

Supplementary Materials:

Table of Contents:

TABLES

Table S1: Dataset 1 taxon list

Table S2: Dataset 2 taxon list and accession numbers

Table S3: Dataset 3 taxon list

Table S4: Dataset 4 taxon list and accession numbers

Table S5: Dataset 5 taxon list

FIGURES

Figure S1: RY-coded ML tree with BS support and all taxa

Figure S2: Partitioned Nucleotide ML Tree with BS support values and collapsed by order

Figure S3: RY-coded ML Tree with BS support values and collapsed by order

Figure S4: Codon1_2 ML Tree with BS support values and collapsed by order

Figure S5: Amino Acid ML Tree with BS support values and collapsed by order

Figure S6: Unpartitioned ML Tree with BS support values and collapsed by order

Figure S7: 340_taxa ML Tree with BS support values and collapsed by order

Figure S8: Unsaturated Genes ML Tree with BS support values and collapsed by order

Figure S9: ML tree inferred using RY-coded datasets1-4 and RAxML-NG

Figure S10: Saturation plots for 1st codon positions by gene

Figure S11: Saturation plots for 2nd codon positions by gene

Figure S12: Saturation plots for 3rd codon positions by gene

Table S1:

<u>Species</u>	<u>Common Name</u>	<u>Order</u>	<u>Source</u>
<i>Circaetus pectoralis</i>	Black-chested snake eagle	Accipitriformes	B10K Phase 2
<i>Pandion haliaetus</i>	Osprey	Accipitriformes	B10K Phase 2
<i>Chauna torquata</i>	Southern screamer	Anseriformes	B10K Phase 2

<i>Nyctibius grandis</i>	Great potoo	Caprimulgiformes (Nightjar & Allies)	B10K Phase 2
<i>Nyctiprogne leucopyga</i>	Band-tailed nighthawk	Caprimulgiformes (Nightjar & Allies)	B10K Phase 2
<i>Chunga burmeisteri</i>	Black-legged seriema	Cariamiformes	B10K Phase 2
<i>Dromaius novaehollandiae</i>	Emu	Casuariiformes	B10K Phase 2
<i>Arenaria interpres</i>	Ruddy turnstone	Charadriiformes	B10K Phase 2
<i>Burhinus bistriatus</i>	Double-striped thick-knee	Charadriiformes	B10K Phase 2
<i>Chroicocephalus maculipennis</i>	Brown-hooded gull	Charadriiformes	B10K Phase 2
<i>Phaetusa simplex</i>	Large-billed tern	Charadriiformes	B10K Phase 2
<i>Rhinoptilus africanus</i>	Double-banded courser	Charadriiformes	B10K Phase 2
<i>Rostratula benghalensis</i>	Greater painted-snipe	Charadriiformes	B10K Phase 2
<i>Rynchops niger</i>	Black skimmer	Charadriiformes	B10K Phase 2
<i>Stercorarius parasiticus</i>	Parasitic jaeger	Charadriiformes	B10K Phase 2
<i>Turnix sylvaticus</i>	Common buttonquail	Charadriiformes	B10K Phase 2
<i>Turnix velox</i>	Little buttonquail	Charadriiformes	B10K Phase 2
<i>Ciconia maguari</i>	Maguari stork	Ciconiiformes	B10K Phase 2
<i>Urocolius indicus</i>	Red-face mousebird	Coliiformes	B10K Phase 2
<i>Columbina picui</i>	Picui ground dove	Columbiformes	B10K Phase 2
<i>Baryphthengus martii</i>	Rufous motmot	Coraciiformes	B10K Phase 2
<i>Ceyx cyanopectus</i>	Indigo-banded kingfisher	Coraciiformes	B10K Phase 2
<i>Chloroceryle aenea</i>	American pygmy kingfisher	Coraciiformes	B10K Phase 2
<i>Todus mexicanus</i>	Puerto Rican tody	Coraciiformes	B10K Phase 2
<i>Centropus bengalensis</i>	Lesser coucal	Cuculiformes	B10K Phase 2

<i>Ceuthmochares aereus</i>	Blue malkoha	Cuculiformes	B10K Phase 2
<i>Crotophaga sulcirostris</i>	Groove-billed ani	Cuculiformes	B10K Phase 2
<i>Tapera naevia</i>	Striped cuckoo	Cuculiformes	B10K Phase 2
<i>Rhynochetos jubatus</i>	Kagu	Eurypygiformes	B10K Phase 2
<i>Penelope pileata</i>	White-crested guan	Galliformes	B10K Phase 2
<i>Aramus guarauna</i>	Limpkin	Gruiformes	B10K Phase 2
<i>Corythaeola cristata</i>	Great blue turaco	Musophagiformes	B10K Phase 2
<i>Tauraco erythrolophus</i>	Red-crested turaco	Musophagiformes	B10K Phase 2
<i>Ardeotis kori</i>	Kori bustard	Otidiformes	B10K Phase 2
<i>Anthoscopus minutus</i>	Cape penduline tit	Passeriformes	B10K Phase 2
<i>Bombycilla garrulus</i>	Bohemian waxwing	Passeriformes	B10K Phase 2
<i>Buphagus erythrorhynchus</i>	Red-billed oxpecker	Passeriformes	B10K Phase 2
<i>Calcarius ornatus</i>	Chestnut-collared longspur	Passeriformes	B10K Phase 2
<i>Cardinalis cardinalis</i>	Northern cardinal	Passeriformes	B10K Phase 2
<i>Catharus fuscescens</i>	Veery	Passeriformes	B10K Phase 2
<i>Certhia brachydactyla</i>	Short-toed treecreeper	Passeriformes	B10K Phase 2
<i>Chaetops frenatus</i>	Cape rockjumper	Passeriformes	B10K Phase 2
<i>Chaetorhynchus papuensis</i>	Drongo fantail	Passeriformes	B10K Phase 2
<i>Chloropsis hardwickii</i>	Orange-bellied leafbird	Passeriformes	B10K Phase 2
<i>Cinclus mexicanus</i>	American dipper	Passeriformes	B10K Phase 2
<i>Cisticola juncidis</i>	Zitting cisticola	Passeriformes	B10K Phase 2
<i>Cnemophilus loriae</i>	Loria's satinbird	Passeriformes	B10K Phase 2
<i>Daphoenositta chrysoptera</i>	Varied sittella	Passeriformes	B10K Phase 2

<i>Dasyornis broadbenti</i>	Rufous bristlebird	Passeriformes	B10K Phase 2
<i>Dicaeum eximium</i>	Red-banded flowerpecker	Passeriformes	B10K Phase 2
<i>Dicrurus megarhynchus</i>	Paradise drongo	Passeriformes	B10K Phase 2
<i>Donacobius atricapilla</i>	Black-capped donacobius	Passeriformes	B10K Phase 2
<i>Drymodes brunneopygia</i>	Southern scrub robin	Passeriformes	B10K Phase 2
<i>Dryoscopus gambensis</i>	Northern puffback	Passeriformes	B10K Phase 2
<i>Dyaphorophya castanea</i>	Chestnut wattle-eye	Passeriformes	B10K Phase 2
<i>Edolisoma coerulescens</i>	Blackish cicadabird	Passeriformes	B10K Phase 2
<i>Erpornis zantholeuca</i>	White-bellied erpornis	Passeriformes	B10K Phase 2
<i>Erythrocercus maccalli</i>	Chestnut-capped flycatcher	Passeriformes	B10K Phase 2
<i>Eulacestoma nigropectus</i>	Wattled ploughbill	Passeriformes	B10K Phase 2
<i>Formicarius rufipectus</i>	Rufous-breasted antthrush	Passeriformes	B10K Phase 2
<i>Furnarius figulus</i>	Band-tailed hornero	Passeriformes	B10K Phase 2
<i>Notiomystis cincta</i>	Stitchbird	Passeriformes	B10K Phase 2
<i>Oenanthe oenanthe</i>	Northern wheatear	Passeriformes	B10K Phase 2
<i>Onychorhynchus coronatus</i>	Royal flycatcher	Passeriformes	B10K Phase 2
<i>Oreocharis arfaki</i>	Tit berrypicker	Passeriformes	B10K Phase 2
<i>Origma solitaria</i>	Rockwarbler	Passeriformes	B10K Phase 2
<i>Orthonyx spaldingii</i>	Chowchilla	Passeriformes	B10K Phase 2
<i>Oxylabes madagascariensis</i>	White-throated oxylabes	Passeriformes	B10K Phase 2
<i>Pachycephala philippinensis</i>	Yellow-bellied whistler	Passeriformes	B10K Phase 2
<i>Pachyramphus minor</i>	Pink-throated becard	Passeriformes	B10K Phase 2
<i>Panurus biarmicus</i>	Bearded reedling	Passeriformes	B10K Phase 2

<i>Paradisaea raggiana</i>	Raggiana bird-of-paradise	Passeriformes	B10K Phase 2
<i>Pardalotus punctatus</i>	Spotted pardalote	Passeriformes	B10K Phase 2
<i>Phainopepla nitens</i>	Phainopepla	Passeriformes	B10K Phase 2
<i>Picathartes gymnocephalus</i>	White-necked rockfowl	Passeriformes	B10K Phase 2
<i>Piprites chloris</i>	Wing-barred piprites	Passeriformes	B10K Phase 2
<i>Ploceus nigricollis</i>	Black-necked weaver	Passeriformes	B10K Phase 2
<i>Polioptila caerulea</i>	Blue-gray gnatcatcher	Passeriformes	B10K Phase 2
<i>Pomatorhinus ruficollis</i>	Streak-breasted scimitar babbler	Passeriformes	B10K Phase 2
<i>Pomatostomus ruficeps</i>	Chestnut-crowned babbler	Passeriformes	B10K Phase 2
<i>Prunella fulvescens</i>	Brown accentor	Passeriformes	B10K Phase 2
<i>Prunella himalayana</i>	Altai accentor	Passeriformes	B10K Phase 2
<i>Pycnonotus jocosus</i>	Red-whiskered bulbul	Passeriformes	B10K Phase 2
<i>Quiscalus mexicanus</i>	Great-tailed grackle	Passeriformes	B10K Phase 2
<i>Regulus satrapa</i>	Golden-crowned kinglet	Passeriformes	B10K Phase 2
<i>Rhabdornis inornatus</i>	Stripe-breasted rhabdornis	Passeriformes	B10K Phase 2
<i>Rhadina sibilatrix</i>	Wood warbler	Passeriformes	B10K Phase 2
<i>Rhagologus leucostigma</i>	Mottled berryhunter	Passeriformes	B10K Phase 2
<i>Rhipidura dahli</i>	Bismarck fantail	Passeriformes	B10K Phase 2
<i>Rhodinocichla rosea</i>	Rosy thrush-tanager	Passeriformes	B10K Phase 2
<i>Scytalopus superciliaris</i>	White-browed tapaculo	Passeriformes	B10K Phase 2
<i>Setophaga kirtlandii</i>	Kirtland's warbler	Passeriformes	B10K Phase 2
<i>Sinosuthora webbiana</i>	Vinous-throated parrotbill	Passeriformes	B10K Phase 2
<i>Sitta europaea</i>	Eurasian nuthatch	Passeriformes	B10K Phase 2

<i>Spizella passerina</i>	Chipping sparrow	Passeriformes	B10K Phase 2
<i>Struthidea cinerea</i>	Apostlebird	Passeriformes	B10K Phase 2
<i>Tachuris rubrigastra</i>	Many-colored rush tyrant	Passeriformes	B10K Phase 2
<i>Thryothorus ludovicianus</i>	Carolina wren	Passeriformes	B10K Phase 2
<i>Tichodroma muraria</i>	Wallcreeper	Passeriformes	B10K Phase 2
<i>Toxostoma redivivum</i>	California thrasher	Passeriformes	B10K Phase 2
<i>Tyrannus savana</i>	Fork-tailed flycatcher	Passeriformes	B10K Phase 2
<i>Urocynchramus pylzowi</i>	Przevalski's finch	Passeriformes	B10K Phase 2
<i>Vireo altiloquus</i>	Black-whiskered vireo	Passeriformes	B10K Phase 2
<i>Zosterops hypoxanthus</i>	Bismarck white-eye	Passeriformes	B10K Phase 2
<i>Balaeniceps rex</i>	Shoebill	Pelecaniformes	B10K Phase 2
<i>Cochlearius cochlearius</i>	Boat-billed heron	Pelecaniformes	B10K Phase 2
<i>Scopus umbretta</i>	Hamerkop	Pelecaniformes	B10K Phase 2
<i>Fregata magnificens</i>	Magnificent frigatebird	Pelecaniformes	B10K Phase 2
<i>Bucco capensis</i>	Collared puffbird	Piciformes	B10K Phase 2
<i>Semnornis frantzii</i>	Prong-billed barbet	Piciformes	B10K Phase 2
<i>Tricholaema leucomelas</i>	Acacia pied barbet	Piciformes	B10K Phase 2
<i>Fregetta grallaria</i>	White-bellied storm petrel	Procellariiformes	B10K Phase 2
<i>Oceanites oceanicus</i>	Wilson's storm petrel	Procellariiformes	B10K Phase 2
<i>Pelecanoides urinatrix</i>	Common diving petrel	Procellariiformes	B10K Phase 2
<i>Thalassarche chlororhynchos</i>	Atlantic yellow-nosed albatross	Procellariiformes	B10K Phase 2
<i>Eolophus roseicapillus</i>	Galah	Psittaciformes	B10K Phase 2

<i>Pterocles burchelli</i>	Burchell's sandgrouse	Pterocliiformes	B10K Phase 2
<i>Syrrhaptes paradoxus</i>	Pallas's sandgrouse	Pterocliiformes	B10K Phase 2
<i>Ciccaba nigrolineata</i>	Black-and-white owl	Strigiformes	B10K Phase 2
<i>Crypturellus soui</i>	Little tinamou	Tinamiformes	B10K Phase 2
<i>Crypturellus undulatus</i>	Undulated tinamou	Tinamiformes	B10K Phase 2
<i>Nothocercus nigrocapillus</i>	Hooded tinamou	Tinamiformes	B10K Phase 2
<i>Nothoprocta ornata</i>	Ornate tinamou	Tinamiformes	B10K Phase 2
<i>Nothoprocta pentlandii</i>	Andean tinamou	Tinamiformes	B10K Phase 2
<i>Nothoprocta perdicaria</i>	Chilean tinamou	Tinamiformes	B10K Phase 2
<i>Trogon melanurus</i>	Black-tailed trogon	Trogoniformes	B10K Phase 2
<i>Glareola pratincola</i>	Collared pratincole	Charadriiformes	B10K Phase 2
<i>Himantopus himantopus</i>	Black-winged stilt	Charadriiformes	B10K Phase 2
<i>Ibidorhyncha struthersii</i>	Ibisbill	Charadriiformes	B10K Phase 2
<i>Jacana jacana</i>	Wattled jacana	Charadriiformes	B10K Phase 2
<i>Larus smithsonianus</i>	American herring gull	Charadriiformes	B10K Phase 2
<i>Halcyon senegalensis</i>	Woodland kingfisher	Coraciiformes	B10K Phase 2
<i>Herpetotheres cachinnans</i>	Laughing falcon	Falconiformes	B10K Phase 2
<i>Grus americana</i>	Whooping crane	Gruiformes	B10K Phase 2
<i>Monias benschi</i>	Subdesert mesite	Mesitornithiformes	B10K Phase 2
<i>Lophotis ruficrista</i>	Red-crested korhaan	Otidiformes	B10K Phase 2
<i>Grantiella picta</i>	Painted honeyeater	Passeriformes	B10K Phase 2
<i>Gymnorhina tibicen</i>	Australian magpie	Passeriformes	B10K Phase 2
<i>Hippolais icterina</i>	Icterine warbler	Passeriformes	B10K Phase 2

<i>Hirundo rustica</i>	Barn swallow	Passeriformes	B10K Phase 2
<i>Horornis vulcanius</i>	Sunda bush warbler	Passeriformes	B10K Phase 2
<i>Hylocitrea bonensis</i>	Hylocitrea	Passeriformes	B10K Phase 2
<i>Hypocryptadius cinnamomeus</i>	Cinnamon ibon	Passeriformes	B10K Phase 2
<i>Ifrita kowaldi</i>	Blue-capped ifrit	Passeriformes	B10K Phase 2
<i>Illadopsis cleaveri</i>	Blackcap illadopsis	Passeriformes	B10K Phase 2
<i>Irena cyanogastra</i>	Philippine fairy-bluebird	Passeriformes	B10K Phase 2
<i>Lanius ludovicianus</i>	Loggerhead shrike	Passeriformes	B10K Phase 2
<i>Leiothrix lutea</i>	Red-billed leiothrix	Passeriformes	B10K Phase 2
<i>Leptocoma aspasia</i>	Black sunbird	Passeriformes	B10K Phase 2
<i>Leucopsar rothschildi</i>	Bali myna	Passeriformes	B10K Phase 2
<i>Locustella ochotensis</i>	Middendorff's grasshopper warbler	Passeriformes	B10K Phase 2
<i>Loxia leucoptera</i>	Two-barred crossbill	Passeriformes	B10K Phase 2
<i>Machaerirhynchus nigripectus</i>	Black-breasted boatbill	Passeriformes	B10K Phase 2
<i>Malurus elegans</i>	Red-winged fairywren	Passeriformes	B10K Phase 2
<i>Melanocharis versteri</i>	Fan-tailed berrypecker	Passeriformes	B10K Phase 2
<i>Menura novaehollandiae</i>	Superb lyrebird	Passeriformes	B10K Phase 2
<i>Mionectes macconnelli</i>	McConnell's flycatcher	Passeriformes	B10K Phase 2
<i>Motacilla alba</i>	White wagtail	Passeriformes	B10K Phase 2
<i>Myiagra hebetior</i>	Velvet flycatcher	Passeriformes	B10K Phase 2
<i>Mystacornis crossleyi</i>	Crossley's vanga	Passeriformes	B10K Phase 2
<i>Neopipo cinnamomea</i>	Cinnamon neopipo	Passeriformes	B10K Phase 2
<i>Nicator chloris</i>	Western nicator	Passeriformes	B10K Phase 2

<i>Hydrobates tethys</i>	Wedge-rumped storm-petrel	Procellariiformes	B10K Phase 2
<i>Glaucidium brasilianum</i>	Ferruginous pygmy owl	Strigiformes	B10K Phase 2

Table S1: Taxon information for species in dataset 1

Table S2: Dataset 2 taxon list and Genbank Accession Numbers

<u>Species</u>	<u>Common Name</u>	<u>Order</u>	<u>Source</u>	
<i>Buteo lagopus</i>	Rough-legged buzzard	Accipitriformes	NCBI Genbank	NC_029189.1
<i>Nisaetus alboniger</i>	Blyth's hawk-eagle	Accipitriformes	NCBI Genbank	NC_007599.1
<i>Nisaetus nipalensis</i>	Mountain hawk-eagle	Accipitriformes	NCBI Genbank	NC_007598.1
<i>Spizaetus nipalensis</i>	Mountain hawk-eagle	Accipitriformes	NCBI Genbank	AP_008238.1
<i>Anas platyrhynchos</i>	Mallard	Anseriformes	NCBI Genbank	NC_009684.1
<i>Anseranas semipalmata</i>	Magpie goose	Anseriformes	NCBI Genbank	NC_005933.1
<i>Aythya americana</i>	Redhead	Anseriformes	NCBI Genbank	AF_090337.1
<i>Dendrocygna javanica</i>	Lesser whistling duck	Anseriformes	NCBI Genbank	NC_012844.1
<i>Aceros waldeni</i>	Rufous-headed hornbill	Bucerotiformes	NCBI Genbank	NC_015085.1
<i>Anthraceroceros coronatus</i>	Malabar pied hornbill	Bucerotiformes	NCBI Genbank	NC_038152
<i>Bucorvus leadbeateri</i>	Southern ground hornbill	Bucerotiformes	NCBI Genbank	NC_015199.1
<i>Bycanistes brevis</i>	Silvery-cheeked hornbill	Bucerotiformes	NCBI Genbank	NC_015201.1
<i>Upupa epops</i>	Hoopoe	Bucerotiformes	NCBI Genbank	KT_356220.1
<i>Florisuga fusca</i>	Black jacobin	Caprimulgiformes (Hummingbird)	NCBI Genbank	NC_030287.1
<i>Glaucis hirsutus</i>	Rufous-breasted hermit	Caprimulgiformes (Hummingbird)	NCBI Genbank	NC_033413.1

<i>Heliodoxa aurescens</i>	Gould's jewelfront	Caprimulgiformes (Hummingbird)	NCBI Genbank	KP_8530 94.1
<i>Lophornis magnificus</i>	Frilled coquette	Caprimulgiformes (Hummingbird)	NCBI Genbank	NC_0334 14.1
<i>Phaethornis malaris</i>	Great-billed hermit	Caprimulgiformes (Hummingbird)	NCBI Genbank	NC_0302 88.1
<i>Archilochus colubris</i>	Ruby-throated hummingbird	Caprimulgiformes (Hummingbirds)	NCBI Genbank	NC_0100 94.1
<i>Apus apus</i>	Common swift	Caprimulgiformes (Swifts)	NCBI Genbank	NC_0085 40
<i>Cypseloides fumigatus</i>	Sooty swift	Caprimulgiformes (Swifts)	NCBI Genbank	NC_0349 33.1
<i>Haematopus ater</i>	Blackish oystercatcher	Charadriiformes	NCBI Genbank	AY_0748 86.2
<i>Synthliboramphus antiquus</i>	Ancient murrelet	Charadriiformes	NCBI Genbank	NC_0079 78.2
<i>Columba livia</i>	Rock dove	Columbiformes	NCBI Genbank	GU_9081 31.1
<i>Geotrygon violacea</i>	violaceous quail-dove	Columbiformes	NCBI Genbank	NC_0152 07.1
<i>Leptotila verreauxi</i>	White-tipped dove	Columbiformes	NCBI Genbank	HM_6402 14.1
<i>Streptopelia chinensis</i>	Spotted dove	Columbiformes	NCBI Genbank	NC_0264 59.1
<i>Streptopelia decaocto</i>	Eurasian collared dove	Columbiformes	NCBI Genbank	NC_0375 13.1
<i>Streptopelia orientalis</i>	Oriental turtle dove	Columbiformes	NCBI Genbank	NC_0314 47.1
<i>Zenaida macroura</i>	Mourning dove	Columbiformes	NCBI Genbank	NC_0318 63.1
<i>Merops viridis</i>	Blue-throated bee-eater	Coraciiformes	NCBI Genbank	NC_0346 42.1
<i>Todiramphus sanctus vagans</i>	New Zealand sacred kingfisher	Coraciiformes	NCBI Genbank	EU_4104 89.1
<i>Cuculus poliocephalus</i>	Lesser cuckoo	Cuculiformes	NCBI Genbank	NC_0284 14.1
<i>Eudynamys taitensis</i>	Longtailed cuckoo	Cuculiformes	NCBI Genbank	NC_0117 09.1
<i>Geococcyx californianus</i>	Greater roadrunner	Cuculiformes	NCBI Genbank	HM_6402 12.1

<i>Falco peregrinus</i>	Peregrine falcon	Falconiformes	NCBI Genbank	NC_0008 78.1
<i>Falco rusticolus</i>	Gyrfalcon	Falconiformes	NCBI Genbank	NC_0293 59.1
<i>Falco sparverius</i>	American kestrel	Falconiformes	NCBI Genbank	DQ_7808 80.1
<i>Falco tinnunculus</i>	Common kestrel	Falconiformes	NCBI Genbank	EU_1963 61.1
<i>Micrastur gilvicollis</i>	Lined forest falcon	Falconiformes	NCBI Genbank	NC_0085 48.1
<i>Acryllium vulturinum</i>	Vulturine guineafowl	Galliformes	NCBI Genbank	NC_0141 80.1
<i>Alectura lathamii</i>	Australian brushturkey	Galliformes	NCBI Genbank	NC_0072 27.1
<i>Colinus virginianus</i>	Northern bobwhite	Galliformes	NCBI Genbank	NC_0246 20.1
<i>Coturnix japonica</i>	Japanese quail	Galliformes	NCBI Genbank	NC_0034 08.1
<i>Meleagris gallopavo</i>	Turkey	Galliformes	NCBI Genbank	NC_0101 95.2
<i>Numida meleagris</i>	Helmeted guineafowl	Galliformes	NCBI Genbank	NC_0343 74.1
<i>Tetrastes bonasia</i>	Hazel grouse	Galliformes	NCBI Genbank	NC_0205 91.1
<i>Gavia pacifica</i>	Pacific loon	Gaviiformes	NCBI Genbank	NC_0081 39.1
<i>Gavia stellata</i>	Red-throated loon	Gaviiformes	NCBI Genbank	NC_0070 07.1
<i>Balearica regulorum</i>	Grey crowned crane	Gruiformes	NCBI Genbank	FJ_76984 1.1
<i>Gallinula chloropus</i>	common moorhen	Gruiformes	NCBI Genbank	NC_0152 36.1
<i>Grus vipio</i>	White-naped crane	Gruiformes	NCBI Genbank	NC_0213 68.1
<i>Porphyrio hochstetteri</i>	South Island takahe	Gruiformes	NCBI Genbank	NC_0100 92.1
<i>Rallina eurizonoides sepiaria</i>	Slaty-legged crake	Gruiformes	NCBI Genbank	NC_0121 42.1
<i>Acridotheres cristatellus</i>	Crested myna	Passeriformes	NCBI Genbank	NC_0156 13.1
<i>Acrocephalus spinus</i>	Eurasian reed warbler	Passeriformes	NCBI Genbank	NC_0102 27.1
<i>Agelaius phoeniceus</i>	Red-winged blackbird	Passeriformes	NCBI Genbank	NC_0188 01.1
<i>Carduelis spinus</i>	Eurasian siskin	Passeriformes	NCBI Genbank	HQ_9158 66.1

<i>Corvus frugilegus</i>	Rook	Passeriformes	NCBI Genbank	NC_0020 69.2
<i>Cyanopica cyanus</i>	Azure-winged magpie	Passeriformes	NCBI Genbank	NC_0158 24.1
<i>Emberiza tristrami</i>	Tristram's bunting	Passeriformes	NCBI Genbank	NC_0152 34.1
<i>Eopsaltria australis</i>	Eastern yellow robin	Passeriformes	NCBI Genbank	JX_90107 3.1
<i>Epthianura albifrons</i>	White-fronted chat	Passeriformes	NCBI Genbank	NC_0196 64.1
<i>Ficedula zanthopygia</i>	Yellow-rumped flycatcher	Passeriformes	NCBI Genbank	NC_0158 02.1
<i>Garrulus glandarius</i>	Eurasian jay	Passeriformes	NCBI Genbank	NC_0158 10.1
<i>Gracula religiosa</i>	Hill myna	Passeriformes	NCBI Genbank	NC_0158 98.1
<i>Luscinia cyanura</i>	Orange-flanked bush robin	Passeriformes	NCBI Genbank	NC_0260 67.1
<i>Molothrus badius</i>	Grayish baywing	Passeriformes	NCBI Genbank	JX_51607 4.1
<i>Petroica goodenovii</i>	Red-capped robin	Passeriformes	NCBI Genbank	NC_0196 67.1
<i>Pica pica</i>	Common magpie	Passeriformes	NCBI Genbank	NC_0152 00.1
<i>Podoces hendersoni</i>	Mongolian ground- jay	Passeriformes	NCBI Genbank	NC_0148 79.1
<i>Progne chalybea</i>	Grey-breasted martin	Passeriformes	NCBI Genbank	JQ_07162 3.1
<i>Smithornis sharpei</i>	Grey-headed broadbill	Passeriformes	NCBI Genbank	NC_0008 79.1
<i>Sylvia crassirostris</i>	Eastern orphean warbler	Passeriformes	NCBI Genbank	NC_0102 29.1
<i>Ardea intermedia</i>	Intermediate egret	Pelecaniformes	NCBI Genbank	KX_5925 85.1
<i>Ardea modesta</i>	Eastern great egret	Pelecaniformes	NCBI Genbank	NC_0259 16
<i>Ardea novaehollandiae</i>	White-faced heron	Pelecaniformes	NCBI Genbank	DQ_7808 78.1
<i>Bubulcus ibis</i>	Cattle egret	Pelecaniformes	NCBI Genbank	KJ_19094 5.1
<i>Egretta garzetta</i>	Little heron	Pelecaniformes	NCBI Genbank	KJ_19095 0.1
<i>Egretta sacra</i>	Pacific reef heron	Pelecaniformes	NCBI Genbank	NC_0259 20.1
<i>Gorsachius goisagi</i>	Japanese night heron	Pelecaniformes	NCBI Genbank	NC_0281 94.1

<i>Gorsachius melanolophus</i>	Malayan night heron	Pelecaniformes	NCBI Genbank	NC_028195.1
<i>Ixobrychus cinnamomeus</i>	Cinnamon bittern	Pelecaniformes	NCBI Genbank	HQ_690247.1
<i>Ixobrychus eurhythmus</i>	Von Schrenck's bittern	Pelecaniformes	NCBI Genbank	NC_025924.1
<i>Ixobrychus sinensis</i>	Yellow bittern	Pelecaniformes	NCBI Genbank	NC_025925.1
<i>Nycticorax nycticorax</i>	Black-crowned night heron	Pelecaniformes	NCBI Genbank	JN_018412.1
<i>Platalea leucorodia</i>	Eurasian spoonbill	Pelecaniformes	NCBI Genbank	KT_901459.1
<i>Egretta eulophotes</i>	Chinese egret	Pelecaniformes	NCBI Genbank	EU_072995.1
<i>Gorsachius magnificus</i>	White-eared night heron	Pelecaniformes	NCBI Genbank	NC_028193.1
<i>Nipponia nippon</i>	Crested ibis	Pelecaniformes	NCBI Genbank	NC_008132.1
<i>Nannopterum brasilianus</i>	Neotropic cormorant	Pelecaniformes (Cormorant)	NCBI Genbank	NC_029758.1
<i>Phalacrocorax chalconotus</i>	Otago shag	Pelecaniformes (Cormorant)	NCBI Genbank	GU_071054.1
<i>Threskiornis aethiopicus</i>	African sacred ibis	Pelecaniformes (Ibises)	NCBI Genbank	GQ_358927.1
<i>Anhinga rufa</i>	African darter	Pelecaniformes (Suliformes)	NCBI Genbank	GU_071055.1
<i>Morus serrator</i>	Australasian gannet	Pelecaniformes (Suliformes)	NCBI Genbank	GU_071056.1
<i>Phaeton lepturus</i>	White-tailed tropicbird	Phaethontiformes	NCBI Genbank	NC_027275.1
<i>Phaeton rubricauda</i>	Red-tailed tropicbird	Phaethontiformes	NCBI Genbank	NC_007979.1
<i>Phoenicopterus roseus</i>	Greater flamingo	Phoenicopteriformes	NCBI Genbank	EF_532932.1
<i>Phoenicopterus ruber</i>	American flamingo	Phoenicopteriformes	NCBI Genbank	NC_027934.1
<i>Dendrocopos leucotos</i>	White-backed woodpecker	Piciformes	NCBI Genbank	NC_029862.1
<i>Dryocopus pileatus</i>	Pileated woodpecker	Piciformes	NCBI Genbank	NC_008546.1
<i>Pteroglossus azara flavirostris</i>	Ivory billed aracari	Piciformes	NCBI Genbank	NC_008549.1
<i>Sasia ochracea</i>	White-browed piculet	Piciformes	NCBI Genbank	NC_028019.1

<i>Podiceps cristatus</i>	Great crested grebe	Podicepediformes	NCBI Genbank	NC_0081 40.1
<i>Tachybaptus novaehollandiae</i>	Australasian grebe	Podicepediformes	NCBI Genbank	EF_53293 6.1
<i>Tachybaptus ruficollis</i>	Little grebe	Podicepediformes	NCBI Genbank	NC_0245 94.1
<i>Pelagodroma marina</i>	White-faced storm petrel	Procellariiformes	NCBI Genbank	KC_8758 56.1
<i>Agapornis roseicollis</i>	Rosy-faces lovebird	Psittaciformes	NCBI Genbank	EU_4104 86.1
<i>Amazona ventralis</i>	Hispaniolan parrot	Psittaciformes	NCBI Genbank	NC_0346 79.1
<i>Ara ararauna</i>	Blue-and-yellow macaw	Psittaciformes	NCBI Genbank	KF_0103 15
<i>Aratinga acuticaudata</i>	Blue-crowned parakeet	Psittaciformes	NCBI Genbank	JQ_78221 4.1
<i>Brotogeris cyanoptera</i>	Cobalt-winged parakeet	Psittaciformes	NCBI Genbank	NC_0155 30.1
<i>Cacatua moluccensis</i>	Salmon-crested cockatoo	Psittaciformes	NCBI Genbank	NC_0205 92.1
<i>Calyptrorhynchus baudinii</i>	Long-billed white- tailed black cockatoo	Psittaciformes	NCBI Genbank	JF_41424 2.1
<i>Calyptrorhynchus lathamii</i>	Glossy black cockatoo	Psittaciformes	NCBI Genbank	JF_41424 1.1
<i>Melopsitta undulatas</i>	Budgeridgar	Psittaciformes	NCBI Genbank	EF_45082 6.1
<i>Nymphicus hollandicus</i>	Cockatiel	Psittaciformes	NCBI Genbank	NC_0151 92.1
<i>Pyrrhura rupicola</i>	Black-capped parakeet	Psittaciformes	NCBI Genbank	KF_7518 01.1
<i>Rhynchopsitta terrisi</i>	Maroon-fronted parrot	Psittaciformes	NCBI Genbank	NC_0217 71.1
<i>Strigops habroptilus</i>	Kakapo	Psittaciformes	NCBI Genbank	NC_0059 31.1
<i>Pterocnemia pennata</i>	Darwin's rhea	Rheiformes	NCBI Genbank	AF_3387 09.2
<i>Eudyptes chrysocome</i>	Rockhopper penguin	Sphenisciformes	NCBI Genbank	AP_0091 89.1
<i>Eudyptula minor</i>	Little penguin	Sphenisciformes	NCBI Genbank	MF_3705 25.1
<i>Pygoscelis adeliae</i>	Adeliae penguin	Sphenisciformes	NCBI Genbank	NC_0211 37.1
<i>Pygoscelis antarcticus</i>	Chinstrap penguin	Sphenisciformes	NCBI Genbank	NC_0214 74.1

<i>Spheniscus demersus</i>	African penguin	Sphenisciformes	NCBI Genbank	NC_0228 17.1
<i>Spheniscus humboldti</i>	Humboldt penguin	Sphenisciformes	NCBI Genbank	KM_8915 93.1
<i>Asio flammeus</i>	Short-eared owl	Strigiformes	NCBI Genbank	NC_0276 06.1
<i>Bubo bubo</i>	Eurasian eagle-owl	Strigiformes	NCBI Genbank	NC_0382 19.1
<i>Bubo scandiacus</i>	Snowy owl	Strigiformes	NCBI Genbank	NC_0382 20.1
<i>Glaucidium brodiei brodiei</i>	Collared owlet	Strigiformes	NCBI Genbank	KP_6841 22.1
<i>Ninox novaeseelandiae</i>	Morepork	Strigiformes	NCBI Genbank	NC_0059 32.1
<i>Strix occidentalis caurina</i>	Northern spotted owl	Strigiformes	NCBI Genbank	MF_4317 46.1
<i>Strix varia varia</i>	Barred owl	Strigiformes	NCBI Genbank	MF_4317 45.1
<i>Apteryx haastii</i>	Great spotted kiwi	Struthioniformes	NCBI Genbank	NC_0027 82.2
<i>Casuarius casuarius</i>	Southern cassowary	Struthioniformes	NCBI Genbank	AF_3387 13.2
<i>Rhea americana</i>	Greater rhea	Struthioniformes	NCBI Genbank	NC_0008 46.1
<i>Struthio camelus</i>	Common ostrich	Struthioniformes	NCBI Genbank	NC_0027 85.1
<i>Eudromia elegans</i>	Elegant crested-tinamou	Tinamiformes	NCBI Genbank	AF_3387 10.2
<i>Trogon viridis</i>	Green-backed trogon	Trogoniformes	NCBI Genbank	EU_4104 90.1

Table S2: Taxon information and Genbank accession numbers for species in dataset 2

Table S3: Dataset3 taxon list

<u>Species</u>	<u>Common Name</u>	<u>Order</u>	<u>Source</u>
<i>Antrostomus carolensis</i>	Chuck-will's-widow	Caprimulgiformes	B10K Phase 1
<i>Cariama cristata</i>	Red-legged seriema	Cariamiformes	B10K Phase 1
<i>Colius striatus</i>	Speckled mousebird	Coliiformes	B10K Phase 1

<i>Eurypyga helias</i>	Sunbittern	Eurypygiformes	B10K Phase 1
<i>Leptosomus discolor</i>	Cuckoo roller	Leptosomidae	B10K Phase 1
<i>Mesitornis unicolor</i>	Brown mesite	Mesitornithiformes	B10K Phase 1
<i>Opisthocomus hoazin</i>	Hoatzin	Opisthocomiformes	B10K Phase 1
<i>Chlamydotis macqueenii</i>	MacQueen's bustard	Otidiformes	B10K Phase 1
<i>Acanthisitta chloris</i>	Rifleman	Passeriformes	B10K Phase 1
<i>Cnemotriccus fuscatus</i>	Fuscous flycatcher	Passeriformes	B10K Phase 1
<i>Apaloderma vittatum</i>	Bar-tailed trogon	Trogoniformes	B10K Phase 1

Table S3: Taxon information for species in dataset 3

Table S4: Dataset 4 taxon list and accession numbers

Species	Common Name	Order	Source	Accession Number
<i>Cathartes aura</i>	Turkey vulture	Accipitriformes	B10K phase 1	N/A
<i>Gyps fulvus</i>	Griffon vulture	Accipitriformes	NCBI Genbank	KX89324 7.1
<i>Sagittarius serpentarius</i>	Secretarybird	Accipitriformes	NCBI Genbank	KF96118 4.1
<i>Spilornis cheela</i>	Crested serpent eagle	Accipitriformes	NCBI Genbank	JN191388 .1
<i>Penelopides panini</i>	Visayan hornbill	Bucerotiformes	NCBI Genbank	HQ83445 1.1
<i>Phoeniculus purpureus</i>	Green wood hoopoe	Bucerotiformes	NCBI Genbank	MK06014 1.1
<i>Rhinopomastus cyanomelas</i>	Common Scimitarbill	Bucerotiformes	NCBI Genbank	MK06014 4.1
<i>Ciconia ciconia</i>	White stork	Ciconiiformes	NCBI Genbank	AB02681 8.1
<i>Ciconia nigra</i>	Black stork	Ciconiiformes	NCBI Genbank	KY76767 0.1
<i>Geobiastes squamiger</i>	Scaly ground-roller	Coraciiformes	NCBI Genbank	MK06013 1
<i>Merops nubicus</i>	Northern carmine bee-eater	Coraciiformes	B10K phase 1	N/A
<i>Nyctyornis amictus</i>	Red-bearded bee eater	Coraciiformes	NCBI Genbank	MK06013 9.1
<i>Gavia arctica</i>	Black-throated loon	Gaviiformes	NCBI Genbank	MH06439 9.1
<i>Eudocimus ruber</i>	Scarlet ibis	Pelecaniformes	NCBI Genbank	KR86229 2.1

<i>Pelecanus crispus</i>	Dalmatian pelican	Pelecaniformes	B10K phase 1	N/A
<i>Pelecanus occidentalis</i>	Brown pelican	Pelecaniformes	NCBI Genbank	MH041272.1
<i>Platalea minor</i>	Black-faced spoonbill	Pelecaniformes	NCBI Genbank	EF455490.1
<i>Brachygalba albogularis</i>	White-throated jacamar	Piciformes	NCBI Genbank	MK060123.1
<i>Bucco macrodactylus</i>	Chestnut-capped puffbird	Piciformes	NCBI Genbank	MK060124.1
<i>Galbula albirostris</i>	Yellow-billed jacamar	Piciformes	NCBI Genbank	MK060130.1
<i>Bubo scandiacus</i>	Snowy owl	Strigiformes	NCBI Genbank	MG681084.1
<i>Phodilus badius</i>	Oriental bay owl	Strigiformes	NCBI Genbank	KF961183.1
<i>Tyto alba</i>	Barn owl	Strigiformes	NCBI Genbank	EU410491.1
<i>Pharomachrus auriceps</i>	Golden-headed quetzal	Trogoniformes	NCBI Genbank	MK060140.1
<i>Trogon personatus</i>	Masked trogon	Trogoniformes	NCBI Genbank	MK060146.1

Table S4: Taxon information and Genbank accession numbers for species in dataset 4

Table S5: Dataset 5 taxon list

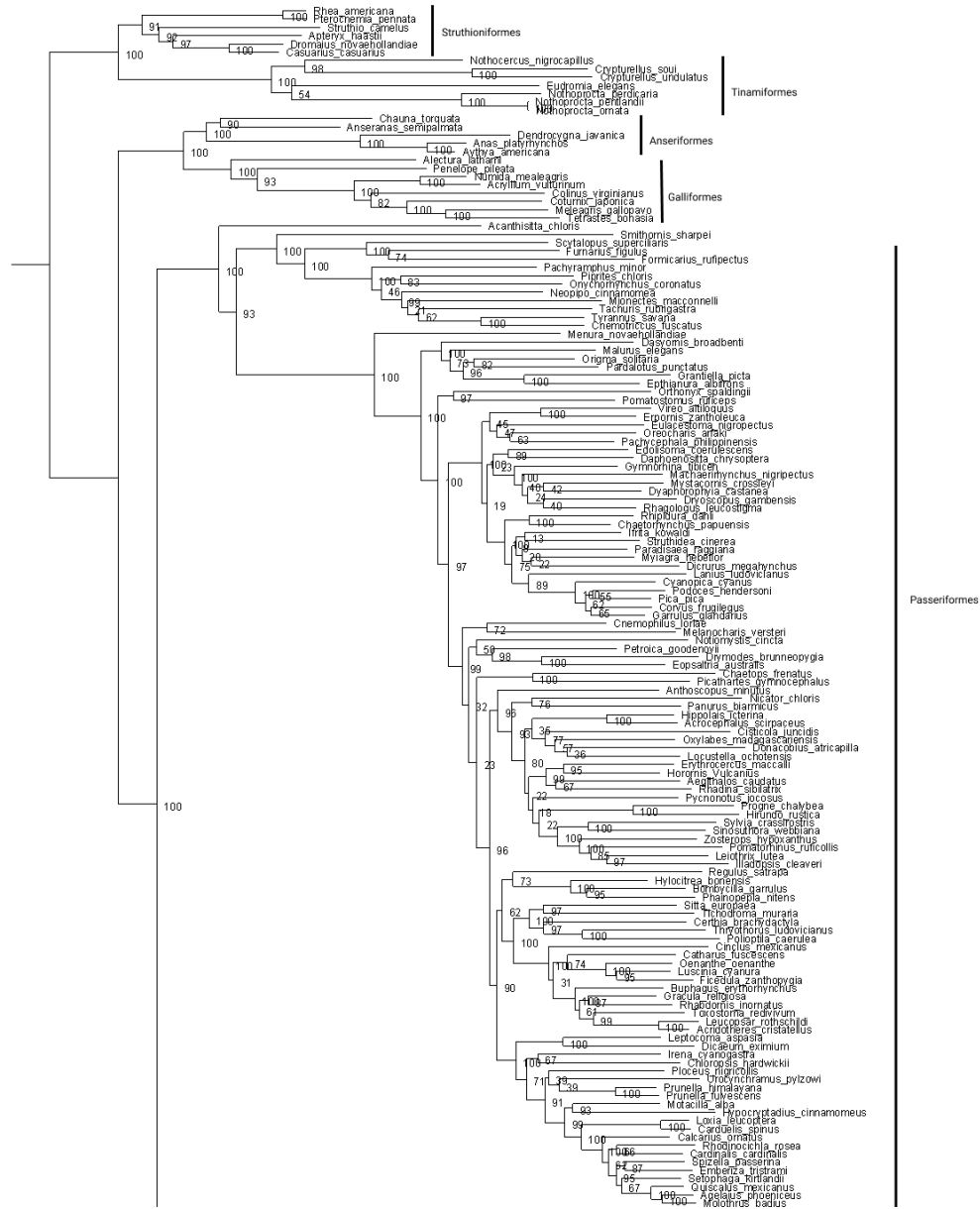
Species Name	Common Name	Order	Source
<i>Cathartes aura</i>	Turkey vulture	Accipitriformes	B10K Phase 1
<i>Haliaeetus albicilla</i>	White-tailed eagle	Accipitriformes	B10K Phase 1
<i>Haliaeetus leucocephalus</i>	Bald eagle	Accipitriformes	B10K Phase 1
<i>Anas platyrhynchos</i>	Mallard	Anseriformes	B10K Phase 1
<i>Buceros rhinoceros</i>	Rhinoceros hornbill	Bucerotiformes	B10K Phase 1
<i>Antrostomus carolinensis</i>	Chuck-will's widow	Caprimulgiformes	B10K Phase 1
<i>Calypte anna</i>	Anna's hummingbird	Caprimulgiformes	B10K Phase 1

<i>Chaetura pelagica</i>	Chimney swift	Caprimulgiformes	B10K Phase 1
<i>Cariama cristata</i>	Red-legged seriema	Cariamiformes	B10K Phase 1
<i>Charadrius vociferus</i>	Killdeer	Charadriiformes	B10K Phase 1
<i>Colius striatus</i>	Speckled mousebird	Coliiformes	B10K Phase 1
<i>Columba livia</i>	Rock dove	Columbiformes	B10K Phase 1
<i>Merops nubicus</i>	Northern carmine bee-eater	Coraciiformes	B10K Phase 1
<i>Cuculus canorus</i>	Common cuckoo	Cuculiformes	B10K Phase 1
<i>Eurypyga helias</i>	Sunbittern	Eurypygiformes	B10K Phase 1
<i>Falco peregrinus</i>	Peregrine falcon	Falconiformes	B10K Phase 1
<i>Gallus gallus</i>	Red junglefowl	Galliformes	B10K Phase 1
<i>Meleagris gallopavo</i>	Wild turkey	Galliformes	B10K Phase 1
<i>Gavia stellata</i>	Red-throated loon	Gaviiformes	B10K Phase 1
<i>Balearica regulorum</i>	Grey-crowned crane	Gruiformes	B10K Phase 1
<i>Leptosomus discolor</i>	Cuckoo roller	Leptosomiformes	B10K Phase 1
<i>Mesitornis unicolor</i>	Brown mesite	Mesitornithiformes	B10K Phase 1
<i>Tauraco erythrophus</i>	Red-crested turaco	Musophagiformes	B10K Phase 1
<i>Opisthocomus hoazin</i>	Hoatzin	Opisthocomiformes	B10K Phase 1
<i>Chlamydotis macqueenii</i>	MacQueen's bustard	Otidiformes	B10K Phase 1
<i>Acanthisitta chloris</i>	Rifleman	Passeriformes	B10K Phase 1
<i>Corvus brachyrhynchos</i>	American crow	Passeriformes	B10K Phase 1
<i>Geospiza fortis</i>	Medium ground finch	Passeriformes	B10K Phase 1
<i>Manacus vitellinus</i>	Golden-collared Manakin	Passeriformes	B10K Phase 1
<i>Taeniopygia guttata</i>	Zebra finch	Passeriformes	B10K Phase 1

<i>Egretta garzetta</i>	Little egret	Pelecaniformes	B10K Phase 1
<i>Nipponia nippon</i>	Crested ibis	Pelecaniformes	B10K Phase 1
<i>Pelecanus crispus</i>	Dalmatian pelican	Pelecaniformes	B10K Phase 1
<i>Phalacrocorax carbo</i>	Great cormorant	Pelecaniformes	B10K Phase 1
<i>Phaethon lepturus</i>	White-tailed tropicbird	Phaethontiformes	B10K Phase 1
<i>Phoenicopterus ruber</i>	American flamingo	Phoenicopteriformes	B10K Phase 1
<i>Picoides pubescens</i>	Downy woodpecker	Piciformes	B10K Phase 1
<i>Podiceps cristatus</i>	Great crested grebe	Podicipediformes	B10K Phase 1
<i>Fulmarus glacialis</i>	Northern fulmar	Procellariiformes	B10K Phase 1
<i>Melopsittacus undulatus</i>	Budgerigar	Psittaciformes	B10K Phase 1
<i>Nestor notabilis</i>	Kea	Psittaciformes	B10K Phase 1
<i>Pterocles gutturalis</i>	Yellow-throated sandgrouse	Pterocliiformes	B10K Phase 1
<i>Aptenodytes forsteri</i>	Emperor penguin	Sphenisciformes	B10K Phase 1
<i>Pygoscelis adeliae</i>	Adelie penguin	Sphenisciformes	B10K Phase 1
<i>Tyto alba</i>	Barn owl	Strigiformes	B10K Phase 1
<i>Struthio camelus</i>	Common ostrich	Struthioniformes	B10K Phase 1
<i>Tinamus guttatus</i>	White-throated tinamou	Tinamiformes	B10K Phase 1
<i>Apaloderma vittatum</i>	Bar-tailed trogon	Trogoniformes	B10K Phase 1

Table S5: Taxon information for species in dataset 5

Figure S1:



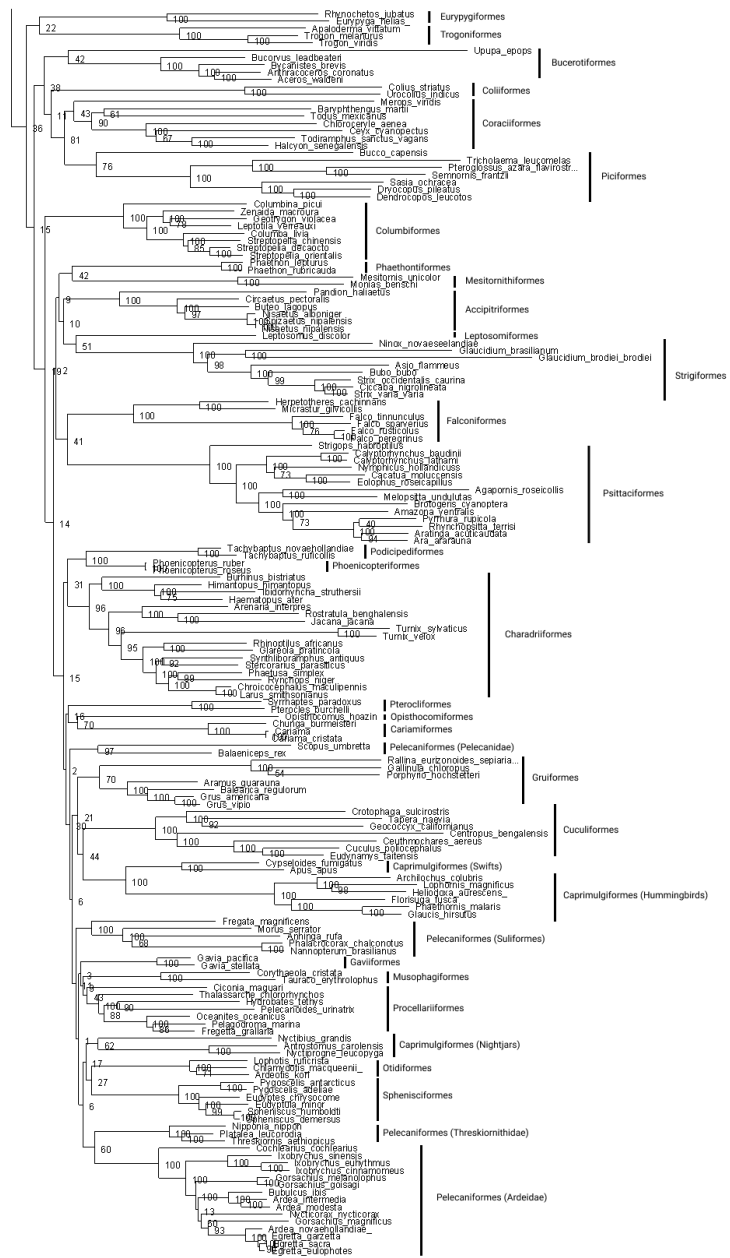


Figure S1: ML tree inferred using RY-coded MSA from datasets 1-3 and RAxMLv8.12.2. Node labels are non-parametric BS support values (1000 replicates)

Figure S2:

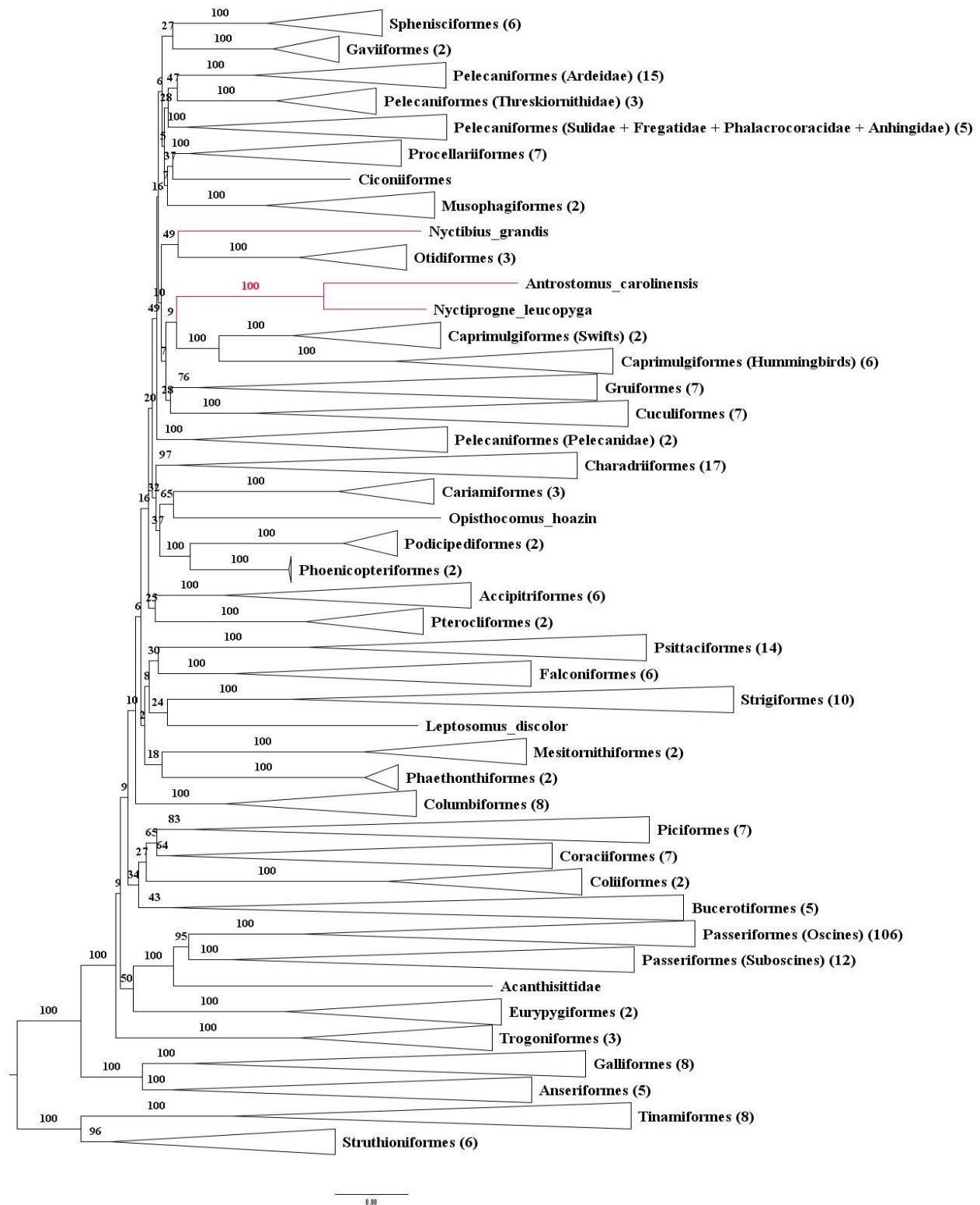


Figure S2: Maximum Likelihood tree obtained using the NT_partitioned MSA and RAxMLv.8.2.12. Tips are collapsed by order. The number of taxa per order is specified in the parentheses.

Figure S3:

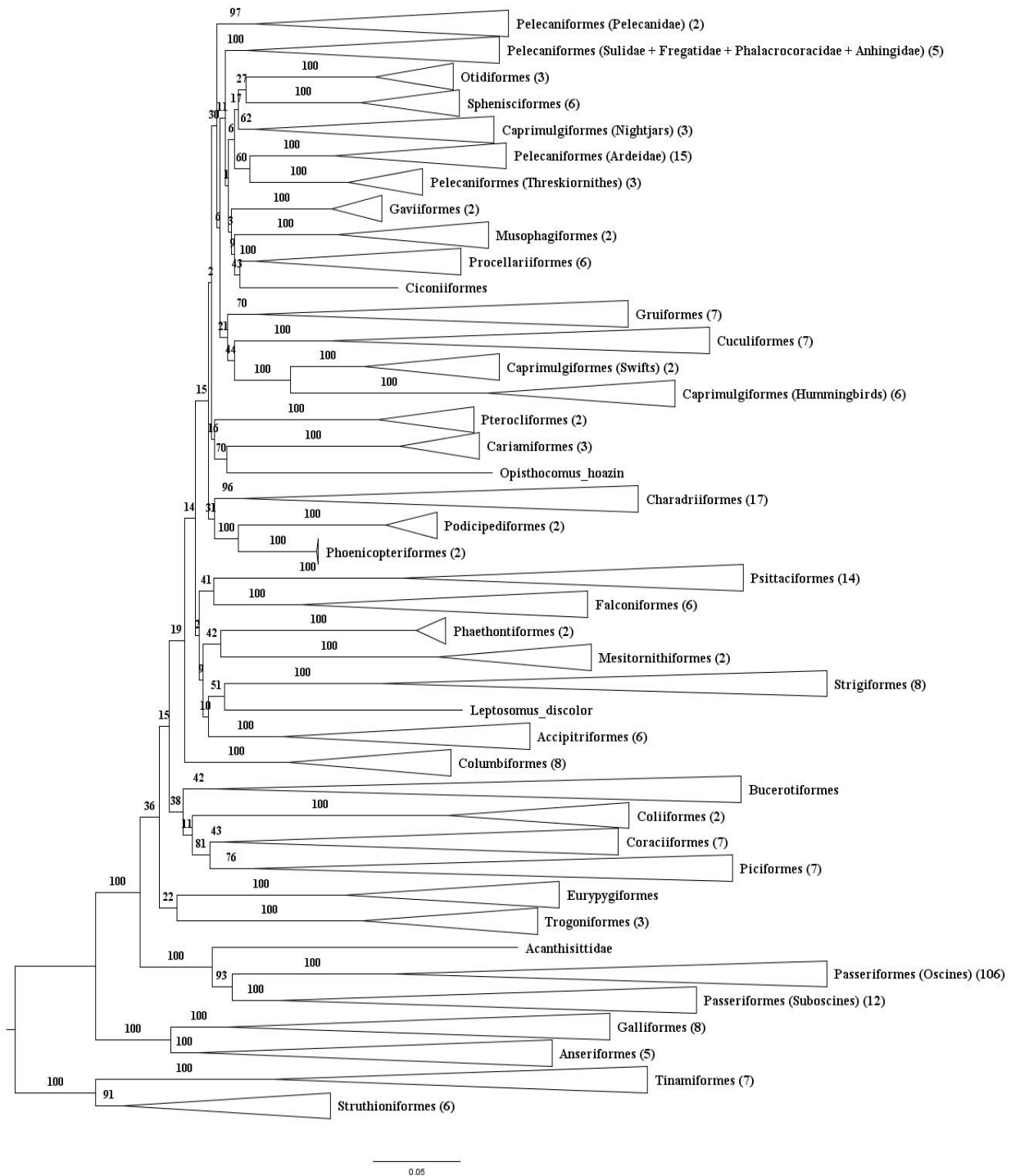


Figure S3: Maximum Likelihood tree obtained using the RY-coded MSA and RAxMLv.8.2.12. Tips are collapsed by order. The number of taxa per order is specified in the parentheses.

Figure S4:

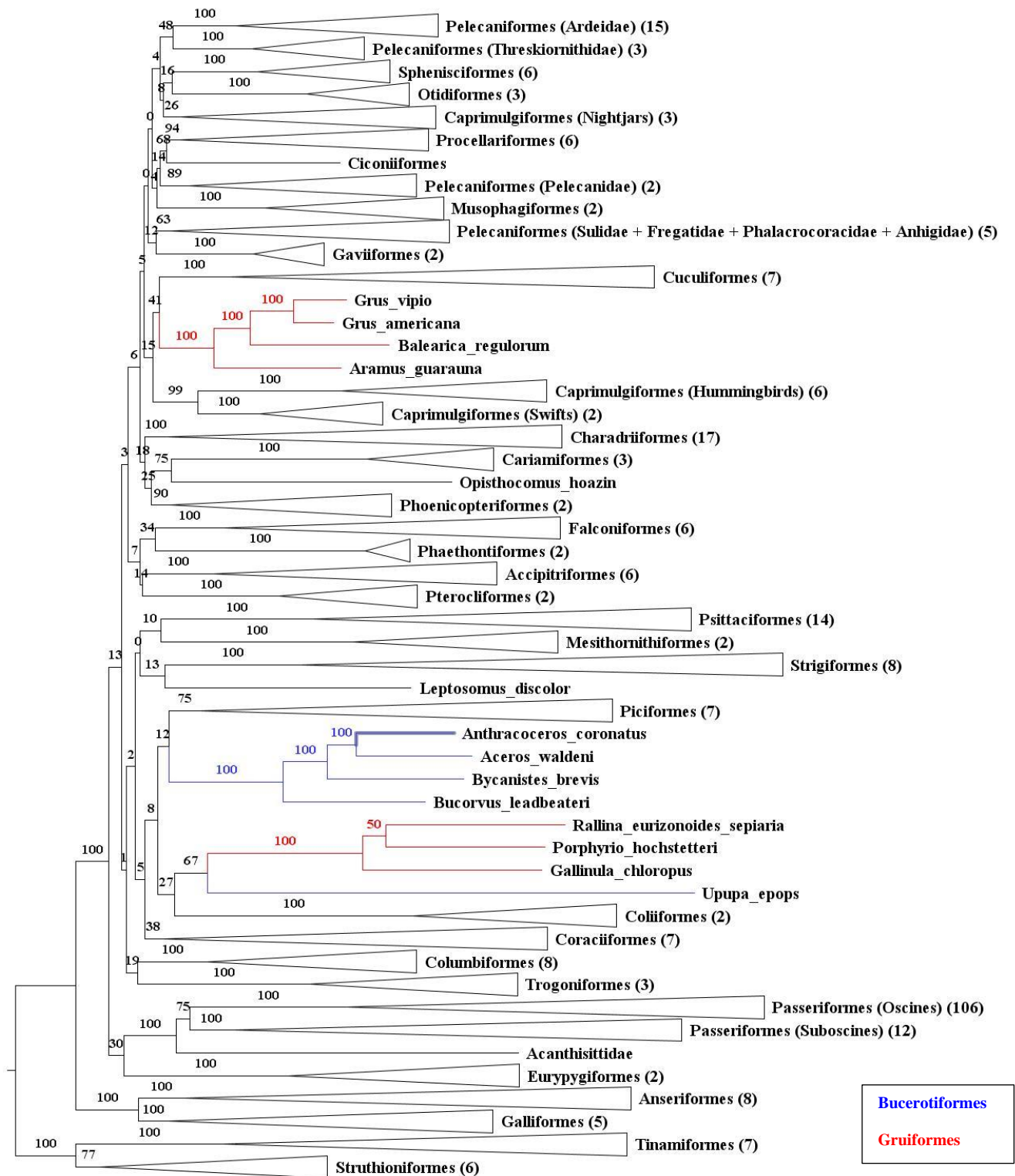


Figure S4: Maximum Likelihood tree obtained using the codon1_2 MSA and RAxMLv.8.2.12. Tips are collapsed by order. The number of taxa per order is specified in the parentheses.

Figure S5:

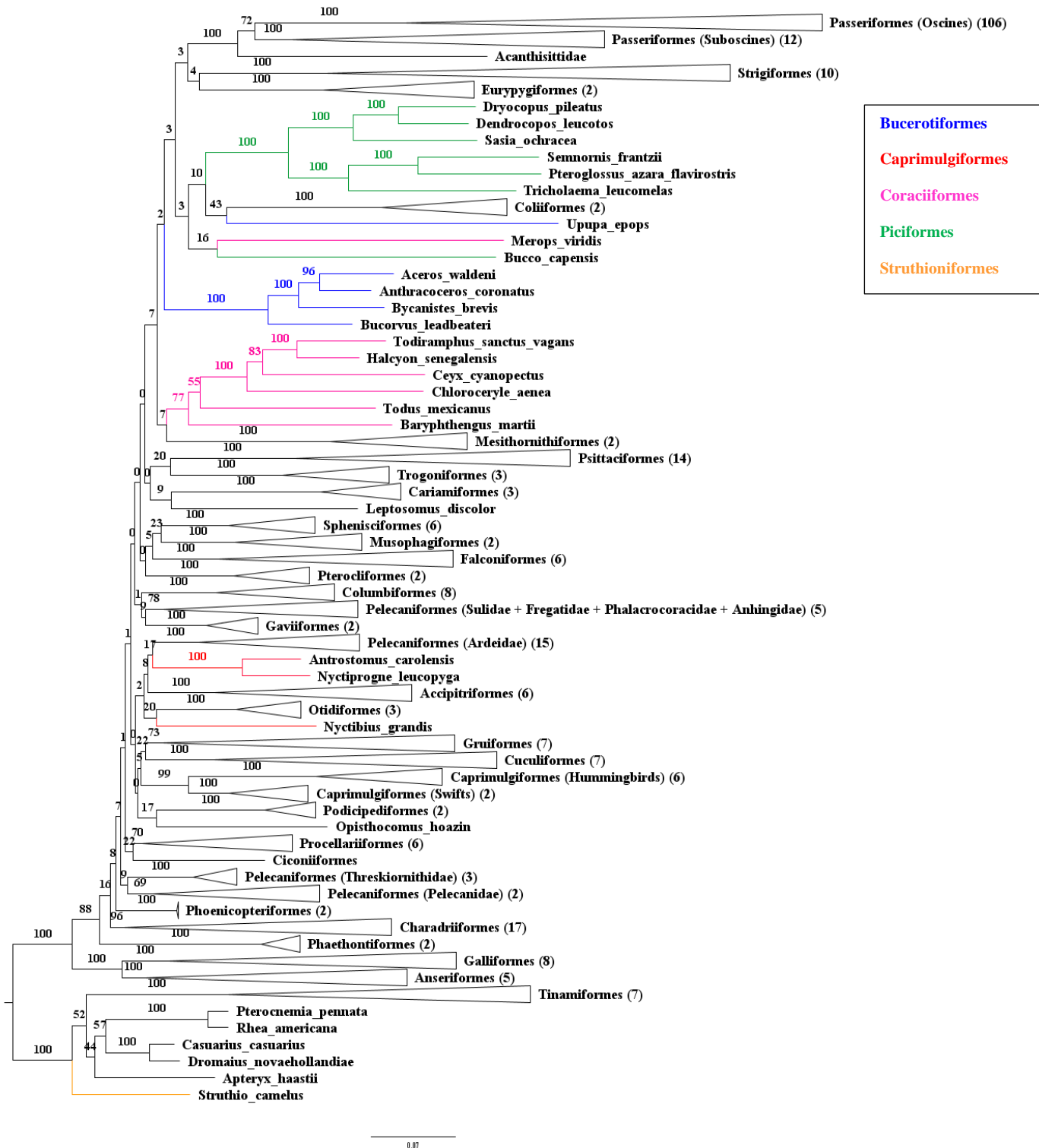


Figure S5: Maximum Likelihood tree obtained using the amino acid MSA and RAxMLv.8.2.12. Tips are collapsed by order. The number of taxa per order is specified in the parentheses.

Figure S6:

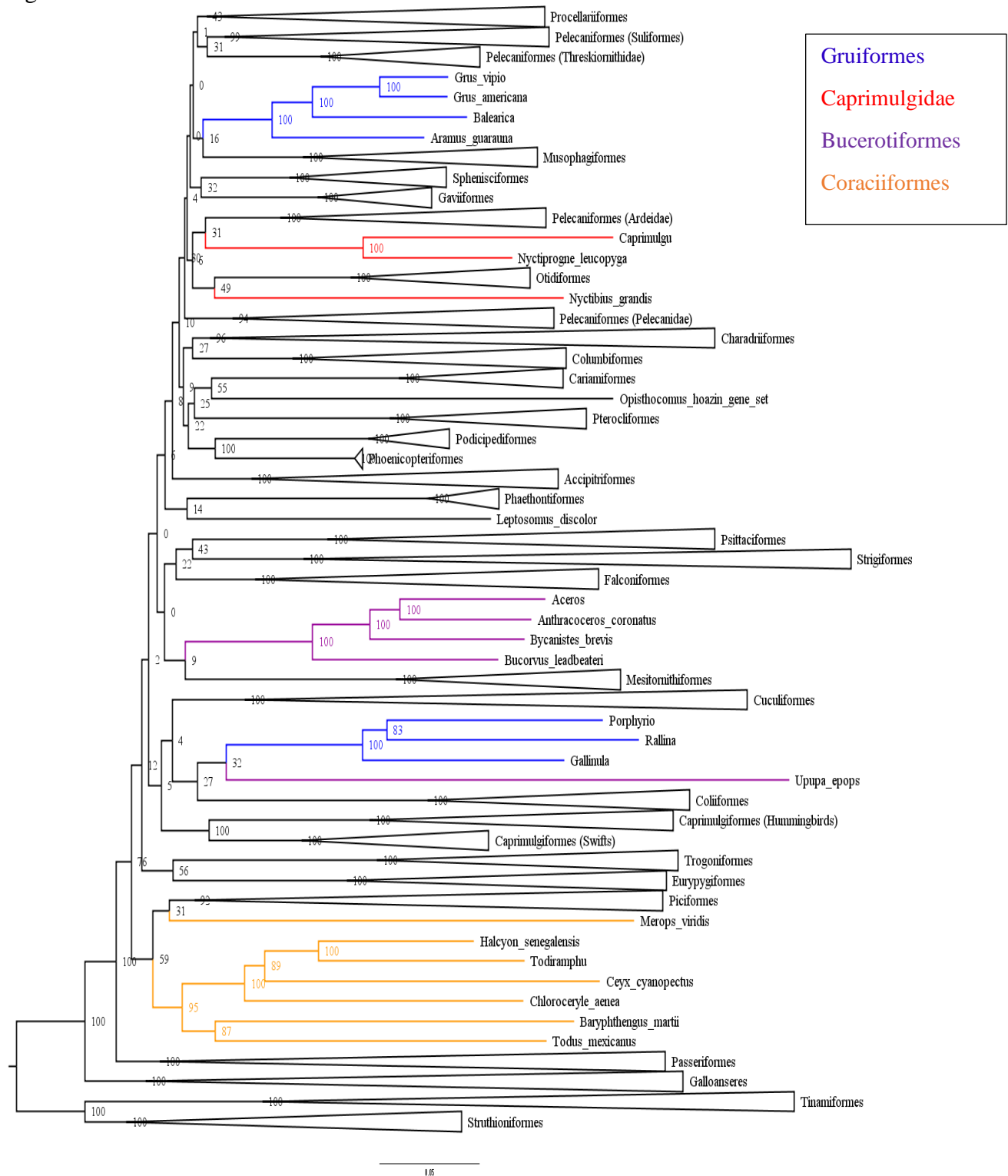


Figure S6: Maximum Likelihood tree obtained using the unpartitioned MSA and RAxMLv.8.2.12. Tips are collapsed by order. The number of taxa per order is specified in the parentheses.

Figure S7



Figure S7: Maximum Likelihood tree obtained using the datasets 1-4 and RAxMLv.8.2.12. Tips are collapsed by order.

Figure S8

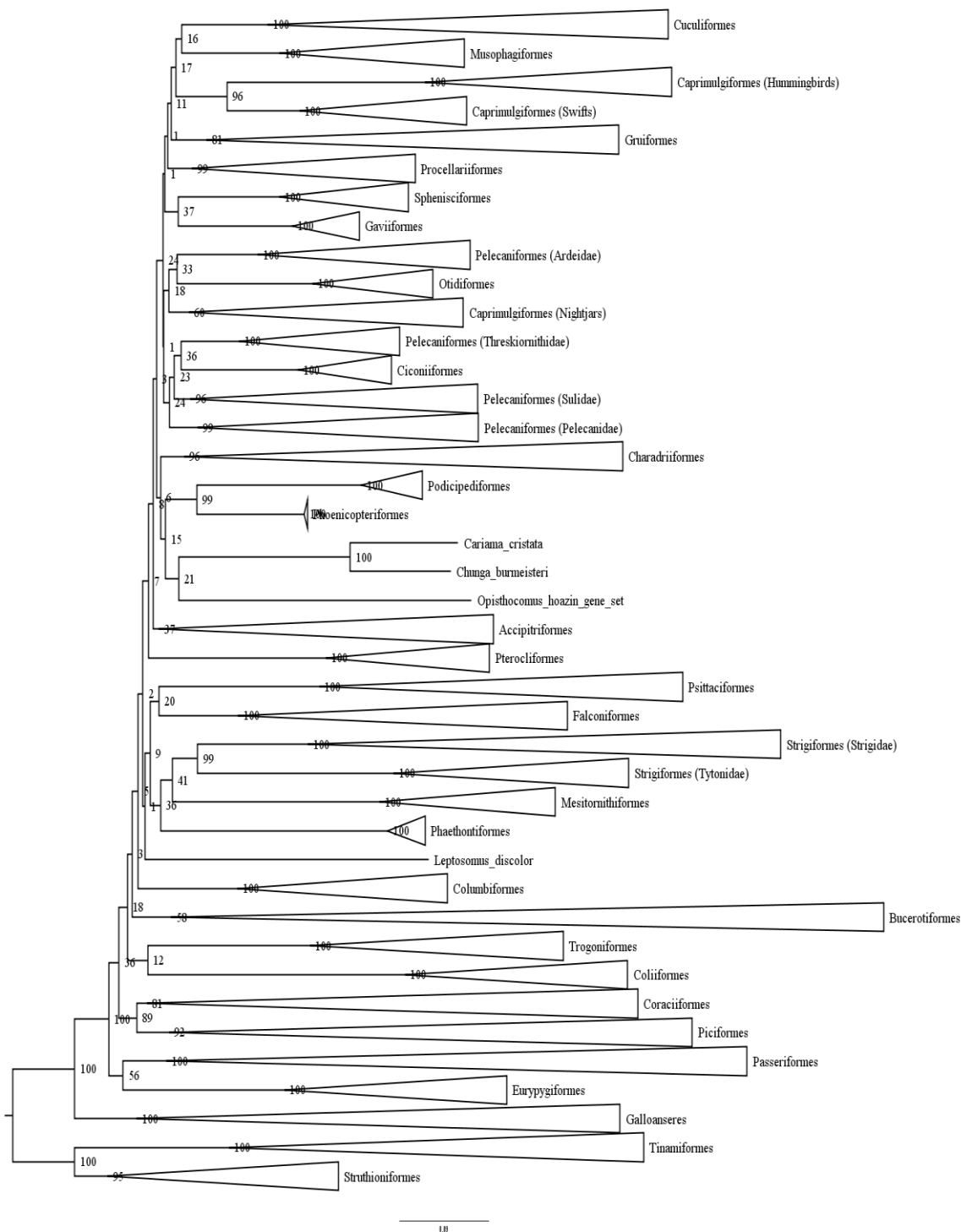


Figure S8: Maximum Likelihood tree obtained using the unsaturated genes only and RAxMLv.8.2.12. Tips are collapsed by order.

Figure S9:

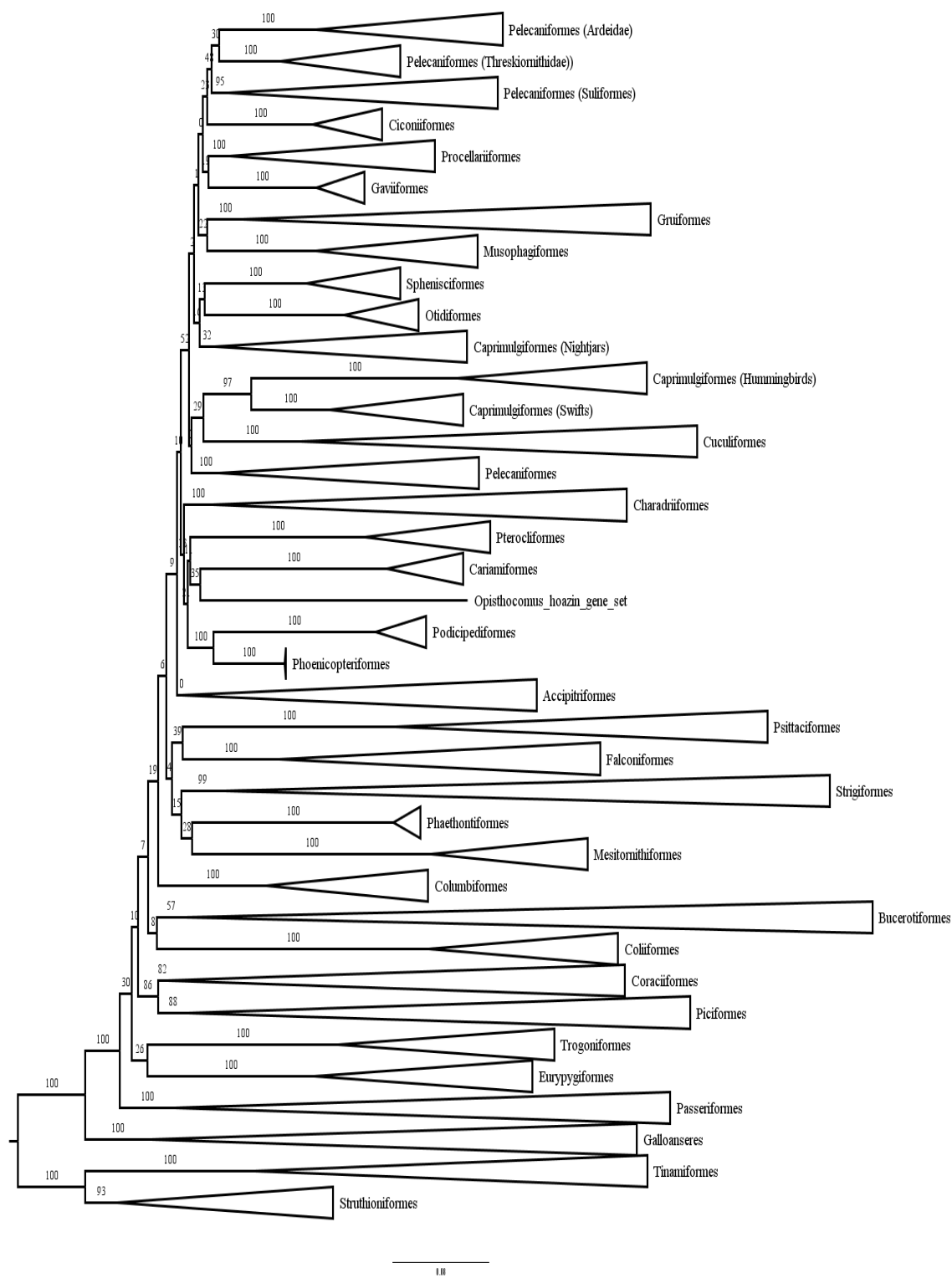


Figure S9: Maximum Likelihood tree obtained using the RY-coded MSA generated from datasets 1-4 and RAXML-NG. Tips are collapsed by order.

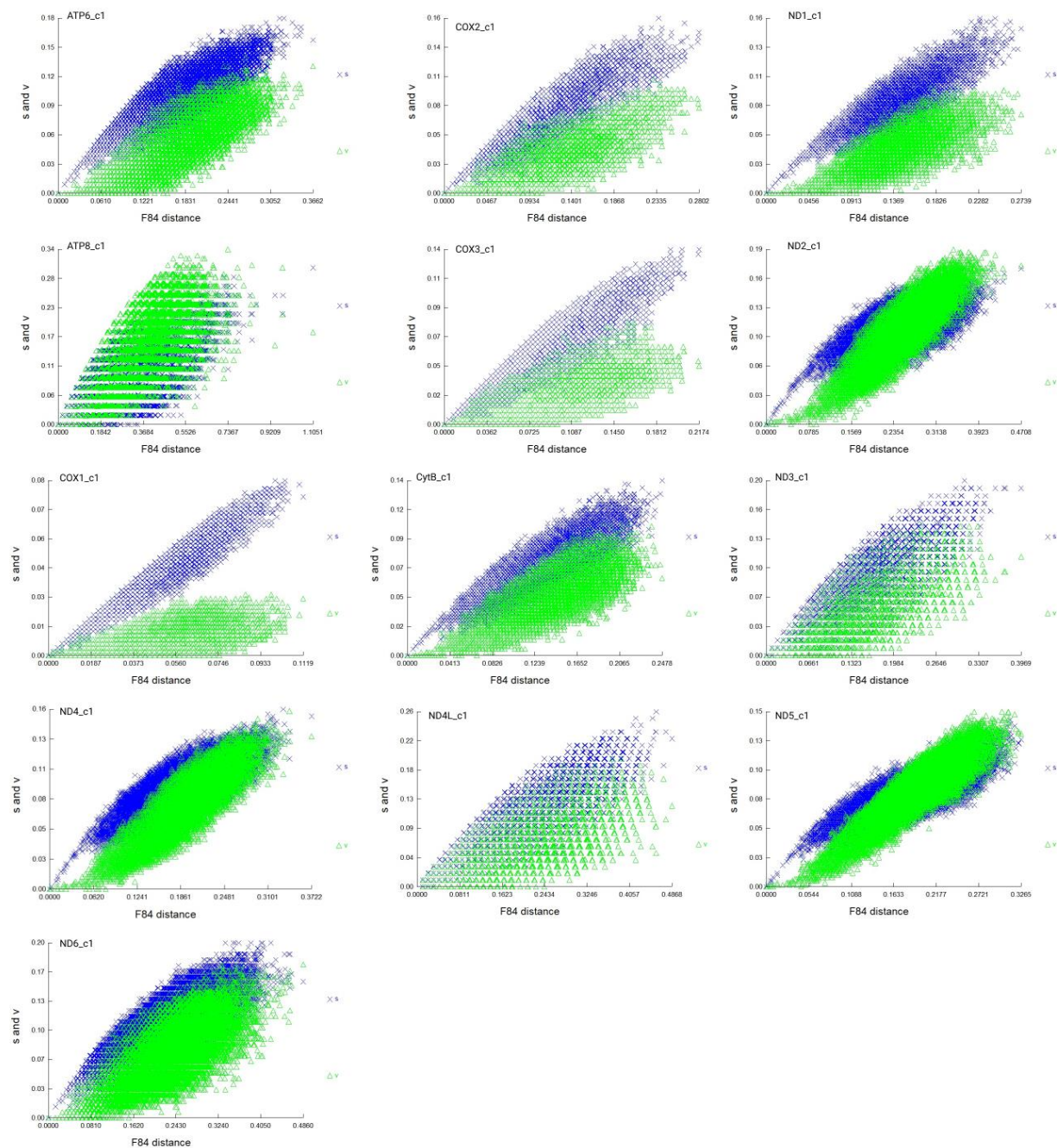


Figure S10: Saturation plots for first codon positions by gene. Plots were generated using DAMBE v7 (Xia, 2018)

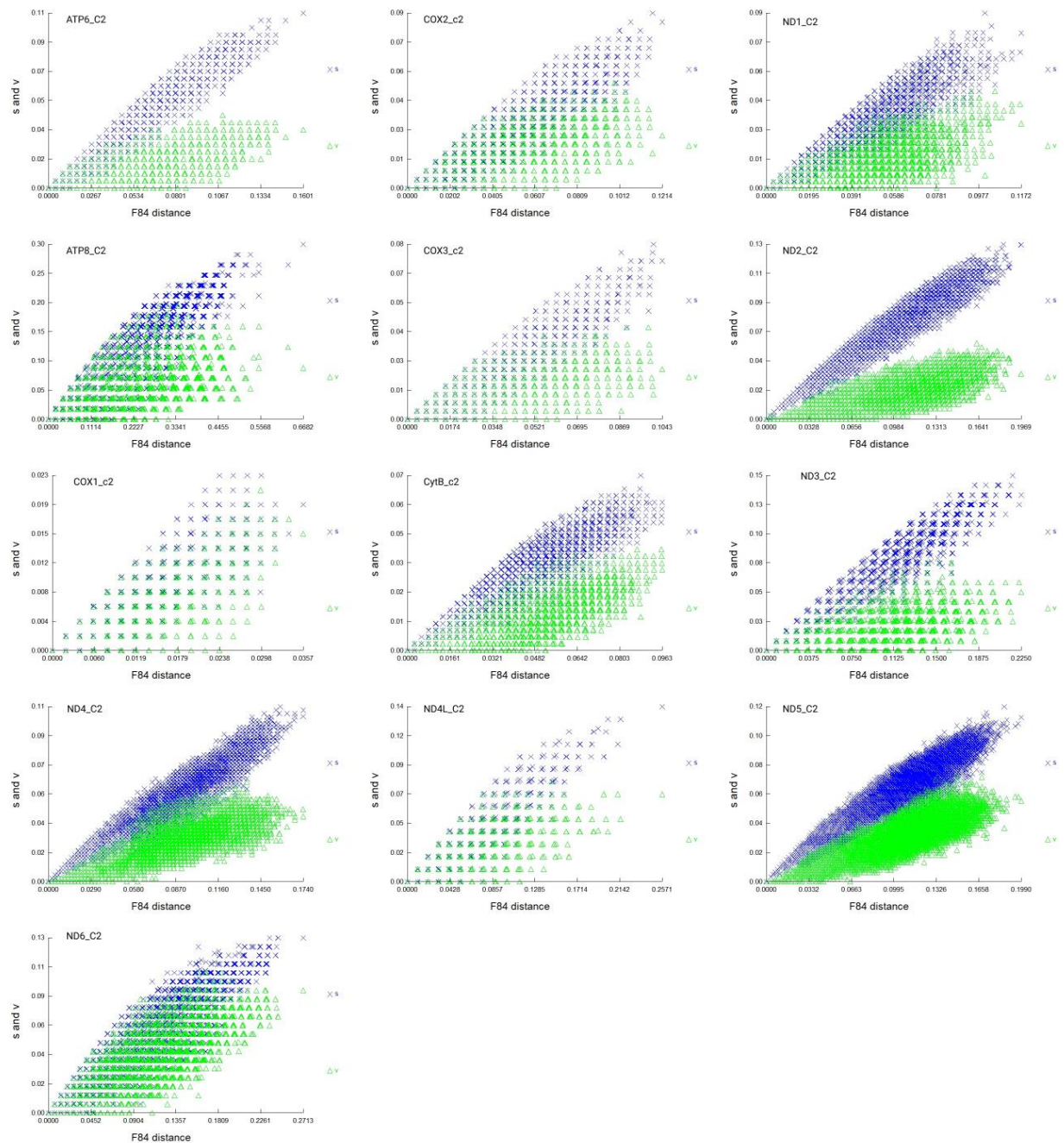


Figure S11: Saturation plots for second codon positions by gene. Plots were generated using DAMBE v7 (Xia, 2018)

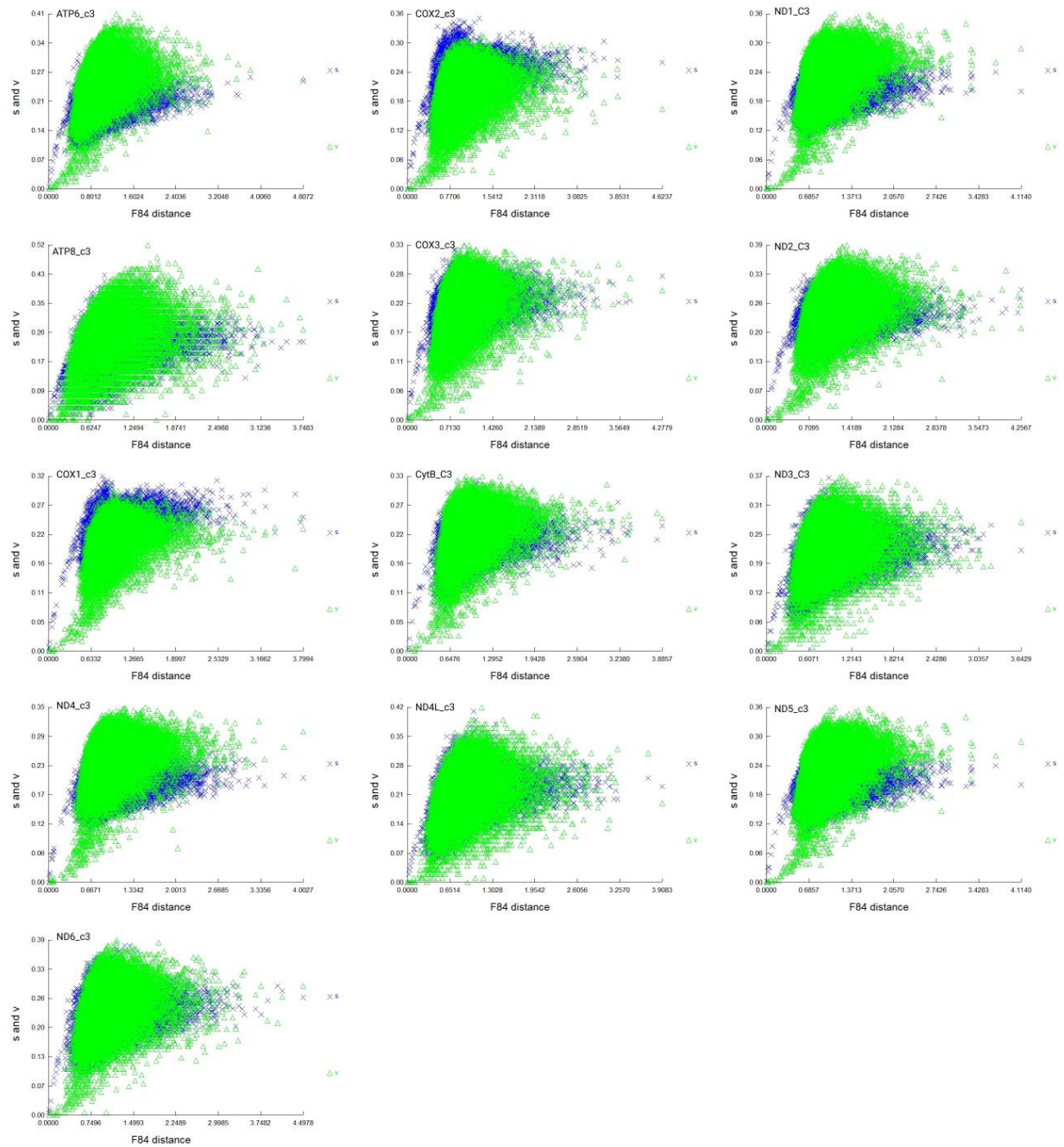


Figure S12: Saturation plots for third codon positions by gene. Plots were generated using DAMBE v7 (Xia, 2018)