Supplementary Information

Material and methods

Data collection. Appendix 1 lists the taxa, localities, and accession numbers of specimens used in the study. DNA extraction was performed as described elsewhere (Winnepenninckx et al. 1993), or with the Nucleospin tissue kit from Biotech, or the DNeasy Tissue Kit from Qiagen.

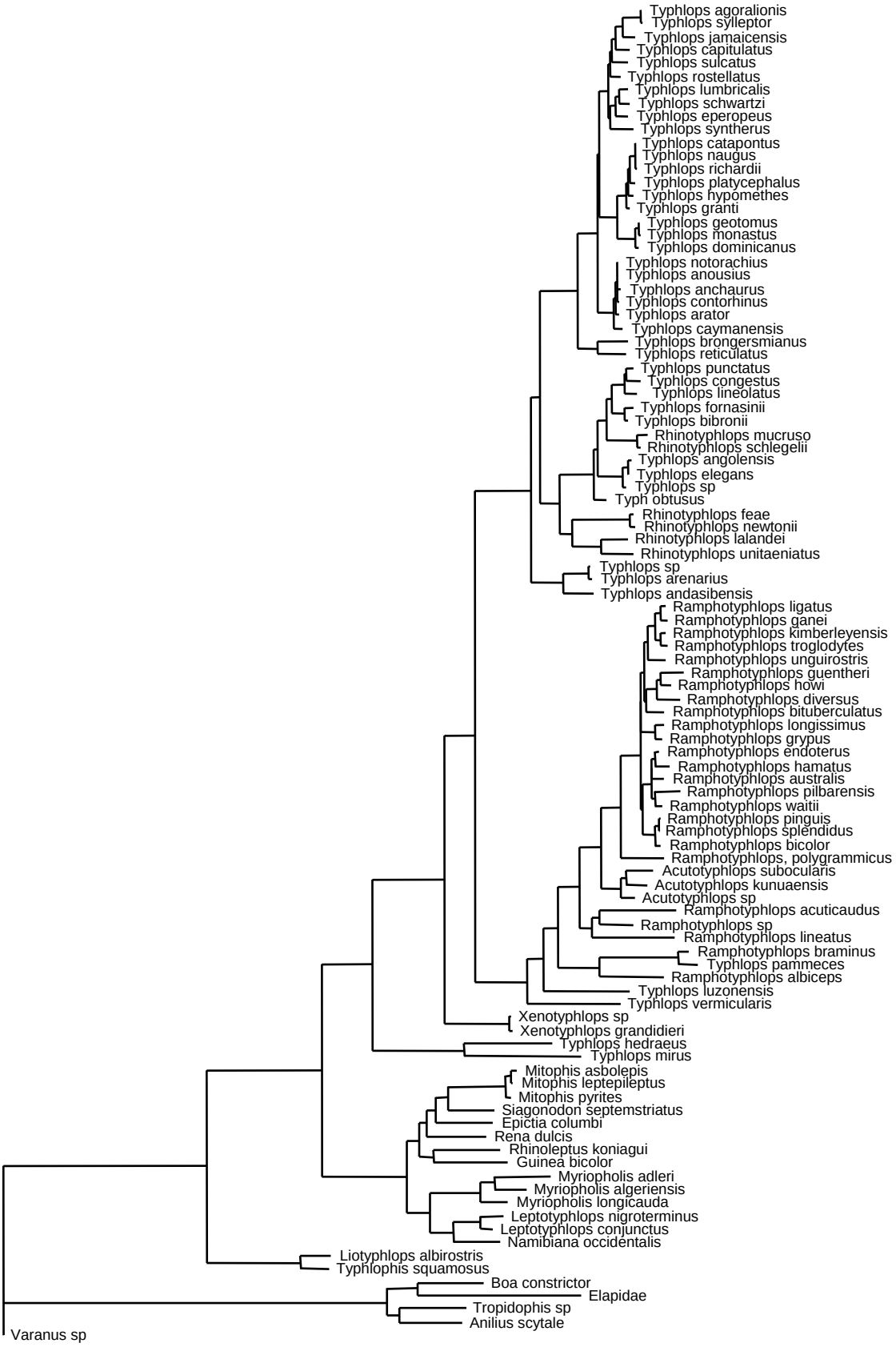
Amplification and sequencing was performed using the following sets of primers:
L2408, 5'-TGCACTGTGACATTGGCAA-3' (Vidal and Hedges, 2004),
H2928, 5'-GACTGCYTG GCATTCATTTT-3' (Vidal and Hedges, 2004) ,
H2920, 5'-GCCATTCATTTTYCGAA-3' (Vidal and Hedges, 2004),
RAG1F3, 5'-TGCAYTGTGAYATTGGCAATGC-3' (original),
RAG1F4, -5'-TTTGTGADYTAATARAGTGTGA-3' (original),
RAG1R4, 5'-ATTACTTYCACAARACYCTTGCTC-3' (original) for **RAG1**;
LAM2N, 5'-TAT-CCA-CGT-TAT-GGC-TAT-GAA-CC-3'(Vidal and Hedges, 2005),
LAMSQ, 5'-ATGGGAGGATGGATGCACCA-3' (original),
HAM, 5'-CAC-TTC-YTC-YTK-CTT-GGT-YT-3' (Vidal and Hedges, 2005),
HAMSQ, 5'-GGCCATGRTTCAAGAGGYGTAT-3' (original) for **AMEL**;
BDNF-F, 5'-GAC-CAT-CCT-TTT-CCT-KAC-TAT-GGT-TAT-TTC-ATA-CTT-3' (Noonan and Chippindale, 2006),
BDNF-R, 5'-CTA-TCT-TCC-CCT-TTT-AAT-GGT-CAG-TGT-ACA-AAC-3' (Noonan and Chippindale, 2006) for **BDNF**;
NT3-F3, 5'-ATA-TTT-CTG-GCT-TTT-CTC-TGT-GGC-3' (Noonan and Chippindale, 2006),
NT3-R4, 5'-GCG-TTT-CAT-AAA-AAT-ATT-GTT-TGA-CCG-G-5' (Noonan and Chippindale, 2006),
NT3F1, 5'-ATGTCCATCTTGTTTTATGTGATATTT-3' (Townsend et al., 2008),
NT3R1, 5'-ACRAGTTTRTTGTTYTCTGAAGTC-3' (Townsend et al., 2008),
NT3r3, 5'-AGCCCRTTGTCTCTGTGGATACAGA-3' (original),
NT3f3, 5'-AGATACAGCTGCTMACAAAAATA-3' (original),
NT3r4, 5'-AGAGCCGRTGGRTCACGGACAA-3' (original),
NT3f4, 5'-AGGAAARAGCCACCGSGGGGAAT-3' (original) for **NT3**;
BMP2_f6, 5'-CAKCACCGWATTAATATTTATGAAA-3' (Wiens et al., 2008),
BMP2_r3, 5'-ACYTTTTCGTTYTCRTCAAGGTA-3' (Wiens et al., 2008),
BMP2_f9, 5'-AYCAYAAYRCCAGCAAATGGGAA-3' (original),
BMP2_f11, 5'-GAYGGCVTGGGCCRYCCYCTCCA-3' (original),
BMP2_r5, 5'-GTCAATTCWGTGAAYYCCAAAAT-3' (original) for **BMP2**.

Both strands of the PCR products were sequenced at Pennsylvania State University and Genoscope (http://www.genoscope.fr), or at Genoscreen, a private company (http://www.genoscreen.fr).

The two strands obtained for each sequence were combined using the BioEdit Sequence Alignment Editor program (Hall, 1999).

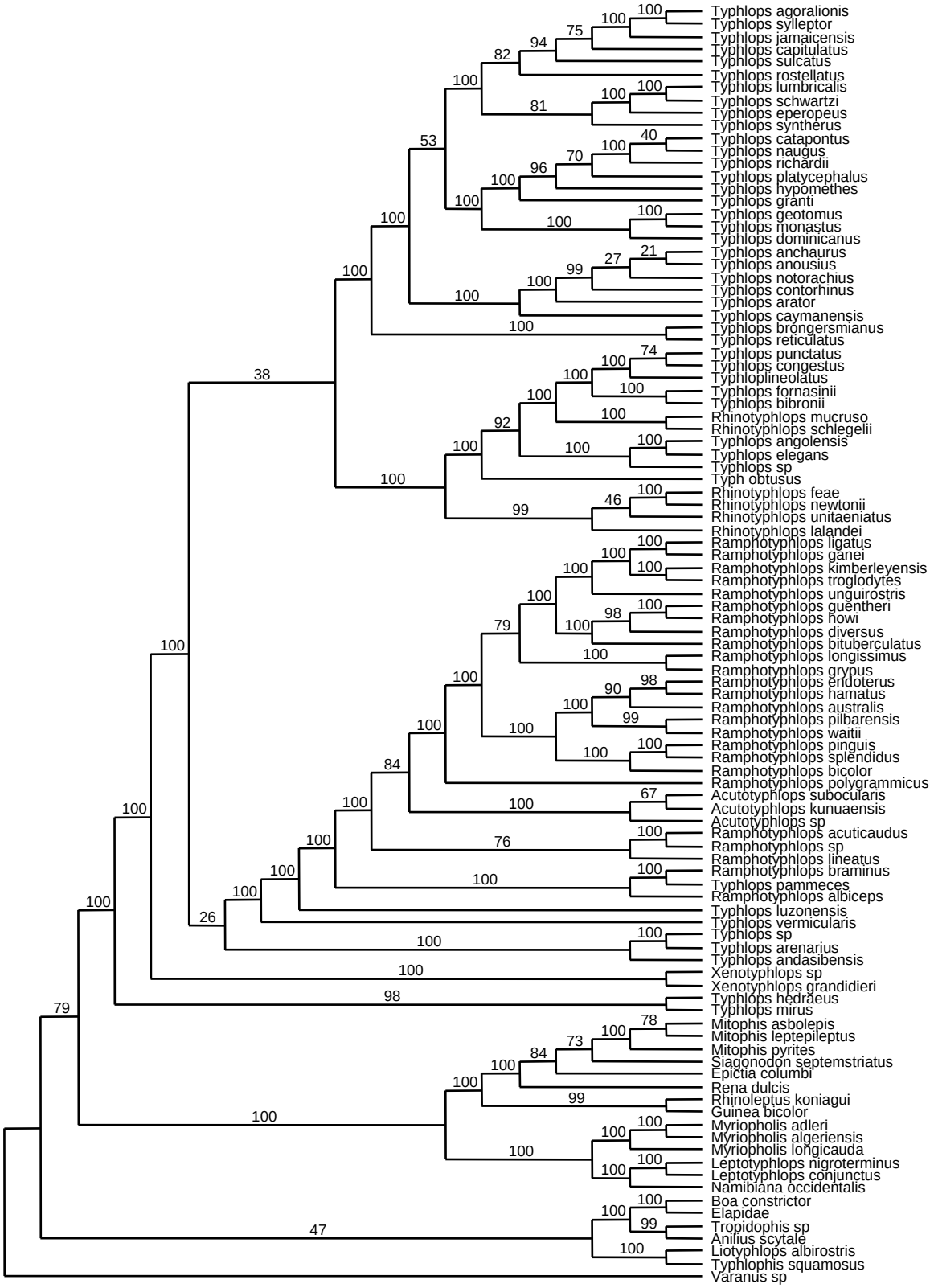
Sequence entry and alignment were performed manually with MEGA4 (Tamura et al. 2007). Amino acid translations were used and alignment was straightforward. In all analyses, gaps were treated as missing data. Alignments can be obtained from Nicolas Vidal. Alignments resulted in 630 BDNF sites, 516 RAG1 sites, 591 BMP2 sites, 639 NT3 sites, and 375 AMEL sites (total: 2751 sites).

Phylogenetic analysis. We built phylogenies using Maximum Likelihood (ML) and Bayesian methods of inference. We used an anguimorph (genus *Varanus*), two amerophidians (genera *Anilius* and *Tropidophis*) and two afrophidians, a 'henophidian' (genus *Boa*) and a caenophidian (elapid, either *Naja* or *Dendroaspis* depending on the gene) as outgroups. ML analyses were performed with RAxML 7.0.4 (Stamatakis 2006; Stamatakis et al. 2008), and Bayesian analyses were performed with MrBayes 3.1 (Ronquist & Huelsenbeck 2003). We treated each of the three codon positions of the genes as a separate partition, so our combined dataset is partitioned into three partitions. Bayesian analyses were performed by running 5,000,000 generations in four chains, saving the current tree every 100 generations, with a GTR model as inferred by Modeltest using the AIC criterion (Posada & Crandall 1998) applied to each of the three partitions. The last 48,000 trees were used to construct a 50% majority rule consensus tree. For the ML analysis, we used the same three partitions and performed 1000 bootstrap replicates.



ML phylogram

ML bootstrap majority-rule consensus tree (1000 replicates)



Bayesian consensus tree (5,000,000 generations)

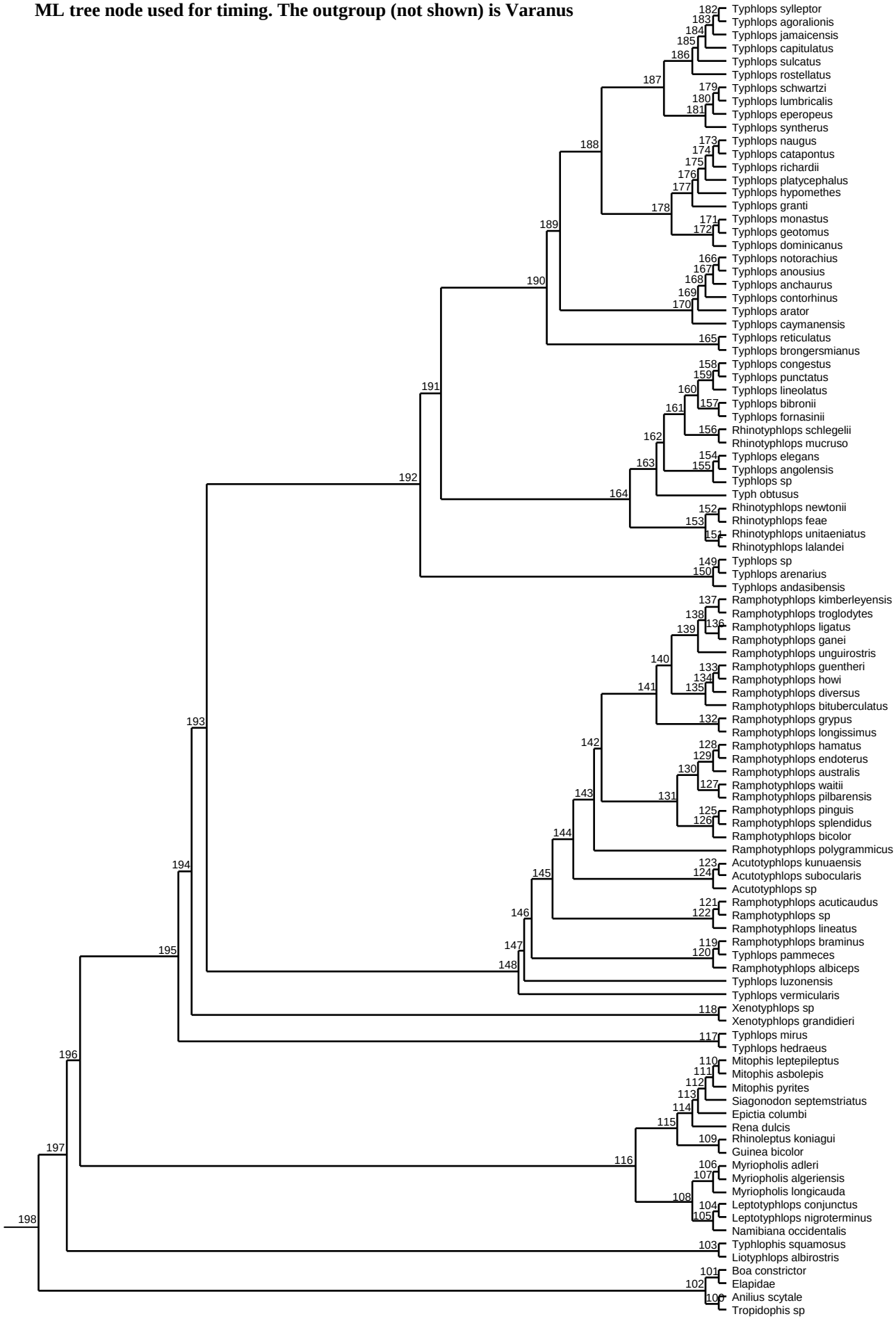
Divergence time estimation. Bayesian timing analyses were conducted with Multidivtime T3 (Thorne & Kishino 2002; Yang & Yoder 2003) using the topology obtained from the Bayesian analysis and the same three data partitions. PAML 3.14 (Yang 1997) was used to estimate model parameters for the Multidivtime analyses. Bayesian credibility intervals (CI), which are posterior probability intervals analogous to the confidence interval in frequentist statistics, were calculated for time estimates.

The prior for the rttm parameter was set at 100 Ma (oldest fossil snake), 166 Ma (oldest fossil anguimorph), and 130 Ma (intermediate) (Vidal et al., 2009). The three rttm settings resulted in less than 1% difference in time estimates, so the intermediate rttm was used in following analyses. The prior bigtime was set at 200 Ma (Triassic-Jurassic boundary). Other priors followed recommendations accompanying the software.

The split between Afrophidia and Amerophidia was constrained at 105.8 Ma according to Vidal et al. (2009) and geological data (opening of the Atlantic Ocean). The oldest caenophidians are from the Cenomanian (100–94 Ma) (Rage & Werner 1999) and therefore the divergence of Elapidae (Caenophidia) and Boidae ('Henophidia') was set at a minimum of 94 Ma. Some objection has been raised to the identity of the fossils and their use in calibrating dating analyses (Sanders & Lee 2008) and so we also ran separate analyses with that calibration removed. In the absence of other available fossil calibrations we instead calibrated a different node in the tree, the leptotyphlopid/typhlopid divergence, using Vidal et al.'s (2009) time estimate (153 Ma) which was obtained by excluding the 94 Ma calibration. We also used the extremes of the 95% credibility interval (163 and 139 Ma) as calibrations for that node in separate analyses, and performed an analysis with that calibration removed.

All other calibrations were maximums corresponding to geologic dates when West Indian islands became habitable (rose above sea-level). The node uniting all West Indian taxa was constrained at a maximum of 37.2 Ma (Iturralde-Vinent & MacPhee 1999). The node uniting the four *Mitophis* species (restricted to South Island of Hispaniola) was constrained at a maximum of 10 Ma (Huebeck & Mann 1985), as was the node uniting *Typhlops jamaicensis*, *sylleptor*, and *agoralionis* (restricted to Jamaica and South Island of Hispaniola). To examine the effect of the geologic calibrations, we also performed analyses without them. All analyses were run for 1,100,000 generations, with a sample frequency of 100 after a burnin of 100,000 generations. In all analyses, the posterior times obtained fell within the credibility intervals derived from the primary analysis using all six original calibrations. Time estimates from all nine analyses can be obtained from Nicolas Vidal.

ML tree node used for timing. The outgroup (not shown) is Varanus



Time estimates from primary analysis (rttm=130, 6 calibrations points).

Actual time node 100 = 0.96815 (S.D. = 0.03882) (0.88538, 1.03830)
Actual time node 101 = 0.96910 (S.D. = 0.02472) (0.94084, 1.03170)
Actual time node 102 = 1.05800 (S.D. = 0.00058) (1.05705, 1.05895)
Actual time node 103 = 0.56864 (S.D. = 0.11349) (0.36482, 0.80671)
Actual time node 104 = 0.20981 (S.D. = 0.06086) (0.11160, 0.34842)
Actual time node 105 = 0.52286 (S.D. = 0.09062) (0.36057, 0.71279)
Actual time node 106 = 0.27608 (S.D. = 0.06330) (0.16938, 0.41944)
Actual time node 107 = 0.35037 (S.D. = 0.07268) (0.22601, 0.51105)
Actual time node 108 = 0.73452 (S.D. = 0.09580) (0.55771, 0.92800)
Actual time node 109 = 0.77407 (S.D. = 0.09226) (0.59677, 0.95667)
Actual time node 110 = 0.03543 (S.D. = 0.01643) (0.00668, 0.07117)
Actual time node 111 = 0.06254 (S.D. = 0.01873) (0.02735, 0.09671)
Actual time node 112 = 0.70457 (S.D. = 0.08893) (0.53511, 0.88163)
Actual time node 113 = 0.76316 (S.D. = 0.08894) (0.59402, 0.94140)
Actual time node 114 = 0.79483 (S.D. = 0.08970) (0.62350, 0.97300)
Actual time node 115 = 0.84291 (S.D. = 0.09038) (0.66762, 1.01887)
Actual time node 116 = 0.91104 (S.D. = 0.09076) (0.73441, 1.08790)
Actual time node 117 = 0.97360 (S.D. = 0.08731) (0.80056, 1.14095)
Actual time node 118 = 0.10362 (S.D. = 0.06240) (0.01343, 0.25702)
Actual time node 119 = 0.05150 (S.D. = 0.01648) (0.02530, 0.08982)
Actual time node 120 = 0.38675 (S.D. = 0.06080) (0.27853, 0.51439)
Actual time node 121 = 0.30074 (S.D. = 0.05652) (0.20057, 0.42145)
Actual time node 122 = 0.37670 (S.D. = 0.05883) (0.27044, 0.50222)
Actual time node 123 = 0.18311 (S.D. = 0.04175) (0.11158, 0.27488)
Actual time node 124 = 0.20196 (S.D. = 0.04376) (0.12692, 0.29642)
Actual time node 125 = 0.01275 (S.D. = 0.00939) (0.00073, 0.03558)
Actual time node 126 = 0.05571 (S.D. = 0.02193) (0.02156, 0.10714)
Actual time node 127 = 0.08437 (S.D. = 0.02642) (0.04248, 0.14546)
Actual time node 128 = 0.06760 (S.D. = 0.02316) (0.03119, 0.12139)
Actual time node 129 = 0.09087 (S.D. = 0.02661) (0.04871, 0.15238)
Actual time node 130 = 0.10543 (S.D. = 0.02914) (0.05902, 0.17288)
Actual time node 131 = 0.14493 (S.D. = 0.03507) (0.08758, 0.22492)
Actual time node 132 = 0.06602 (S.D. = 0.02483) (0.02649, 0.12311)
Actual time node 133 = 0.08950 (S.D. = 0.02687) (0.04622, 0.15017)
Actual time node 134 = 0.11937 (S.D. = 0.03032) (0.06996, 0.18897)
Actual time node 135 = 0.13033 (S.D. = 0.03196) (0.07804, 0.20364)
Actual time node 136 = 0.03813 (S.D. = 0.01630) (0.01225, 0.07576)
Actual time node 137 = 0.04535 (S.D. = 0.01798) (0.01691, 0.08774)
Actual time node 138 = 0.08192 (S.D. = 0.02484) (0.04234, 0.13878)
Actual time node 139 = 0.12153 (S.D. = 0.03062) (0.07126, 0.19092)
Actual time node 140 = 0.14298 (S.D. = 0.03383) (0.08739, 0.21952)
Actual time node 141 = 0.15976 (S.D. = 0.03692) (0.09858, 0.24448)
Actual time node 142 = 0.16997 (S.D. = 0.03877) (0.10518, 0.25817)
Actual time node 143 = 0.27631 (S.D. = 0.05254) (0.18520, 0.39077)
Actual time node 144 = 0.37125 (S.D. = 0.05874) (0.26577, 0.49545)
Actual time node 145 = 0.39683 (S.D. = 0.06056) (0.28756, 0.52501)
Actual time node 146 = 0.44566 (S.D. = 0.06438) (0.32854, 0.58004)
Actual time node 147 = 0.49040 (S.D. = 0.06920) (0.36482, 0.63373)
Actual time node 148 = 0.57858 (S.D. = 0.07298) (0.44306, 0.72660)
Actual time node 149 = 0.06063 (S.D. = 0.03047) (0.01195, 0.13288)
Actual time node 150 = 0.37482 (S.D. = 0.06601) (0.25773, 0.51669)
Actual time node 151 = 0.44214 (S.D. = 0.06736) (0.31881, 0.58434)
Actual time node 152 = 0.03041 (S.D. = 0.01491) (0.00707, 0.06599)

Actual time node 153 = 0.47257 (S.D. = 0.06844) (0.34696, 0.61715)
Actual time node 154 = 0.02259 (S.D. = 0.01437) (0.00217, 0.05697)
Actual time node 155 = 0.04584 (S.D. = 0.01943) (0.01703, 0.09217)
Actual time node 156 = 0.02816 (S.D. = 0.01557) (0.00418, 0.06383)
Actual time node 157 = 0.07768 (S.D. = 0.03100) (0.02754, 0.14814)
Actual time node 158 = 0.07470 (S.D. = 0.02565) (0.03398, 0.13468)
Actual time node 159 = 0.09022 (S.D. = 0.02878) (0.04455, 0.15793)
Actual time node 160 = 0.16970 (S.D. = 0.04156) (0.09981, 0.26201)
Actual time node 161 = 0.20799 (S.D. = 0.04670) (0.12895, 0.31242)
Actual time node 162 = 0.25355 (S.D. = 0.05121) (0.16539, 0.36546)
Actual time node 163 = 0.27967 (S.D. = 0.05492) (0.18350, 0.39913)
Actual time node 164 = 0.51610 (S.D. = 0.06981) (0.38759, 0.66210)
Actual time node 165 = 0.22437 (S.D. = 0.04773) (0.14178, 0.32823)
Actual time node 166 = 0.00803 (S.D. = 0.00679) (0.00029, 0.02537)
Actual time node 167 = 0.01785 (S.D. = 0.01016) (0.00339, 0.04203)
Actual time node 168 = 0.02748 (S.D. = 0.01314) (0.00816, 0.05910)
Actual time node 169 = 0.04533 (S.D. = 0.01782) (0.01876, 0.08865)
Actual time node 170 = 0.07381 (S.D. = 0.02503) (0.03499, 0.13383)
Actual time node 171 = 0.00763 (S.D. = 0.00644) (0.00029, 0.02419)
Actual time node 172 = 0.03241 (S.D. = 0.01561) (0.00853, 0.06824)
Actual time node 173 = 0.00629 (S.D. = 0.00549) (0.00021, 0.02011)
Actual time node 174 = 0.01727 (S.D. = 0.01032) (0.00295, 0.04224)
Actual time node 175 = 0.03491 (S.D. = 0.01427) (0.01298, 0.06839)
Actual time node 176 = 0.04334 (S.D. = 0.01588) (0.01905, 0.08058)
Actual time node 177 = 0.05099 (S.D. = 0.01755) (0.02405, 0.09152)
Actual time node 178 = 0.12166 (S.D. = 0.03433) (0.06419, 0.19786)
Actual time node 179 = 0.07023 (S.D. = 0.02011) (0.03665, 0.11508)
Actual time node 180 = 0.10051 (S.D. = 0.02403) (0.05941, 0.15276)
Actual time node 181 = 0.13276 (S.D. = 0.02691) (0.08547, 0.19200)
Actual time node 182 = 0.01172 (S.D. = 0.00774) (0.00080, 0.03040)
Actual time node 183 = 0.08111 (S.D. = 0.01327) (0.05072, 0.09922)
Actual time node 184 = 0.10607 (S.D. = 0.01981) (0.06937, 0.14750)
Actual time node 185 = 0.11696 (S.D. = 0.02214) (0.07668, 0.16546)
Actual time node 186 = 0.13130 (S.D. = 0.02520) (0.08694, 0.18730)
Actual time node 187 = 0.14498 (S.D. = 0.02785) (0.09581, 0.20684)
Actual time node 188 = 0.19689 (S.D. = 0.03800) (0.13012, 0.28047)
Actual time node 189 = 0.21328 (S.D. = 0.04059) (0.14301, 0.30329)
Actual time node 190 = 0.33021 (S.D. = 0.05446) (0.23264, 0.44350)
Actual time node 191 = 0.59361 (S.D. = 0.07196) (0.46093, 0.73927)
Actual time node 192 = 0.61435 (S.D. = 0.07314) (0.47875, 0.76249)
Actual time node 193 = 0.62750 (S.D. = 0.07421) (0.48965, 0.77810)
Actual time node 194 = 0.96870 (S.D. = 0.07966) (0.80850, 1.12239)
Actual time node 195 = 1.06661 (S.D. = 0.07821) (0.90928, 1.21472)
Actual time node 196 = 1.52994 (S.D. = 0.00580) (1.52047, 1.53947)
Actual time node 197 = 1.59223 (S.D. = 0.03500) (1.53617, 1.67190)
Actual time node 198 = 1.64508 (S.D. = 0.04776) (1.56557, 1.75235)

Time estimates with rttm=130 & 5 calibrations points (153 Ma calibration removed).

Actual time node 100 = 0.96751 (S.D. = 0.03932) (0.88540, 1.03812)
Actual time node 101 = 0.96953 (S.D. = 0.02480) (0.94085, 1.03291)
Actual time node 102 = 1.05800 (S.D. = 0.00058) (1.05705, 1.05895)
Actual time node 103 = 0.57239 (S.D. = 0.12261) (0.35482, 0.82926)
Actual time node 104 = 0.21211 (S.D. = 0.06319) (0.11078, 0.35628)
Actual time node 105 = 0.52871 (S.D. = 0.09887) (0.35136, 0.73563)
Actual time node 106 = 0.27924 (S.D. = 0.06849) (0.16587, 0.43259)
Actual time node 107 = 0.35407 (S.D. = 0.07901) (0.22029, 0.52565)
Actual time node 108 = 0.74319 (S.D. = 0.11266) (0.53432, 0.97375)
Actual time node 109 = 0.78264 (S.D. = 0.11113) (0.57750, 1.01152)
Actual time node 110 = 0.03578 (S.D. = 0.01684) (0.00637, 0.07230)
Actual time node 111 = 0.06313 (S.D. = 0.01914) (0.02677, 0.09711)
Actual time node 112 = 0.71406 (S.D. = 0.10485) (0.51914, 0.92676)
Actual time node 113 = 0.77225 (S.D. = 0.10787) (0.57239, 0.99232)
Actual time node 114 = 0.80471 (S.D. = 0.11006) (0.60210, 1.02995)
Actual time node 115 = 0.85297 (S.D. = 0.11299) (0.64238, 1.08322)
Actual time node 116 = 0.92180 (S.D. = 0.11686) (0.70277, 1.15859)
Actual time node 117 = 0.98585 (S.D. = 0.11859) (0.76010, 1.22422)
Actual time node 118 = 0.10481 (S.D. = 0.06466) (0.01371, 0.26554)
Actual time node 119 = 0.05254 (S.D. = 0.01722) (0.02588, 0.09221)
Actual time node 120 = 0.39221 (S.D. = 0.06892) (0.27289, 0.54032)
Actual time node 121 = 0.30516 (S.D. = 0.06130) (0.19759, 0.43789)
Actual time node 122 = 0.38188 (S.D. = 0.06582) (0.26777, 0.52194)
Actual time node 123 = 0.18610 (S.D. = 0.04422) (0.11163, 0.28565)
Actual time node 124 = 0.20513 (S.D. = 0.04670) (0.12679, 0.30973)
Actual time node 125 = 0.01269 (S.D. = 0.00939) (0.00066, 0.03564)
Actual time node 126 = 0.05554 (S.D. = 0.02175) (0.02158, 0.10722)
Actual time node 127 = 0.08488 (S.D. = 0.02685) (0.04269, 0.14904)
Actual time node 128 = 0.06830 (S.D. = 0.02355) (0.03114, 0.12414)
Actual time node 129 = 0.09161 (S.D. = 0.02721) (0.04886, 0.15518)
Actual time node 130 = 0.10619 (S.D. = 0.02961) (0.05933, 0.17421)
Actual time node 131 = 0.14572 (S.D. = 0.03587) (0.08694, 0.22672)
Actual time node 132 = 0.06611 (S.D. = 0.02476) (0.02641, 0.12399)
Actual time node 133 = 0.08977 (S.D. = 0.02722) (0.04583, 0.15185)
Actual time node 134 = 0.12013 (S.D. = 0.03095) (0.06964, 0.19163)
Actual time node 135 = 0.13119 (S.D. = 0.03272) (0.07726, 0.20685)
Actual time node 136 = 0.03788 (S.D. = 0.01635) (0.01171, 0.07550)
Actual time node 137 = 0.04556 (S.D. = 0.01843) (0.01664, 0.08846)
Actual time node 138 = 0.08233 (S.D. = 0.02539) (0.04223, 0.14210)
Actual time node 139 = 0.12236 (S.D. = 0.03158) (0.07141, 0.19462)
Actual time node 140 = 0.14398 (S.D. = 0.03482) (0.08653, 0.22533)
Actual time node 141 = 0.16072 (S.D. = 0.03785) (0.09830, 0.24706)
Actual time node 142 = 0.17108 (S.D. = 0.03978) (0.10572, 0.26069)
Actual time node 143 = 0.27924 (S.D. = 0.05522) (0.18398, 0.40028)
Actual time node 144 = 0.37632 (S.D. = 0.06551) (0.26238, 0.51565)
Actual time node 145 = 0.40229 (S.D. = 0.06794) (0.28413, 0.54806)
Actual time node 146 = 0.45146 (S.D. = 0.07330) (0.32204, 0.60726)
Actual time node 147 = 0.49671 (S.D. = 0.07925) (0.35540, 0.66529)
Actual time node 148 = 0.58560 (S.D. = 0.08534) (0.42934, 0.76097)
Actual time node 149 = 0.06125 (S.D. = 0.03117) (0.01217, 0.13406)
Actual time node 150 = 0.37923 (S.D. = 0.07213) (0.25269, 0.53420)
Actual time node 151 = 0.44812 (S.D. = 0.07574) (0.31355, 0.61102)
Actual time node 152 = 0.03061 (S.D. = 0.01527) (0.00673, 0.06716)

Actual time node 153 = 0.47845 (S.D. = 0.07758) (0.33952, 0.64266)
Actual time node 154 = 0.02311 (S.D. = 0.01462) (0.00214, 0.05866)
Actual time node 155 = 0.04652 (S.D. = 0.01987) (0.01661, 0.09337)
Actual time node 156 = 0.02870 (S.D. = 0.01580) (0.00437, 0.06606)
Actual time node 157 = 0.07870 (S.D. = 0.03189) (0.02906, 0.15249)
Actual time node 158 = 0.07656 (S.D. = 0.02703) (0.03399, 0.13969)
Actual time node 159 = 0.09249 (S.D. = 0.03029) (0.04486, 0.16295)
Actual time node 160 = 0.17302 (S.D. = 0.04418) (0.09901, 0.27092)
Actual time node 161 = 0.21164 (S.D. = 0.04980) (0.12665, 0.32137)
Actual time node 162 = 0.25788 (S.D. = 0.05582) (0.16193, 0.37788)
Actual time node 163 = 0.28439 (S.D. = 0.05994) (0.18044, 0.41333)
Actual time node 164 = 0.52278 (S.D. = 0.08060) (0.37824, 0.69230)
Actual time node 165 = 0.22634 (S.D. = 0.05037) (0.14063, 0.33753)
Actual time node 166 = 0.00804 (S.D. = 0.00673) (0.00032, 0.02512)
Actual time node 167 = 0.01794 (S.D. = 0.01037) (0.00331, 0.04290)
Actual time node 168 = 0.02751 (S.D. = 0.01306) (0.00838, 0.05886)
Actual time node 169 = 0.04552 (S.D. = 0.01784) (0.01857, 0.08725)
Actual time node 170 = 0.07429 (S.D. = 0.02523) (0.03495, 0.13341)
Actual time node 171 = 0.00784 (S.D. = 0.00660) (0.00030, 0.02452)
Actual time node 172 = 0.03278 (S.D. = 0.01589) (0.00877, 0.07028)
Actual time node 173 = 0.00635 (S.D. = 0.00554) (0.00021, 0.02056)
Actual time node 174 = 0.01731 (S.D. = 0.01052) (0.00285, 0.04329)
Actual time node 175 = 0.03530 (S.D. = 0.01438) (0.01349, 0.06941)
Actual time node 176 = 0.04389 (S.D. = 0.01617) (0.01932, 0.08257)
Actual time node 177 = 0.05161 (S.D. = 0.01791) (0.02424, 0.09386)
Actual time node 178 = 0.12364 (S.D. = 0.03545) (0.06411, 0.20262)
Actual time node 179 = 0.07103 (S.D. = 0.02120) (0.03572, 0.11789)
Actual time node 180 = 0.10164 (S.D. = 0.02564) (0.05790, 0.15836)
Actual time node 181 = 0.13394 (S.D. = 0.02824) (0.08475, 0.19573)
Actual time node 182 = 0.01178 (S.D. = 0.00784) (0.00080, 0.03048)
Actual time node 183 = 0.08116 (S.D. = 0.01358) (0.04991, 0.09920)
Actual time node 184 = 0.10659 (S.D. = 0.02058) (0.06837, 0.14989)
Actual time node 185 = 0.11748 (S.D. = 0.02299) (0.07588, 0.16767)
Actual time node 186 = 0.13212 (S.D. = 0.02630) (0.08593, 0.19011)
Actual time node 187 = 0.14606 (S.D. = 0.02939) (0.09439, 0.21043)
Actual time node 188 = 0.19857 (S.D. = 0.04004) (0.12817, 0.28675)
Actual time node 189 = 0.21522 (S.D. = 0.04289) (0.14024, 0.31031)
Actual time node 190 = 0.33390 (S.D. = 0.05951) (0.22759, 0.46198)
Actual time node 191 = 0.60046 (S.D. = 0.08604) (0.44262, 0.78222)
Actual time node 192 = 0.62158 (S.D. = 0.08790) (0.46091, 0.80756)
Actual time node 193 = 0.63486 (S.D. = 0.08923) (0.47019, 0.82244)
Actual time node 194 = 0.98106 (S.D. = 0.11112) (0.77215, 1.20937)
Actual time node 195 = 1.08047 (S.D. = 0.11715) (0.85575, 1.31950)
Actual time node 196 = 1.55224 (S.D. = 0.13570) (1.29385, 1.82218)
Actual time node 197 = 1.61396 (S.D. = 0.13863) (1.35611, 1.88646)
Actual time node 198 = 1.66715 (S.D. = 0.13747) (1.41054, 1.93892)

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Appendix A. Tissue samples used for this work. List of taxa used for this study including museum catalog number and geographic origin. Abbreviations are: ABTC (Australian Biological Tissue Collection, Adelaide, Australia), AMNH (American Museum of Natural History, USA), CAS (California Academy of Sciences, USA), LSUMZ (Louisiana State University, Museum of Zoology, USA), MCZ (Museum of Comparative Zoology Field Series, Harvard University, USA), MVZ (Museum of Vertebrate Zoology, University of California, Berkeley), PEM (Port Elizabeth Museum, South Africa), ROM (Royal Ontario Museum, Toronto, Canada), TR (Sébastien Trape, Montpellier University, France), USNM (National Museum of Natural History, Washington, D.C., USA), and UTEP (University of Texas at El Paso). In cases where letters are used in the catalog number, R=reptile collection, FS=field series, and other letters refer to collector numbers. Permission to use the vertebrate animals in this study was provided by the Institutional Animal Care and Use Committee of Pennsylvania State University.

Anomalepididae

Liotyphlops albirostris (USNM FS172151, 'Venezuela'), *Typhlophis squamosus* (NV, French Guiana)

Leptotyphlopidae

Guinea bicolor (USNM FS268130, Niger, Niamey Airport, 13°31'N, 2°7'E), *Rhinoleptus koniagui* (USNM FS268182, Senegal, Ibel), *Rena dulcis* (MVZ 230602; USA, Texas, Crane County, 2.4 km W of junction with Farm Road 1601), *Siagonodon septemstriatus* (LSUMZ H12312; Brazil, Roraima, Fazenda Nova Esperanca, 47 km W BR-174 on BR-210), *Epictia columbi* (USNM FS192936; Little Fortune Hill, San Salvador, Bahamas), *Mitophis leptepileptus* (USNM FS103600; Soliette, l'Quest, Haiti), *Mitophis asbolepis* (USNM FS160213; 0.3 km S, 13.5 km E Canoa, Barahona, Dominican Republic), *Mitophis pyrites* (USNM FS102591; 6.4 km SW of Las Mercedes, Pedernales, Dominican Republic), *Namibiana occidentalis* (PEM R11915; Hellskloof Gate, Richtersveldt National Park, Namaqualand, Northern Cape Province, South Africa), *Leptotyphlops nigroterminus* (PEM R17346; Klein's Camp Lodge area, Loliondo Game Controlled Area, NW Serengeti, Tanzania), *Leptotyphlops conjunctus* (PEM R17410; Mkhuze Game Reserve, Mixed Bushveld, KwaZulu-Natal, South Africa), *Myriopholis longicauda* (MCZ R184447; South Africa, Limpopo Province, near Waterport), *Myriopholis algeriensis* (TR 115; Mauritania, Rachid), *Myriopholis adleri* (USNM FS268179, Senegal, Bandafassi).

Gerrhopilidae

Gerrhopilus hedraeus (USNM 305988; Valencia Municipality, Bong Bong Barrio, Camp Lookout, Negros Island, Philippines), *Gerrhopilus mirus* (USNM 297494; Colombo or Uda Walawe National Park, Uda Walawe, Sri Lanka).

Xenotyphlopidae

Xenotyphlops grandidieri (UADBA FGZC1141, Baie de Sakalava, northern Madagascar), *Xenotyphlops sp.* (UADBA FGZC1336, Baie de Sakalava, northern Madagascar).

Typhlopidae

Eurasia/Indonesia
Typhlops vermicularis (ROM 23400; Geolazar, Armenia), *Typhlops luzonensis* (USNM 305991; Valencia Municipality, Bong Bong Barrio, Camp Lookout, Negros Island, Philippines), *Ramphotyphlops albiceps* (CAS 216149; Tha Baik Kyin Township, Shwe U Daung Wildlife Sanctuary, Nyaung Gome Elephant Camp, Mandalay, Myanmar), *Typhlops cf. pammeces* (USNM 297493; Colombo or Uda Walawe National Park, Uda Walawe, Sri Lanka), *Ramphotyphlops braminus* (NV, Florida), *Ramphotyphlops acuticaudus* (USNM FS220996; Palau), *Ramphotyphlops lineatus* (MVZ 239633; Malakoni, Bengkulu, Sumatra), *Ramphotyphlops sp*. (LSUMZ CCA1622; Lavongai Island, New Ireland), *Acutotyphlops sp.* (ABTC 5009; Amelei, WNBP, PNG, -6,105555556, 150,6136111), *Acutotyphlops kunuaensis* (LSUMZ CCA2694; SE slope of Mt. Balbi, North Solomons, Papua New Guinea), *Acutotyphlops subocularis* (ABTC 104792; Vuovo Camp, West New Britain, PNG), *Ramphotyphlops polygrammicus* (WAM R98715; Brang Kua, Moyo Island, Indonesia, -8.2375, 117.6125).

Australia
Ramphotyphlops bicolor (WAM R165619; Ora Banda, WA, Australia, -30.3666, 121.0500), *Ramphotyphlops pinguis* (WAM R166813; Karragullen, WA, Australia, -32.1886, 116.2664), *Ramphotyphlops splendidus* (WAM R119900; Milyering Well, Cape Range National Park, WA, Australia, -22.0166, 113.9333), *Ramphotyphlops waitii* (WAM R166874; Wiluna, WA, Australia, -26.9391, 120.4094), *Ramphotyphlops pilbarensis* (WAM R166890; Nullagine, WA, Australia, -21.8833, 120.1167), *Ramphotyphlops australis* (WAM R90968; Perth Airport, WA, Australia, -31.9233, 115.9778), *Ramphotyphlops hamatus* (WAM R170181; 22.5k NNW Tom Price, WA, Australia, -22.5047, 117.704), *Ramphotyphlops endoterus* (WAM R166724; Queen Victoria Spring, WA, Australia, -29.2691, 124.5139), *Ramphotyphlops grypus* (WAM R170782; 8.5k NE Mt Rica, WA, Australia, -21.9522, 116.488), *Ramphotyphlops longissimus* (WAM R120049; Bandicoot Bay, Barrow Island, WA, Australia, -20.9000, 115.3667), *Ramphotyphlops bituberculatus* (WAM R144106; 5k E Ora Banda, WA, Australia, -30.3788, 121.1242), *Ramphotyphlops diversus* (WAM R166605; Halls Creek, WA, Australia, -17.6150, 127.9519), *Ramphotyphlops howi* (WAM R146381; Kalumburu, WA, Australia, -14.3000, 126.6333), *Ramphotyphlops guentheri* (WAM R129303, Gogo Station Homestead, WA, Australia, -18.3000, 125.5833), *Ramphotyphlops unguirostris* (WAM R151036; 10k SE Kununurra, WA, Australia, -15.8333, 128.8000), *Ramphotyphlops troglodytes* (WAM R146051; Oobagooma Homestead, WA, Australia, -16.7500, 123.9853), *Ramphotyphlops kimberleyensis* (WAM R165886; South Maret Island, WA, Australia, -14.4363, 124.9844), *Ramphotyphlops ganei* (WAM R165000; 24.5k N Cowra Line Camp, WA, Australia, -22.1347, 119.024), *Ramphotyphlops ligatus* (WAM R141065; Kununurra, WA, Australia, -15.7666, 128.7333).

Madagascar
Typhlops andasibensis (ZCMV 2255, Andasibe, Madagascar), *Typhlops arenarius* (MVZ 238852; 10 km N Toliara, Toliary Province, Madagascar), *Typhlops sp.* (FGMV2002.2033).

Africa
Rhinotyphlops unitaeniatus (PEM MB398; Kenya, Namanga Border Post), *Rhinotyphlops lalandei* (PEM BB516, Sardinia Bay, Port Elizabeth, South Africa), *Rhinotyphlops newtonii*

(CAS 218908; São Tome and Principe, São Tome, Rio Abade Bridge), *Rhinotyphlops feae* (CAS 219337; São Tome and Principe, São Tome, Macambrara), *Typhlops obtusus* (USNM FS268086, PEM FN1436), *Typhlops* sp. (UTEP EBG1191; Lwiro, Democratic Republic of the Congo), *Typhlops elegans* (CAS 219221; Ribeira Macoia, Principe Island, São Tome and Principe), *Typhlops angolensis* (PEM FN113BB350; Africa), *Rhinotyphlops schlegelii* (PEM 17408; Mkhuze Game Reserve, KZN, South Africa), *Rhinotyphlops mucruso* (PEM R15461; Zambezi Delta, Mozambique), *Typhlops bibronii* (PEM R17400; Mkhuze Game Reserve, KZN, South Africa), *Typhlops fornasinii* (USNM FS268085; Sodwana Bay, KZN, South Africa), *Typhlops lineolatus* (USNM FS268244; Kalakundi, Democratic Republic of the Congo), *Typhlops congestus* (UTEP EBG1191; Irangi, Democratic Republic of the Congo), *Typhlops punctatus* (NV, Kabougou, Burkina-Faso, 11.88N, 1.88E).

South America
Typhlops reticulatus (USNM FS267114, ROM 28368, Guyana, Paramakatoi, 04°41’50’’N, 59°47’12’’W), *Typhlops brongersmianus* (AMNH R140972; Guyana).

West Indies
Typhlops caymanensis (USNM FS266477; Prospect, Grand Cayman, Cayman Islands), *Typhlops arator* (USNM 564784; El Narigon, near Puerto Escondido, La Habana Province, Cuba), *Typhlops contorhinus* (MNHNCu 4552; 4.9 km S La Tinta, Guantánamo Province, Cuba), *Typhlops anchaurus* (MNHNCu 4553; Cueva de Agua, 2.5 km NW Maisí, Guantánamo Province, Cuba), *Typhlops anousius* (USNM 564783; 3.5 km E Tortuguilla, Guantánamo Province, Cuba), *Typhlops notorachius* (MNHNCu 4551; 9.4 km W Imias, Guantánamo Province, Cuba), *Typhlops dominicanus* (USNM FS194217; near town of Soufriere, Dominica), *Typhlops monastus* (USNM FS192765; Woodlands Spring, Montserrat), *Typhlops geotomus* (USNM 336089; ca. 1.5 km NE New River, Nevis, St. Kitts and Nevis), *Typhlops granti* (USNM FS172154; 4.0 km E Guanica, Puerto Rico), *Typhlops hypomethes* (USNM 300584; Bahia de Jobos, Bosque de Aguirre and distal part of Peninsula de Jobos, Puerto Rico), *Typhlops platycephalus* (USNM FS172194; 5.7 km WNW Sabana Grande, Puerto Rico), *Typhlops richardii* (USNM FS266835; Santa Maria, St. Thomas, U.S. Virgin Islands), *Typhlops naugus* (USNM FS172757; Shangrila, Guana, British Virgin Islands), *Typhlops catapontus* (USNM FS267193; Neptune's Treasure, Anegada, British Virgin Islands), *Typhlops syntherus* (USNM FS192623; 6.1 km S Los Tres Charcos, Dominican Republic), *Typhlops eperopeus* (USNM 564785; 3.9 km SSW Barahona), *Typhlops schwartzi* (USNM FS192458; 4.2 km N, 8.4 km W Nisibon, El Seibo, Dominican Republic), *Typhlops lumbricalis* (USNM FS172600; Havana Botanical Garden, La Habana Province, Cuba), *Typhlops rostellatus* (USNM FS172174; 12.3 km SSE Arecibo, Puerto Rico), *Typhlops sulcatus* (USNM FS191716; 11.0 km N Croix de Bouquettes, Centre, Haiti), *Typhlops capitulatus* (USNM FS191704; 18.1 km E Thomazeau, L'Ouest, Haiti), *Typhlops jamaicensis* (USNM 328408; 6.2 km W Oracabessa, St. Mary, Jamaica), *Typhlops sylleptor* (USNM 564804; 8.0 km WSW Baradères, Grand Anse, Haiti), *Typhlops agorialonis* (USNM 564777; 8.0 km S Marché Léon, Grand Anse, Haiti).

Appendix B. Sequence data obtained from GenBank.

Varanidae

Varanus salvator (BDNF: EU402618; BMP2: EU402673; NT3: EU390902), *Varanus dumerili* (AMEL: GU797443; RAG1: AY487354)

Boidae

Boa constrictor (AMEL: FJ434054; BDNF: FJ433975; BMP2: EU402684; NT3: AY988047; RAG1: AY487351)

Elapidae

Dendroaspis angusticeps (AMEL: EF144002; BDNF: FJ433988; NT3: FJ434089; RAG1: AY487395), *Naja kaouthia* (BMP2: EU402709)

Aniliidae

Anilius scytale (AMEL: FJ434040; BDNF: FJ433961; BMP2: EU402680; NT3: FJ434066; RAG1: AY487382)

Tropidophiidae

Tropidophis melanurus (AMEL: FJ434041; BDNF: FJ433962; NT3: FJ434067; RAG1: AY487384), *Tropidophis haetianus* (BMP2: EU402718)

Anomalepididae

Liotyphlops albirostris (AMEL: FJ434039; BDNF: FJ433960; BMP2: EU402705; RAG1: FJ433886)

Leptotyphlopidae

Guinea bicolor (AMEL: GQ468992; BDNF: GQ469175; NT3: GQ469016; RAG1: GQ469038), *Rhinoleptus koniagui* (AMEL: GQ469010; BDNF: GQ469193; NT3: GQ469032; RAG1: GQ469055), *Rena dulcis* (AMEL: GQ468999; BDNF: GQ469182; NT3: GQ469022; RAG1: GQ469045), *Siagonodon septemstriatus* (AMEL: GQ469008; BDNF: GQ469191; NT3: GQ469030; RAG1: GQ469053), *Epictia columbi* (NT3: GQ469018; BDNF: GQ469178), *Mitophis leptepileptus* (NT3: GQ469024; BDNF: GQ469185), *Mitophis asbolepis* (NT3: GQ469015; BDNF: GQ469174), *Mitophis pyrites* (AMEL: GQ468987; BDNF: GQ469170; NT3: GQ469011; RAG1: GQ469033), *Namibiana occidentalis* (NT3: GQ469028; BDNF: GQ469189), *Leptotyphlops nigroterminus* (NT3: GQ469027; BDNF: GQ469188), *Leptotyphlops conjunctus* (NT3: GQ469019; BDNF: GQ469179), *Myriopholis longicauda* (AMEL: GQ469003; BDNF: GQ469186; NT3: GQ469025; RAG1: GQ469048), *Myriopholis algeriensis* (AMEL: GQ468990; BDNF: GQ469173; NT3: GQ469014; RAG1: GQ469036), *Myriopholis adleri* (AMEL: GQ468989; BDNF: GQ469172; NT3: GQ469013; RAG1: GQ469035).