

Supplementary information

"Fossil evidence for an ancient divergence of lorises and galagos" Erik R. Seiffert¹, Elwyn L. Simons¹, & Yousry Attia²

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Section 1. Descriptions, measurements, and hypodigms of *Karanisia clarki* and *Saharagalago misrensis* specimens

Karanisia clarki

Upper dentition. Only upper third and fourth premolars can be confidently attributed to *K. clarki*. Both are simple teeth, with no metacone or hypocone; the P⁴ protocone is well-developed but that of P³ is relatively reduced. Buccal and lingual cingula and a small parastyle are evident on P⁴, but these features are not clearly developed on P³ (the sole specimen representing this locus is, however, quite eroded, and depositional processes may have obscured these details).

M¹⁻³ evidently decrease in size posteriorly if our identifications to locus are correct. The most distinctive features of the upper molars are the well-developed buccal and lingual cingula and the large hypocone lobe that protrudes from the distolingual aspect of the tooth; it is delimited buccally by a moderately deep concavity in the distal wall of the tooth, but it is not distended lingually far beyond the position of the protocone. Hypocones are very small on all upper molars and are placed only slightly lingual to the position of the protocone. The preprotocristae are confluent with small paraconules, and there is no development of hypoparacristae; the postprotocrista is trenchant on all upper molars and there is no development of a metaconule or pre- and post-metaconule cristae. Cusps are essentially crestiform with very little basal inflation.

Lower dentition. P₄ is unicuspid, and has continuous buccal and lingual cingula, a poorly developed talonid basin, and no trenchant cristid obliqua. The lower molars increase in length posteriorly. The metaconid on M₁ is shifted quite far distally with respect to the protoconid, and a weak premetacristid descends from its apex. On the type specimen tiny paraconids are evident on M₁₋₃, but on other specimens these cusps are either not developed or obscured by wear. Cingulids surround the entire buccal aspect of each lower molar, and ascend the distal aspect of the tooth to form a distobuccal cingulid. The oblique cristids meet the posterior trigonid wall lingual to the protoconids on all lower molars. On M₂, the entoconid is placed directly transverse to the hypoconid. There is quite a large hypoconulid lobe on M₃, and no cuspidate entoconid.

Karanisia clarki hypodigm: CGM 40249A (M₂), CGM 40255G (M²), CGM 40255H (M²), CGM 40265 (lower mandible with M₁₋₃), DPC 21214E (P⁴), DPC 21249 (lower mandible with P₄ and M₂) DPC 21365C (M³), DPC 21371B (P³), DPC 21487B (lower canine), DPC 21636E (M²), DPC 21639C (M¹), as well as uncatalogued specimens housed in the Egyptian Geological Museum.

Metric data for figured specimens of <i>Karanisia clarki</i>			
Locus	Specimen number	Mesiodistal length	Buccolingual width
Lower canine	DPC 21487B	0.75	1.3
M ₁	CGM 40265	2.95	2.0 (Tri), 2.1 (Tal)
M ₂	CGM 40265	2.9	2.1 (Tri), 2.2 (Tal)
M ₃	CGM 40265	3.5	2.0 (Tri), 1.95 (Tal)
P ³	DPC 21371B	2.2	2.45
P ⁴	DPC 21214E	2.3	2.8
M ¹	DPC 21639C	2.9	3.3
M ²	DPC 21636E	2.6	3.2
M ³	DPC 21365C	2.3	3.1

Means and standard deviations for specimens included in hypodigm of <i>Karanisia clarki</i>		
Locus	Mesiodistal length (st. dev.)	Buccolingual width (st. dev.)
M ₁	2.92 (0.05)	1.92 (Tri) (0.06), 2.1 (Tal) (0.06)
M ₂	2.8 (0.1)	2.05 (Tri) (0.05), 2.12 (Tal) (0.1)
M ₃	3.5	2.0 (Tri), 1.95 (Tal)
P ³	2.2	2.45
P ⁴	2.3	2.78 (0.04)
M ¹	2.83 (0.07)	3.35 (0.13)
M ²	2.57 (0.05)	3.17 (0.09)
M ³	2.3	3.1

Saharagalago misrensis

Lower molar. The single known lower molar of *S. misrensis* is very similar to the M₁ of *Karanisia clarki* - the metaconid is shifted far distally relative to the protoconid, a premetacristid descends from its apex, and there is a continuous cingulid surrounding the buccal aspect of the tooth. There is no paraconid, and the paracristid is oriented almost directly mesially but is recurved at its most mesial extent. The cristid obliqua meets the posterior trigonid wall at approximately the same point as does the same crest in *Karanisia clarki*.

Upper molar. As noted in the main text, the upper molar of *S. misrensis* exhibits a number of striking galagid synapomorphies - e.g., a deeply indented distal crown margin, a continuous prehypocrista, a long and buccally oriented postmetacrista, flaring of the molar wall buccal to the metacone, and no buccal or lingual cingula.

<i>Saharagalago misrensis</i> dental metrics			
Locus	Specimen number	Mesiodistal length	Buccolingual width
M ₁	DPC 21214B	2.35	1.6
M ¹ or ²	DPC 21487B	2.15	2.65

Section 2. Character descriptions and matrix

Character descriptions

Key to character references:

"D": Dagosto et al. (1999) *Ann. Carnegie Mus.* 68, 175-211

"R": Ross et al. (1998), *J. Hum. Evol.* 35, 221-306

"Y": Yoder (1994), *Am. J. Phys. Anthropol.* 94, 25-46

"YIP": Yoder et al. (2001) *Syst. Biol.* 50, 408-424

"MB": Masters & Brothers, *Am. J. Phys. Anthropol.* 117, 79-93.

Many scorings for cranial characters are derived from Tables 2-5 in C.F. Ross & H.H. Covert (2000), *J. Hum. Evol.* 39, 225-251.

"N"= missing data; "-"= inapplicable; polymorphisms in brackets ({01} indicates that states 0 and 1 occur within that taxon)

1-1140: cytochrome *b*

1141-2079: IRBP

2080-2358: morphological features

2359: continental biogeography

ordered characters: 2080, 2083, 2086, 2087, 2089 - 2091, 2095, 2096, 2100, 2107, 2110, 2117, 2118, 2121, 2124, 2125, 2127, 2128, 2131, 2132, 2134 - 2140, 2144, 2145, 2150, 2151, 2154, 2155, 2158 - 2161, 2164, 2167, 2169 - 2171, 2174 - 2178, 2183, 2184, 2189, 2190, 2193, 2194, 2196, 2198, 2200 - 2203, 2206, 2207, 2210 - 2214, 2218, 2223, 2224, 2229 - 2231, 2236, 2237, 2239 - 2240, 2253, 2254, 2257, 2258, 2261, 2268, 2269, 2278, 2284, 2287, 2291, 2293, 2294, 2308, 2321, 2328, 2342, 2343, 2347, 2352

2080. Lower incisor number (Y46,Ri1-1,modified):

0. three
1. two
2. one
3. none

2081. Lower incisor occlusal arrangement (Ri2-2):

0. arcuate battery in occlusal arrangement (U-shaped arcade)
1. cusp tips staggered (V-shaped arcade)

2082. Toothcomb (Y42,Ri13-13,modified):

0. lower canine is not incorporated into a toothcomb
1. lower canine is incorporated into a toothcomb

2083. i1:i2 proportions (Ri6-6):

0. i1 much smaller than i2 (<0.65)
1. i1 smaller than i2 (=>0.65, <0.82)
2. i1 almost as large as i2 (=>0.83, <1.00)
3. i1 larger than i2 (=>1.01,<1.25)
4. i1 much larger than i2 (=>1.25)

2084. i2 cross-sectional shape (ratio of mesiodistal length to buccolingual breadth) (Ri8-8):

0. rounded oval (=>0.64)
1. mesiodistally compressed (=<0.64)

2085. Lower incisor crown height (Ri9-9):

- 0. low-crowned
 - 1. moderately high-crowned
 - 2. high-crowned
- 2086. Lower incisor root orientation (Ri11-11):**
- 0. erect or vertical
 - 1. slightly procumbent
 - 2. very procumbent
- 2087. Incisor crown orientation (Ri12-12):**
- 0. erect or vertical
 - 1. procumbent
 - 2. very procumbent
- 2088. Lower incisor crown shape (Ri14-14):**
- 0. spatulate
 - 1. pointed or lanceolate
- 2089. Lower first incisor lingual cingulum (Ri17-17):**
- 0. absent to weak
 - 1. strong but incomplete
 - 2. strong and complete
- 2090. Female C/c area (relative to molars) (Rc1-19):**
- 0. very small ($c1/m1 < 0.40$)
 - 1. moderate ($=>0.4, < 0.8$)
 - 2. large ($=>0.8, < = 1.2$)
 - 3. very large ($=>1.2$)
- 2091. C/c dimorphism (square root male c1 area/square root female c1 area) (Rc2-20):**
- 0. low (< 1.07)
 - 1. moderate ($> = 1.07, < 1.17$)
 - 2. high ($> = 1.17$)
- 2092. lower canine cross-sectional shape (Rc3-21):**
- 0. rounded oval
 - 1. mesiodistally compressed
 - 2. buccolingually compressed
- 2093. Canine paracristid (Rc5-23, modified):**
- 0. oblique to occlusal plane
 - 1. nearly horizontal to occlusal plane
 - 2. forms part of cropping mechanism with il-2
 - 3. is oriented in line with buccal face of adjacent incisor
- 2094. Lower canine height (females) (Rc6-24):**
- 0. low, squat
 - 1. narrow, short
 - 2. tall, at or above toothrow
 - 3. high-crowned but very procumbent
- 2095. Lower premolar number (Y48, Rp1/2-25/26):**
- 0. four
 - 1. three
 - 2. two
 - 3. one

- 4. none
- 2096. p2 protoconid height and shape (Rp13-34):**
 - 0. extremely short, shorter than p3
 - 1. not projecting, in line with p3
 - 2. slender, projects above protoconids of p3-4
 - 3. massive, projects above protoconids of p3-4
- 2097. p2 roots (Rp3-27):**
 - 0. one
 - 1. two
- 2098. p3 paraconid (Rp6-30, modified):**
 - 0. negligible or absent
 - 1. present
- 2099. p3 lingual cingulum:**
 - 0. present
 - 1. absent
- 2100. p3 metaconid (contains information similar to that in Rp16-37):**
 - 0. absent
 - 1. present
- 2101. p3 length/sexual dimorphism (contains information similar to Rp41 and Rp42):**
 - 0. p3 shorter than or equal in length to p4
 - 1. p3 distinctly longer and taller than p4 in males
- 2102. p3 roots (Rp4-28, in part):**
 - 0. one
 - 1. two
 - 2. three
- 2103. p3 root orientation (contains information similar to Rp45-62):**
 - 0. mesial root placed directly mesial to distal root
 - 1. mesial root placed lateral to distal root
- 2104. p3 hypoconid (Rp25-46, in part):**
 - 0. very small, absent, or incorporated into talonid as an indistinct cusp
 - 1. large and well-defined, projects above other talonid cusps
- 2105. p3 shape:**
 - 0. protoconid upright, mesial aspect of tooth does not protrude far beyond the alveolar bone mesial to mesial root
 - 1. protoconid mesially procumbent, mesial aspect of tooth protrudes far beyond the alveolar bone mesial to mesial root
- 2106. p3 entoconid and lingual talonid crest (Rp19-40):**
 - 0. absent
 - 1. lingual talonid crest present but an entoconid does not stand out above it
 - 2. entoconid is a small discrete cusp
- 2107. p4 metaconid size (Rp17-38):**

- 0. absent or trace
 - 1. small
 - 2. large
- 2108. Mesiodistal position of p4 metaconid with respect to protoconid:**
- 0. distal
 - 1. transverse
- 2109. p4 paraconid (Rp7-31, modified):**
- 0. present
 - 1. very small or absent
- 2110. p4 protocristid morphology (contains information similar to Rp21):**
- 0. no development of a trenchant horizontal protocristid
 - 1. metaconid well-separated from protoconid, trenchant protocristid present
 - 2. metaconid and protoconid bases widely separated, trenchant protocristid present
- 2111. p4 premetacristid (Rp18):**
- 0. premetacristid absent or poorly developed
 - 1. premetacristid present
- 2112. p4 lateral protocristid orientation (Rp23-44):**
- 0. transversely oriented
 - 1. distolingually oriented
- 2113. p4 postprotoconid ridge (Rp36-55):**
- 0. weak or absent
 - 1. moderate
 - 2. very strong
- 2114. p4 postmetaconid ridge (or, if no metaconid present, medial protocristid) crest development (contains information similar to Rp37-56):**
- 0. weak or absent
 - 1. moderate
 - 2. very strong
- 2115. p4 entoconid and lingual talonid crest (Rp20-41):**
- 0. absent or a trace
 - 1. lingual talonid crest present but an entoconid does not stand out above it
 - 2. entoconid is a small discrete cusp
- 2116. Height of p4 talonid:**
- 0. no aspect of the talonid is at level of m1 trigonid basin
 - 1. hypoconid extends to level of m1 trigonid basin
 - 2. entire talonid basin extends to level of m1 trigonid basin
- 2117. p4 talonid length (ratio of midline md length of trigonid to md length of talonid) (Rp31-52):**
- 0. tri:tal=>1.61
 - 1. =>1.27, <1.61
 - 2. =>0.92, <1.27
 - 3. <0.91

- 2118. Morphology of p4 talonid (contains information similar to that in Rp11 and Rp26):**
0. talonid basin poorly defined, hypoconid is indistinct or poorly differentiated from distal cingular structures
 1. hypoconid present, talonid basin is buccolingually narrow and situated lingually
 2. hypoconid present and buccally placed; talonid is buccolingually broad
- 2119. p4 hypocristid shearing development (Rp27-48):**
0. absent
 1. weak
 2. strong
- 2120. p4 cristid obliqua:**
0. absent or indistinct
 1. present, meets trigonid distal to protoconid
 2. present, meets trigonid between metaconid and protoconid
 3. present, meets trigonid distal to metaconid
- 2121. Lower premolar crowding (Rp5-29):**
0. no crowding
 1. slightly crowded
 2. very crowded
- 2122. Buccal cingulum on p4:**
0. absent or indistinct
 1. present and distinct
- 2123. p4 lingual cingulum:**
0. absent or discontinuous
 1. present
- 2124. m1 paraconid (contains information similar to Rm20-81):**
0. absent or crestiform
 1. present, small
 2. present, large
- 2125. m1 length/width (Rm55-111):**
0. 1.0-1.15
 1. 1.16-1.22
 2. 1.23-1.32
 3. >1.33
- 2126. m1 metaconid position (Rm19-80):**
0. transverse to protoconid
 1. slightly distal to protoconid
- 2127. m1 cristid obliqua orientation (Rm32-93):**
0. reaches trigonid wall at a point distal to protoconid
 1. reaches trigonid wall at a point distolingual to protoconid
 2. reaches trigonid wall at a point distal to metaconid
- 2128. m2 cristid obliqua orientation (Rm33-94):**
0. reaches trigonid wall at a point distal to protoconid
 1. reaches trigonid wall at a point distolingual to protoconid

- 2. reaches trigonid wall at a point distal to metaconid
- 2129. m1 premetacristid (contains information similar to Rm18-79):**
- 0. premetacristid absent or indistinct
 - 1. premetacristid present
- 2130. Orientation of paracristid on m1:**
- 0. paracristid oriented mesially or only slightly lingual, lingual aspect recurved
 - 1. paracristid curves gradually lingually
 - 2. paracristid poorly developed
- 2131. m1-2 hypocristid development (Rm38-99):**
- 0. absent or indistinct
 - 1. weak
 - 2. strong
- 2132. m1 trigonid height (ratio of trigonid height to talonid height) (Rm16-77):**
- 0. higher than talonid (≥ 1.20)
 - 1. slightly higher than talonid ($\geq 1.10, < 1.20$)
 - 2. trigonid and talonid of similar height
- 2133. m1 area (m54-110):**
- 0. 1.10-2.00 mm
 - 1. 2.10-3.00 mm
 - 2. 3.10-4.00 mm
 - 3. 4.10-5.00 mm
 - 4. 5.10-6.00 mm
 - 5. 6.10-7.00 mm
 - 6. 7.10-8.00 mm
 - 7. 8.10-9.00 mm
 - 8. > 9.10 mm
- 2134. m2 trigonid width (ratio of buccolingual breadths of trigonid and talonid) (Rm6-67):**
- 0. much wider than talonid (≥ 1.11)
 - 1. width similar ($< 1.11, > 0.90$)
 - 2. much narrower than talonid (≤ 0.90)
- 2135. Hypoconulid position on m1 (contains information similar to Rm30-91):**
- 0. twinned with, or most closely situated next to, entoconid
 - 1. central
 - 2. closer to hypoconid than to entoconid
- 2136. Hypoconulid position on m2 (contains information similar to Rm30-91):**
- 0. twinned with, or most closely situated next to, entoconid
 - 1. central
 - 2. closer to hypoconid than to entoconid
- 2137. Position of entoconid relative to hypoconid on m2 (contains information similar to Rm57-113):**
- 0. mesial to hypoconid
 - 1. transverse to hypoconid
 - 2. distal to hypoconid

- 2138. m2 paraconid (contains information similar to Rm20):**
0. absent
 1. present, small
 2. present, large
- 2139. m3 paraconid:**
0. absent
 1. present, small
 2. present, large
- 2140. Morphology of distolingual aspect of m2 (contains information similar to Rm26 and Rm41):**
0. no postentoconid sulcus
 1. hypoconulid closely situated next to entoconid and postentoconid sulcus present, entoconid confluent with distal talonid wall
 2. distolingual fovea present, entoconid confluent with posterior talonid wall
 3. distolingual fovea present, entoconid mesiodistally abbreviated and not confluent with posterior talonid wall
- 2141. Accessory cusps on distolingual aspect of m2:**
0. absent
 1. present
- 2142. m3 cristid obliqua:**
0. trenchant, well-defined
 1. indistinct or absent
- 2143. m3 trigonid width (based on relative buccolingual breadths) (Rm7-68):**
0. much wider than talonid (≥ 1.20)
 1. trigonid and talonid widths similar ($\leq 1.20-1.05$)
 2. trigonid narrower than talonid (< 1.05)
- 2144. m2 length/m3 length (Rm53-109):**
0. m3 much longer than m2 (0.71-0.80)
 1. m3 longer than m2 (0.81-0.90)
 2. m3 equal to m2 (0.91-1.00)
 3. m3 smaller than m2 (1.01-1.12)
 4. m3 much smaller than m2 (≥ 1.13)
 5. m3 absent
- 2145. m3 entoconid:**
0. present and cuspidate
 1. greatly reduced or absent
- 2146. Morphology of m3 hypoconulid:**
0. large and at least moderately "lobate"
 1. lobe greatly reduced
- 2147. Molar centroconids (contains information similar to Rm37-98):**
0. absent
 1. present
- 2148. Sulci between metaconid and protoconid on molars (contains**

- information similar to Rm22/23-83/84):
- 0. absent
 - 1. present
- 2149. Paraconid position (if present on any molars) (contains information similar to Rm8-10):**
- 0. mesial to metaconid
 - 1. slightly labial to metaconid
 - 2. mesial to protoconid
- 2150. Cusp basal inflation on m2 (contains information similar to Rm17-78 and Rm44-105):**
- 0. crestiform
 - 1. moderate basal inflation
 - 2. cusp bases bulbous
- 2151. Lower molar metastylids (Rm12-73, modified):**
- 0. absent
 - 1. present
- 2152. Orientation of lateral protocristid on m2 (contains information similar to Rm21-82):**
- 0. not directed towards hypoflexid
 - 1. directed towards the hypoflexid
- 2153. Size of m1-2 hypoconulids (contains information similar to Rm27/28-88/89):**
- 0. absent
 - 1. small
 - 2. large and distinct
- 2154. m1-2 buccal cingulum development (Rm45-106):**
- 0. absent to trace
 - 1. partial, discontinuous
 - 2. complete
- 2155. Enamel crenulation on lower molars (contains information similar to Rm15-76):**
- 0. absent or weakly developed
 - 1. well developed
- 2156. Interincisal diastema (RCr42-224):**
- 0. very broad
 - 1. narrow
- 2157. I1-I2 interstitial contact (RI1-114):**
- 0. absent, teeth widely spaced
 - 1. present as a narrow contact
 - 2. I2 tightly packed against I1, I1 paracrista abbreviated
- 2158. I1:I2 area (RI4-117):**
- 0. areas approximately equal or I1 smaller than I2 (≤ 1.00)
 - 1. I1 slightly larger than I2 ($> 1.00, < 1.40$)
 - 2. I1 much larger than I2 (> 1.40)
- 2159. I1-2 lingual cingulum (RI11-124):**
- 0. weak, discontinuous

1. moderate, continuous
 2. strong
- 2160. I1 occlusal shape (mesiodistal length/buccolingual breadth) (RI6-119):**
0. rounded oval (<1.05)
 1. buccolingually compressed (>1.05, <1.30)
 2. extremely compressed (>1.30)
- 2161. I1 crown shape (RI8-121):**
0. spatulate (no apparent occlusal cusp, mesial and distal edges continuous and rounded)
 1. semi-spatulate (central cusp present, but blunt with discernable mesial and distal occlusal crests)
 2. central occlusal cusp pointed, occlusal edges steep
- 2162. I1 occlusal edge orientation (spatulate incisors only) (RI10-123):**
0. occlusal edge orthogonal to long axis of root
 1. occlusal edge wears at a steep angle to long axis of root
 2. crown with pronounced mesial asymmetry (=mesial process) in unworn state
- 2163. I2 occlusal shape (mesiodistal length/buccolingual breadth) (RI7-120):**
0. rounded oval (=<1.05)
 1. slightly buccolingually compressed (>1.05, <1.30)
 2. extremely buccolingually compressed (=>1.30)
- 2164. I2-C diastema (RI3-116):**
0. present
 1. absent
- 2165. Upper incisor number (Y43):**
0. two in each quadrant
 1. one or none in each quadrant
- 2166. Upper canine shape (contains information similar to RC1-127):**
0. round in cross-section
 1. oval
 2. strongly compressed buccolingually
- 2167. C1 mesial groove (females) (RC3-129):**
0. shallow or absent
 1. deep
- 2168. C1 lingual cingulum (RC4-130):**
0. weak or absent
 1. strong
 2. very strong
- 2169. Upper canine occlusion (RC2-128):**
0. wears against p1-2
 1. wears against p2
 2. wears against p2-3
 3. wears against p3

2170. **Upper premolar number (Y45):**
0. four
 1. three
 2. two
 3. one
2171. **P2 occlusal outline (RP6-136):**
0. triangular
 1. suboval with the long axis buccolingual
 2. suboval with the long axis mesiodistal
 3. round
2172. **P2 protocone (RP12-142, modified):**
0. present
 1. absent
2173. **P2 area relative to P3 area (contains information similar to that in RP4-134):**
0. much smaller than P3
 1. approximately the same size, or only slightly smaller, than P3
 2. much larger than P3
2174. **Height of P2 relative to P3:**
0. smaller than, or subequal in height (P2 height/P3 height ≤ 1.1)
 1. P2 slightly taller than P3 (P2 height/P3 height ≥ 1.11 , < 1.5)
 2. P2 much taller than P3 (P2 height/P3 height > 1.51)
2175. **P2 root number (RP1-131):**
0. one
 1. two
 2. three
2176. **P3 protocone (RP9-139, modified):**
0. absent
 1. present, small
 2. present, distinct
2177. **P3 root number (RP2-132):**
0. one
 1. two
 2. three
2178. **P4 metacone (RP10-140):**
0. present
 1. absent
2179. **P4 occlusal outline (RP7-137):**
0. triangular
 1. suboval
 2. squared
2180. **P3-4 parastyles (RP15-145):**
0. present
 1. absent

- 2181. P3-4 metastyles (RP16-146):**
 0. absent
 1. present
- 2182. P4 area:M1 area (RP5-135):**
 0. $P4 < M1$ (≤ 0.66)
 1. $P4 < M1$ ($> 0.66, \leq 0.76$)
 2. $P4 = M1$ ($0.77-1.05$)
 3. $P4 > M1$ (> 1.06)
- 2183. Premolar hypocones (RP13-143):**
 0. absent
 1. present on P4 only
 2. present on P3-4
 3. present on P2-4
- 2184. P2-3 distal crown margin (RP18-148):**
 0. smoothly rounded
 1. waisted between buccal and lingual cusps
- 2185. P3-4 buccal cingulum development (RP21-151):**
 0. absent or weak
 1. strong
- 2186. Upper premolar paraconules (contains information similar to RP14-144):**
 0. absent or indistinct
 1. present
- 2187. Upper premolar lingual cingula around protocone (contains information similar to RP19-149):**
 0. present
 1. absent
- 2188. M1-2 root number (RM1-152):**
 0. three or more, three or more
 1. three, two
 2. two, two
- 2189. M2 shape (bl/md) (RM3-154):**
 0. very broad (> 1.65)
 1. broad ($< 1.65, > 1.30$)
 2. squared (≤ 1.30)
- 2190. M1 area:M2 area (RM4-155):**
 0. $M1 >> M2$ (≥ 1.40)
 1. $M1 > M2$ ($< 1.40, > 1.0$)
 2. $M1 = M2$ (≤ 1.0)
- 2191. M1 mesiobuccal fovea delimited by trenchant parahypocrista:**
 0. absent
 1. present
- 2192. M1-2 Nannopithex fold (RM5-156):**
 0. absent
 1. weak

- 2. strong
- 2193. Hypocone size on M1-M2 (contains information similar to RM10/11-160/161):**
- 0. no hypocones, or very small hypocones
 - 1. small hypocones
 - 2. large hypocones (subequal to protocone)
- 2194. M1-2 hypocone position (RM12-162):**
- 0. distal, slightly lingual to protocone
 - 1. distal, far lingual to protocone
- 2195. M1-2 prehypocrista development (RM13-163):**
- 0. absent
 - 1. weak
 - 2. strong -- reaches to postprotocrista, encloses the talon lingually
- 2196. M1-2 paraconule position (RM15-165):**
- 0. attached to preprotocrista
 - 1. not attached to preprotocrista
- 2197. Convex distal lobe for M1-2 hypocone:**
- 0. absent
 - 1. present, distal crown margin weakly concave
 - 2. present, distal crown margin deeply notched
- 2198. Lingual extension of hypocone lobe:**
- 0. lobe does not extend lingually far beyond protocone
 - 1. lobe does extend far lingually past protocone
- 2199. M1 paraconule size (RM37-180):**
- 0. absent
 - 1. small-moderate (smaller than paracone)
 - 2. large (nearly as large as protocone)
- 2200. M1-2 metaconule size (RM16-166):**
- 0. absent
 - 1. small
 - 2. moderate
 - 3. large
- 2201. Shape of M1-2 centrocrista:**
- 0. straight, aligned with mesiodistal plane
 - 1. crests are more buccally oriented, meet at an angle
 - 2. crests form a mesostyle
- 2202. Buccal cingulum on M1-2 (contains information similar to RM24-172):**
- 0. absent
 - 1. present but poorly developed
 - 2. present and distinct
 - 3. extensive buccal "shelf"
- 2203. M2 postmetacrasta:**
- 0. short, indistinct, or absent
 - 1. long, trenchant, and labially extended

- 2204. M1-2 postprotocrista development (RM18-168):**
0. strong, runs to base of metaconule or metacone
 1. strong but short, does not reach to base of metacone
 2. absent
- 2205. P4-M1 pericones (RM20-170):**
0. absent
 1. small
 2. large
- 2206. M1-3 lingual cingulum development (RM22-171):**
0. absent
 1. weak, broken
 2. strong, complete
- 2207. M1-2 premetaconule cristae (RM27-173):**
0. absent or weak
 1. strong
- 2208. M1-2 postmetaconule cristae (RM28-174):**
0. absent or weak
 1. strong
- 2209. Molar protocone lingual inflation (RM31-176):**
0. not inflated
 1. slightly inflated
 2. very inflated
- 2210. M2 buccal expansion of paracone (RM33-177):**
0. no expansion
 1. slight expansion
 2. considerable expansion
- 2211. M3 metacone (RM34-178):**
0. absent or very small
 1. moderate (but smaller than paracone)
 2. large (equal to paracone)
- 2212. M3 hypocone (RM36-179):**
0. absent or very small
 1. small
 2. large
- 2213. M3 size relative to M1 (RM46-182):**
0. very small (half the size of M1 or less)
 1. small (two thirds)
 2. large (approximately as large)
- 2214. Mandibular symphyseal fusion (Y57,RCr39-221):**
0. absent
 1. present
- 2215. Shape of the mandibular angle (Y40):**
0. sharply hooked
 1. smoothly rounded
 2. rounded but noticeably expanded

- 2216. Shape of masseteric fossa:**
0. shallow
 1. deeply excavated
- 2217. Mandibular depth (Y39,RCr45-227):**
0. shallow (less than 1.8 times as deep @ m2 as md length of m2)
 1. deep (more than 1.8 times as deep @ m2 as md length of m2)
 2. very deep (more than 2.2 times as deep @ m2 as md length of m2)
- 2218. Height of coronoid process relative to condyle (RCr43-225):**
0. very high above
 1. slightly above or equal
- 2219. Condyle height relative to toothrow (RCr44-226):**
0. at level of toothrow
 1. slightly above
 2. well above toothrow
- 2220. Scapular morphology (Y64):**
0. long and narrow
 1. broad and mediolaterally shortened
- 2221. Curved ridge along inferior border of infraspinous fossa (Y65):**
0. absent
 1. present
- 2222. Relative sizes of infraspinous and supraspinous fossae (Y66):**
0. supraspinous fossa larger than infraspinous fossa
 1. fossae roughly equivalent
 2. infraspinous fossa approximately two times as large as the supraspinous fossa
 3. infraspinous fossa approximately three times as large as the supraspinous fossa
- 2223. Position of humeral head relative to tubercles:**
0. humeral head is expanded dorsal to tubercles
 1. humeral head and tubercles are approximately equal in height
 2. tubercles are expanded above humeral head
- 2224. Shape of intertubercular sulcus:**
0. narrow and deep
 1. narrow and shallow
 2. shallow and wide
- 2225. Shape of humeral trochlea (contains information similar to RH1):**
0. conical, medial aspect of trochlea flares distally
 1. cylindrical, distomedial aspect of trochlea is straight
- 2226. Capitular shape:**
0. globular
 1. ovoid
- 2227. Relative width of capitulum (contains information similar to**

- RH5):**
0. maximum ventral articular width less than 2.5 times longer than maximum capitular width
 1. maximum ventral articular width greater than 2.5 times longer than maximum capitular width
- 2228. Trochlear-capitular junction:**
0. trochlea and capitulum are confluent, with no distinct trochleo-capitular ridge
 1. lateral aspect of trochlea is offset from capitulum by a weak ridge
 2. lateral aspect of trochlea is separated from capitulum by a deep gutter
- 2229. Olecranon fossa morphology (Y78, contains information similar to RH12):**
0. deep, open and unossified
 1. moderately deep, thinly ossified and nearly transparent
 2. robustly ossified
- 2230. Humerofemoral index:**
0. <59
 1. 60-69
 2. 70-79
 3. 80-89
 4. 90-100
- 2231. Entepicondylar foramen (Y77,RH6-237):**
0. present
 1. absent
- 2232. Mediolateral position of entepicondylar foramen (Seiffert et al., 2000):**
0. lateral wall of medial strut defining foramen is confluent with medial edge of the trochlea
 1. foramen more medial, and lateral wall of medial strut defining foramen is not confluent with medial edge of the trochlea
- 2233. Capitular tail:**
0. elongate and distinct
 1. short or absent
 2. proximodistally tall capitular flange is present
- 2234. Dorsal placement of medial epicondyle (RH9-240):**
0. parallel
 1. slight dorsal angle
 2. large dorsal angle
- 2235. Dorsoepitrochlear fossa (RH11-242):**
0. present
 1. small, shallow
 2. absent
- 2236. Supinator crest (Y76, contains information similar to RH13-244):**
0. absent or poorly developed
 1. moderately developed

- 2. well-developed
- 2237. Size of centrale, orientation of centrale trapezoid facet, and articulation with hamate (RW1-249):**
- 0. small centrale, facet faces distally, no articulation with hamate
 - 1. large centrale, facet faces distoradially, articulation with hamate
- 2238. Ulnar-pisiform articulation (RW2-250):**
- 0. no ulnar-pisiform articulation
 - 1. facet on pisiform for ulnar styloid process is roughly equal in size to that for triquetrum
 - 2. facet on pisiform for ulnar styloid process is much enlarged and deeply excavated
- 2239. Styloid process (Y80):**
- 0. no discernable styloid process
 - 1. present but only moderately developed
 - 2. long and well-developed
- 2240. Pedal grooming claw (Y82,RO2):**
- 0. absent
 - 1. nail present
- 2241. Second digit of hand (Y81):**
- 0. of normal length
 - 1. drastically reduced
- 2242. Prehallux (RO3-284):**
- 0. present
 - 1. absent
- 2243. Lateral astragalar trochlear asymmetry (Seiffert & Simons, 2001):**
- 0. absent
 - 1. present
- 2244. Morphology of fibular facet (RA2, modified):**
- 0. facet slopes obliquely and gradually laterally
 - 1. facet is flat (vertical) and has a small pointed process plantarly
 - 2. dorsal aspect of facet is subvertical and has a long ventral process that projects laterally
- 2245. Astragalar cotylar fossa (Seiffert & Simons, 2001):**
- 0. shallow
 - 1. deep, medially projecting
- 2246. Shape of proximal aspect of medial tibial facet on astragalus (RA6, modified):**
- 0. dorsoventrally deep, extends to plantar aspect of astragalus
 - 1. dorsoventrally restricted, confined to dorsal half of astragalar body
- 2247. Relative astragalar head width:**
- 0. astragalar head less than 1.3 times wider than high

1. astragalar head more than 1.3 times wider than high
- 2248. Plantarflexion of astragalar head:**
0. absent
 1. present
- 2249. Posterior astragalar shelf (D20; contains information similar to RA4):**
0. present
 1. absent
- 2250. Position of groove for flexor fibularis (RA1):**
0. plantad to astragalar trochlea
 1. lateral to astragalar trochlea
- 2251. Shape of calcaneocuboid joint surface (Gebo et al., 2000):**
0. no nonarticular wedge on medioplantar surface of joint, pivot central
 1. nonarticular wedge on medioplantar surface of joint present, pivot medial
 2. cuboid pivot very shallow or absent
- 2252. Relative length of posterior calcaneal facet:**
0. length/width <1.8
 1. 1.81-2.00
 2. 2.01-2.20
 3. >2.21
- 2253. Anterior calcaneal elongation (length of calcaneus distal to astragalocalcaneal facet/total calcaneal length x 100) (RC1, scoring from D22 addendum):**
0. not elongate (ACL or anterior calcaneal ratio <40)
 1. moderate (ACL=>40-45)
 2. long (45-60)
 3. >60
- 2254. Navicular length relative to width (contains information similar to RN1):**
0. short
 1. long (150% longer than wide)
- 2255. Morphology of the naviculocuboid articulation (RN3):**
0. cuboid facet contacts only the ectocuneiform
 1. cuboid facet contacts the ectocuneiform and the mesocuneiform
- 2256. Peroneal tubercle of MT1 (RMT1-286):**
0. very large
 1. large
 2. small
- 2257. Hallux length relative to digit three length (RMT2):**
0. less than 70% the length of the three phalanges of digit III
 1. 71-80%
 2. 81% or longer

- 2258. Tibial process for peroneus longus:**
0. absent or poorly developed
 1. present and distinct
- 2259. Retroflexion of proximal tibial articulation:**
0. absent, articular surface of tibial condyles perpendicular to long axis of tibial shaft
 1. moderate retroflexion present
 2. proximal articular surface is strongly retroflexed
- 2260. Tibiofibular joint (contains information similar to RT1):**
0. tibiofibular syndesmosis extends 15% or less along the length of the distal tibial shaft
 1. tibiofibular syndesmosis or synostosis extends 25% or more along the length of the distal tibial shaft
 2. complete distal tibiofibular fusion
- 2261. Shape of distal surface of tibia (RT3-264):**
0. square
 1. triangular
- 2262. Rotation of the medial malleolus (RT4-265):**
0. none
 1. slight
 2. strong
- 2263. Shape of the medial malleolar articular surface (RT5-266):**
0. flat
 1. anteriorly convex, posteriorly flat
 2. all convex
- 2264. Shape of distal tibial shaft (RT6-267):**
0. no compression
 1. anteroposteriorly compressed
- 2265. Fovea capitis (Y75):**
0. small and insignificant
 1. present and well-developed
- 2266. Patellar margin asymmetry:**
0. absent
 1. present
- 2267. Knee index (contains information similar to RF5):**
0. 100 or higher
 1. 90-99
 2. 80-89
 3. 70-79
- 2268. Gluteal tuberosity (Y74):**
0. present, large
 1. present, small and reduced to a thin crest
 2. absent
- 2269. Position of gluteal tuberosity:**
0. proximal to, or at level of, lesser trochanter
 1. distal to lesser trochanter

- 2270. Anteroposterior angulation of proximal femur (contains information similar to RF8):**
- 0. bent anteriorly
 - 1. not bent anteriorly
- 2271. Crista paratrochanterica:**
- 0. absent
 - 1. present
- 2272. Femoral neck (Y71):**
- 0. absent, femoral head elongate with articular surface extending onto "neck"
 - 1. present
- 2273. Intertrochanteric fossa (contains information similar to RF11):**
- 0. long and distally "open"
 - 1. long and walled off by an intertrochanteric crest that meets the lesser trochanter
 - 2. short and restricted to small fossa proximal to lesser trochanter
- 2274. Greater trochanter shape (Y72):**
- 0. hook-shaped
 - 1. rounded
- 2275. Shape of manubrium (Y83):**
- 0. sternal head elongate
 - 1. shortened and triangular in shape
- 2276. Transpedicular foramina (Y85):**
- 0. absent
 - 1. present
- 2277. Number of thoraco-lumbar vertebrae:**
- 0. 18
 - 1. 19
 - 2. 20
 - 3. 21
 - 4. 22
 - 5. 23
 - 6. 24
- 2278. Anticlinal vertebra (Y84):**
- 0. T10
 - 1. T11
 - 2. T12
 - 3. L1
 - 4. no anticlinal vertebra
- 2279. Anterior inferior iliac spine (Y70):**
- 0. present
 - 1. absent
- 2280. Ilium shape (Y67):**
- 0. narrow
 - 1. markedly flared

- 2281. Ischial flaring (Y69):**
 0. absent
 1. present
- 2282. Pubic bone flaring (Y68):**
 0. absent
 1. present
- 2283. Tail length (Y86):**
 0. long tail
 1. reduced
 2. absent
- 2284. Shape of glenoid fossa (RCr40-222):**
 0. gutter or trough-like
 1. wide and biconcave
- 2285. Postglenoid process (Y25):**
 0. present
 1. absent
- 2286. Postglenoid process-auditory bulla relationship (Y26):**
 0. not confluent
 1. partially fused
 2. postglenoid process fused to lateral aspect of bulla
- 2287. Entoglenoid process (RCr41-223):**
 0. robust
 1. indistinct or absent
- 2288. Nasal septum (Y20):**
 0. forms a connection with the posteromedial edge of the palate
 1. nasal septum is recessed within the nasal fossa
- 2289. Position of pyramidal processes (RCr35-217):**
 0. medially placed
 1. laterally placed
- 2290. Position of the anteriormost point on the palatine/maxillary suture of the palate (Y19):**
 0. medial to space between M2 and M3
 1. medial to M2
 2. medial to space between M1 and M2
 3. medial to M1
 4. medial to the space between P4 and M1
- 2291. Posterior palatine torus (RCr34-216):**
 0. present
 1. absent
- 2292. Position of the posteromedial edge of the palate in relation to M3 (Y24):**
 0. anterior to M3
 1. medial to M3
 2. posterior to M3

- 2293. Shape of medial pterygoid plate (Y22, contains information similar to RCr36)):**
0. lateral pterygoid protrudes more deeply than the medial pterygoid
 1. medial and lateral pterygoids are equally deep
 2. relatively deep and protrudes ventrally when compared to the lateral pterygoid plate
- 2294. Lateral pterygoid-bullar overlap (RCr18-200):**
0. laminar
 1. absent
 2. abutting
- 2295. Extent of contact between the lateral pterygoid plate and the bullar wall (RCr19-201):**
0. slight
 1. very extensive
- 2296. Position of foramen ovale (Y28):**
0. lateral side of lateral pterygoid
 1. medial to lateral pterygoid
- 2297. Central stem of basicranium (D47):**
0. narrow
 1. broad
- 2298. Choanal shape (D50):**
0. broad
 1. peaked
- 2299. Morphology of anterior extension of bulla (Y35):**
0. smooth and rounded
 1. pointed
- 2300. Basioccipital flange (contains information similar to RCr20-202):**
0. present, extensive
 1. absent or minimal
- 2301. Encroachment of auditory bulla on pterygoid fossa (RCr17-199):**
0. present
 1. absent
- 2302. Shape of external auditory meatus (D38):**
0. tubular
 1. not tubular
- 2303. Suprameatal foramen (RCr21-203):**
0. present
 1. absent
- 2304. Ascending pharyngeal artery (Y52):**
0. if present is poorly developed
 1. present and enlarged
- 2305. Vascular plexus associated with ascending pharyngeal artery (Y53):**

- 0. absent
 - 1. present
- 2306. Relative size of stapedial and promontory arteries (contains information similar to RCr11-193):**
- 0. stapedial and promontory arteries present, stapedial larger than promontory
 - 1. stapedial absent or highly reduced relative to promontory
 - 2. stapedial and promontory absent
 - 3. stapedial and promontory of equal size
- 2307. Mediolateral position of posterior carotid foramen (RCr6-188):**
- 0. lateral
 - 1. midline of bulla
 - 2. medial
- 2308. Rostrocaudal position of posterior carotid foramen with respect to fenestra cochleae (contains information similar to RCr8-190):**
- 0. anterior to fenestra cochleae
 - 1. posterior to fenestra cochleae
- 2309. Ventrodorsal position of posterior carotid foramen relative to fenestra cochleae (RCr7-189):**
- 0. dorsal
 - 1. ventral
- 2310. Position of pathway for internal carotid artery or nerve relative to fenestra cochleae (RCr9-191):**
- 0. runs across ventral lip of fenestra cochleae, shielding it from ventral view
 - 1. does not shield fenestra cochleae
- 2311. Presence or absence of canal for internal carotid artery or nerves (RCr13-195):**
- 0. absent
 - 1. present
- 2312. Morphology of promontory canal (RCr12-194):**
- 0. complete canal
 - 1. open trough
 - 2. absent
- 2313. Perbullar pathway for internal carotid artery (RCr4-186):**
- 0. present
 - 1. absent
- 2314. Transverse septum defining caudal wall of anterior accessory cavity (contains information similar to RCr1):**
- 0. absent
 - 1. present, forms lateral wall of AAC pneumatized from tympanic cavity
 - 2. present, forms lateral wall of AAC pneumatized from epitympanic recess
- 2315. Composition of bulla:**
- 0. petrosal
 - 1. entotympanic

2316. **Epitympanic crest (RCr48-230):**
 0. absent
 1. present
2317. **Morphology of annular bridge (RCr16-198):**
 0. absent
 1. complete
 2. linea semicircularis
2318. **Position of ventral edge of tympanic bone (RCr14-196):**
 0. extrabullar
 1. intrabullar
2319. **Parotic fissure (RCr22-204):**
 0. patent
 1. closed
2320. **Pneumatization of mastoid (from epitympanic recess) (RCr3):**
 0. absent
 1. present, moderately inflated
 2. present, greatly inflated
2321. **Paroccipital processes (Y23):**
 0. absent
 1. present
2322. **Foramen on the mastoid-basioccipital suture (Y34):**
 0. present
 1. absent
2323. **Disposition of hypoglossal canal and posterior foramen of jugular complex (Y30):**
 0. distinct and separate
 1. share a shallow fossa
2324. **Jugular foramen morphology (Y29):**
 0. two foramina
 1. one foramen
2325. **Emissary foramina on lateral edge of parietals (Y33):**
 0. present
 1. absent
2326. **Interparietal bone (Y14):**
 0. no visible suture
 1. separate from supraoccipital in adult specimens
2327. **Pattern of sagittal cresting:**
 0. temporal lines converge on frontal
 1. temporal lines converge on the parietals, forming short sagittal crest
 2. temporal lines are not confluent, no sagittal crest present
2328. **Metopic sutural fusion in adults (RCr31-213):**
 0. present
 1. absent

- 2329. Frontal-maxillary contact :**
- 0. present
 - 1. absent due to intervening lacrimal
 - 2. absent due to intervening premaxilla
- 2330. Degree of orbital convergence (contains information similar to RCr32-214):**
- 0. less than 120 degrees
 - 1. greater than 120 degrees
- 2331. Expansion of ethmoturbinals (YIP89):**
- 0. no anteromedial expansion
 - 1. anterior and medial expansion
- 2332. Pronounced interorbital constriction:**
- 0. absent
 - 1. present below CN I
- 2333. Orbit size/inferred or confirmed activity pattern (contains information similar to RCr23-205):**
- 0. diurnal, or orbit size indicative of diurnal activity pattern
 - 1. nocturnal, or orbit size indicative of nocturnal activity pattern
- 2334. Foramen rotundum (Y12,RCr29-211):**
- 0. confluent with the superior orbital fissure
 - 1. present
- 2335. Lacrimal foramen morphology (Y11):**
- 0. surrounded by lacrimal bone
 - 1. foramen lies on lacrimal/maxillary suture
 - 2. foramen lies on the lacrimal/maxillary suture but is primarily surrounded by maxilla
- 2336. Position of lacrimal foramen (RCr30-212):**
- 0. inside the orbit
 - 1. on rim, or outside of, orbit
- 2337. Zygomatic-lacrimal contact (Y6, RCr26-208):**
- 0. present
 - 1. absent
- 2338. Lacrimal-palatine contact (Y5, contains information similar to RCr28-210):**
- 0. no contact
 - 1. contact present
- 2339. Fissure in orbit between the ethmoid and maxilla (Y13):**
- 0. absent
 - 1. present
- 2340. Ethmoid exposure within orbit (Y7):**
- 0. absent
 - 1. present

- 2341. Infraorbital foramina (Y2):**
0. one
 1. two
 2. three
- 2342. Location of infraorbital foramina (Y3):**
0. above P2-3
 1. above P3-4
 2. above P4
 3. above P4-M1
 4. above M1
- 2343. Morphology of zygomatic portion of postorbital bar (Y18, contains information similar to RCr24-25):**
0. no postorbital bar
 1. slender and delicate
 2. wide and robust
 3. contributes to postorbital septum
- 2344. Morphology of frontal segment of the postorbital bar (Y17, contains information similar to RCr24-25):**
0. partial frontal process but no postorbital bar
 1. slender and delicate
 2. wide and robust
 3. incorporated into postorbital septum
- 2345. Zygomatic arch depth:**
0. slender
 1. dorsoventrally deep
- 2346. Malar foramen in zygomatic bone (Y16):**
0. absent
 1. present, small
 2. present, large
- 2347. Snout length (RCr37):**
0. long snout
 1. short snout
- 2348. Maxillary depth (RCr38):**
0. deep
 1. shallow
- 2349. Facial profile (MB31):**
0. straight
 1. dished
- 2350. Position of anterior palatine foramina relative to incisors (MB2):**
0. foramina sit behind anterior incisors
 1. foramina intrude between medial incisors
- 2351. Rostral projection of premaxilla (MB12):**
0. no extension of premaxilla beyond anterior incisors
 1. mild premaxillary projection
 2. considerable projection, forming a tubular anterior rostrum

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 1 4 0 0 0 2 0 1 1 0 0 1 1 1 1 1 2 2 1 0 0 0 2 1 2 0 0 0 1 2 0 1 0 1 1 0 2 1 0 0 1 1 1
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Galagoides demidoff A T G A C C A A C A C C C G T A A A C A A C A T C C T T T A G C A A A
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 A G T A C A A A T C A T T A C T T A C T G G G A T T C C T A G C T A T A C A T T A C A C A T C
 A G A T A C T A C C A C A G C A T T C T C C T C A G T A A C A C A C A T T T G C C G G G A
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G G G A G G G G C C C T G G A T C T C C A G A A G C T G A G G A T C G G C C A A T C C A A
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1 0 1 0 0 0 0 1 0 2 1 3 1 0 1 1 N 2 0 1 1 1 1 0 0 0 0 0 2 0 0 0 N 0 1 0 0 0 0 0 0 1
0 1 0 3 0 1 1 0 0 1 0 0 0 1 0 0 0 1 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 N 0 1 0 0 2 0 0 0
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Tupaia spp. A T G G C C A A C A T A C G A A A A A A C C A C C A T T A C T A A A A T T
A T T A A C C A C T C A T T C A T T G A C C T C C C G C C C C A T C A A A T A T C T C A
T C A T G G T G A A A C T T T G G A T C C T T G C T A G G A A T G T G C C T A G T C C T A
C A A A T C G C C A C A G G A C T A T T C C T A G C T A T A C A C T A C A C T G C T G A T
A C C A C A A C A G C C T T T C C T C A G T A A C C T C A C A T T T G C C G A G A C G T A
A A T T A C G G A T A G A T A A T C C G A T A C C T T C A T G C C A A C G G A G C A T C C
A T A T T C T T T G C A T G C C T G T C C T T C A T G T A G G A C G A G G C T A T A C
T A C G G A T C T T A C A T A T A C C T A G A A A C A T G A A A T A T T G G A G T A A T T
T T A T T A T T C A C C A C T A T A G C A A C A G C C T T C A T A G G C T A C G T G C T A
C C A T G A G A C A G A T A T A T C C T T T G A G G T G C C A C A G T A A T T A C A A C
C T G C T C T C A G C A A T C C C A T A T G T A G G C A C C G A C C T A A G T A G A A T G A
A T T T G A G G C G G C T T C T C G G T A G A C A A A G C T A C C C T C A C C C G A T T C
T T C G C C T T C A C T T C A T C C C A T T A T C C C A T T A T C C C A T T A T C A G C C T A G T T

A T C G T C C A T C T C C T T T T C C T C C A T G A A A C A G G A T C C A G C A A T C C T
C T A G G A A T C G A C T C A G A C G C A G A C A A A A T T C C C A T T C C A C C C A T A C
T A C A C A A T C A A A G A T A T C T T A G G C G T A G T T G T T C T A C T T G C C G T T
T T A T C A G G C C T A G T C C T A T T T T C C C C G A C T T A C T A G G A G A T C C A
G A C A A C T A T A T G C C A G C C A A C C C A C T A A A C A C C C C T C C C A C A T C
A A G C C A G A G T G A T A C T T C C T A T T C G C A T A C G C A A T T C T A C G A T C C
A T C C C T A A C A A A T T A G G T G G A G T A G T A G C A T T A G C T A T A T C T A T C
C T T A T T C T G C T A T T C G T C C C A T T C C T T C A C A C G T C T A A A C A A C G A
A G C A T A A C T T T T C C G T C C C A T T A G C C A A T G C C T A T T C T G A A T T C T A
G T A G C T G A C C T T A T C A C A C T C A C A T G A A T C G G T G G A C A A C C T G T T
G A A C A C C C A T T C A T T C T T A T C G G C C C A A G T A G C C T C A G T C C T A T A C
T T T G C A A T C A T C A T C A T C C T A A T A C C A C T A G C C G G T T G A T T A G A A
A A T T A C C T A A T G A A G T G A T A G N G C A T T T G A C A G C C T C A C C C A G G A
G G A G C T G C T C A C C C A T C T G C A G G A G G G C A T C C G C C A T G A G G T C C T
G G A G G G C A A T G T G G G C T A C C T G C G A C T G G A C G A C C T C C A A A C C A
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C C C G G G A G A G A G G T A C A G T G C C A A C A A G G A C G T G G T G G T C C T C A C
C A G C A G C C A C A C T G G G G G C G T G G C C G A G G A C A T C G C C T A C A T C C T
C A A G C A G A T G C G C A G A G C C A T C G T G G T G G G C G A G C G C A C C G T G G G
G G G G G C C C T G G A C C T T C A G A A G C T G A G G A T C G G C C A G T C C G A C T T
C T T C T T C A C G G T G C C C G T G T C T A G G T C C C T A G G G C C C C T G G G T G G
G G G C A G C C A G A C C T G G G A G G G A A G C G G G G T C C T G C C C T G T G T G G G
G A C G C C C G C G G A G A A G G C C C T G G A G A A A G C C T T G G C C A T C C T C A C
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G G G C C T G G T C A G C A G G C T C A A T G C T G G C C T G C A G G C A G T G T C C G A
G G A T C C C C G G C T G C T G G T G C G G G C A G T C A A G C C C A G A G A A G C C T C
C G T G G A G C C T G A G G C C G G A G C T G A C A A T G C C C G G G A G A G G C C C C
G G T G T T A C C C A C A G A 0 0 0 2 0 2 2 2 1 0 0 0 0 N N 1 1 0 0 1 0 0 1 0 0 0 1 1 0 0
0 0 0 1 0 1 1 1 2 0 0 2 0 0 1 1 2 1 0 N 1 0 2 1 0 0 N 0 0 1 1 0 1 0 1 1 0 0 0 0 0 N 0 - 0
0 N 3 1 1 0 0 0 N 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 N 0 1 0 N 2 2 0 1 1 0 2 0 0 1 0 0 0 0 1 1
1 1 1 0 1 0 2 N 0 0 0 2 0 N N 0 0 0 0 N 0 0 1 0 1 1 0 1 1 0 0 0 N 0 0 0 0 0 1 0 0 1 0 0
3 0 2 1 1 - 0 1 0 0 1 1 N 0 0 0 3 2 1 0 0 1 0 1 0 1 1 2 1 0 0 0 1 0 1 0 N 2 0 0 0 N 0 0 0
0 1 0 1 0 0 N 0 1 1 0 2 0 1 0 N N 1 N 0 0 0 0 0 2

Section 3. GenBank accession numbers for nucleotide sequences included in parsimony analysis

<u>Taxon</u>	<u>cytochrome b</u>	<u>IRBP</u>
<i>Cheirogaleus major</i>	U53570	AF271421
<i>Daubentonia madagascariensis</i>	U53569	AF271422
<i>Galago moholi</i>	AF271410	AF271415
<i>Galagoides demidoff</i>	AF271411	AF271416
<i>Lemur catta</i>	U53575	AF081058
<i>Loris tardigradus</i>	U53581	AF271418
<i>Nycticebus coucang</i>	U53580	AF271419
<i>Otolemur crassicaudatus</i>	U53579	Z11805
<i>Perodicticus potto</i>	AF271413	AF271420
<i>Propithecus tattersalli</i>	U53573	AF081053
<i>Saimiri sciureus</i>	U53582	AF271424
<i>Tarsius bancanus</i>	AB011077	AF271423
<i>Tupaia belangeri</i>	NC_02521 ¹	
<i>Tupaia glis</i>		Z11808

¹region 14131-15270

Section 4. Additional information from quartet dating

Estimates based on 38 Ma date for galagid-Asian lorisid and equivalent crown lemuriform split

Quartets:	Rate	Rate 2	Date	Low	High	lnL
((<i>Daubentonia</i> , <i>Cheirogaleus</i>),(<i>Nycticebus</i> , <i>Otolemur</i>))	0.002321	0.858109	49.670563	46.853563	53.010563	-5986.985719
((<i>Daubentonia</i> , <i>Cheirogaleus</i>),(<i>Loris</i> , <i>Otolemur</i>))	0.002314	0.809185	50.194135	47.309935	53.615135	-5951.732003
((<i>Daubentonia</i> , <i>Propithecus</i>),(<i>Nycticebus</i> , <i>Otolemur</i>))	0.002173	0.92415	50.285316	47.372316	53.738316	-5923.128485
((<i>Daubentonia</i> , <i>Cheirogaleus</i>),(<i>Nycticebus</i> , <i>Galagoides</i>))	0.002302	0.854468	50.669265	47.739965	54.133265	-6011.288001
((<i>Daubentonia</i> , <i>Lemur</i>),(<i>Nycticebus</i> , <i>Otolemur</i>))	0.002223	0.901675	50.675069	47.734069	54.152069	-5957.913862
((<i>Daubentonia</i> , <i>Lemur</i>),(<i>Loris</i> , <i>Galago</i>))	0.002238	0.843706	50.680211	47.691211	54.221211	-5921.220194
((<i>Daubentonia</i> , <i>Lemur</i>),(<i>Loris</i> , <i>Otolemur</i>))	0.002241	0.841582	50.760442	47.772442	54.298442	-5916.671515
((<i>Daubentonia</i> , <i>Cheirogaleus</i>),(<i>Loris</i> , <i>Galago</i>))	0.002317	0.812983	50.815896	47.829896	54.348896	-5969.78015
((<i>Daubentonia</i> , <i>Propithecus</i>),(<i>Loris</i> , <i>Otolemur</i>))	0.002183	0.861406	50.965064	47.953064	54.534064	-5891.418638
((<i>Daubentonia</i> , <i>Cheirogaleus</i>),(<i>Loris</i> , <i>Galagoides</i>))	0.002301	0.835332	51.049363	48.053363	54.591363	-5997.439488
((<i>Daubentonia</i> , <i>Propithecus</i>),(<i>Nycticebus</i> , <i>Galagoides</i>))	0.002176	0.91178	51.034416	48.020416	54.599416	-5948.688845
((<i>Daubentonia</i> , <i>Lemur</i>),(<i>Loris</i> , <i>Galagoides</i>))	0.002223	0.863282	51.051559	48.043459	54.607559	-5948.63053
((<i>Daubentonia</i> , <i>Lemur</i>),(<i>Nycticebus</i> , <i>Galagoides</i>))	0.002223	0.89077	51.220845	48.203545	54.782845	-5976.75855
((<i>Daubentonia</i> , <i>Propithecus</i>),(<i>Loris</i> , <i>Galago</i>))	0.002182	0.866407	51.19987	48.13957	54.82487	-5902.788108
((<i>Daubentonia</i> , <i>Propithecus</i>),(<i>Loris</i> , <i>Galagoides</i>))	0.002177	0.879162	51.831227	48.719927	55.505227	-5935.74931
((<i>Daubentonia</i> , <i>Cheirogaleus</i>),(<i>Nycticebus</i> , <i>Galago</i>))	0.002319	0.758277	52.43628	49.21228	56.24128	-5932.213495
((<i>Daubentonia</i> , <i>Propithecus</i>),(<i>Nycticebus</i> , <i>Galago</i>))	0.002184	0.811517	53.071488	49.729488	57.014488	-5866.467862
((<i>Daubentonia</i> , <i>Lemur</i>),(<i>Nycticebus</i> , <i>Galago</i>))	0.002235	0.789735	53.286251	49.940051	57.228251	-5898.946981