

Electronic supplementary material for “Exquisitely preserved fossil snakes yield insight into the early evolution and ecology of boas”

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1. Supplementary figures

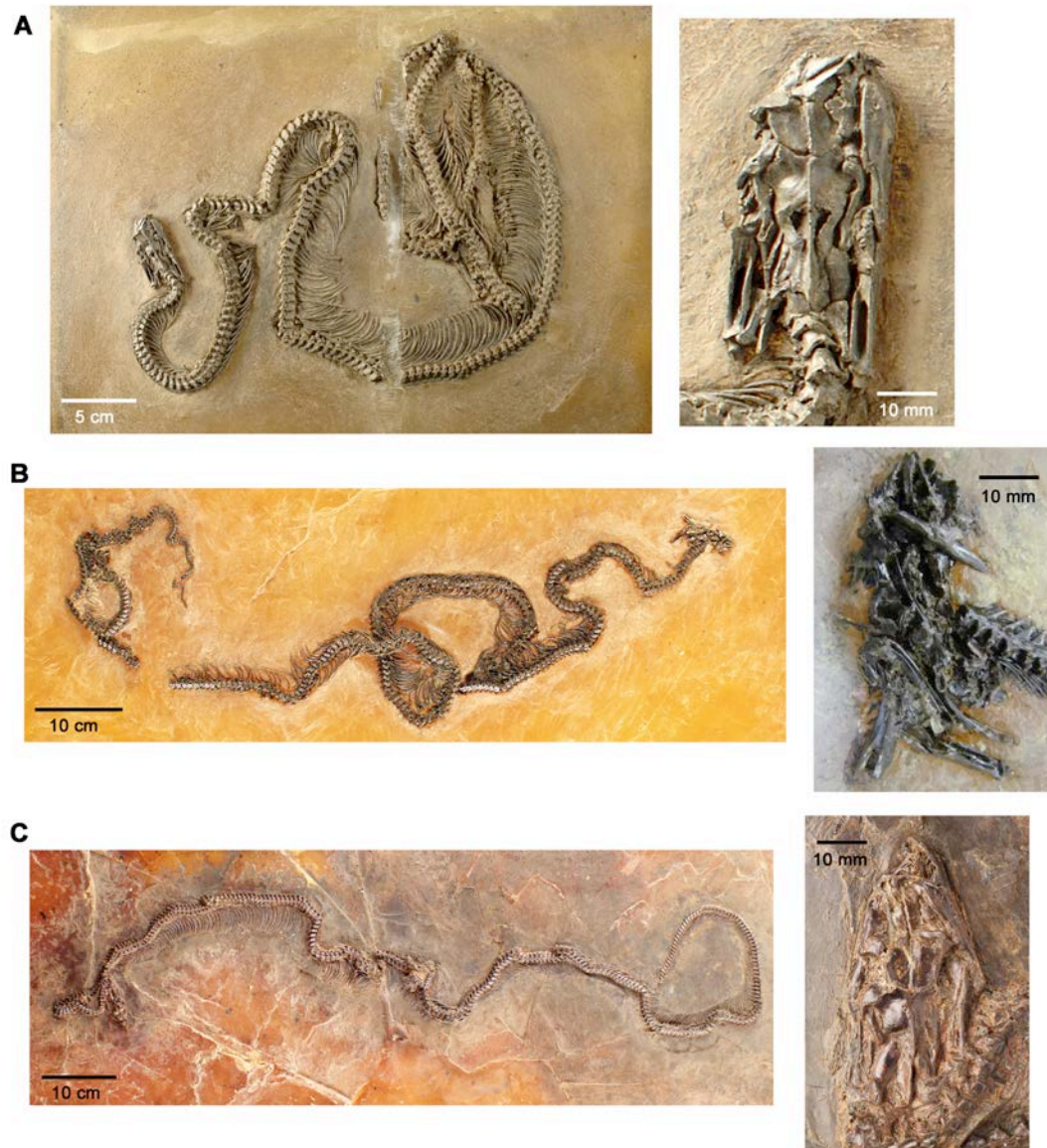


Figure S1. Selected specimens of *Eoconstrictor fischeri* mentioned in the main text. A, SMF ME 11398; B, SMF ME 2504a; C, SMF ME 1002 (paratype).

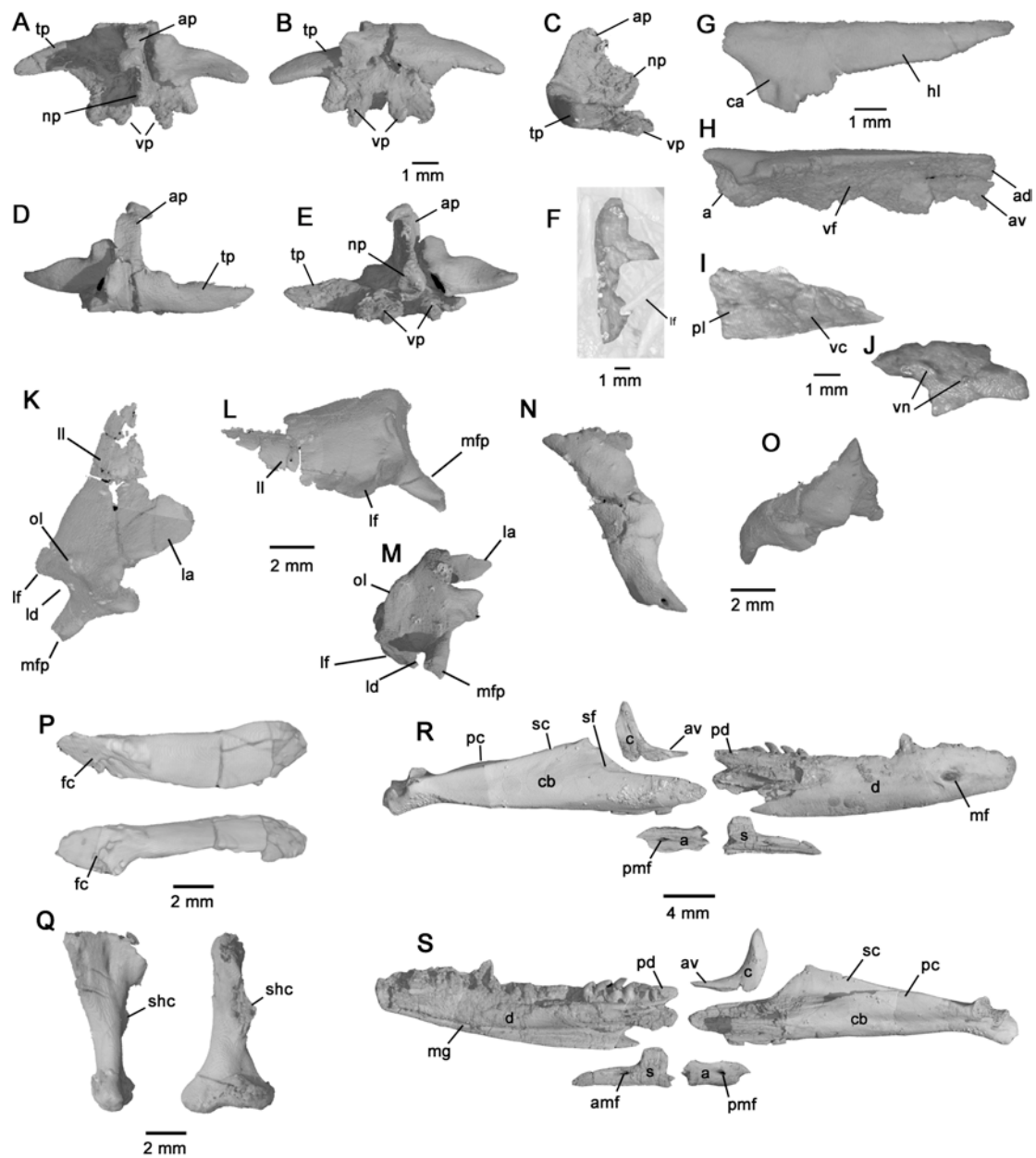


Figure S2. Tridimensional reconstructions of the snout bones of *Eoconstrictor fischeri* (SMF ME 11398) based on HRXCT data. Premaxilla in dorsal (A), ventral (B), left lateral (C), anterior (D) and posterior (E) views; F, left septomaxilla in lateral view; right nasal in dorsal (G) and lateral (H) views; vomer in lateral (I) and medial (J) views; left prefrontal bone in dorsal (K), lateral (L) and posterior (M) views; left jugal bone in lateral (N) and dorsal (O) views; P, right supratemporal in dorsal (upper) and lateral (lower) views; Q, left quadrate in lateral (left) and posterior (right) views; lower jaw bones in lateral (R) and

medial (s) views. a, facet for the frontal pillar; ad, facet for the ascending process; amf, anterior mylohyoid foramen; av, anteroventral process; av, facet for the nasal process; au, angular; c, coronoid; ca, facet for the prefrontal dorsal lappet; cb, compound bone; d, dentary; fc, facet for quadrate cephalic condyle; hl, horizontal lamina; la, dorsal lappet; ld, lachrymal duct; lf, lateral foot process; ll, anterior lateral lamina; ln, lateral vertical flange; mf, mental foramen; mfp, medial foot process; mg, Meckelian groove; np, nasal process; pc, prearticular crest; pd, posterior dentigerous process; pl, posterior (vertical) lamina; pmf, posterior mylohyoid foramen; s, splenial; sc, surangular crest; sf, anterior surangular foramen; shc, stylohyal crest. tp, transverse process; vc, cupola; vn, foramina for the olfactory nerves; vp, vomerine process.

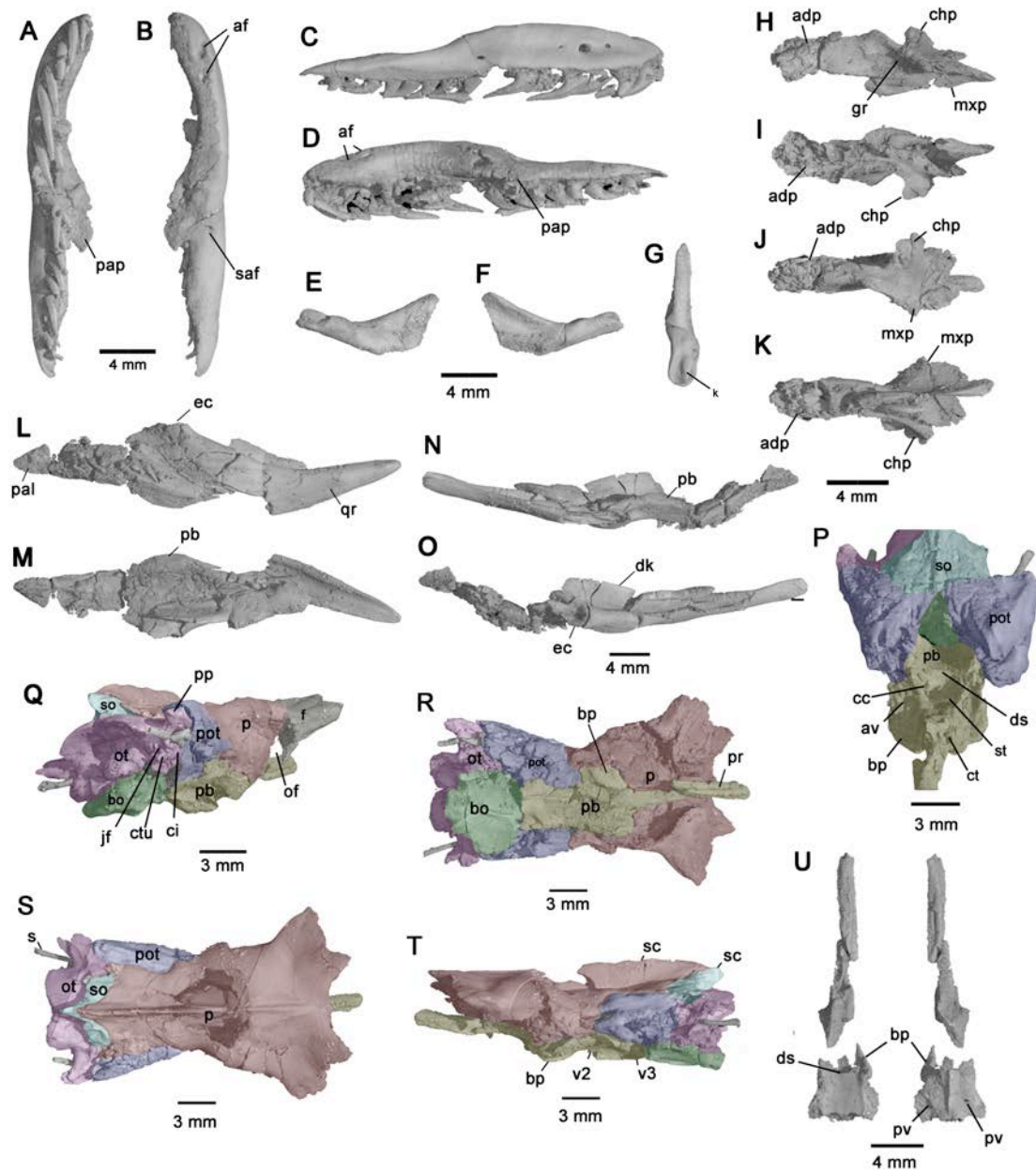


Figure S3. 3D reconstructions of the palatomaxillary and braincase bones of *Eoconstrictor fischeri* (SMF ME 11398) based on HRXCT data. Right maxilla in ventral (A), dorsal (B), lateral (C) and medial (D) views; right ectopterygoid in dorsal (E), ventral (F) and medial (G) views; left palatine in dorsal (H,I) and ventral (J,K) views; left pterygoid in ventral (L), dorsal (M), medial (N) and lateral (O) views; floor of the basicranium in anterodorsal view (P); braincase in posterolateral view (Q); braincase in ventral (R), dorsal (S), and left lateral (T) views; U, parabasisphenoid bone in dorsal (left) and ventral (right) views. adp,

anterior dentigerous process; af, anterior medial foramina; av, anterior aperture of Vidian canal; bp, basipterygoid process; bo, basioccipital; cc, cerebral carotid; chp; choanal process; ci, crista interfenestralis; ct, crista trabecularis; ctu, crista tuberalis; dk, dorsal keel; ds, dorsum sellae; ec, ectopterygoid facet; gr, groove for the passage of the maxillary branch of trigeminal nerve; jf, jugular foramen; k, medial keel of the pterygoid facet; mxp, maxillary process; of, optic foramen; os, ophidiosphenoid; ot, otooccipital; p, parietal; pap, palatine process; pb, area of contact with the basipterygoid process; pb, parabasisphenoid; pot, prootic; pp, vestigial paraoccipital process; pr, parasphenoid rostrum; pv, posterior aperture of the Vidian canal; qr, quadrate ramus; s, stapes; saf, foramen for the superior alveolar nerve; sc, sagittal crest; so, supraoccipital; st, sella turcica; v2, foramen for the maxillary ramus of the trigeminal nerve; v3, foramen for the mandibular ramus of the trigeminal nerve.

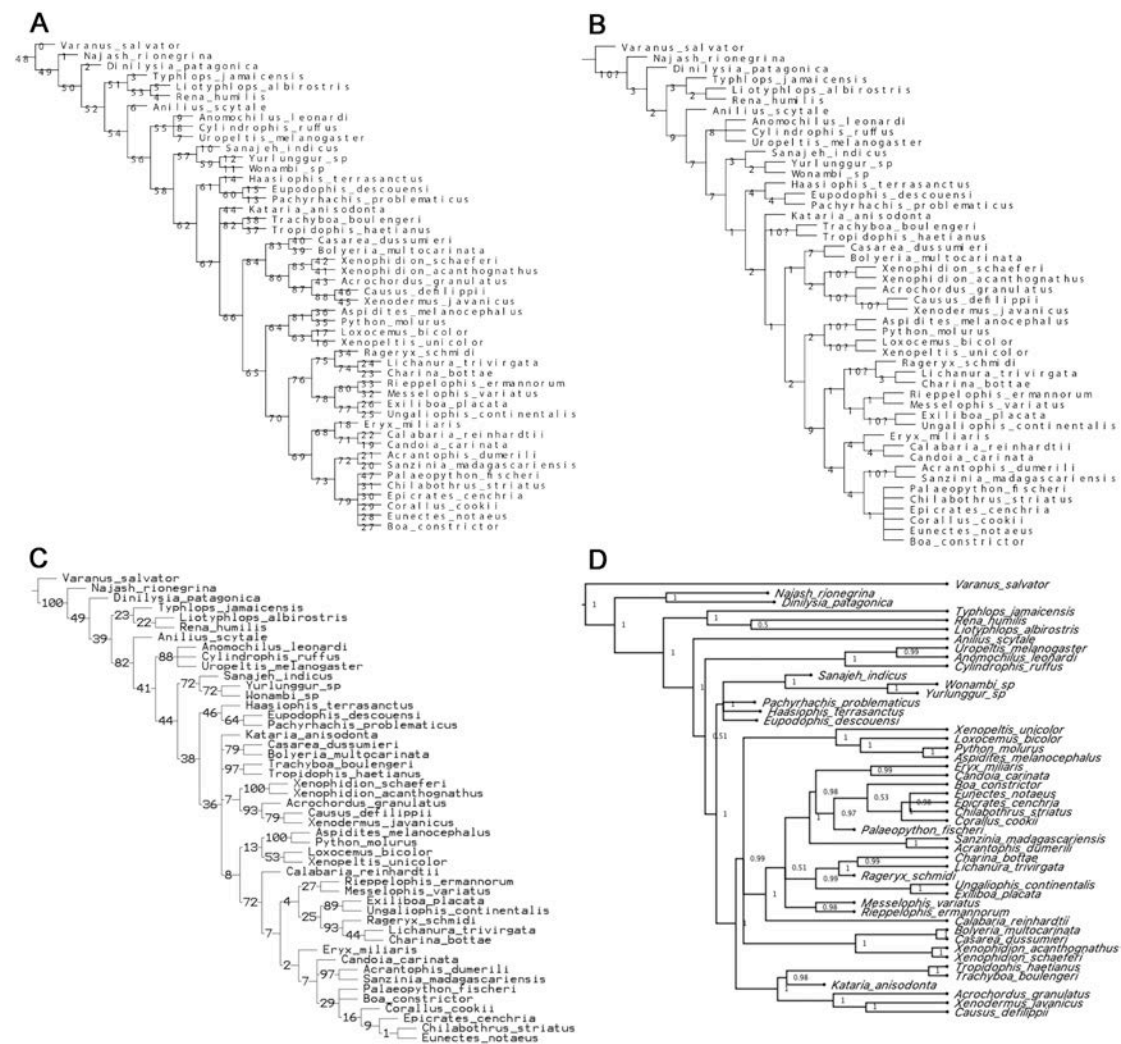


Figure S4. A, obtained consensus tree for eight most parsimonious trees with 9522 steps. (consistency index = 0.46; retention index = 0.41); B, Bremer support values for the maximum parsimony analysis; C, Bootstrap support values for the maximum parsimony analysis; D, tree obtained from Bayesian analysis of combined data set, support values are indicated by posterior probability.

2. Details of the phylogenetic analysis

2.1 List of morphological characters employed

1. Tooth implantation on the dentary pleurodont (0), alethinophidian (1).
(*Eoconstrictor fischeri* 1).
2. Plicidentine present (0), absent (1). (*Eoconstrictor fischeri* 1).
3. Maxillary and dentary teeth relatively short conical and upright (0), robust and recurved (1), elongate needle-shaped, and distinctly recurved (2).
(*Eoconstrictor fischeri* 2).
4. Maxillary dentition composed by several unmodified teeth that decrease in size posteriorly (0), or slightly to greatly enlarged teeth are present in the posterior tip of maxillary tooth row (1). (*Eoconstrictor fischeri* 0).
5. Premaxillary dentition present (0), or absent (1). (*Eoconstrictor fischeri* 1).
6. Alveoli and base of teeth not expanded transversely (0), wider transversely than anteroposteriorly (1). (*Eoconstrictor fischeri* 0).
7. Pterygoid teeth absent (0), present (1). (*Eoconstrictor fischeri* 1).
8. Ascending process of the premaxilla absent (0), or present (1). (*Eoconstrictor fischeri* 1).
9. Premaxilla broadly articulated with the maxilla (0), or loosely contacting the maxilla (1). (*Eoconstrictor fischeri* 1).
10. Transverse processes of premaxilla curved backwards (0), or extending straight laterally or anterolaterally (1). (*Eoconstrictor fischeri* 1).
11. Anterior margin of premaxilla broadly in line with arch defined by maxillae (0), projected forward (1). (*Eoconstrictor fischeri* 0).
12. Transverse process of premaxilla (0) long, projecting further laterally than midpoint of Jacobson's organ, (1) reduced or absent. (*Eoconstrictor fischeri* 0).
13. Vomerine process of premaxilla shallowly bifid (0), deeply bifid, with gap encompassing at least 50% of length of processes (1) . (*Eoconstrictor fischeri* 0).

14. Vomerine process of premaxilla in contact with and slightly overlapped by septomaxilla and/or vomer (0), no direct contact (1). (*Eoconstrictor fischeri* ?).
15. Nasal process [as in lizards] of premaxilla elongate, approaching or contacting frontals (0), short, divides nasals only at anterior margin (1), absent or nearly so (2). (*Eoconstrictor fischeri* 1).
16. Nasal terminates posterior to anterior margin of premaxilla (0), above or anterior to premaxilla (1). (*Eoconstrictor fischeri* 0).
17. Medial (vertical) flange of nasal, or paraseptal cartilages, without special vertical articulation on premaxilla (0), terminates in special facet adjacent to internal (nasal) process of premaxilla (1). (*Eoconstrictor fischeri* ?).
18. Dorsal (horizontal) lamina of nasal relatively broad anteriorly, leaving a narrow gap between its lateral margin and the vertical flange of the septomaxilla (0), or dorsal lamina of nasal distinctly tapering anteriorly, leaving a wide gap between its lateral margin and the vertical flange of the septomaxilla (1), or dorsal lamina of nasal with distinctly expanded anterior tip (2). (*Eoconstrictor fischeri* 1).
19. Medial vertical flanges of nasals absent (0), or present (1). (*Eoconstrictor fischeri* 1).
20. Vertical (medial) flanges of nasal do not (0), or do (1) articulate with the medial frontal pillars; articulate with extensive, transverse surface (2). (*Eoconstrictor fischeri* 1).
21. Anterior margin of nasals restricted to posteromedial margins of nares (0), extends anteriorly¹ toward tip of rostrum (1). (*Eoconstrictor fischeri* 0).
22. Lateral flanges of nasal articulate with anterior margin of frontals (0), are separated from frontals (1). (*Eoconstrictor fischeri* ?).

23. Posterolateral margin of nasal contacts anteromedian margin of prefrontal (0), elements in contact along most of their length (1), contact between elements with interfingering of nasal and prefrontal margins (2), nasals do not contact prefrontals (3). (*Eoconstrictor fischeri* 1).
24. The posterior dorsal process of the lateral vertical flange of the septomaxilla is absent (0), present and shorter than body of flange (1), or present and longer than it (2) . (*Eoconstrictor fischeri* ?).
25. The septomaxilla does not (0), or does (1) articulate with the medial frontal pillars . (*Eoconstrictor fischeri* ?).
26. Ventral portion of posterior edge of lateral flange of the septomaxilla is located at the level of the posterior edge or behind (0), or distinctly in front (1) of the opening of Jacobson's organ . (*Eoconstrictor fischeri* ?).
27. Vomeronasal cupola fenestrated medially (0), or closed medially by a sutural contact of septomaxilla and vomer (1) . (*Eoconstrictor fischeri* ?).
28. The septomaxilla forms the entire lateral margin of the opening of Jacobson's organ (0), or the vomer extends into the posterior part of the lateral margin, restricting the septomaxilla to the anterolateral part of the lateral margin of the opening of Jacobson's organ (1) . (*Eoconstrictor fischeri* 0).
29. Lateral ascending flange of septomaxilla: (0) taller than long, (1) longer than tall. (*Eoconstrictor fischeri* ?).
30. Ratio of lengths of anterior and posterior processes of vomer, measured to mid-point of opening for Jacobson's organ: (0) <0.35, (1) 0.35-0.50, (2) >0.50. (*Eoconstrictor fischeri* ?).

31. The vomeronasal nerve does not pierce the vomer (0), exits the vomer through a single large foramen (or an additional one or two smaller foramina) (1), or through a cluster of small foramina (2) . (*Eoconstrictor fischeri* 1).
32. Posterior ventral (horizontal) lamina of vomer long, parallel edged (0), or short, tapering to a pointed tip (1) . (*Eoconstrictor fischeri* ?).
33. Posterior dorsal (vertical) lamina of vomer well developed (0), or reduced or absent (1) . (*Eoconstrictor fischeri* 0).
34. Prefrontal articulates with the frontal laterally (0), or anterolaterally (1). (*Eoconstrictor fischeri* 1).
35. Outer orbital (lateral) margin of the prefrontal is slanting anteroventrally (0), or is positioned vertically (1) . (*Eoconstrictor fischeri* 1).
36. Orbital margin in horizontal cross-section sharp-edged (0) or rounded (1) (Kluge 1993 #16) . (*Eoconstrictor fischeri* 0).
37. The lacrimal duct on the prefrontal is not completely enclosed (0), or is completely enclosed by the prefrontal (1) . (*Eoconstrictor fischeri* 0).
38. The lateral foot process of the prefrontal is absent (0), contacts the maxilla only (1), or the maxilla and the palatine (2), or the palatine only (3) . (*Eoconstrictor fischeri* 1).
39. The medial foot process of the prefrontal is absent (0), present but short and only slightly differentiated from the prefrontal orbital lamina (1), or present as a long finger-like process (2) . (*Eoconstrictor fischeri* 2).
40. Lateral lamina of prefrontal, covering completely the nasal gland and roofing the aditus conchae, is absent (0), or well developed (1) . (*Eoconstrictor fischeri* 1).

41. Lateral foot process of the prefrontal articulates with the lateral edge of the maxilla via a thin anteroposteriorly directed lamina (0), or articulates with the maxilla via a large contact that runs from the lateral to the medial dorsal surface of the maxilla (1) . (*Eoconstrictor fischeri* 1).

42. The ventral margin of the lateral lamina of the prefrontal articulates along its entire length with the dorsal surface of the maxilla (0), or retains only a posterior contact (1) (i.e., at the anteroventral corner of the orbit) . (*Eoconstrictor fischeri* 1).

43. Distinct dorsal lappet of the prefrontal is absent (0), present (1), or present and well developed, and forms an extended overlapping contact with the nasal posteromedially (2) . (*Eoconstrictor fischeri* 2).

44. Interorbital width of the frontals is narrow (0), or broad owing to the presence of a supraorbital shelf (1) . (*Eoconstrictor fischeri* 1).

45. Medial frontal pillars absent (0), present and projected ventrally (1) . (*Eoconstrictor fischeri* 1).

46. Frontal subolfactory process (lateral frontal pillar) absent or present as a simple horizontal lamina (0), or present and closing the tractus olfactorius medially (1) . (*Eoconstrictor fischeri* 1).

47. Preorbital process dorsally exposed (0), or overlapped by the prefrontal (1) . (*Eoconstrictor fischeri* 1).

48. Transverse horizontal shelf of the frontal developed and broadly overlapped by nasals (0), or poorly developed and never broadly overlapped by nasals (1), absent (2) . (*Eoconstrictor fischeri* 1).

49. Lacrimal present (0), absent (1) . (*Eoconstrictor fischeri* 1).

50. Postfrontal present (0), or absent (1). According with Palci and Caldwell (2013), we consider the supraorbital ossification homologous to the postfrontal of non-ophidian squamates. . (*Eoconstrictor fischeri* 1).
51. Jugal present (0), or absent (1). Modified according to Palci and Caldwell (2013). . (*Eoconstrictor fischeri* 0).
52. Ventral tip of jugal remains separated by a wide gap from ectopterygoid (0), or it touches (in dried skulls), or closely approaches the ectopterygoid, forming an almost complete posterior margin of the orbit (1) . (*Eoconstrictor fischeri* 1).
53. Dorsal head of the jugal fuses or articulates with the posterodorsal surface of the postfrontal (0), articulates with the parietal (1) . (*Eoconstrictor fischeri* 1).
54. Dorsal head of jugal with rounded or squared (0), or with prominent posterodorsal knob articulating with parietal (1) (Rieppel 1987). *Eryx johnei* is a good example of state 1. . (*Eoconstrictor fischeri* 0).
55. Parietal without anterolateral wings meeting jugal bones (0), or with lateral wings meeting jugal bones (1) . (*Eoconstrictor fischeri* 1).
56. Distinct lateral ridge of parietal extending posteriorly from anterolateral wing up to prootic is absent (0), or present (1) . (*Eoconstrictor fischeri* ?).
57. Fronto-parietal suture relatively straight (0), or distinct supraorbital process of parietal extends along at least 50% of the length of dorsal margin of orbit (1) (i.e., fronto-parietal suture U-shaped) . (*Eoconstrictor fischeri* 0).
58. The parietal margin of the optic foramen is straight (0) (i.e., the parietal is not notched by the optic foramen), or concave (1) (i.e., the parietal is notched by the optic foramen) . (*Eoconstrictor fischeri* 1).
59. Lateral margins of the braincase open anterior to prootic (0), descending lateral processes of parietal enclose braincase (1) . (*Eoconstrictor fischeri* 1).

60. Supratemporal processes of parietal distinctly developed (0) (i.e., parietal expanded at level of jaw suspension), or not distinctly developed (1) .

(*Eoconstrictor fischeri* 1).

61. Parietal does not (0), or does (1) enter the anterior aspect of the base of the basiptyergoid process along its entire width . (*Eoconstrictor fischeri* 1).

62. Mid-sagittal crest of parietal absent (0), present, extending up to 50% of length of bone (1), or present, extending more than 50% of length of bone (2) .

(*Eoconstrictor fischeri* 2).

63. Shape of mid-sagittal crest of parietal in cross-section: V-shaped (0), blade with parallel sides (1) . (*Eoconstrictor fischeri* 1).

64. Contact between parietal and supraoccipital is V-shaped with the apex pointing anteriorly (i.e., the parietal is embayed posteriorly) (0), or is essentially a straight transverse line (1), or is V-shaped with the apex pointing posteriorly (i.e., posteriorly pointed) (2) . (*Eoconstrictor fischeri* 2).

65. The portion corresponding to the midsagittal line of the posterior region of the parietal does not form an elongate, slender and pointed posterior process in adult specimens (0), or does form an elongate, slender and pointed posterior process that conceals partially or totally the sagittal crest of the supraoccipital in adult specimens (1) (*Eoconstrictor fischeri* 1).

66. Medial parietal pillar absent (0), or present (1) . (*Eoconstrictor fischeri* 1).

67. Ascending (facial) process of the maxilla present and tall, reaching the dorsal region of the snout (0), reduced but still contacts the lateral lamina of prefrontal (1), reduced and does not contact the anterolateral lamina of prefrontal (2), or absent, anterior and posterior dorsal regions of the maxilla coincide (3) .

(*Eoconstrictor fischeri* 2).

68. Small horizontal shelf on medial surface of anterior end of maxilla present (0), absent (1). . (*Eoconstrictor fischeri* 1).
69. Posterior end of maxilla does not project beyond posterior margin of orbit (0), projects moderately beyond posterior margin of orbit (1), projects distinctly beyond posterior margin of orbit, with broad flat surface (2) . (*Eoconstrictor fischeri* 1).
70. Medial (palatine) process of maxilla located in front of the orbit (0), or located below the orbit (1) . (*Eoconstrictor fischeri* 1).
71. Medial (palatine) process of maxilla pierced (0), or not pierced (1) . (*Eoconstrictor fischeri* 0).
72. Maxilla without distinct posteromedial (ectopterygoid) expansion or flange (0), or this bone bears a weak but distinct posteromedial (ectopterygoid) expansion or flange (1), or the maxilla with large posteromedial (ectopterygoid) expansion or flange (2) . (*Eoconstrictor fischeri* 0).
73. Intramaxillary joint absent (0), or present (1) . (*Eoconstrictor fischeri* 0).
74. Number of maxillary labial foramina: two or more (0), one (1), zero (2). State 2 does occur in *Trachyboa boulengeri*. (*Eoconstrictor fischeri* 0).
75. Suborbital ossification absent (0), or present (1) . (*Eoconstrictor fischeri* 0).
76. Anterior end of supratemporal (facet) located behind or above posterior border of trigeminal foramen (0), or in front of posterior border of trigeminal foramen (1) . (*Eoconstrictor fischeri* 1).
77. Supratemporal facet on otooccipital flat (0), or sculptured and delineated with projecting posterior rim that overhangs otooccipital (1) . (*Eoconstrictor fischeri* 0).

78. Free-ending posterior process of supratemporal absent (0), present (1) .

(*Eoconstrictor fischeri* 1).

79. Supratemporal present (0), or absent (1) . (*Eoconstrictor fischeri* 0).

80. Supratemporal is applied along the lateral surface of the supratemporal process of parietal (0), or is embayed between prootic and parietal (1), or it is a free lamina of bone applied against the neurocranial roof (2) . (*Eoconstrictor fischeri* 2).

81. Anterior process of palatine absent (0), present and slender (1), or present as an edentulous expanded lamina (2) . (*Eoconstrictor fischeri* 1).

82. Maxillary process of the palatine represents the main element that bridges the contact between maxilla and palatine in a ventral view (0), or is covered ventrally by an expanded palatine process of the maxilla (1) . (*Eoconstrictor fischeri* 1).

83. Medial (choanal) process of palatine forms an extensive concave surface dorsal to the ductus nasopharyngeus (0), narrows abruptly to form a curved finger-like process (1), or forms a short horizontal lamina that does not reach the vomer (2) . (*Eoconstrictor fischeri* 2).

84. Choanal process of palatine without expanded anterior flange articulating with vomer (0), with anterior flange (1) . (*Eoconstrictor fischeri* 0).

85. Pterygoid contacts palatine in more or less complex pattern with clasping projections (0), in tongue-in-groove joint (1), in tongue-in-groove joint plus an anteromedial process of the pterygoid that contact with a notch in the palatine medially (2) or palatine-ptyergoid contact reduced to flap-overlap (3). State 2 corresponds with the anteromedial process described by Kluge (1990) .

(*Eoconstrictor fischeri* 1).

86. Palatine does (0), or does not (1) contact the ectopterygoid. (*Eoconstrictor fischeri* 1).

87. The anterior (dentigerous) process of the palatine meets the vomer and/or septomaxilla posterolateral to the opening of Jacobson's organ (0), or fails to do so (1) . (*Eoconstrictor fischeri* ?).

88. Lateral (maxillary) process of palatine is situated anterior to the posterolateral edge of the palatine, as judged by the tooth row (0), or at the posterior edge of the palatine (1) . (*Eoconstrictor fischeri* 1).

89. Lateral (maxillary) process of palatine in well-defined articulation (0), or only loosely overlapping the medial (palatine) process of maxilla, or no articulation between palatine and maxilla (1) . (*Eoconstrictor fischeri* 1).

90. Maxillary branch of trigeminal nerve pierces the lateral (maxillary) process of the palatine (0), or it passes dorsally between the palatine and the prefrontal (1) . (*Eoconstrictor fischeri* 1).

91. The vomerine (choanal) process of the palatine articulates broadly with the posterior end of the vomer, being continuous with the latter (0), meets the vomer in a well-defined articular facet (1), touches or abuts the vomer without articulation or remains separated from the vomer (2) . (*Eoconstrictor fischeri* 2).

92. Internal articulation of palatine with pterygoid short (0), or long (1) . (*Eoconstrictor fischeri* 0).

93. Pterygoid tooth row lies ahead of the basipterygoid joint (0), tooth row reaches or passes shortly the level of the basipterygoid joint posteriorly (1), extends greatly along the medial margin of the quadrate ramus of the pterygoid bone (2) . (*Eoconstrictor fischeri* 1).

94. Quadrate ramus of pterygoid robust, rounded or triangular in cross-section, without groove (0), or sagittally blade-like and with distinct medial longitudinal groove for the insertion of the muscle protractor pterygoidei (1), or horizontally blade like with distinct dorsal longitudinal groove (2) . (*Eoconstrictor fischeri* 1).

95. Medial edge of quadrate ramus of pterygoid crosses dorsally over to lateral side, forming an oblique keel on the dorsal surface: absent (0) or present (1). . (*Eoconstrictor fischeri* 1).

96. Transverse (lateral) process of the pterygoid forms a distinct, well-defined lateral projection (0), is a gently curved lateral expansion of the pterygoid or is absent (1) . (*Eoconstrictor fischeri* 1).

97. The lateral edge of the ectopterygoid is straight (0), or clearly angulated at the level of its contact with the maxilla (1) . (*Eoconstrictor fischeri* 1).

98. Anterior end of ectopterygoid restricted to posteromedial edge of maxilla (0), or invades the dorsal surface of the maxilla (approaching the posteroventral corner of the orbit) (1) . (*Eoconstrictor fischeri* 1).

99. Ectopterygoid-ptyerygoid contact: the posterior end of the ectopterygoid bears a notch that receives the ectopterygoid process of the pterygoid (0), or the posterior portion of the ectopterygoid overlaps significantly the dorsal surface of the pterygoid body or its ectopterygoid process or both (1), or the posterior region of the ectopterygoid establishes an extended contact with the lateral surface of the pterygoid (2), or the posterior tip of the ectopterygoid contacts a well-defined shallow concavity in the lateral surface of the pterygoid (3) . (*Eoconstrictor fischeri* 3).

100. Medial finger-like process of the ectopterygoid articulating with the medial surface of the maxilla present (0), or absent (1) . (*Eoconstrictor fischeri* 1).

101. Quadrate slender (0), or broad, with a rectangular shape (1), or extremely broad (2) . (*Eoconstrictor fischeri* 0).
102. Crest of cephalic condyle of quadrate oriented parallel or oblique to ventral condyle (0), orthogonal to ventral condyle, i.e. anteroposteriorly (1) (Smith 2013) . (*Eoconstrictor fischeri* 0).
103. Anterodorsal corner of cephalic condyle of quadrate angulated (0), smoothly rounded (1) (Smith 2013) . (*Eoconstrictor fischeri* 0).
104. Stylohyal process of quadrate visible in lateral view (0), hidden behind dorsal portion (1) (Smith 2013) . (*Eoconstrictor fischeri* 1).
105. Quadrate slanted clearly anteriorly, posterior tip of pterygoid displaced anteriorly from mandibular condyle of quadrate (0), positioned slightly anteriorly or vertically (cephalic condyle positioned behind or at the same level of mandibular condyle) (1), slanted posteriorly (cephalic condyle positioned in front of mandibular condyle) (2). (*Eoconstrictor fischeri* ?)
106. Cephalic condyle of quadrate elaborated into posteriorly projecting suprastapedial process (0), or suprastapedial process absent or vestigial (in the adult) (1) . (*Eoconstrictor fischeri* 1).
107. Stapedial footplate broad and massive (0), narrow and thin (1) . (*Eoconstrictor fischeri* 1).
108. Stylohyal not fused to the quadrate (0), fuses to the posterior tip of the suprastapedial process of quadrate (1), fuses to the posterior region of the cephalic condyle (2), or it is fused at the tip of an anteroventrally directed crest located in the quadrate shaft (3), or the stylohyal fuses directly to the middle part of the quadrate shaft (4) . (*Eoconstrictor fischeri* 3).
109. Stapedial shaft straight (0), or angulated (1) . (*Eoconstrictor fischeri* 0).

110. Stapedial shaft slender and longer than diameter of stapedial foot-plate (0), or thick, and equal to, or shorter than diameter of stapedial foot-plate (1) .

(*Eoconstrictor fischeri* 0).

111. Paroccipital process of otooccipital well developed and laterally projected (0), or reduced as a posteriorly spike-like projection (1), or strongly reduced/absent (2) . (*Eoconstrictor fischeri* 2).

112. Juxtastapedial recess defined by a bony rim absent (0), present and defined by a bony rim formed by crista prootica, crista interfenestralis, basioccipital and crista tuberalis (1), present and defined by a bony rim formed by crista prootica, crista interfenestralis, and crista tuberalis, thus excluding the basioccipital to the otic region (i.e. crista circumfenestralis) (2). Modified according to Palci and Caldwell (2014). . (*Eoconstrictor fischeri* 2).

113. Crista circumfenestralis (in the sense of Palci and Caldwell [2014]) exposes most of stapedial footplate (0), converges upon stapedial footplate (1) .

(*Eoconstrictor fischeri* 1).

114. Crista interfenestralis does not (0) or does (1) form individualized component in ventral floor of the bony rim that defines the juxtastapedial recess. Modified according to Palci and Caldwell (2014). . (*Eoconstrictor fischeri* 1).

115. Jugular foramen exposed in lateral view (0), concealed in lateral view by crista tuberalis (1) . (*Eoconstrictor fischeri* 1).

116. Otooccipitals do not contact each other dorsally (0), contact each other dorsally (1). (*Eoconstrictor fischeri* 1).

117. Otooccipital posterolateral processes short and narrow, do not extend toward posterior margin of occipital condyle (0), wider than condyle and long,

combine with crista tuberalis to extend to approximate posterior margin of occipital condyle (1) . (*Eoconstrictor fischeri* 0).

118. Supraoccipital with narrow (i.e., less than parietal) (0), or broad (i.e., as long as or more than parietal) contact to prootic (1) . (*Eoconstrictor fischeri* 0).

119. Sagittal crest of supraoccipital is restricted into the anteroposterior limits of the supraoccipital bone (0), or it extends posteriorly and reaches/surpasses the posterior dorsal margin of the atlantal crests of otooccipital (1) . (*Eoconstrictor fischeri* 1).

120. In adult specimens, the prootic bone does not exclude parietal from trigeminal foramen (0), does exclude parietal from trigeminal foramen (1) . (*Eoconstrictor fischeri* 0).

121. Ophidiosphenoid ("laterosphenoid") absent (0), present (1) . (*Eoconstrictor fischeri* 1).

122. Prootic exposed in dorsal view medial to the supratemporal or to supratemporal process of parietal (where supratemporal is lacking) (0), or fully concealed by the supratemporal or parietal in dorsal view (1) . (*Eoconstrictor fischeri* 1).

123. Exit foramen for the hyomandibular branch of the facial nerve is located outside (0), or inside (1) the opening for the mandibular branch of the trigeminal nerve (*Eoconstrictor fischeri* 1)

124. Palatine branch of facial nerve VII visible in lateral view (0), obscured by projecting flange of ophidiosphenoid (1) (novum) . (*Eoconstrictor fischeri* 0).

125. Vidian canal does not open intracranially (0), opens intracranially (1) . (*Eoconstrictor fischeri* 1).

126. Anterior opening of Vidian canal single (0), or divided (1) . (*Eoconstrictor fischeri* 0).

127. The right and left posterior Vidian canals are approximately equal in size (0), or the left is larger than the right (1) or the right is larger than the left (2) . (*Eoconstrictor fischeri* 2).

128. Sella turcica bordered posteriorly by well-developed dorsum sellae (0), dorsum sellae low (1), dorsum sellae not developed, sella turcica with shallow posterior margin (2) . (*Eoconstrictor fischeri* 1).

129. "Lateral wings" of the parabasisphenoid absent (0), present (1) . (*Eoconstrictor fischeri* 1).

130. Ventral surface of the parabasisphenoid smooth (0), or with weak crest, at least partly on midline, dividing the origin of m. protractor pterygoidei (1), with strongly projecting sagittal crest (2) . (*Eoconstrictor fischeri* 2).

131. Parasphenoid crest, if present, is linear (0), or Y-shaped (1) . (*Eoconstrictor fischeri* ?).

132. Parasphenoid crest, if present, is continuous from front to back (0), or is interrupted along its length (1) . (*Eoconstrictor fischeri* ?).

133. Basioccipital contributes to ventral margin of foramen magnum (0), basioccipital excluded by medial contact of otooccipitals (1) . (*Eoconstrictor fischeri* 0).

134. Basisphenoid-basioccipital suture smooth (0), transversely crested for attachment of hypaxial neck musculature (1) . (*Eoconstrictor fischeri* 0).

135. The palatobasal articulation is carried out through a long pedicelate process of the parabasisphenoid that articulate with the ventromedial surface of the pterygoid (0), or the parabasisphenoid bear an anteroposteriorly elongated shelf

that contact the pterygoid dorsally (1), or the parabasisphenoid projects a lamina anterolaterally that contacts the dorsal or dorsomedial surface of the pterygoid (2), or there is no bony contact between the palatopterygoid bar and the neurocranium (3) . (*Eoconstrictor fischeri* 2).

136. Crista trabecularis short and/or indistinct (0), elongate and distinct in lateral view of the basisphenoidal rostrum (1) . (*Eoconstrictor fischeri* 1).

137. Cultriform process of parabasisphenoid does not extend anteriorly to approach posterior margin of choanae (0), approaches posterior margin of vomers (1) . (*Eoconstrictor fischeri* 1).

138. Basisphenoid with strong ventrolateral processes (0), or without (1) . (*Eoconstrictor fischeri* 1).

139. Paired egresses for cranial nerve VI widely spaced, near lateral margins of pituitary fossa (0), narrowly spaced, so that space between them is approximately one-third of the width of the bone (1) . (*Eoconstrictor fischeri* ?).

140. Parabasisphenoid rostrum behind optic foramen narrow (0), broad (1) (i.e., base of the rostrum) . (*Eoconstrictor fischeri* 0).

141. Parabasisphenoid anteroventral surface flat or broadly convex (0), concave (1). (*Eoconstrictor fischeri* 0)

142. Occipital condyle visible in dorsal view (0), obscured by supraoccipital or conjoined otooccipitals (1) (Rage 1972) . (*Eoconstrictor fischeri* 1).

143. Basioccipital expanded laterally to form the floor of the recessus scalae tympani (0), or excluded from the floor of the recessus scalae tympani by the otooccipital (1) . (*Eoconstrictor fischeri* 1).

144. Basioccipital meets parabasisphenoid in a suture located at the level of the fenestra ovalis (0), or located at level or just behind the trigeminal foramen (foramina) (1) . (*Eoconstrictor fischeri* 1).
145. Parasphenoid rostrum without (0), or with broad based (1), or narrow based (2) interchoanal process . (*Eoconstrictor fischeri* 2).
146. Cristae trabeculares do not reach frontals (0), reach frontals (1) . (*Eoconstrictor fischeri* 0).
147. Anteromedial margin of dentaries possess symphyseal articular facet (0), dentaries lack symphyseal articular facet (1) . (*Eoconstrictor fischeri* 1).
148. Posterior dentigerous process of dentary absent (0), present and short (1), present and long (2) . (*Eoconstrictor fischeri* 2).
149. Medial margin of adductor fossa relatively low and smoothly rounded (0), forms a distinct dorsally projecting crest (1) . (*Eoconstrictor fischeri* 1).
150. Mental foramina on lateral surface of the dentary two or more (0), one (1) . (*Eoconstrictor fischeri* 1).
151. Coronoid process of coronoid bone high, tapering distally (0), high, with a rectangular shape (1), low, not exceeding significantly the coronoid process of the compound bone (2) . (*Eoconstrictor fischeri* 2).
152. Coronoid bone present (0) absent (1) . (*Eoconstrictor fischeri* 0).
153. Coronoid bone contributes to the anterior margin of the adductor fossa (0), does not form (reach) the anterior margin of the adductor fossa (1) . (*Eoconstrictor fischeri* 1).
154. Coronoid bone sits mostly on the dorsal and dorsomedial surfaces of the compound bone, being exposed in both lateral and medial views of the mandible

(0), or is applied to the medial surface of the compound bone (1) . (*Eoconstrictor fischeri* 1).

155. Anteromedial process of coronoid present (0), absent (1) . (*Eoconstrictor fischeri* 0).

156. Posteroventral process of coronoid present (0), absent (1). (*Eoconstrictor fischeri* 1)

157. Coronoid process on lower jaw formed by coronoid bone only (0), or by coronoid and compound bone (1), or by compound bone only (2) (i.e., coronoid absent) . (*Eoconstrictor fischeri* 1).

158. Discrete surangular and articular postdentary elements (0), fusion of surangular and articular into compound bone (1) . (*Eoconstrictor fischeri* 1).

159. Prearticular crest entirely hidden behind surangular crest in lateral aspect (0), or with strongly convex dorsal margin, visible in lateral view above surangular crest (1) . (*Eoconstrictor fischeri* 1).

160. Chevrons present (0), absent (1) . (*Eoconstrictor fischeri* 1).

161. Hemapophyses absent (0), present (1) . (*Eoconstrictor fischeri* 1).

162. Hypapophyses absent in middle trunk region (0), present throughout precloacal skeleton (1) . (*Eoconstrictor fischeri* 0).

163. Posterior trunk and cloacal vertebrae without (0) or with (1) hypapophysis (Underwood #76) . (*Eoconstrictor fischeri* 1).

164. Para- and diapophyses confluent in posterior trunk (0), separated into dorsal and ventral facet (1) . (*Eoconstrictor fischeri* 1).

165. Prezygapophyseal accessory processes absent (0), present (1) . (*Eoconstrictor fischeri* 1).

166. Subcentral paralympathic fossae (subcentral grooves) on posterior precloacal vertebrae absent (0), present (1) . (*Eoconstrictor fischeri* 1).
167. Subcentral grooves on posterior trunk vertebrae shallow, or deep with relatively gradual margins (0), deep with sharp margins (1) (Smith 2013) . (*Eoconstrictor fischeri* 0).
168. Subcentral ridges on posterior trunk vertebrae weak and rounded (0), strong and sharp, so that lateral surface of neural arch is scarcely visible in ventral aspect, and centrum with strongly triangular shape (1) (Smith 2013) . (*Eoconstrictor fischeri* 0).
169. Hemal keel on posterior trunk vertebrae absent, or narrow (0), broad, well over half the width of the vertebral condyle (1) (Smith 2013) . (*Eoconstrictor fischeri* 0).
170. Ratio of centrum length to minimum neural arch width (CL/NAW) in middle trunk is ≥ 1.1 (0), < 1.1 (1) (cutoff after Smith 2013, ratio after numerous authors) . (*Eoconstrictor fischeri* 1).
171. Subcentral foramina absent (0), present and consistently small (1), present, of variable size (2) . (*Eoconstrictor fischeri* 1).
172. Well-developed, consistently distributed paracotylar foramina absent (0), present (1) . (*Eoconstrictor fischeri* 0).
173. Ventral margin of centra smooth (0), median prominence extending from cotyle to condyle on ventral surface (1) . (*Eoconstrictor fischeri* 1).
174. Second (axis) intercentrum not fused to anterior region of axis centrum, suturally connected at most (0), fused to anterior region of axis centrum (1) . (*Eoconstrictor fischeri* ?).

175. Neural spine height: a well-developed process (0), low ridge or absent (1) .

(*Eoconstrictor fischeri* 0).

176. Posterior margin of neural arch shallowly concave in dorsal view (0), with deep V-shaped embayment in dorsal view exposing much of centrum in front of condyle (1) (Kluge 1993, p. 302) . (*Eoconstrictor fischeri* 1).

177. Cotyle shape of precloacal vertebrae strongly oval (0), approximately circular (1) . (*Eoconstrictor fischeri* 1).

178. Parazygantral foramen absent (0), present, with deep fossae (1). [madstoid thing, see Rage in litt. in Smith 2013] . (*Eoconstrictor fischeri* 0).

179. Lymphapophyses absent (0), present (1) . (*Eoconstrictor fischeri* 1).

180. Lymphapophyses, three or fewer (0), three lymphapophyses and one forked rib (1), more than three lymphapophyses and one forked rib (2) . (*Eoconstrictor fischeri* ?).

181. Sacral vertebrae present (0), absent (1) . (*Eoconstrictor fischeri* 1).

182. Position of synapophyses in relation to lateral edge of prezygapophyses at the same level or slightly more projected laterally (0), clearly medial to the edge of the prezygapophyses (1) . (*Eoconstrictor fischeri* 1).

183. Pachyostotic vertebrae absent (0), present (1) . (*Eoconstrictor fischeri* 0).

184. Precloacal vertebrae number fewer than 100 (0), 100–209 (1), 210–259 (2), ≥ 260 (3) (Gauthier et al. 2012 #457-458) Ordered. . (*Eoconstrictor fischeri* 3).

185. Postcloacal vertebrae number more than 30 (0), fewer than 30 (1) .

(*Eoconstrictor fischeri* 0).

186. Neural spine in distal caudal vertebrae unitary (0), bifurcated (1) .

(*Eoconstrictor fischeri* 0).

187. Postzygapophyseal wings in distal caudal vertebrae absent (0), present (1) .
(*Eoconstrictor fischeri* 0).

188. Posterior extensions of prezygapophyses in distal caudal vertebrae absent
(0), present (1) . (*Eoconstrictor fischeri* 0).

189. Tubercular prominences in distal caudal vertebrae absent (0), present (1) .
(*Eoconstrictor fischeri* 0).

190. Zygosphenes-zygantral articulations, if present in precloacal vertebrae,
present also throughout tail (0), absent in distal tail (1) . (*Eoconstrictor fischeri*
0).

191. Pterapophyses in postcloacal vertebrae absent (0), or present (1) .
(*Eoconstrictor fischeri* 0).

192. Distal tip of prezygapophyses in postcloacal vertebrae undifferentiated (0),
or elaborated into a horizontal blade (posterior extension of prezygapophysis)
(1) . (*Eoconstrictor fischeri* 0).

193. Distal caudal vertebrae longer than tall, or height equals length (0), much
taller than long (1) . (*Eoconstrictor fischeri* 0).

194. Tuber costae absent from ribs (0), tuber costae present (1) . (*Eoconstrictor*
fischeri 1).

195. Pectoral girdle and forelimbs present (0), absent (1) . (*Eoconstrictor fischeri*
?).

196. Tibia, fibula, and hind foot present (0), absent (1) . (*Eoconstrictor fischeri* ?).

197. Trochanter externus present (0), absent (1) . (*Eoconstrictor fischeri* ?).

198. Pelvis external to sacral-cloacal ribs (0), internal to sacral-cloacal ribs (1) .
(*Eoconstrictor fischeri* ?).

199. Ilium and pubis length, ilium longer than pubis (0), ilium and pubis of same size (1), pubis much longer than ilium (2) . (*Eoconstrictor fischeri* ?).

200. Pelvic elements with strongly sutured contact (0), with weak (cartilaginous) contact (1), fused together (2) . (*Eoconstrictor fischeri* ?).

201. Pelvic vestiges present (0), absent (1) . (*Eoconstrictor fischeri* ?).

2.2 GenBank accession codes

	cytb	12s	16s	BDNF	NTF-3	PNN	C-mos	NGFB
<i>Acrantophis dumerili</i>	ADU69735	EU403569	AF215276	AY988032	AY988049	X	EU403581	X
<i>Acrochordus granulatus</i>	AF217841	AF544738	AF544786	EU402621	EU390905	EU390949	AF471124	EU437984
<i>Anilius scytale</i>	U69738	AF544753	AF544826	EU402625	AY988055	EU390953	AY099965	EU437988
<i>Anomochilus leonardi</i>	X	AY953430	AY953431	X	X	X	X	X
<i>Aspidites melanocephalus</i>	U69741	EF545033	EF545060	DQ465559	DQ465558	EU390955	DQ465557	EU437990
<i>Boa constrictor</i>	AY575035	Z46470	Z46495	EU402629	AY988047	EU390957	AF471115	EU437993
<i>Calabaria reinhardtii</i>	AY099985	Z46464	Z46494	FJ433972	EU390911	EU390959	AY099978	EU437995
<i>Candoia carinata</i>	CCU69754	AF544741	AF544815	FJ433974	AY988048	X	AF544674	X
<i>Casarea dussumieri</i>	U69755	AF544754	AF544827	EU402632	EU390912	JN703055	AF471114	EU437996
<i>Causus defilippii</i>	AY223556	AF057186	AF057233	EU402633	EU390913	JN703037	MK410890	EU437997
<i>Charina bottae</i>	CBU69758	AF544743	AF544816	FJ433978	FJ434079	X	CBU69757	X
<i>Chilabothrus striatus</i>	ESU69791	X	X	KC330061	KC330126	EU390965	KC329996	EU438002
<i>Corallus cookii</i>	HM348836	JX244287	X	JX244302	JX244326	X	JX244315	X
<i>Cylindrophis ruffus</i>	AF471032	AF544744	AF544817	EU402635	EU390915	EU390962	AF471133	EU437999
<i>Epicrates cenchria</i>	ECU69777	AF368059	AF215273	AY988028	AY988045	X	HQ399538	X
<i>Eryx miliaris</i>	U69825	AF544746	AF544818	FJ433977	X	X	AF544683	X
<i>Eunectes notaeus</i>	U69810	AF368057	AF215274	KC330076	HQ399526	X	HQ399536	X
<i>Exiliboa placata</i>	AY099989	AF512742	AF512742	EU402640	EU390920	EU390967	AY099973	EU438004
<i>Rena humilis</i>	AY099991	GQ469228	GQ469228	EU402648	EU390928	EU390974	AY099979	EU438012

<i>Lichanura trivirgata</i>	AY099988	AF544749	AF544821	EU402649	DQ465578	EU390975	AF544687	EU438013
<i>Liotyphlops albirostris</i>	AF544672	Z46461	Z46487	EU402650	X	GU456069	AF544727	EU438014
<i>Loxocemus bicolor</i>	U69845	Z46456	Z46486	EU402651	DQ465572	EU390976	AY444035	EU438015
<i>Python molurus</i>	U69854	AF236682	EF545065	EU402658	X	X	AY099968	EU438022
<i>Sanzinia madagascariensis</i>	AY612002	AF368055	AF215272	AY988033	AY988050	X	AY611911	X
<i>Trachyboa boulengeri</i>	X	AF512730	AF512730	EU402661	EU390936	EU390985	X	EU438025
<i>Tropidophis haetianus</i>	U69869	FJ755181	FJ755181	EU402663	EU390936	EU390987	AY099962	EU438027
<i>Typhlops jamaicensis</i>	KF993259	AF366695	AF366764	EU402664	EU390938	EU390988	AF544733	EU438028
<i>Ungaliophis continentalis</i>	U69870	AF544760	AF544833	EU402665	EU390939	EU390989	AY099970	EU438029
<i>Uropeltis melanogaster</i>	X	AF512739	AF512739	FJ433965	FJ434070	X	X	X
<i>Varanus salvator</i>	GU476585	AF004512	KU746389	JQ845024	JQ844931	EU390946	AF435017	EU437981
<i>Xenodermus javanicus</i>	AY425810	AF544781	AF544810	EU402667	EU390940	EU390991	AF544711	EU438031
<i>Xenopeltis unicolor</i>	LC105621	AF544752	AF544825	EU402668	DQ465562	EU390992	DQ465561	EU438032
<i>Xenophidion schaeferi</i>	AY574279	X	X	X	X	X	X	X

2.3 Results of phylogenetic analyses

List of synapomorphies for the labelled nodes in Figure S4A:

- Node 49 : No morphological synapomorphies
- Node 50 : Char. 115: 0 --> 1 Char. 146: 0 --> 1 Char. 164: 0 --> 1 Char. 181: 0 --> 1
- Node 51 : Char. 9: 0 --> 1 Char. 14: 0 --> 1 Char. 22: 0 --> 1 Char. 59: 0 --> 1 Char. 69: 0 --> 1 Char. 95: 0 --> 1 Char. 99: 0 --> 1 Char. 104: 1 --> 0 Char. 143: 0 --> 1 Char. 163: 1 --> 0 Char. 170: 1 --> 2 Char. 173: 0 --> 1 Char. 176: 1 --> 0
- Node 52 : Char. 17: 1 --> 0 Char. 18: 0 --> 1 Char. 49: 0 --> 1 Char. 50: 0 --> 1 Char. 98: 0 --> 1 Char. 111: 1 --> 2 Char. 137: 0 --> 1 Char. 142: 0 --> 1 Char. 152: 0 --> 1 Char. 153: 0 --> 1 Char. 159: 0 --> 1
- Node 53 : Char. 11: 0 --> 1 Char. 172: 1 --> 0

- Node 54 : Char. 23: 0 --> 2 Char. 30: 0 --> 1 Char. 37: 0 --> 1
Char. 42: 0 --> 1 Char. 44: 0 --> 1 Char. 45: 0 --> 1 Char. 61: 0 --> 2
Char. 65: 0 --> 1 Char. 80: 0 --> 1 Char. 81: 0 --> 1 Char. 91: 0 --> 1
Char. 128: 0 --> 1 Char. 135: 0 --> 1 Char. 144: 0 --> 1
Char. 150: 0 --> 2 Char. 156: 0 --> 1
- Node 55 : Char. 19: 1 --> 2 Char. 23: 2 --> 1 Char. 101: 0 --> 1
- Node 56 : Char. 38: 0 --> 1 Char. 154: 0 --> 1
- Node 57 : Char. 116: 0 --> 1 Char. 133: 0 --> 1 Char. 177: 0 --> 1
Char. 181: 1 --> 0
- Node 58 : Char. 14: 0 --> 1 Char. 22: 0 --> 3 Char. 50: 1 --> 0
Char. 68: 1 --> 2 Char. 77: 0 --> 1 Char. 79: 1 --> 2 Char. 88: 0 --> 1
Char. 96: 0 --> 1 Char. 113: 0 --> 1 Char. 114: 0 --> 1 Char. 121: 0 --> 1
Char. 127: 2 --> 1 Char. 143: 0 --> 1 Char. 147: 1 --> 2
Char. 171: 0 --> 1 Char. 174: 1 --> 0
- Node 59 : Char. 55: 0 --> 1 Char. 76: 0 --> 1
- Node 60 : Char. 100: 0 --> 1
- Node 61 : Char. 150: 2 --> 1 Char. 156: 1 --> 0 Char. 182: 0 --> 1
Char. 195: 1 --> 0
- Node 62 : Char. 59: 0 --> 1 Char. 67: 0 --> 1 Char. 69: 0 --> 1
Char. 90: 1 --> 2 Char. 95: 0 --> 1 Char. 105: 0 --> 1 Char. 139: 1 --> 0
- Node 63 : Char. 9: 1 --> 0 Char. 22: 0 --> 2 Char. 41: 1 --> 0
Char. 54: 1 --> 0 Char. 56: 0 --> 1 Char. 67: 1 --> 0 Char. 69: 1 --> 0
Char. 86: 1 --> 0 Char. 90: 2 --> 1 Char. 100: 0 --> 2 Char. 101: 0 --> 1
Char. 108: 0 --> 1 Char. 114: 1 --> 0 Char. 141: 1 --> 0
Char. 148: 1 --> 0 Char. 166: 0 --> 1 Char. 168: 0 --> 1 Char. 173: 0 --> 1
Char. 174: 0 --> 1 Char. 175: 1 --> 0
- Node 64 : Char. 4: 1 --> 0
- Node 65 : Char. 22: 3 --> 0 Char. 71: 1 --> 0 Char. 154: 1 --> 0
Char. 171: 1 --> 0
- Node 66 : Char. 66: 3 --> 2 Char. 82: 0 --> 1
- Node 67 : Char. 34: 0 --> 1 Char. 41: 0 --> 1 Char. 66: 1 --> 3
Char. 71: 0 --> 1 Char. 93: 0 --> 1 Char. 148: 0 --> 1 Char. 162: 0 --> 1
- Node 68 : Char. 23: 2 --> 1
- Node 69 : Char. 61: 1 --> 2 Char. 62: 0 --> 1 Char. 64: 0 --> 1
Char. 82: 1 --> 2 Char. 118: 0 --> 1
- Node 70 : Char. 25: 0 --> 1 Char. 38: 1 --> 2 Char. 68: 2 --> 1
Char. 87: 0 --> 1 Char. 89: 0 --> 1
- Node 71 : No morphological synapomorphies
- Node 72 : Char. 84: 1 --> 2 Char. 166: 0 --> 1 Char. 179: 2 --> 1
- Node 73 : Char. 7: 0 --> 1 Char. 43: 0 --> 1 Char. 91: 1 --> 0
Char. 103: 0 --> 1 Char. 112: 0 --> 1 Char. 129: 1 --> 2
- Node 74 : Char. 10: 0 --> 1 Char. 19: 1 --> 2 Char. 185: 0 --> 1
Char. 188: 0 --> 1
- Node 75 : Char. 63: 02 --> 1 Char. 93: 1 --> 2 Char. 144: 2 --> 0
Char. 154: 0 --> 1 Char. 186: 0 --> 1 Char. 187: 0 --> 1 Char. 190: 0 --> 1
Char. 191: 0 --> 1 Char. 192: 0 --> 1

- Node 76 : Char. 73: 0 --> 1 Char. 96: 1 --> 0
- Node 77 : Char. 9: 1 --> 0 Char. 39: 1 --> 0 Char. 156: 1 --> 2
Char. 160: 1 --> 0 Char. 169: 1 --> 0
- Node 78 : Char. 7: 0 --> 1 Char. 91: 1 --> 0
- Node 79 : Char. 171: 0 --> 1
- Node 80 : Char. 68: 1 --> 2 Char. 100: 0 --> 1
- Node 81 : Char. 36: 0 --> 1 Char. 42: 1 --> 2 Char. 53: 0 --> 1
Char. 61: 1 --> 2 Char. 76: 0 --> 1 Char. 82: 1 --> 2 Char. 107: 2 --> 4
Char. 110: 2 --> 1 Char. 112: 0 --> 1 Char. 124: 1 --> 0
- Node 82 : Char. 53: 0 --> 1 Char. 68: 2 --> 0 Char. 91: 1 --> 0
Char. 96: 1 --> 0 Char. 117: 0 --> 1 Char. 119: 0 --> 1 Char. 151: 0 --> 1
Char. 156: 1 --> 2
- Node 83 : Char. 9: 1 --> 0 Char. 69: 1 --> 0 Char. 74: 0 --> 1
- Node 84 No morphological synapomorphies
- Node 85 : Char. 10: 0 --> 1 Char. 13: 0 --> 1 Char. 22: 3 --> 2
Char. 25: 0 --> 1 Char. 26: 1 --> 0 Char. 37: 1 --> 0 Char. 39: 0 --> 1
Char. 50: 0 --> 1 Char. 54: 1 --> 0 Char. 63: 0 --> 2 Char. 80: 1 --> 2
- Node 86 : Char. 30: 1 --> 2 Char. 32: 0 --> 1 Char. 70: 0 --> 1
Char. 151: 0 --> 1 Char. 156: 1 --> 2
- Node 87 : Char. 19: 1 --> 0 Char. 23: 2 --> 1 Char. 27: 0 --> 1
Char. 31: 0 --> 1 Char. 38: 1 --> 0 Char. 66: 2 --> 3 Char. 73: 0 --> 2
Char. 82: 1 --> 0 Char. 91: 1 --> 0 Char. 104: 1 --> 2 Char. 117: 0 --> 1
Char. 119: 0 --> 1 Char. 141: 1 --> 0 Char. 144: 2 --> 0
Char. 145: 0 --> 1
- Node 88 : Char. 24: 0 --> 1 Char. 140: 0 --> 1

3. Specimens examined

Institutional abbreviations: AMNH, American Museum of Natural History; BMNH, British Museum of Natural History; CAS, California Academy of Science; CENAI, Centro Nacional de Investigaciones Biológicas (currently housed in MACN); CM, Carnegie Museum of Natural History; FML, Fundación Miguel Lillo; FMNH, Field Museum of Natural History; HLMD Me, Messel collection of the Hessisches Landesmuseum Darmstadt; IAA, Instituto Antártico Argentino; IB, Instituto Butantan; LSUMZ, Louisiana State University Museum of Zoology; MACN, Museo Argentino de Ciencias Naturales “Bernardino Rivadavia”; MECN, Museo Ecuatoriano de Ciencias Naturales; MHNC, Museo de Historia Natural “Alcide D’Orbigny”; MLP, Museo de La Plata; MNHN, Museum National d’Histoire

Naturelle; MPEG, Museu Paraense “Emílio Goeldi”; MPCA, Museo Provincial “Carlos Ameghino”; MUCPv, Museo Universidad Nacional del Comahue; MZUSP, Museu de Zoologia, Universidade de Sao Paulo; PVPH, Museo Carmen Funes; SMF ME, collection of the Abteilung Messelforschung of the Forschungsinstitut Senckenberg Frankfurt a.M.

- Fossil species

Messelophis variatus: AMNH FARB 30650, SMF ME 756, SMF ME 904, SMF ME 958 b, SMF ME 1541 a+b, SMF ME 1780 a+b, SMF ME 1805, SMF ME 1815, SMF ME 1823 (Paratype), SMF ME 1828 a+b (Holotype), SMF ME 2379 (Paratype).

Messelophis ermannorum: HLMD Me 7915 (Paratype), SMF ME 71, SMF ME 759, SMF ME 760, SMF ME 1370, SMF ME 1565 a+b, SMF ME 1576, SMF ME 1677, SMF ME 1805, SMF ME 1810, SMF ME 1812 a+b+c+d+e (Holotype), SMF ME 1816 a+b, SMF ME 1820, SMF ME 2608, SMF ME 11426.

Platyspondylia lepta: MNHN PFR 6325, MNHN PFR 6351, MNHN PFR 6352, MNHN PFR 6358, MNHN PFR 6353, MNHN PFR 6356, MNHN PFR 6355, MNHN PFR 6357, MNHN PDS 3117, MNHN PDS 3118, MNHN PDS 3119, MNHN PDS 3120, MNHN PDS 3121, MNHN PDS 3122, MNHN PDS 3126, MNHN PDS 3127.

Eoconstrictor fischeri: SMF ME 1002, SMF ME 1545a-d, SMF ME 1607, SMF ME 2504a-c, SMF ME 11398.

- Extant species

Achalinus formosanus (LSUMZ 19354; BMNH 1983-192); *Acrantophis madagascariensis* (MNHN 1983.484); *Acrantophis dumerili* (MZUSP 14430); *Acrochordus granulatus* (AMNH 66367); *Acrochordus javanicus* (AMNH 140813);

Ahaetulla ahaetulla (MNHN C 952-36/-37/-38); *Ahaetulla prasina* (MNHN C 2943-29/-30/-31); *Ahaetulla subocularis* (MNHN 1973.142A); *Anilius scytale* (CENAI 3883, MACN 8817a, MACN 8817b, IB 46686, MZ 14572); *Antaresia childreni* (AMNH 86213); *Apostolepis erythronota* (AMNH 62192); *Apostolepis flavotorquata* (AMNH 93559); *Aspidites melanocephala* (AMNH 18681); *Atractaspis irregularis* (MNHN 1991.4071/4072); *Bitis arietans* (CENAI 3386); *Boa constrictor* (MACN 39025, MZUSP 2553, MZUSP 13843, CM 145331); *Boiruna maculata* (MACN 40006, MACN 40007); *Boiruna sertaneja* (MZUSP 7031); *Bungarus fasciatus* (CENAI 3887); *Calabaria reinhardtii* (AMNH 45901, CM 147738, SMF-PH 68); *Candoia aspera* (AMNH 142843); *Candoia carinata* (MZ 14111, MZ 14112, CM 118570, MBS 7103); *Casarea dussumieri* (MNHN 1992-27, MNHN 1993.3382); *Causus rhombeatus* (MNHN 1991.4146/4147); *Causus maculatus* (MNHN 1991.4140); *Causus resimus* (MNHN 1991.4144); *Cerberus rhynchops* (MNHN 1991.4352); *Charina bottae* (CM 36539, MZ, 8854, UMMZ 135016); *Clelia rustica* (MACN 40004); *Corallus caninus* (CM 145320, IB 40869, MZUSP 14426); *Corallus hortulanus* (MZ 13050); *Cylindrophis maculatus* (AMNH 85496); *Cylindrophis ruffus* (AMNH 85647, CM 147774, MNHN 1970.411); *Daboia russelli* (MNHN 1991.4112/4113/4114, MNHN 1997.6005/6037); *Dasypeltis scabra* (CENAI 3853); *Dendroaspis polylepis* (MACN S/N); *Enhydris bocourti* (MNHN 1970-557A); *Enhydris enhydris* (MNHN C 3458-23/-24); *Enhydris innominata* (MNHN 1970-560A); *Enhydris plumbea* (MNHN C 3461-15/-19); *Enhydris dussumieri* (MNHN 2009.0206); *Enhydris jagorii* (MNHN 1970.554A); *Enhydris sieboldii* (MNHN 2009.0204); *Chilabothrus angulifer* (CM 35999); *Epicrates cenchria* (IB 52174, IB 49335, SMF 92371); *Erpeton tentaculatus* (MNHN 1970.573A); *Eryx colubrinus* MBS 447, SMF-PH 24; *Eryx conicus* (AMNH 89273, CM 91863, BM 1964.1224, SMF-PH 18); *Eryx jaculus* (MZ 14101, Tü-VI.1935); *Eryx jayakari* BM 1909.10.15.8; *Eryx johnei* (AMNH 99701, BM 1930.5.8.31,

SMF-PH 20); *Eryx miliaris* (AMNH 143770); *Eryx muelleri* MBS 454; *Eryx tataricus* CM 145329; *Eunectes murinus* (MPEG 16443); *Eunectes notaeus* (MZUSP 7622); *Eunectes deschauensis* (MPEG 18019); *Exiliboa placata* (AMNH 102892); *Helicops leopardinus* (MACN 40014); *Homalopsis buccata* (MNHN 1991.4202, MNHN 1991.4347, MNHN 1991.4348, MNHN 1970.519a); *Homoroselaps lacteus* (MNHN 1991.4162); *Hydrophis* sp. (MNHN 1986.0596); *Langaha nasuta* (MNHN 1991.4355, MNHN 1950.178A); *Leiopython albertisii* (AMNH 95140, MZUSP 14427); *Liasis fuscus* (AMNH 86222); *Lichanura roseofusca* (CM 56093, CM 145332, MZUSP 7283); *Lichanura trivirgata* CM 56093, CM 145332, SMF-PH 21; *Liophis anomalus* (MACN 40012); *Liophis miliaris* (MACN 40013); *Liophis poecilogyrus* (MACN 40011); *Loxocemus bicolor* (AMNH 110151, MZUSP 14114, FML 970, LSUMZ 49634); *Lystrophis dorbignyi* (MACN 40009); *Macrelaps microlepidotus* (CENAI 3858, LSUMZ 55387); *Madagascarophis colubrinus* (MNHN C 2451-37/-38); *Malpolon monspesulanus* (MNHN 1988.6505, MNHN 1994.4175, MNHN 1991.4358, MNHN 1991.4562); *Mastigodryas bifossatus* (MACN 40017); *Mehelya capensis* (MACN 3857); *Mimophis madagascariensis* (MNHN 1989.2917, MNHN 1989.2918, MNHN 1989.2919, MNHN 1989.2961); *Morelia viridis* (AMNH 95135, MZUSP 14428); *Morelia spilota* (MNHN 1991.4048); *Naja nivea* (CENAI 3881); *Nerodia rhombifer* (CENAI 3838); *Notechis* sp. (MNHN 1991.4100); *Oxyrhabdium modestum* (LSUMZ 11814); *Oxyrhopus rhombifer* (MACN 40010); *Pareas mollendorfi* (AMNH 27770); *Parias sumatranus* (CENAI 3783); *Philodryas patagoniensis* (MACN 40008); *Philodryas mottogrossensis* (MACN 33420); *Philotamnus hoplogaster* (CENAI 3856); *Phimophis vittatus* (MACN 40005); *Psammophis crucifer* (MNHN 1991.4214); *Psammophis lineatus* (MNHN 1989.2942); *Psammophis sibilans* (MNHN 1991.4173, MNHN 1991.4565, MNHN 1991.4199/4200); *Pseudotyphlops philippinus* (BMNH 1978.1092); *Python molurus* (MACN 39026, MACN 39027);

Ramphiophis togoensis (MNHN 1991.4184); *Ramphiophis maradiensis* (MNHN 1994.0587); *Rhinophis blythi* (AMNH 85076); *Rhinocerothis alternatus* (MACN 40018); *Rhinophis drummondhayi* (AMNH 85076); *Sanzinia madagascariensis* (MNHN 1900.122a); *Thamnodynastes hypoconia* (MACN 40016); *Trachyboa boulengeri* (MECN 2240, MZ 8247); *Trachyboa gularis* (AMNH 28982); *Tropidophis canus* (AMNH 73066, AMNH 45839); *Tropidophis feicki* (AMNH 81128, AMNH 81132); *Tropidophis melanurus* (AMNH 82880, AMNH 46690, AMNH 93002); *Tropidophis semicinctus* (AMNH 7386); *Tropidophis tackzanowskii* (MECN 3037); *Ungaliophis continentalis* (LSUMZ 55454); *Ungaliophis panamensis* (AMNH 58845, AMNH 62639); *Uropeltis brevis* (BMNH); *Uropeltis ceylonicus* (AMNH 43343); *Uropeltis pulmeyensis* (MNHN 1994-756); *Vipera aspis* (MNHN 1991.4066, MNHN 1991.4107, MNHN 1982.169A); *Vipera ammodytes* (MNHN 1991.4068); *Vipera berus* (MNHN 1991.4128); *Vipera latasti* (MNHN 1991.4145); *Waglerophis merremi* (MACN 40015); *Xenopeltis unicolor* (MACN 7568, MZUSP 9665, MNHN 1991.4446, FMNH 11524); *Xylophis perroteti* (MNHN 1991.4426).

Also, anatomical comparisons and some of the skull characters were codified through the CT scan movies available from DigiMorph (www.digimorph.org), MorphoSource (www.morphosource.com) and Phenome 10K (www.phenome10k.org).