1
Achillesaurus 1
Albertonykus 1
YPM_1049 1
Heptasteornis 1
Parvicursor 1
Tugrik_alvarezsaur 1
Lourinhanosaurus 1
Bergisuchus 1
Itaborai_Croc 1
Doratodon 1
Sebecus 1
Carnotaurini_France 1
Lirainosaurus 1
Aeolosaurus 1

Rocasaurus 1
Pellegrinisaurus 1
Mahajangasuchus 1
Kaprosochus 1
Laganosuchus 1
Magyarosaurus 1
Ampelosaurus 1
Aegyptosaurus 1
Malagasy_TaxonB 1
Rajasaurus 1
Spinostropheus 1
Deltadromeus 1
Neuquensuchus 1
Shantungosuchus 1
Haplocheirus 1
Aussie_abelisauroid 1
Austroraptor 1
Cedarpetta 1
Valdosaurus 1
Kangnasaurus 1
La_Paloma_abelisaurid 1
La_Paloma_titanosaur 1
Mulichinco_hadrosauroid 1
Zhuchengceratops 1
Asiaceratops 1
Cerasinops 1
Ajkaceratops 1
Psittacosaurus_major 1
Majiacum_spinosaurid 1
Pabweshi 1
Jainosaurus 1
Mythunga 1
La_Amarga_stegosaur 1
Concavenator 1
Sarcosuchus_hartti 1
Velocisaurus 1
;
tread
(Jobaria((Suuwassea(Apatosaurus Diplodocus)(Amargasaurus(Brachytrachelopan
Dicraeosaurus)))(Histriasaurus(Rebbachisaurus((Zapalalaurus((Rayososaurus
Cathartesaura)(England_rebbachisaurid Limaysaurus)))(Spanish_rebbachisaurid
Nigersaurus)))))))*
(Plateosaurus(Tazoudasaurus(Shunosaurus(Patagosaurus(Omeisaurus(Mamenchisaurus((Jobaria
((Nigersaurus Limaysaurus Rebbachisaurus)((Dicraeosaurus
Amargasaurus)(Apatosaurus(Barosaurus
Diplodocus)))))(Haplocanthosaurus(Camarasaurus(Europasaurus((Tehuelchesaurus
Galveosaurus)((Janenschia Tastavinsaurus)(Euhelopus((Chubutisaurus
Wintonotitan)((Brachiosaurus
Paluxysaurus)(La_Paloma_titanosaur(Phuwiangosaurus(Mendozasaurus
Futalongkosaurus((Argentinosaurs(Ligabuesaurus Andesaurus))(Malawisaurus ((Nemegtosaurus
Rapetosaurus)(Epachthosaurus(Alamosaurus(Opisthocoelicaudia(Isisaurus(Neuquensaurus
Saltasaurus)))))))))))))))))))*
(Shunosaurus(Barapasaurus(Patagosaurus((Omeisaurus
Mamenchisaurus)(Cetiosaurus(Ferganasaurus(Jobaria((Haplocanthosaurus((Nigersaurus
Limaysaurus)((Apatosaurus Suuwassea(Tornieria(Barosaurus
Diplodocus)))(Dicraeosaurus(Brachytrachelopan
Amargasaurus)))))(Camarasaurus(Europasaurus((Brachiosaurus Paluxysaurus Cedarosaurus

Giraffatitan Abydosaurus)(Euhelopus((Erketu Qiaowanlong)(Andesaurus(Bor_Guve_titanosaur
Sonidosaurus(Malawisaurus((Nemegtosaurus
Rapetosaurus)(Epachthosaurus(Isisaurus(Opisthocoelicaudia Gondwanatitan
Alamosaurus(Neuquensaurus Saltasaurus))))))))))))))))*
((Plateosaurus Jobaria)(Syntarsus(Dilophosaurus((Ceratosaurus
Carnotaurus)((Xuanhanosaurus(Marshosaurus(Piatnitzkysaurus Condoraptor)))(Monolophosaurus
(((Eustreptospondylus(Streptospondylus Magnosaurus))(Duriavenator((Torvosaurus
Megalosaurus)(Dubreuillosaurus Afrovenator)))(Majiacum_spinosaurid(Spinosaurus
Irrirator)(Suchomimus Baryonyx))))((Compsognathus(Tanycolagreus
Guanlong))((Lourinhanosaurus Poekilopleuron)(Sinraptor
Metriacanthosaurus))(Allosaurus(Concavenator(Eocarcharia(Acrocanthosaurus(Shaochilong(Tyran
notitan(Mapusaurus Giganotosaurus
Carcharodontosaurus)))))(Neovenator(Chilantaisaurus((Fukuiraptor Australovenator)(Megaraptor
Aerosteon)))))))))))*
(Euparkeria((Gracilisuchus Protosuchus)(Marasuchus((Herrerasaurus(Jobaria
Allosaurus))(Pisanosaurus((Echinodon(Fruitadens Tianyulong(Heterodontosaurus Lycorhinus
NHM_RU_A100)))(Eocursor((Scutellosaurus(Emausaurus(Scelidosaurus(Stegosaurus_armatus
Ankylosaurus))))(Lesothosaurus(Stormbergia(Agilisaurus(Hexinlusaurus((Jeholosaurus(Hypsiloph
don((Parksosaurus Gasparinisaura)(Zalmoxes((Iguanodon Dryosaurus)(Tenontosaurus_dossi
Tenontosaurus_tilletti))))((Stenopelix Yinlong((Micropachycephalosaurus
Chaoyangosaurus)(Psittacosaurus_mongoliensis(Liaoceratops(Archaeoceratops
Triceratops)))))(Wannanosaurus(Goyocephale(Homalocephale Pachycephalosaurus)))))))))))))))*
(Diplodocus(Syntarsus((Spinosaurus(Allosaurus
Carcharodontosaurus))(Ceratosaurus(Aussie_abelisauroid((Ligabueino(Elaphrosaurus(Noasaurus
Masiakasaurus)))(La_Paloma_abelisaurid
Rugops(Abelisaurus(Majungasaurus((Carnotaurini_France Genusaurus Carnotaurus
Aucasaurus)(Ilokelesia(Skorpiovenator Ekrixinatosaurus)))))))))))*
(Zalmoxes(Iguanodon(Mulichinco_hadrosauroid(Mantellisaurus Dollodon)(Ouranosaurus
Probactrosaurus(Protohadros(Bactrosaurus Gilmoreosaurus Tanius(Telmatosaurus
Tethyshadros(Pararhabdodon(Gryposaurus_notabilis Edmontosaurus_regalis(Brachylophosaurus
Maiasaura)(Prosaurolophus_maximus Saurolophus_osborni)))))))))*
(Lesothosaurus(Hypsilophodon(Tenontosaurus_dossi((Tenontosaurus_tilletti(Muttaborrasaurus(Zal
moxes((Dryosaurus Kangnasaurus Valdosaurus)(Camptosaurus(Lurdusaurus(Iguanodon
(Mantellisaurus(Ouranosaurus((Altirhinus Eolambia)(Protohadros(Jinzhousaurus
Nanyangosaurus(Bactrosaurus Edmontosaurus_regalis)))))))))))))))*
(Iguanodon(Mantellisaurus((Jinzhousaurus
Penelopognathus)(Equijubus(Probactrosaurus((Eolambia
Protohadros)(Tanius(Bactrosaurus(Gilmoreosaurus(Telmatosaurus(Shuangmiaosaurus
Nanyangosaurus Lophorhodon(((Brachylophosaurus Maiasaura)(Kritosaurus
Secernosaurus(Gryposaurus_latidens
Gryposaurus_notabilis))(Shantungosaurus((Edmontosaurus_regalis
Edmontosaurus_annectens)(Prosaurolophus_maximus(Saurolophus_osborni
Saurolophus_angustirostris)))))(Aralosaurus(Jaxartosaurus((Pararhabdodon
Tsintaosaurus)((Charonosaurus(Parasaurolophus_cryptocristatus
Parasaurolophus_walkeri)))(Lambeosaurus_lambeii
Lambeosaurus_magnicristatus)(Olorotitan((Hypacrosaurus_altispinus(Amurossaurus
Velfrons))(Hypacrosaurus_stebingeri(Corythosaurus_casuaris
Corythosaurus_intermedius)))))))))))))))*
((Allosaurus Sinraptor)((Tanycolagreus Coelurus)(Dilong(Eotyrannus(Tyrannosaurus
Gorgosaurus)))(Huaxiagnathus(Compsognathus
Sinosauropteryx)))(Harpymimus(Deinocheirus(Shenzhouosaurus(Pelecanimimus(Garudimimus(Arc
haeorhithomimus(Gallimimus(Struthiomimus(Anserimimus
Ornithomimus)))))))(Ornitholestes((Falcarius(Beipiaosaurus(Alxasaurus(Nothronychus
Erliansaurus Nanshiungosaurus(Neimongosaurus(Segnosaurus(Erlikosaurus
Therizinosaurus)))))))(Alvarezsaurus(Patagonykus(Mononykus Shuvuuia)))(Caenagnathus
Avimimus(Protarchaeopteryx Incisivosaurus)(Caudipteryx(Microvenator(Oviraptor(((Khaan
Conchoraptor)(Ingenia Heyuannia)))(Rinchenia IGM_100_42)(Citipati(Elmisaurus Hagryphus

Chirostenotes))))))(((Epidendrosaurus Epidexipteryx))(Archaeopteryx Wellnhoferia)(Jeholornis(Sapeornis(Confusiusornis(Protopteryx Yanornis))))))((Sinovenator(Anchiornis(Mei(Byronosaurus(Sinornithoides(Troodon Saurornithoides)))))))(Rahonavis(Unenlagia Buitreraptor))(Bambiraptor(Sinornithosaurus(Microraptor NGMC91))(Adasaurus(IGM_100_1015((Velociraptor Balaur) Saurornitholestes)(Deinonychus(Atrociraptor(Achillobator(Dromaeosaurus Utahraptor)))))))))*)
(Lesothosaurus(Triceratops((Hypsilophodon Thescelosaurus)(Tenontosaurus_dossi(Muttaborrasaurus(Gasparinisaura((Talenkauen Macrogyphosaurus)(Anabisetia(Dryosaurus Iguanodon)))))))))*)
(Hypsilophodon(Triceratops(Stenopelix(Wannanosaurus(Goyocephale(Homalocephale(Ornatolitholus(Stygomoloch (Stegoceras_validus Stegoceras_edmontoni(Tylocephale Prenocephale Pachycephalosaurus)))))))))*)
((Tanycolagreus Coelurus)((Kileskus(Guanlong(Proceratosaurus Sinotyrannus))(Dilong((Eotyrannus Stokesaurus)(Xiongguanlong(Dryptosaurus(Raptorex(Appalachiosaurus(Biestahievorsor((Albertosaurus Gorgosaurus)(Alioramus(Utah_taxon(Daspletosaurus(Tyrannosaurus Tarbosaurus)))))))))*)
(Hypsilophodon(Stegoceras_edmontoni((Chaoyangosaurus Xuanhuaceratops)((Psittacosaurus_mongoliensis Psittacosaurus_sinensis)(Liaoceratops(Yamaceratops(Archaeoceratops((Montanoceratops(Leptoceratops Udanoceratops Prenoceratops))(Gaciliceratops ((Bagaceratops Protoceratops)(Zuniceratops(Centrosaurus(Triceratops Turanoceratops)))))))))*)
((Gracilisuchus Protosuchus))((Marasuchus (Herrerasaurus Allosaurus))(Scleromochlus ((Anurognathus (Batrachognathus Dendrorhynchoides Jeholopterus))(Austriadactylus (Sordes (Preondactylus Scaphognathus (Dorygnathus Wukongopterus (Dimorphodon (Eudimorphodon_cromptonellus Eudimorphodon_ranzii (Raeticodactylus Caviramus)(Peteinosaurus Eudimorphodon_rosenfeldi))((Campylognathoides_liasicus Campylognathoides_zitteli))(Rhamphorhynchus_muensteri Rhamphorhynchus_longicaudus))((Pterodactylus_kochi Pterodactylus_antiquus (Germanodactylus_cristatus Germanodactylus_rhamphastinus))(Gnathosaurus ((Ctenochasma Pterodaustro)(Feilongus (Gallodactylus Cynorhamphus))))((Nyctosaurus_gracilis Nyctosaurus_bonneri)(Nemicolopterus ((Pteranodon ((Istiodactylus Nurhachius)(Ornithocheirus (Tropeognathus (Mythunga Anhanguera_santanae Anhanguera_bliettersdorffi Anhanguera_piscator))))((Dsungaripterus Phobetor Noripterus))((Tupuxuara Thalassodromeus)(Tapejara Tupandactylus))(Quetzalcoatlus Azhdarcho Zhejiangopterus)))))))*)
(Gracilisuchus ((Terrestriusuchus Dibothrosuchus))(Orthosuchus ((Protosuchus Hemiprotosuchus)(Kayentasuchus Edentosuchus))((Zaraasuchus Gobiosuchus)(Zosuchus (Sichuanosuchus Shantungosuchus))(Fruita_Form (Hsisosuchus (((Uruguaysuchus (((Notosuchus (Comahuesuchus Mariliasuchus))((Chimaerasuchus Sphagesaurus)(Pabweshi Baurusuchus_pachecoi (Bretesuchus Iberosuchus))))((Malawisuchus Candidodon)(Simosuchus Libycosuchus))))((Araripesuchus_wegeneri (Araripesuchus_tsangatsangana (Araripesuchus_buitraensis (Araripesuchus_gomesii Araripesuchus_patagonicus))))((Lomasuchus Peirosaurus))((Theriosuchus Alligatorium)(Pachycheilosuchus (((Goniopholis_simus (Goniopholis_stovalli Eutretauranosuchus))(Calsoyasuchus Sunosuchus))(Bernissartia Glen_Rose_Form))(Shamosuchus Rugosuchus)(Isisfordia (Hylaeochampsia (Borealosuchus ((Crocodylus_porosus (Asiatosuchus_germanicus (Argochampsia (Eothoracosaurus Gavialis)))(Leidyosuchus (Diplocynodon Alligator)))))))((Steneosaurus (Pelagosaurus (Metriorhynchus_casamiquelai (Metriorhynchus_superciliosus ((Geosaurus_araucanensis Geosaurus_suevicus)(Dakosaurus_maximus Dakosaurus_andiniensis)))))(Pholidosaurus ((Sokotosuchus (Rhabdognathus (Dyrosaurus Hyposaurus))((Sarcosuchus_imperator Sarcosuchus_hartti)Terminonaris))))*)
(Bernissartia(Hylaeochampsia((Eothoracosaurus(Thoracosaurus_macrorhynchus Thoracosaurus_neocesariensis(Argochampsia (Eosuchus_lerichei Eosuchus_minor)(Eogavialis((Ikanogavialis Gryposuchus Siquisiquesuchus)(Siwalik_Gavialis Gavialis)))))))(Borealosuchus(Pristichampsus(Alligator(Prodiplacynodon

Asiatosuchus_germanicus(Dormaal_crocodyloid Asiatosuchus_grangeri
Crocodylus_affinis(Crocodylus_acer
Brachyuranochampsia(Crocodylus_porosus(Kentisuchus(Dollosuchus(Gavialosuchus_americanus(
Tomistoma_cairense(Paratomistoma_courtii(Tomistoma_lusitanica
Gavialosuchus_eggenburgensis Tomistoma_schlegelii))))))))))))*
(Theriosuchus(Goniopholis_simus(Bernissartia(Susisuchus(Isisfordia((Allodaposuchus
Hylaeochampsia)((Gavialis Borealosuchus)(Pristichampsus(Alligator Crocodylus_porosus))))))))*
(Scelidosaurus(Stegosaurus_armatus(Cedarpelta(Struthiosaurus(Hungarosaurus((Silvisaurus
Sauropelta)(Pawpawsaurus(Edmontia
Panoplosaurus)))))(Gargyleosaurus(Minmi(Gastonia((Gobisaurus
Shamosaurus)(Pinacosaurus(Saichania(Euoplocephalus Ankylosaurus))))))))*
(Lesothosaurus(Scutellosaurus(Emausaurus(Scelidosaurus((Sauropelta(Euoplocephalus
Gastonia)(La_Amarga_stegosaur(Chungkingosaurus Huayangosaurus)Tuojiangosaurus
Paranthodon Gigantspinosaurs (Kentrosaurus(Loricatosaurus((Dacentrurus
Miragaia)(Stegosaurus_armatus(Stegosaurus_mjosi Stegosaurus_homheni))))))))*
(Andesaurus(Malawisaurus((Nemegtosaurus
Rapetosaurus)(Isisaurus(Diamantinasaurus((Alamosaurus Opisthocoelicaudia)(Neuquensaurus
Saltasaurus)))))))*
(Tehuelchesaurus(Galveosaurus(Losillasaurus Turiasaurus)))*
(Falcarius(Avimimus(Haplocheirus(Achillesaurus Alvarezsaurus(Patagonykus((Albertonykus
YPM_1049)(Heptasteornis(Parvicursor Tugrik_alvarezsaur)(Shuvuuia Mononykus)))))))*
(Tsintaosaurus(Jaxartosaurus((Arenysaurus Blasisaurus)(Parasaurolophus
Charonosaurus)(Olorotitan(Lambeosaurus(Corythosaurus(Hypacrosaurus Nipponosaurus)))))))*
(Gobiosuchus(Lomasuchus(Notosuchus(Doratodon(Baurusuchus_pachecoi Iberosuchus
Bergisuchus(Itaborai_Croc(Bretesuchus Sebecus)))))))*
(Chubutisaurus(Phuwiangosaurus(Andesaurus(Malawisaurus(Lirainosaurus((Isisaurus
Aeolosaurus)(Rapetosaurus(Opisthocoelicaudia (Alamosaurus(Neuquensaurus(Saltasaurus
Rocasaurus)))))))))*
((Brachiosaurus Cedarosaurus)(Phuwiangosaurus(Malawisaurus(Isisaurus((Alamosaurus
Pellegrinisaurus)(Opisthocoelicaudia Saltasaurus)))))*
(Opisthocoelicaudia((Neuquensaurus(Jainosaurus Malagasy_TaxonB
Saltasaurus))(Aegyptosaurus(Ampelosaurus(Magyarosaurus(Rapetosaurus Nemegtosaurus)))))*
(Ceratosaurus(Spinostropheus((Velocisaurus Noasaurus Masiakasaurus
Deltadromeus)(Rugops(Abelisaurus(Rajasaurus(Majungasaurus Carnotaurus)))))*
(Gracilisuchus((Terrestrisuchus Dibothrosuchus)((Gobiosuchus Zazaasuchus)((Protosuchus
Hemiprotosuchus)(Kayentasuchus Edentosuchus))(Zosuchus(Sichuanosuchus(Shantungosuchus
Neuquensuchus)))))*
(Peirosaurus((Mahajangasuchus Kaposuchus)((Sarcosuchus_imperator
Dyrosaurus)(Laganosuchus(Bernissartia(Isisfordia(Gavialis(Crocodylus_porosus(Leidyosuchus
Alligator)))))))*
(Buitreraptor(Rahonavis Unenlagia Austroraptor))*
(Hypsilophodon(Stegoceras(Yinlong((Chaoyangosaurus
Xuanhuaceratops)((Psittacosaurus_mongoliensis Psittacosaurus_sinensis
Psittacosaurus_major)(Liaoceratops(Yamaceratops(Archaeoceratops((Asiaceratops(Cerasinops(M
ontanoceratops(Prenoceratops(Leptoceratops Udanoceratops
Zhuchengceratops)))))(Gaciliceratops((Ajkeratops Bagaceratops
Protoceratops)(Zuniceratops(Centrosaurus Triceratops)))))))));
;
p/;