Electronic supplementary material from:

Niche shifts after island colonization spurred adaptive diversification and speciation in a cosmopolitan bird clade

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Supplementary Table S1. PCA loadings resulting from a phylogenetic PCA (PPCA) including the log-transformed values of the morphological variables. These PCA axes explained 64, 18 and 11% of the total morphological variation, respectively.

	PC1	PC2	PC3
Log (tarsus length)	0.55 [0.53,0.63]	0.61 [0.58,0.63]	-0.53 [-0.59,0.04]
Log (wing length)	0.42 [0.41,0.43]	0.03 [0.01,0.05]	0.41 [-0.04,0.82]
Log (tail length)	0.62 [0.61,0.64]	-0.73 [-0.74,-0.71]	-0.17 [-0.21,0.01]
Log (beak length)	0.36 [0.35,0.37]	0.30 [0.26,0.32]	0.62 [-0.07,0.71]

Supplementary Table S2. GenBank accession numbers of the sequences used to infer the phylogenetic relationships of Columbiformes.

Species	ND2	ND3	cytb	X12s	COI	ATPCO3	RAG1
Alectroenas madagascariensis	-	-	AF483344	AF483307	-	-	-
Alectroenas pulcherrima	KF446808	KF447112	-	-	KF447017	-	KF446934
Alectroenas sganzini	-	-	MH307415	-	-	-	-
Alopecoenas beccarii	-	HQ630241	MN356295	-	-	-	-
Alopecoenas salamonis	KX902250	-	KX902250	KX902250	-	-	-
Aplopelia larvata	-	-	MH307437	-	-	-	-
Aplopelia simplex	-	-	MH307438	-	-	-	-
Caloenas maculata	KX902249	-	KX902249	KX902249	-	KX902249	-
Caloenas nicobarica	-	KF447109	KX902248	KX902248	MG590264	EF373439	EF373493
Chalcophaps indica	HM746789	-	KJ456225	HM746789	MH929122	HM746789	KJ455999
Chalcophaps stephani	KT023405	-	AY443673	EF373293	JQ174401	EF373444	EF373498
Claravis geoffroyi	KX169278	-	KX169277	-	-	-	-
Claravis mondetoura	KJ645736	-	KJ639093	-	-	-	-
Claravis pretiosa	KJ645730	-	-	EF373294	-	EF373445	EF373499
Columba arquatrix	AF353437	-	AF353412	-	-	-	-
Columba bollii	EU482001	-	EU481978	-	EF012614	-	-
Columba elphinstonii	-	-	KJ702785	-	-	-	-
Columba fasciata	AF353443	-	AF353414	-	-	-	-
Columba flavirostris	-	-	AY443656	-	-	-	-
Columba guinea	AF353435	-	AF279708	-	KU722534	AY443591	-
Columba hodgsonii	NC048989	-	NC048989	NC048989	NC048989	NC048989	-
Columba iriditorques	KT023406	-	KT023367	-	-	-	-
Columba janthina	-	-	-	-	AB842664	-	-
Columba jouyi	KX902247	-	KX902247	KX902247	-	KX902247	-
Columba junoniae	EU482004	-	EU481985	-	EF012613	-	-
Columba leucocephala	AY274070	-	AY274041	-	-	-	-
Columba leuconota	KJ455387	-	KJ456239	-	-	-	-
Columba livia	AF353433	-	KC811442	KP168712	EF373367	KF926376	EF373500
Columba malherbii	-	-	MH307440	-	-	-	-
Columba oenas	EU482007	-	EU481987	FN675576	GU571344	-	-
Columba oenops	AF353440	-	AF182690	-	-	-	-
Columba palumbus	MN122869	-	MN122869	MN122869	GU571346	MN122869	-
Columba plumbea	AF251547	-	AF182691	-	-	AY443598	-
Columba pulchrichollis	AF353438	-	AF353413	-	-	-	-
Columba rupestris	AF353434	-	KX902246	KX902246	GQ481611	KX902246	KJ456009
Columba speciosa	AF353442	-	AF279711	-	-	-	-
Columba squamosa	-	-	AY443657	-	-	-	-
Columba subvinacea	-	-	AF182692	-	-	-	-
Columba thomensis	-	-	MH307444	-	-	-	-

Columba trocaz	-	-	EF012588	-	EF012609	-	-
Columba vitiensis	GU230688	-	GU230687	GU230684	-	-	-
Columbina buckleyi	KJ645722	-	KF924044	-	-	-	-
Columbina cruziana	KJ645732	-	AF483318	AF483281	-	-	-
Columbina inca	KJ645733	-	KJ639103	-	-	-	-
Columbina minuta	KJ645743	-	AF182685	-	JQ174505	-	-
Columbina passerina	KJ645734	-	KF924046	-	JN801583	AF132377	-
Columbina picui	KJ645723	-	KJ639094	MN356335	-	MN356335	-
Columbina talpacoti	KJ645744	-	KJ639101	-	-	-	-
Didunculus strigirostris	MG590266	-	MG590266	MG590266	MG590266	MG590266	-
Drepanoptila holosericea	KF446790	KF447105	AF483345	AF483308	-	-	KF446927
Ducula aenea	KJ455415	-	AF483331	AF483294	KF446993	-	KJ456032
Ducula aurorae	KY354872	KY354777	-	-	-	-	KY354840
Ducula badia	KJ455416	KY354774	-	-	-	-	KJ456033
Ducula bakeri	KT023408	KY354775	KT023369	-	-	-	KY354843
Ducula basilica	-	KY354795	-	-	-	-	-
Ducula bicolor	KF446740	KY354786	AF182705	-	-	-	KY354844
Ducula brenchleyi	KY354890	KY354797	-	-	-	-	-
Ducula chalconota	KY354893	KY354799	-	-	-	-	-
Ducula finschii	KY354895	KY354801	-	-	-	-	-
Ducula forsteni	KY354896	KY354802	-	-	-	-	-
Ducula galeata	KY354873	KY354803	-	-	-	-	KY354846
Ducula goliath	KY354909	KY354816	-	-	-	-	KY354863
Ducula latrans	KY354899	KY354805	-	-	-	-	-
Ducula luctuosa	KY354867	KY354772	-	-	-	-	KY354841
Ducula melanochroa	KY354901	KY354807	GU230690	GU230689	-	-	-
Ducula mullerii	KY354903	KY354809	-	-	-	-	-
Ducula myristicivora	KY354904	KY354810	-	-	-	-	-
Ducula oceanica	KY354905	KY354812	-	-	-	-	-
Ducula pacifica	KF446741	KY354794	AY443667	-	-	-	KF446913
Ducula pinon	KY354868	KY354773	AF483332	AF483295	-	-	-
Ducula pistrinaria	KY354877	KY354784	AY443669	-	-	-	KY354852
Ducula rubricera	KY354885	KY354792	AY443668	GU230697	-	-	KY354859
Ducula rufigaster	KT023414	KY354780	EF373277	EF373297	KY354920	EF373448	EF373502
Ducula zoeae	-	KY354814	AF483333	AF483296	-	-	-
Ectopistes migratorius	KY974366	-	KY974346	MF595517	KY974353	KY974353	-
Gallicolumba beccarii	KC484583	-	AF483346	AF483309	-	-	-
Gallicolumba canifrons	KC484586	KC484567	-	-	-	-	-
Gallicolumba crinigera	KC484587	HQ630246	-	-	-	-	-
Gallicolumba erythroptera	HQ630223	HQ630245	-	-	-	-	-
Gallicolumba hoedtii	HQ845209	HQ845210	-	-	-	-	-
Gallicolumba jobiensis	EF373332	-	EF373278	EF373298	-	-	EF373503
Gallicolumba keayi	HQ630236	HQ630256	-	-	-	-	-

Gallicolumba kubaryi	HQ630235	HQ630255	-	-	-	-	-
Gallicolumba luzonica	HQ630215	KC484572	HM746790	HM746790	-	HM746790	-
Gallicolumba platenae	HQ630233	HQ630253	-	-	-	-	-
Gallicolumba rubescens	HQ630216	HQ630237	-	-	-	-	-
Gallicolumba rufigula	KC484592	HQ630238	-	-	-	-	-
Gallicolumba sanctaecrucis	HQ630230	HQ630251	-	-	-	-	-
Gallicolumba stairi	KC484593	HQ630240	-	-	-	-	-
Gallicolumba tristigmata	KC484602	KC484576	AF483319	AF483282	-	-	-
Gallicolumba xanthonura	KC484594	HQ630243	-	-	-	-	-
Geopelia cuneata	NC047279	HQ630242	NC047279	NC047279	NC047279	NC047279	-
Geopelia humeralis	KU194406	-	-	-	-	-	-
Geopelia placida	KU194405	-	KU194388	-	-	-	-
Geopelia striata	-	-	HM746791	MG590276	-	MG590276	EF373504
Geophaps lophotes	EF373334	-	-	EF373300	EF373372	EF373451	EF373505
Geophaps plumifera	KU194407	HQ630247	-	-	-	-	-
Geophaps scripta	KU194408	-	KU194389	-	-	-	-
Geophaps smithii	KU194409	-	-	-	-	-	-
Geotrygon albifacies	HQ993556	-	AY443658	-	-	-	-
Geotrygon chiriquensis	HQ993548	-	AY443659	-	-	-	-
Geotrygon chrysia	KC881102	-	-	-	-	-	-
Geotrygon costaricensis	HQ993549	-	AY443660	-	JQ174936	-	-
Geotrygon frenata	HQ993550	-	HQ993508	-	-	-	-
Geotrygon goldmani	HQ993554	-	HQ993512	-	-	-	-
Geotrygon lawrencii	HQ993555	-	HQ993513	-	-	-	-
Geotrygon montana	-	-	AF182696	EF373301	EF373373	-	EF373506
Geotrygon purpurata	-	-	HQ993510	-	-	-	-
Geotrygon saphirina	-	-	FJ899159	-	-	-	-
Geotrygon veraguensis	HQ993538	-	HQ993502	-	-	-	-
Geotrygon versicolor	KC881101	-	AF483326	AF483289	-	-	-
Geotrygon violacea	HM640213	-	HM640213	HM640213	-	-	-
Goura cristata	MG590275	-	-	MG590275	EF373374	MG590273	EF373507
Goura scheepmakeri	MG590283	-	MG590284	MG590284	MG590281	MG590282	LN590004
Goura sclaterii	MG590286	-	-	MG590287	-	MG590288	-
Goura victoria	MG590299	-	MG590298	MG590303	MG590303	MG590303	LN590002
Gymnophaps albertisii	KT023417	-	-	EF373303	EF373375	EF373454	EF373508
Hemiphaga chathamensis	HM165269	-	GQ912615	HM165267	-	-	-
Hemiphaga novaeseelandiae	NC013244	KC484580	NC013244	EF373304	EF373376	NC013244	EF373509
Henicophaps albifrons	EF373339	-	EF373281	EF373305	-	-	EF373510
Leptotila cassini	-	-	HQ993505	-	JQ175250	-	-
Leptotila jamaicensis	HQ993543	-	AF279706	-	-	-	-
Leptotila megalura	HQ993545	-	AF483342	AF483305	-	-	-
Leptotila plumbeiceps	-	-	AF279707	-	-	-	-
Leptotila rufaxilla	AF251546	-	AF182698	EF373306	-	EF373457	EF373511

Leptotila verreauxi	HM640214	-	AF279705	HM640214	-	HM640214	-
Leucosarcia melanoleuca	EF373341	HQ630250	AF182712	EF373307	-	EF373458	EF373512
Lopholaimus antarcticus	GU230698	-	EF373282	EF373308	EF373380	EF373459	EF373513
Macropygia amboinensis	EF373343	-	EF373283	EF373309	-	EF373460	EF373514
Macropygia mackinlayi	AF353444	-	AF353415	-	-	-	-
Macropygia phasianella	-	-	AF182693	AF483302	-	-	-
Macropygia ruficeps	MN991463	-	KU194391	-	-	-	-
Macropygia tenurirostris	AF353445	-	AF353416	-	-	-	-
Macropygia unchall	KJ455489	-	KJ456331	-	-	-	KJ456071
Metriopelia aymara	KJ645742	-	KJ639099	-	FJ027798	-	-
Metriopelia ceciliae	-	-	AF182688	-	-	-	-
Metriopelia melanoptera	KJ645729	-	KJ639092	-	-	-	-
Metriopelia morenoi	KJ645726	-	AY443677	EF373310	-	EF373461	EF373515
Nesoenas mayeri	-	-	AF483322	-	-	-	-
Ocyphaps lophotes	KC484598	HQ630249	AF483323	-	-	-	-
Oena capensis	KT023421	-	AF182707	EF373311	HQ168043	EF373462	EF373516
Otidiphaps nobilis	-	-	AF483352	-	-	-	-
Patagioenas araucana	-	-	-	-	FJ027967	-	-
Patagioenas cayennensis	-	-	-	-	JQ175687	-	-
Patagioenas fasciata	KX902240	-	KX902240	KX902240	KX902240	KX902239	-
Patagioenas flavirostris	-	-	-	-	DQ433887	-	-
Patagioenas inornata	-	-	-	-	JQ175688	-	-
Patagioenas leucocephala	-	-	-	AY274023	JQ175689	-	-
Patagioenas maculosa	-	-	-	-	FJ027971	-	-
Patagioenas nigrirostris	-	-	-	-	JQ175693	-	-
Patagioenas picazuro	KT023407	-	-	-	-	-	-
Patagioenas plumbea	-	-	-	-	JQ175697	-	-
Patagioenas speciosa	EF373347	-	-	EF373313	-	EF373464	EF373518
Patagioenas subvinacea	-	-	FJ899155	-	JQ175702	-	-
Petrophassa albipennis	EF373348	-	-	EF373314	EF373386	EF373465	EF373519
Petrophassa plumifera	-	-	AY443676	-	-	-	-
Petrophassa rufipennis	KU194410	-	-	-	-	-	-
Pezophaps solitaria	KX902238	-	AF483337	KX902238	-	KX902238	-
Phapitreron amethystinus	-	-	AF182706	EF373315	JQ175770	EF373466	EF373520
Phapitreron cinereiceps	KT023425	-	KT023379	-	-	-	-
Phapitreron leucotis	-	-	AF279712	-	JQ175771	-	-
Phaps chalcoptera	KC484599	HQ630248	AF483324	EF373316	EF373388	EF373467	EF373521
Phaps elegans	KT023426	-	KU194387	-	-	-	-
Phaps histrionica	KU194411	-	-	-	-	-	-
Pterocles bicinctus	-	-	-	DQ674558	-	-	-
Pterocles burchelli	MN356340	-	-	MN356340	-	MN356340	-
Pterocles coronatus	-	-	-	U83745	-	-	-
Pterocles gutturalis	-	-	KX902237	MN356147	-	MN356147	AY339116

Pterocles namaqua	-	DQ385097	-	DQ385267	DQ385165	DQ385199	-
Pterocles orientalis	-	-	-	-	-	-	AY228767
Pterocles personatus	-	-	-	-	-	-	KT954362
Ptilinopus aurantiifrons	KF446711	-	-	-	-	-	-
Ptilinopus bernsteinii	KF446756	KF447094	-	-	-	-	-
Ptilinopus chalcurus	KF446703	KF447044	-	-	-	-	-
Ptilinopus cinctus	KT023427	-	KT023380	-	-	-	-
Ptilinopus coralensis	KF446701	KF447043	-	-	-	-	KF446884
Ptilinopus coronulatus	KT023428	-	-	-	-	-	-
Ptilinopus dupetithouarsii	KF446788	KF447103	-	-	KF446956	-	KF446882
Ptilinopus eugeniae	KF446686	KF447027	-	-	KF446944	-	KF446878
Ptilinopus greyii	-	KF447106	-	-	-	-	KF446929
Ptilinopus huttoni	KF446765	-	-	-	-	-	-
Ptilinopus hyogastrus	KF446774	-	-	-	-	-	-
Ptilinopus insularis	KF446767	-	-	-	-	-	-
Ptilinopus iozonus	KF446708	KF447084	-	-	-	-	KF446890
Ptilinopus jambu	KF446730	KF447070	-	-	KF446982	-	KF446904
Ptilinopus layardi	KF446797	-	-	-	-	-	-
Ptilinopus leclancheri	KT023431	KF447024	AF182708	-	-	-	KF446875
Ptilinopus luteovirens	GU230703	KF447097	GU230704	GU230707	GU230705	-	-
Ptilinopus magnificus	GU230708	KF447086	KT023383	GU230712	-	-	KF446903
Ptilinopus marchei	KF446778	-	-	-	-	-	-
Ptilinopus melanospilus	KF446748	KF447088	KT023385	AF483291	KF446994	-	KF446917
Ptilinopus mercierii	KF446766	-	-	-	-	-	-
Ptilinopus merrilli	KF446758	-	-	-	-	-	-
Ptilinopus monacha	KF446754	-	-	-	-	-	-
Ptilinopus nainus	KF446776	-	-	-	-	-	-
Ptilinopus occipitalis	KF446749	KF447089	AF279713	AF483293	KF446935	-	KF446872
Ptilinopus ornatus	KF446759	-	-	-	-	-	-
Ptilinopus pelewensis	KF446755	-	-	-	-	-	-
Ptilinopus perlatus	KF446709	KF447050	-	-	KF446967	-	KF446891
Ptilinopus perousii	KF446717	KF447098	KT023386	-	-	-	-
Ptilinopus porphyraceus	KF446716	KF447058	-	-	-	-	KF446894
Ptilinopus porphyreus	KF446681	KF447078	-	-	-	-	KF446910
Ptilinopus pulchellus	KF446727	KF447067	EF373285	EF373317	-	EF373468	EF373522
Ptilinopus purpuratus	KF446691	KF447053	-	-	-	-	KF446933
Ptilinopus rarotongensis	KF446714	KF447055	AY443663	-	-	-	-
Ptilinopus regina	-	KF447051	KT023389	GU230713	JQ176046	-	KF446886
Ptilinopus richardsii	KF446804	-	AY443664	-	-	-	-
Ptilinopus rivoli	KT023445	-	KT023391	GU230721	-	-	-
Ptilinopus roseicapilla	KF446735	KF447075	-	-	-	-	KF446907
Ptilinopus solomonensis	KF446689	KF447031	-	GU230722	-	-	KF446876
Ptilinopus superbus	KF446721	KF447091	-	AF483292	-	-	KF446899

Ptilinopus tannensis	KF446752	KF447093	-	-	KF447005	-	KF446918
Ptilinopus victor	GU230727	-	GU230728	GU230731	-	-	-
Ptilinopus viridis	KF446723	KF447068	-	-	KF446977	-	KF446897
Ptilinopus wallacii	KF446781	KF447095	-	-	-	-	-
Raphus cucullatus	KX902236	-	KX902236	KX902236	-	KX902236	-
Reinwardtoena browni	AF353446	-	AF353417	EF373318	-	EF373469	EF373523
Reinwardtoena reinwardtii	-	-	KU194392	-	-	-	-
Scardafella squammata	KJ645747	-	AF483347	EF373296	-	EF373447	EF373501
Streptopelia bitorquata	AF353427	-	AF353406	-	JQ176289	-	-
Streptopelia capicola	AF353422	-	AF279709	EF373319	MN510767	EF373470	EF373524
Streptopelia chinensis	KP273832	-	KP636801	KP636801	KP636801	KP636801	-
Streptopelia decaocto	AF353418	-	AF353398	NC037513	NC037513	NC037513	-
Streptopelia decipiens	AF353420	-	AF353400	-	JX160007	-	-
Streptopelia hypopyrrha	AF353424	-	AF353403	-	-	AY443580	-
Streptopelia mayeri	AF353429	-	AF353408	-	-	-	-
Streptopelia orientalis	KY827037	-	KY827037	KY827037	GQ482673	KY827037	-
Streptopelia picturata	AF353430	-	AF353409	-	-	AY443586	-
Streptopelia roseogrisea	AF353419	-	AF353399	-	MF580156	-	-
Streptopelia semitorquata	AF353421	-	AF353401	-	-	-	-
Streptopelia senegalensis	AF353432	-	AF279710	-	MF580183	AY443588	-
Streptopelia tranquebarica	AF353428	-	AF353407	-	JQ176292	-	-
Streptopelia turtur	AF353425	-	AF353404	-	GQ482680	AY443581	LR594556
Streptopelia vinacea	AF353423	-	AF353402	-	-	-	-
Syrrhaptes paradoxus	-	-	MN356289	-	-	-	-
Treron apicauda	KJ455675	-	-	-	-	-	-
Treron australis	-	-	-	AF483312	-	-	-
Treron bicinctus	KJ455676	-	-	-	-	-	-
Treron calva	EF373354	-	AY443674	EF373320	EF373392	EF373471	EF373525
Treron calvus	KT023448	-	MH307619	-	-	-	KT954361
Treron curvirostra	KJ455677	-	-	-	-	-	-
Treron formosae	-	-	-	-	AB843232	-	-
Treron griveaudi	-	-	MH307627	-	-	-	-
Treron phayrei	-	-	KJ456492	-	-	-	-
Treron phoenicopterus	KJ455678	-	-	-	-	-	-
Treron pompadora	-	-	-	-	JQ176531	-	-
Treron sanctithomae	-	-	MH307628	-	-	-	-
Treron sieboldii	-	-	AY274042	AY274024	-	-	-
Treron sphenurus	-	-	KJ456494	-	-	-	-
Treron vernans	KT023452	KF447079	AF483321	AF483284	KF446996	-	KF446911
Treron waalia	KF446707	KF447048	-	AF483313	KF446965	-	KF446889
Trugon terrestris	MG590263	-	EF373286	MG590263	-	EF373472	EF373526
Turacoena manadensis	-	-	EF373287	EF373322	-	EF373473	EF373527
Turtur abyssinicus	-	-	KT023398	-	-	-	-

Turtur afer	-	-	-	AF483311	-	-	-
Turtur brehmeri	KT023457	-	AY151005	-	JQ176588	-	-
Turtur chalcospilos	-	-	AY443671	EF373323	-	EF373474	EF373528
Turtur tympanistria	-	-	-	HM746793	-	HM746793	-
Uropelia campestris	-	-	EF373288	EF373324	-	EF373475	EF373529
Zenaida asiatica	-	-	AF251533	-	KM894410	-	-
Zenaida auriculata	AF251538	-	AF182700	HM640211	FJ028598	HM640211	KJ456167
Zenaida aurita	-	-	AF182704	-	JN639028	-	-
Zenaida galapagoensis	-	-	AF251531	-	JQ420133	-	KJ456168
Zenaida graysoni	AF251537	-	AF182702	-	-	-	-
Zenaida macroura	AF251536	AF076379	KX902235	EF373325	DQ433272	EF373476	EF373530
Zenaida meloda	-	-	AF182699	-	-	-	-
Zentrygon chiriquensis	-	-	-	-	JQ174934	-	-

Supplementary Table S3. Model fit of the different evolutionary models tested for the evolution of relative tarsus length.

	BM1	BMS	OU1	OUM
AICc	-51.89	-110.38	-83.48	-123.36
Delta	73.67	15.17	42.08	2.20

Supplementary Table S4. Comparison between phenotypic optima from OUM models. We show the proportion of samples in which the phenotypic optimum (i.e. tarsus length relative to body size) of each eco-geographic group is estimated to be larger than that of the eco-geographic group in each column:

X>Y/100	AFC	AFI	TFC	TFI	TOC
AFC	-	0.07	<0.01	<0.01	0.77
AFI	0.93	-	<0.01	<0.01	0.95
TFC	1.00	1.00	-	<0.01	1.00
TFI	1.00	1.00		-	1.00
TOC	0.23	0.05	<0.01	<0.01	-

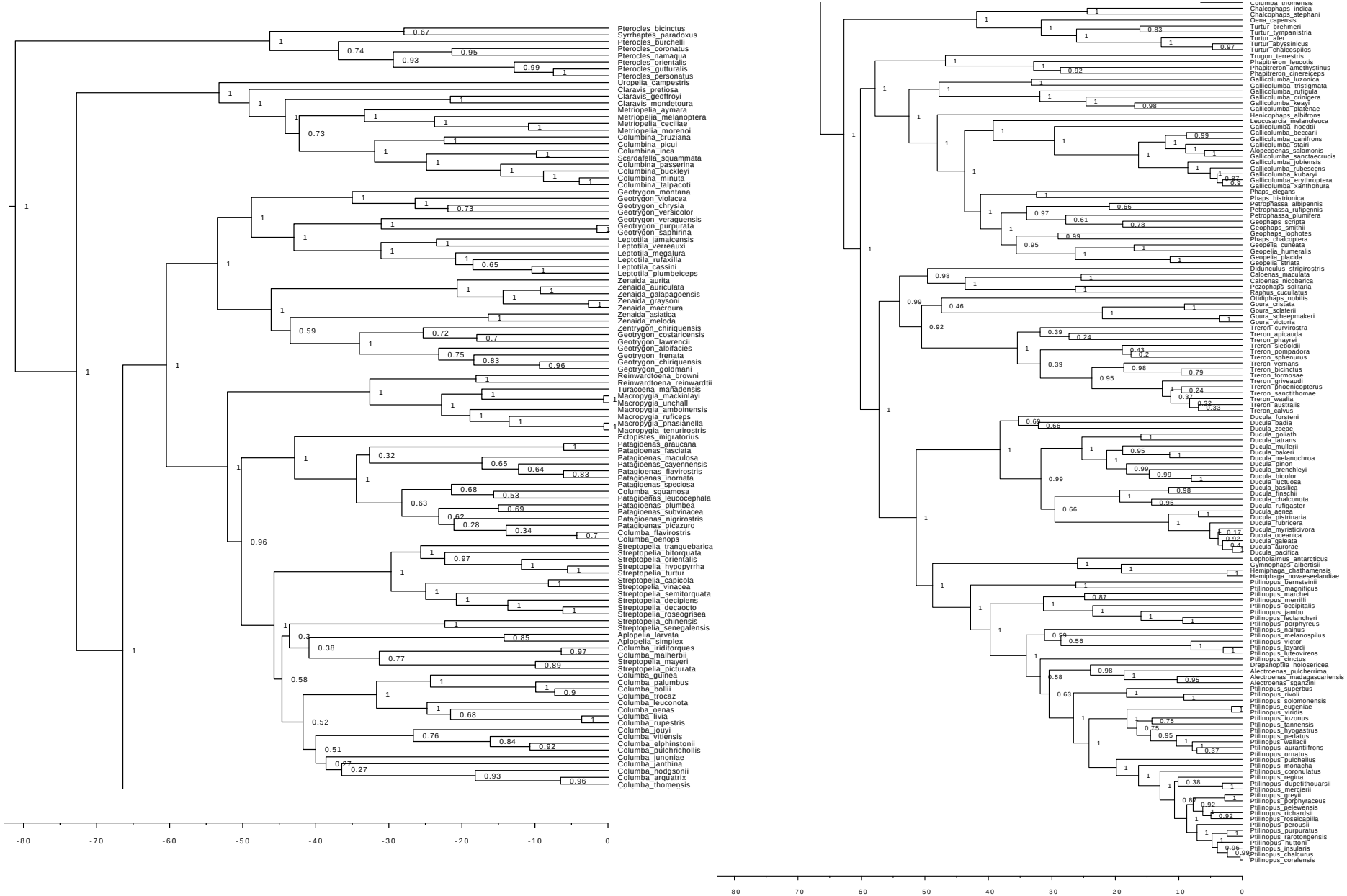
Supplementary Table S5. Phylogenetic linear model (PGLS) with tarsus length (log-transformed) as a response of body mass (log-transformed), insularity, arboreality and open habitat. The table shows the mean values over 100 phylogenetic trees, with 95% intervals in brackets. The phylogenetic signal for the model was lambda=0.75 [0.69,0.81] and the adjusted R-squared=0.56 [0.54,0.58].

	Estimate	Std. error	t-value	P-value
Intercept	1.27 [1.18,1.26]	0.15 [0.14,0.15]	8.44 [8.15,8.75]	<0.001
Log (mass)	0.33 [0.31,0.33]	0.03 [0.02,0.03]	13.19 [12.68,13.53]	<0.001
Arboreal foraging	0.34 [0.33,0.36]	0.06 [0.05,0.06]	5.98 [5.65,6.46]	<0.001
Open habitat	-0.14 [-0.13,-0.16]	0.04 [0.04,0.04]	-3.34 [-3.61,-3.13]	[0.001,0.020]
Island dwelling	0.09 [0.08,0.10]	0.03 [0.03,0.03]	2.83 [2.51,3.15]	[0.005,0.013]

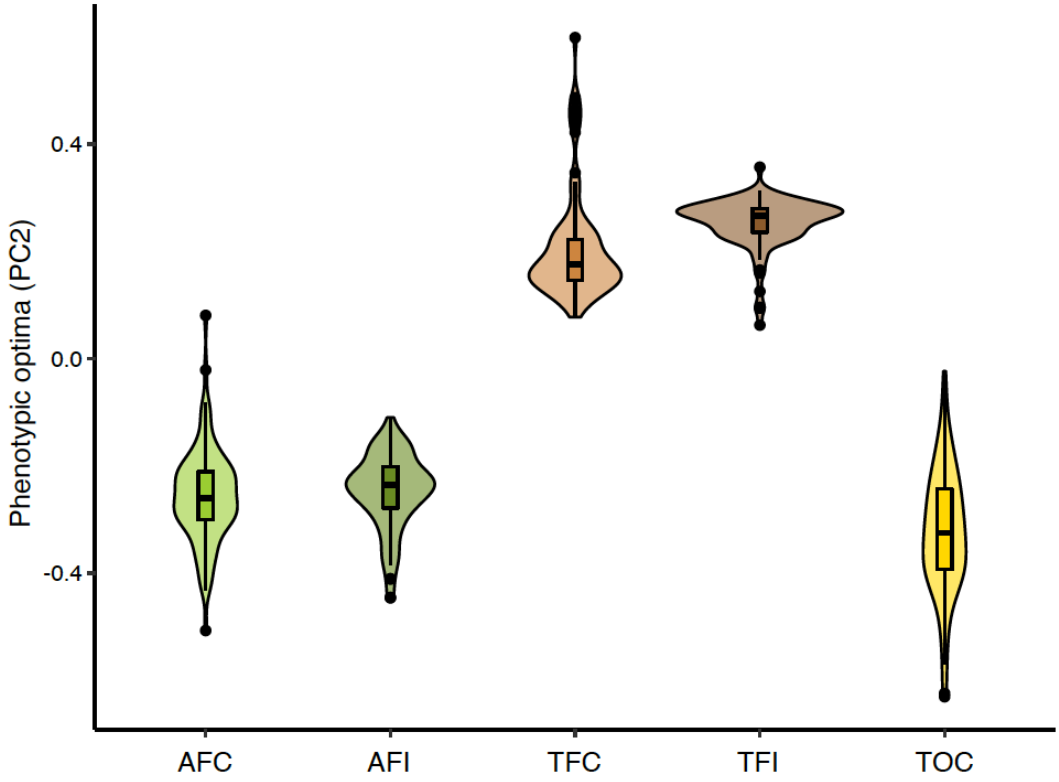
Supplementary Table S6. Mean and 95% confidence intervals for speciation rate estimations (λ) for the different character states obtained from 100 phylogenetic trees. We show the results contrasting two models of diversification, either considering character-dependent diversification with no hidden states (CDD-0) or including a hidden state (CDD-1). In the table, AICc and delta AICc are average values across the 100 trees.

Diversification model	**Character state**	**Hidden state**	**λ mean**	**λ 2.5% C.I.**	**λ 97.5% C.I.**
CDD-0	AFC	-	0.042	<0.001	0.072
AICc = 2216.21	AFI	-	0.067	0.054	0.085
delta AICc = 0	TFC	-	0.040	0.021	0.058
	TFI	-	0.043	0.027	0.058
	TOC	-	0.042	0.026	0.060
CDD-1	AFC	A	0.040	0.006	0.062
AICc = 2286.40	AFC	B	0.042	<0.001	0.097
delta AICc = 70.2	AFI	A	0.027	<0.001	0.075
	AFI	B	0.072	0.059	0.089
	TFC	A	0.051	0.036	0.073
	TFC	B	0.023	<0.001	0.058
	TFI	A	0.042	0.018	0.065
	TFI	B	0.031	<0.001	0.090
	TOC	A	0.044	0.024	0.078
	TOC	B	0.039	0.007	0.061

Supplementary Figure S1. Time-calibrated maximum clade credibility tree of the order Columbiformes (and outgroups) derived from our BEAST analyses. Numbers at the nodes indicate supports as posterior probabilities. Horizontal axis indicates time in millions of years.



Supplementary Figure S2: Phenotypic optima for PC2 for each of the eco-geographic groups (see Methods section), under a OUM model.



Supplementary Figure S3: Distribution of differences in speciation rates (λ) estimated for each pair of eco-geographic groups across 100 phylogenetic trees in the best supported model (CCD-0). P indicates the proportion of samples where the differences are below 0.