

1 **Online Appendix** Justification of clock calibrations. The complete dataset of clock  
2 calibrations and associated biogeographic, paleontological and phylogenetic references  
3 are presented in the Supporting Online Dataset. Additional details of calibration points  
4 are presented here.

5  
6  
7 **Anseridae:** 1) A previous calibration using RFLP data used fossils of *Branta* which  
8 extend back to 5.0 Ma to calibrate the node connecting the sister genera *Branta* and  
9 *Anser*. Recently published fossils of *Branta* extend this date by approximately 2 million  
10 years. 2) A calibration was also obtained from ancient DNA for the extinct flightless  
11 giant goose (*Branta* sp.) from the Island of Hawaii and its sister species *B. hylobadistes*  
12 which once inhabited the islands of Maui, Oahu and Kauai. Assuming immediate  
13 colonization of Hawaii as it formed, the age of Hawaii is used to calibrate the split  
14 between these sister species. 3) fossils assigned to *Branta bernicla* were used to date the  
15 split between *B. bernicla* and *B. ruficollis*. 4) The earliest *Cygnus* fossil used to date split  
16 between swans and geese. 5) The oldest mallard-like fossil was used to date split between  
17 mallard clade of *Anas* and other dabbling ducks. 6) Moa-Nalos are extinct flightless  
18 ducks from the main Hawaiian Islands. We used the age of the oldest main island (Kauai)  
19 to calibrate the split between Moa-Nalos and other ducks. 7) *Histrionicus (Ocyplonessa)*  
20 *shortwelli* was used to date the split between *Histrionicus* and *Somateria*.

21  
22  
23 **Trochilidae:** The uplift of the Talamanca highlands was used to date the Talamancan  
24 endemic *Lampornis castaneoventris* from its sister clade (*L. sybillae* and *L. viridipallens*)  
25 in northern Central America. Calibration of additional Talamancan endemic  
26 hummingbirds awaits further phylogenetic data.

27  
28 **Alcidae:** A fairly well represented fossil record exists for this family (Olson 1985,  
29 Becker 1987). Many of the major extant lineages simultaneously appear in the fossil  
30 record between 9.5 and 11 Ma, consistent with the short branch lengths separating these  
31 lineages at the base of the Alcid phylogeny. Relationships between genera were based on  
32 a Bayesian phylogenetic analysis of several published datasets (Friesen *et al* 1996,  
33 Moum *et al* 2002). 1) The fossil auk *Pinguinus alfrednewtoni* was used to date the split  
34 between the sister genera *Alca* and *Pinguinus*. Because this fossil clearly belongs to  
35 *Pinguinus*, this calibration point is probably underestimated and the rate overestimated.  
36 2) The split between *Uria* and its sister clade *Alca, Allele and Pinguinus* was dated using  
37 the Miocene *Uria brodkorbi*. 3) The lineage leading to *Cepphus* was dated using a  
38 Miocene *Cepphus*-like fossil. The exact relationship between *Cepphus* and other Alcid  
39 lineages is ambiguous in current phylogenetic reconstructions. Corrected sequence  
40 divergence between *Cepphus* and other lineages ranged between 18.13% and 20.33%.  
41 The average of these distances was used for the calibration. 4) The split between puffins  
42 (*Fratercula* and *Cerorhinca*) and auklets (*Aethia* and *Ptychoramphus*) was dated with a  
43 fossil assigned to *Cerorhinca* and the fossil *Aethia rossmoori* both from the late Miocene.  
44

45 **Laridae:** The split between the two extant kittiwakes (*Rissa*) was dated with *R. estesi*  
 46 believed to be on the lineage leading to *R. tridactyla* (Chandler 1990) and thus a crown  
 47 group fossil.

48  
 49 **Sternidae:** 1) a fossil *Gelochelidon* was used to date the split between *G. nilotica* and its  
 50 sister *Hydroprogne caspia*. 2) A North American fossil tern when compared to other  
 51 North American terns was most similar to *Thalasseus maximus*. This fossil was used to  
 52 date the split between a clade containing *Thalasseus maxima* and two Old World species  
 53 (*T. bengalensis*, *T. bergii*) and a clade containing *T. sandvicensis* and *T. elegans*. Cross  
 54 validation did not support this fossil calibration.

55  
 56 **Stercorariidae:** Several equally aged fossils most similar to *Stercorarius parasiticus* or  
 57 *S. longicaudus* were used to date the split between this pair of sister species.

58  
 59 **Recurvirostridae:** *Himantopus olsoni* was used to date the split between *Himantopus* and  
 60 *Recurvirostra*.

61  
 62 **Scolpanidae:** 1) the oldest *Philomachus* fossils were used to date the split between  
 63 *Philomachus* and *Limicola*. 2) A fossil species (*Tringa antiqua*) is considered closely  
 64 related to *Tringa solitarius* and dates to approximately 4.5 Ma. A second fossil similar to  
 65 *ochropus* dates to approximately 4.5 Ma (Olson & Rasmussen 2001). 3) The oldest North  
 66 America *Actitis*-like fossil was used to date the presence of *Actitis* in the New World. 4)  
 67 Well supported phylogenies place *Limosa* as sister to everything else in the family except  
 68 *Bartramia* and *Numenius*. Baker et al. (2007) incorrectly used the 33 million year old  
 69 fossil *Montirallus gypsorum* to provide a minimum calibration of this split. *Montirallus*  
 70 *gypsorum* was originally misclassified in *Limosa*, but its relation to living clades is  
 71 uncertain and it has most recently been recognized as a rail (Olson 1985). This calibration  
 72 incorrectly overestimated ages within the Scolpanidae in Baker et al.'s study. Instead we  
 73 date this split with the oldest recognized *Limosa* (*L. vanrossemi*), a calibration point  
 74 supported by cross validation and which yielded a rate close to the traditional 2% 5) The  
 75 fossil *Numenius antiquus* was used to calibrate the split between *Numenius* and  
 76 *Bartramia* following Baker et al (2007). 6) following Baker et al (2007) the fossil  
 77 *Micropalama hesternus* was used to date the split between *Micropalama* and *Trygnites*.

78  
 79 **Ardeidae:** 1) The fossil *Nycticorax fidens* was used to date the split between *Nycticorax*  
 80 and *Nyctanassa*. These genera are sister in DNA hybridization trees and some but not  
 81 phylogenetic analysis using DNA sequences (see Sheldon et al. 2000). 2) The oldest  
 82 *Egretta* fossil was used to calibrate the split between *Egretta* and its sister genus *Syrigma*.

83  
 84 **Ciconiidae** The mitochondrial based phylogenies available for this family are poorly  
 85 resolved and additional sequence data is necessary to confirm relationships. For the  
 86 purposes of this study we reconstructed a phylogeny using Bayesian analysis and the  
 87 GTR-gamma model of sequence evolution. 1) The split between *Mycteria* and its sister  
 88 clade comprising all other extant stork genera in our analysis was dated with the oldest  
 89 fossil *Mycteria* from the Miocene. 2) *Ciconia* was sister to the entire stork radiation to the  
 90 exclusion of *Mycteria* and we dated this split using the oldest recognized *Ciconia*. 3) A

91 fossil of *Ephippiorhynchus asiaticus* was used to date the split between this species and  
 92 *E. senegalensis*.

93

94 **Psittacidae:** The oldest *Melopsittacus* fossil was used to date the split between this genus  
 95 and its sister. To identify its sister we constructed a Bayesian phylogeny from Genbank  
 96 sequences for Cytochrome b (GTR-gamma model) including representatives from most  
 97 Australasian and New World genera. This phylogeny strongly supported *Psittaculirostris*  
 98 as the immediate sister. Additional phylogenetic analysis using nuclear DNA datasets is  
 99 needed to confirm this relationship.

100

101 **Spheniscidae:** 1) The earliest *Spheniscus* fossil was used to calibrate the split between  
 102 *Spheniscus* and its sister *Eudyptula*. 2) The age of the Galapagos (based on the oldest  
 103 exposed lavas) were used to calibrate the endemic *Spheniscus mendiculus* from its sister  
 104 *S. humboldti* from coastal South America. Both *Spheniscus* calibrations were not  
 105 supported by cross validation.

106

107 **Hydrobatidae:** Nunn & Stanley (1998) dated the crown group of extant *Oceanodroma*  
 108 species with the earliest *Oceanodroma* fossil which they assumed belonged to the crown  
 109 group. We provide this calibration here but confirmation of fossil placement is necessary.

110

111 **Diomedidae:** 1) The sister genera *Thalassarche* and *Phoebetria* were dated using the  
 112 oldest known fossil of *Thalassarche* (*T. thyridata*) dated at ~ 5.3 Ma. Nunn *et al* (1996)  
 113 incorrectly used a date of 10 mya for this fossil calibration. 2) The split between the  
 114 Ecuadorian endemic *Phoebastria irrorata* and its sister clade (*P. nigripes*, *immutabilis*,  
 115 and *albatrus*) was dated with the age of the oldest terrestrial lavas for the Galapagos  
 116 Archipelago. *Phoebastria irrorata* is essentially endemic to the Galapagos but a small  
 117 colony of a few pairs of *P. irrorata* also occurs on a continental shelf island just off the  
 118 coast of Ecuador. This latter island is of mid-Pleistocene age and thus post dates the age  
 119 of the Galapagos islands used to date this species.

120

121 **Cuculidae:** *Coccyzus melacoryphus* endemic to the Galapagos was dated with the age of  
 122 the Galapagos islands from its sister clade. A second calibration is possible for *C.*  
 123 *ferrugineus* endemic to Cocos I, Costa Rica but sequences were not available.

124

125 **Columbidae:** 1) *Zenaida galapagoensis* from the Galapagos is sister to a clade  
 126 containing *Z. auriculata*, *macroura* and *graysoni*. This split was dated using the age of  
 127 the Galapagos Islands 2) *Z. graysoni* endemic to Socorro Island represents an Island form  
 128 of the mainland *Z. macroura* and the date of Socorro Island was used to date this split. 3)  
 129 The closest living know relative of the extinct flightless Dodo (*Raphus*) is the Nicobar  
 130 Pigeon (*Caloenas*). I used the age of Mauritius Island to which the Dodo was endemic, to  
 131 calibrate the split between this genus and *Caloenas*. Note: this split was previously  
 132 estimated to much older (~43 million years) using an external calibration between  
 133 Procellariiformes and penguins, however, the age of Mauritius was not rejected by the  
 134 cross validation test while the this older date was.

135

136 **Odontophoridae:** We used *Callipepla (Lophorhyx) shortwelli* to date the split between  
137 *Callipepla* and *Colinus*. Confirmation that this fossil belongs to or is closely related to  
138 *Callipepla* is needed.

139

140 **Gruidae:** Krajewski & King (1996) provided several fossil based calibrations for cranes  
141 but did not specify fossil identities or ages, or the nodes used for calibration. As such we  
142 were not able to include their calibrations in our analysis. Though other potential fossil  
143 calibration points may exist, we felt confident only to use the split between *Grus*  
144 *americana* and its sister clade (*G. grus*, *G. monachus*, and *G. nigricollis*). This split was  
145 dated using the oldest known fossil of *G. americana* and probably underestimates the true  
146 rate.

147

148 **Accipitridae:** The split between New World *Spizaetus* and *Oroaetus* and its Old World  
149 sister clade was dated with the earliest New World fossil of *Spizaetus (S. schultzi)*.

150

151 **Falconidae:** The age of Mauritius was used to date the endemic *Falco punctatus* from its  
152 sister clade (*F. araea* and *F. newtoni*).

153

154 **Ramphastidae:** *Semnornis frantzii* is endemic to the Talamanca highlands of Costa Rica  
155 and Panama. Its sister, *S. ramphastinus* is endemic to the Choco slope of the Andes of  
156 Colombia and Ecuador. We dated the split between these species using the age of  
157 completion of the Central American landbridge.

158

159 **Picidae:** The split between *Sasia abnormis* from peninsular Malaysia and *S. ochracea*  
160 distributed north of the peninsula was previously calibrated with the formation of the  
161 temporary Kra Seaway that bisected the Malaysian peninsula. Other calibrations using  
162 this seaway will be possible when phylogenetic information becomes available.

163

164 **Dendrocolaptidae:** The split between the Central American clade of endemic species  
165 *Lepidocolaptes leucogaster* and *L. affinis* and their South American sister *L. lachrymosus*  
166 was dated with the completion of the Central American landbridge.

167

168 **Tyrannidae:** The split between the *Empidonax atriceps* endemic to the Talamanca and  
169 its Middle American sister *E. fulvifrons* was dated with uplift of the Talamanca.

170

171 **Dicruridae:** Though Cibois *et al* (2004) did not calibrate molecular rates, they did  
172 discuss the colonization history of *Pomarea* monarchs in the Marquesas islands and  
173 suggested that species colonized islands in a stepping stone fashion shortly after the  
174 intense volcanic activity on each island had subsided. Five calibrations are possible as  
175 presented in the Online Dataset. These can be dated either with the age of the oldest  
176 known lavas on the islands or with the ending of intense volcanic activity. We tested both  
177 under the cross validation procedure. Using dates of the cessation of volcanism as  
178 calibration points received much stronger support in the cross validation procedure than  
179 using dates of island origin (Online Dataset). Dates are taken from Cibois *et al* (2004)  
180 and references therein.

181

182 **Turdidae:** 1) *Catharus gracilirostris* endemic to the Talamanca highlands is sister to a  
 183 clade of *Catharus* derived from the north that includes *C. occidentalis*, *guttatus*,  
 184 *fuscescens*, *minimus* and *bicknelli* (Outlaw 2003) and was dated with the uplift of the  
 185 Talamanca. 2) The Hawaiian clade of *Myadestes* is endemic to the main Hawaiian  
 186 islands. The split between the Hawaiian clade and its sister mainland clade (*M. unicolor*,  
 187 *genibarbis*, *elisabeth* and *occidentalis*) was dated with the age of the main islands. 3) The  
 188 pair of Central American species, *Myadestes melanops* endemic to Costa Rica and  
 189 western Panama and *M. coloratus* of eastern Panama, are sister to the Andean *M.*  
 190 *ralloides* and were dated with the age of the Central American landbridge.

191

192 **Sylviidae:** Three calibration points for *Sylvia* warblers are presented by Bohning-Gaese  
 193 *et al* (2006). However, DNA sequence data were available for only two of these. 1)  
 194 *Sylvia ruepelli* endemic to the island of Cyprus and 2) *Sylvia balearica* endemic to the  
 195 Balearic Islands are sister to the mainland forms *S. melanothorax* and *S.*  
 196 *undata/deserticola* respectively. Both are believed to have formed after the end of the  
 197 Messinian salinity crisis which had left the Mediterranean Sea dry.

198

199

200 **Nectariniidae:** Warren *et al* (2003) used the mid to late Pleistocene aged islands from  
 201 the Indian Ocean to date three endemic subspecies of *Nectarinia* sunbirds. Cytochrome b  
 202 sequences were available for only two of these. 1) *N. sovimanga aldabrensis* from  
 203 Aldabra Island is believed to have descended from *N. s. sovimanga* and is dated with the  
 204 formation of Aldabra. Note that these two subspecies however are not reciprocally  
 205 monophyletic rendering this calibration suspect. We took average sequence divergence as  
 206 our estimate. However, correcting for ancestral polymorphism was problematic due to  
 207 lack of monophyly and we were forced to apply the average correction from the rest of  
 208 our dataset. 2) *Nectarinia humbloti humbloti* endemic to Grande Comore Island is sister  
 209 to *N. h. mohelica* and is dated with the formation of Grande Comore. Both of these  
 210 calibrations were highlighted by the cross validation test as highly incompatible with the  
 211 rest of the dataset or with other calibrations less than 2 million years old and we do not  
 212 recommend their further use.

213

214 **Emberizinae:** 1) Phylogenetic relationships within *Chlorospingus* bush-tanagers (which  
 215 belong with New World sparrows not tanagers) are taken from Weir *et al* (2008).  
 216 *Chlorospingus pileatus* endemic to the Talamanca highlands is sister to a clade  
 217 containing *C. ophthalmicus*, *tacarcunae*, *inornatus* and *semifuscus*. This split is dated  
 218 with the uplift of the Talamanca highlands. *C. ophthalmicus* secondarily colonized the  
 219 Talamanca highlands at a later date. 2) The earliest fossil of the following taxa were used  
 220 to date the splits between those taxa and their sister clades: *Melospiza melodia*,  
 221 *Zonotrichia albicollis* and *Junco*. 3) The earliest emberizid fossil was used to date the  
 222 split between Emberizidae and its sister group. The exact relationship between  
 223 Emberizidae and other nine-primaried oscine families are uncertain. We used the  
 224 relationships in the Barker *et al* 2004 phylogeny which suggest that Thraupidae and  
 225 Cardinalidae together form the sister. However, calibrated rates are similar if Parulidae or  
 226 Icteridae are used as the sister.

227

228 **Thraupinae:** 1) The completion of the Central American Landbridge was used to  
 229 calibrate several sister species pairs in which one sister is endemic to Central America  
 230 and the other to South America (see Supporting Online Dataset). 2) the node separating  
 231 the Galapagos finches from their closest ancestors in the Caribbean (*Tiaris fuliginosa*, *T.*  
 232 *obscura*, *T. canora*, *T. bicolor*, *Melanospiza richardsoni* and *Loxigilla noctis*; Burns  
 233 2002) was dated with the age of the Galapagos Archipelago (oldest exposed terrestrial  
 234 lavas).

235

236 **Parulidae:** 1) The earliest fossil of *Vermivora celata* was used to date the split between  
 237 this species and its sister clade. 2) *Myioborus torquatus* endemic to the Talamanca  
 238 highlands was dated with the Central American Landbridge. Phylogenetic analysis  
 239 suggest its exact sister is uncertain do to rapid divergence of Andean *Myioborus* in a  
 240 narrow time period. The sister is either *M. brunniceps* or a larger clade of Andean  
 241 species. Similar calibrations are obtained independent of which Andean sister was used.  
 242 3) The split between the endemic *Parula gutturalis* endemic to the Talamanca and its  
 243 Middle American sister *P. superciliosa* was dated with uplift of the Talamanca. These  
 244 taxa are similar genetically suggesting recent colonization of the Talamanca and cross  
 245 validation highlighted this calibration as a poor predictor of other calibration points.

246

247 **Icteridae:** 1) Florida fossils of *Sturnella* most similar to *S. magna* extent back to 2  
 248 million years and were used to date the split between *S. magna* and *S. neglecta*. 2) An  
 249 early *Sturnella* fossil from Nebraska was used to date the split between *S. magna* /  
 250 *neglecta* (yellow meadowlark clade) from the South American red meadowlark clade. 3)  
 251 Florida fossils of *Euphagus cyanocephalus* also extend to the same period and were used  
 252 to date the split between *E. carolinensis* and *E. cyanocephalus*. 3) Earliest fossils of  
 253 *Agelaius phoenicius* were used to date the split between this species and *A. tricolor*. 4)  
 254 Earliest fossils of *Molothrus ater* were used to date the split between this species and its  
 255 sister *M. bonariensis*. 5) Five pairs of sister species of blackbirds in which one species is  
 256 endemic to Central America and the other to South America were dated with the  
 257 formation of the Isthmus of Panama (Online Dataset)

258

259 **Cardinalinae:** The split between *Passerina* and *Cyanocompsa* buntings is dated with the  
 260 earliest fossil *Passerina*.

261

262 **Fringillidae:** Three Hawaiian honeycreeper calibrations were presented by Fleischer *et al*  
 263 (1998) and are included here.

264

265

266

267

268

## 269 **Additional Literature Cited**

270

271 Baker AJ, Pereira SL, Haddrath OP, Edge KA (2006) Multiple gene evidence for  
 272 expansion of extant penguins out of Antarctica due to global cooling. Proceedings  
 273 of the Royal Society B-Biological Sciences, 273, 11-17.

- 274 Baker AJ, Pereira SL, Paton TA (2007) Phylogenetic relationships and divergence times  
275 of Charadriiformes genera: multigene evidence for the Cretaceous origin of at  
276 least 14 clades of shorebirds. *Biology Letters*, 3, 205-209.
- 277 Barker FK, Cibois A, Schikler P, Feinstein J, Cracraft J (2004) Phylogeny and  
278 diversification of the largest avian radiation. *Proceedings of the National  
279 Academy of Sciences of the United States of America*, 101, 11040-11045.
- 280 Benz BW, Robbins MB, Peterson AT (2006) Evolutionary history of woodpeckers and  
281 allies (Aves : Picidae): Placing key taxa on the phylogenetic tree. *Molecular  
282 Phylogenetics and Evolution*, 40, 389-399.
- 283 Boev ZN, Koufos GD (2006) The late Miocene vertebrate locality of Perivolaki,  
284 Thessaly, Greece - 2. *Aves. Palaeontographica Abteilung A-Palaeozoologie-  
285 Stratigraphie*, 276, 11-22.
- 286 Bohron WA, Reid MR (1997) Genesis of silicic peralkaline volcanic rocks in an ocean  
287 island setting by crustal melting and open-system processes: Socorro Island,  
288 Mexico. *J. Petrol.*, 38, 1137-1166.
- 289 Boles WE (1998) A Budgerigar *Melopsittacus undulatus* from the Pliocene of  
290 Riversleigh, north-western Queensland. *Emu*, 98, 32-35.
- 291 Boles WE (2005) A review of the Australian fossil storks of the genus *Ciconia* (Aves:  
292 Ciconiidae), with the description of a new species. *Records of the Australian  
293 Museum*, 57, 165-178.
- 294 Bridge ES, Jones AW, Baker AJ (2005) A phylogenetic framework for the terns  
295 (Sternini) inferred from mtDNA sequences: implications for taxonomy and  
296 plumage evolution. *Molecular Phylogenetics and Evolution*, 35, 459-469.
- 297 Burns KJ, Hackett SJ, Klein NK (2002) Phylogenetic relationships and morphological  
298 diversity in Darwin's finches and their relatives. *Evolution*, 56, 1240-1252.
- 299 Burns KJ, Hackett SJ, Klein NK (2003) Phylogenetic relationships of Neotropical  
300 honeycreepers and the evolution of feeding morphology. *J. Avian Biol.*, 34, 360-  
301 370.
- 302 Burns KJ, Naoki K (2004) Molecular phylogenetics and biogeography of Neotropical  
303 tanagers in the genus *Tangara*. *Mol. Phylogenet. Evol.*, 32, 838-854.
- 304 Carson HL, Calue DA (1995) Geology and biogeography of the Hawaiian Islands. In:  
305 Hawaiian Biogeography: Evolution in a Hotspot Archipelago (eds. Wagner W,  
306 Funk V), pp. 14-19. Smithsonian Institution Press, Washington, DC.
- 307 Carson RJ, Spicer GS (2003) A phylogenetic analysis of the emberizid sparrows based on  
308 three mitochondrial genes. *Molecular Phylogenetics and Evolution*, 29, 43-57.

- 309 Castillo P, Batiza R, Vanko D *et al* (1988) Anomalously young volcanoes on old hot-  
310 spot traces: I. geology and petrology of Cocos-Island. *Geol. Soc. Am. Bull.*, 100,  
311 1400-1414.
- 312 Chandler RM (1990) Fossil birds of the San Diego Formation, late Pliocene, Blancan,  
313 San Diego County, California, Part 2. Pp. 73–171 *in* Recent advances in the  
314 study of Neogene fossil birds. Ornithol. Monogr. No. 44.
- 315 Cibois A, Thibault J, Pasquet E (2004) Biogeography of eastern Polynesian monarchs  
316 (*Pomarea*): an endemic genus close to extinction. *Condor* **106**, 837-851.
- 317 Cohen BL, Baker AJ, Bleschschmidt K *et al.* (1997) Enigmatic phylogeny of skuas  
318 (Aves: Stercorariidae). Proceedings of the Royal Society of London Series B-  
319 Biological Sciences, 264, 181-190.
- 320 Crowe TM, Bowie RCK, Bloomer P *et al.* (2006) Phylogenetics, biogeography and  
321 classification of, and character evolution in, gamebirds (Aves : Galliformes):  
322 effects of character exclusion, data partitioning and missing data. *Cladistics*, 22,  
323 495-532.
- 324 Donne-Gousse C, Laudet V, Hanni C (2002) A molecular phylogeny of anseriformes  
325 based on mitochondrial DNA analysis. *Molecular Phylogenetics and Evolution*,  
326 23, 339-356.
- 327 Emslie SD (2007) Fossil passerines from the early Pliocene of Kansas and the evolution  
328 of songbirds in North America. *Auk*, 124, 85-95.
- 329 Friesen VL, Baker AJ, Piatt JF (1996) Phylogenetic relationships within the Alcidae  
330 (Charadriiformes: Aves) inferred from total molecular evidence. *Mol. Biol. Evol.*,  
331 13, 359-367.
- 332 Garcia-Moreno J, Cortes N, Garcia-Deras GM, Hernandez-Banos BE (2006) Local origin  
333 and diversification among *Lampornis* hummingbirds: A Mesoamerican taxon.  
334 *Molecular Phylogenetics and Evolution*, 38, 488-498.
- 335 Gohlich UB (2007) The oldest fossil record of the extant penguin genus *Spheniscus* - a  
336 new species from the Miocene of Peru. *Acta Palaeontologica Polonica*, 52, 285-  
337 298.
- 338 Groombridge JJ, Jones CG, Bayes MK *et al.* (2002) A molecular phylogeny of African  
339 kestrels with reference to divergence across the Indian Ocean. *Molecular*  
340 *Phylogenetics and Evolution*, 25, 267-277.
- 341 Hall ML (1983) Origin of Espanola-Island and the age of terrestrial life on the  
342 Galapagos-Islands. *Science*, 221, 545-547.
- 343 Hughes JM (2006) Phylogeny of the cuckoo genus *Coccyzus* (Aves: Cuculidae): a test of  
344 monophyly. *Systematics and Biodiversity*, 4, 483-488.

- 345 Johnson KP, Clayton DH (2000) A molecular phylogeny of the dove genus *Zenaida*:  
346 Mitochondrial and nuclear DNA sequences. *Condor*, 102, 864-870.
- 347 Johnson KP, Sorenson MD (1998) Comparing molecular evolution in two mitochondrial  
348 protein coding genes (cytochrome b and ND2) in the dabbling ducks (Tribe:  
349 Anatini). *Molecular Phylogenetics and Evolution*, 10, 82-94.
- 350 Johnson NK, Cicero C (2002) The role of ecologic diversification in sibling speciation of  
351 *Empidonax* flycatchers (Tyrannidae): multigene evidence from mtDNA.  
352 *Molecular Ecology*, 11, 2065-2081.
- 353 Klicka J, Fry AJ, Zink RM, Thompson CW (2001) A cytochrome-b perspective on  
354 *Passerina* bunting relationships. *Auk*, 118, 611-623.
- 355 Krajewski C, King DG (1996) Molecular divergence and phylogeny: Rates and patterns  
356 of cytochrome b evolution in cranes. *Mol. Biol. Evol.*, 13, 21-30.
- 357 Lambrecht K (1933) *Handbuch der Palaeornithologie*. Berlin.
- 358 Lanyon SM, Omland KE (1999) A molecular phylogeny of the blackbirds (Icteridae):  
359 Five lineages revealed by cytochrome-b sequence data. *Auk*, 116, 629-639.
- 360 Lerner HRL, Mindell DP (2005) Phylogeny of eagles, Old World vultures, and other  
361 Accipitridae based on nuclear and mitochondrial DNA. *Molecular Phylogenetics*  
362 *and Evolution*, 37, 327-346.
- 363 Lovette IJ, Bermingham E (2001) Mitochondrial perspective on the phylogenetic  
364 relationships of the Parula wood-warblers. *Auk*, 118, 211-215.
- 365 Lovette IJ, Hochachka WM (2006) Simultaneous effects of phylogenetic niche  
366 conservatism and competition on avian community structure. *Ecology*, 87, S14-  
367 S28.
- 368 McDougall L, Chamalaun FG (1969) Isotopic dating and geomagnetic polarity studies on  
369 volcanic rocks from Mauritius, Indian Ocean. *Geol. Soc. America Bull.* 80, 1419-  
370 1442.
- 371 Mlíkovský J (2002) *Cenozoic Birds of the World, Part 1: Europe*. Ninox Press, Prague.
- 372 Moum T, Arnason U, Arnason E (2002) Mitochondrial DNA sequence evolution and  
373 phylogeny of the Atlantic Alcidae, including the extinct great auk (*Pinguinus*  
374 *impennis*). *Mol. Biol. Evol.*, 19, 1434-1439.
- 375 Nunn GB, Cooper J, Jouventin P, Robertson CJR, Robertson GG (1996) Evolutionary  
376 relationships among extant albatrosses (Procellariiformes: Diomedidae)  
377 established from complete cytochrome-b

- 378 Nunn GB, Stanley SE (1998) Body size effects and rates of cytochrome b evolution in  
379 tube-nosed seabirds. *Mol. Biol. Evol.*, 15, 1360-1371.
- 380 Olson SL (1991) The fossil record of the genus *Mycteria* (Ciconiidae) in North America.  
381 *Condor*, 93, 1004-1006.
- 382 Olson SL, Rasmussen PD (2001) Miocene and Pliocene birds from the Lee Creek Mine,  
383 North Carolina. 233-365 in Ray, C. E. & Bohaska, D. J., (eds.): *Geology and*  
384 *paleontology of the Lee Creek Mine, North Carolina, Vol. III. Smithsonian*  
385 *Contributions to Paleobiology: No. 90, iii-365.*
- 386 Omland KE, Lanyon SM, Fritz SJ (1999) A molecular phylogeny of the new world  
387 orioles (*Icterus*): The importance of dense taxon sampling. *Molecular*  
388 *Phylogenetics and Evolution*, 12, 224-239.
- 389 Paxinos EE, James HF, Olson SL *et al* (2002) Prehistoric decline of genetic diversity in  
390 the nene. *Science*, 296, 1827.
- 391 Pons JM, Hassanin A, Crochet PA (2005) Phylogenetic relationships within the Laridae  
392 (*Charadriiformes: Aves*) inferred from mitochondrial markers. *Molecular*  
393 *Phylogenetics and Evolution*, 37, 686-699.
- 394 Shapiro B, Sibthorpe D, Rambaut A *et al* (2002) Flight of the dodo. *Science*, 295, 1683.
- 395 Sheldon FH, Jones CE, McCracken KG (2000) Relative patterns and rates of evolution in  
396 heron nuclear and mitochondrial DNA. *Molecular Biology and Evolution*, 17,  
397 437-450.
- 398 Sorenson MD, Cooper A, Paxinos EE *et al* (1999) Relationships of the extinct moa-  
399 nalos, flightless Hawaiian waterfowl, based on ancient DNA. *Proc. R. Soc. Lond.*  
400 *B*, 266, 2187-2193.
- 401 Tyrberg T (1998) *Pleistocene Birds of the Palearctic a Catalogue*. Nuttall Ornithological  
402 Club, Cambridge, Mass.
- 403 Warren BH, Bermingham E, Bowie RC, Prys-Jones RP, Thebaud C (2003) Molecular  
404 phylogeography reveals island colonization history and diversification of western  
405 Indian Ocean sunbirds (*Nectarinia: Nectariniidae*). *Mol. Phylogenet. Evol.*, 29,  
406 67-85.
- 407 Weckstein JD, Zink RM, Blackwell-Rago RC, Nelson DA (2001) Anomalous variation in  
408 mitochondrial genomes of White-crowned (*Zonotrichia leucophrys*) and Golden-  
409 crowned (*Z. atricapilla*) sparrows: Pseudogenes, hybridization, or incomplete  
410 lineage sorting?. *Auk*, 118, 231-236.
- 411 Wilkinson HE (1969) Description of an upper Miocene albatross from Beaumaris,  
412 Victoria, Australia, and a review of fossil Diomedidae. *Memoirs of the National*  
413 *Museum of Victoria*, 29, 41-51.

- 414 Winker K, Pruett CL (2006) Seasonal migration, speciation, and morphological  
415 convergence in the genus *Catharus* (Turdidae). *Auk*, 123, 1052-1068.
- 416 Zink RM, Blackwell RC (1998) Molecular systematics of the Scaled Quail complex  
417 (genus *Callipepla*). *Auk*, 115, 394-403.