

## Avian island radiations shed light on the dynamics of adaptive and non-adaptive radiation

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### Table information

**Table S1.** [See Excel file.] A global review of avian radiations (excluding Procellariiformes) on oceanic islands, their characteristics, and geographical distribution. Oceanic islands include ‘classic’ volcanic islands, as well as atolls/reef islands originating from underwater volcanos, with no minimum or maximum size criteria. The table is ordered geographically first (treating all of Micronesia, Melanesia, and Polynesia except Hawaii as one region) and taxonomically second. To assess the support for in situ divergence, we have primarily scrutinized the topology and node support of phylogenetic trees, and secondarily considered extinct genera or genus groups well supported if subfossils or fossils have only been found on islands. 66 radiations classified with strong or moderate support constitute a rather credible set of in situ divergence; additionally we list 13 good candidates for which phylogenetic topology suggests in situ divergence, but where node support is low, or for which no molecular studies have yet been carried out. Finally, we have included six examples of systems that are sometimes treated as radiations, but for which the evidence on the contrary supports origins from repeated colonisations. We have assessed whether any members of a radiation occur/occurred in sympatry and attempted a classification of whether speciation has included adaptive responses. The material within Table S1 is summarised in Tables 1 and S2.

Under **archipelago/islands**, “Island” or “Islands” have been omitted from names for brevity. If the same **taxon group** occurs more than once, the instances are labeled consecutively with capital letters, e.g. *Zosterops* spp. A and *Zosterops* spp. B. **N diff. spp.** = number of different species (**est.** = estimated number). In the **taxon list**, † = extinct species; \* = species occurring also on the mainland; ?Taxon = uncertain whether this taxon belongs to the radiation clade. If two or more taxa are/were **distributed in sympatry**, Y = yes (highlighted in blue), otherwise N = no; the same notation is used for assessment whether the radiation is **adaptive** (highlighted in green). **References** are found in SI. Notes indicated with superscript numeral are explained under **comments**.

**Table S2.** Summary of passerine evolutionary radiations on oceanic islands, and their distribution across families and major oceans. This table corresponds to Table 1, providing a higher resolution for order Passeriformes. Taxonomy and number of extant and recently extinct passerine species worldwide follow Gill et al. (2022); blue bars illustrate the number of species. The radiations exclude those for which repeated colonisations rather than in situ divergence is presumed; all details available in Table S1. Number of radiations and species within them illustrated by green bars. All radiations except three (possibly four) are presumed non-adaptive; details on this and on allopatric/sympatric distribution in Table S1.

Family	N species worldwide	Radiations (N radiations, N species)		
		Total	Atlantic Ocean	Indian Ocean
Acanthisittidae	4			
Sapayoidae	1			
Philepittidae	4			
Eurylaimidae	9			
Calyptomenidae	6			
<b>Pittidae</b>	<b>44</b>	<b>1</b>	<b>3</b>	<b>1</b> <b>3</b>
Furnariidae	315			
Thamnophilidae	238			
Formicariidae	12			
Grallariidae	68			
Conopophagidae	11			
Rhinocryptidae	65			
Melanopareiidae	5			
<b>Tyrannidae</b>	<b>438</b>	<b>1</b>	<b>2</b>	<b>1</b> <b>2</b>
Cotingidae	66			
Pipridae	54			
Tityridae	45			
Menuridae	2			
Atrichornithidae	2			
Ptilonorhynchidae	28			
Climacteridae	7			
Maluridae	32			
<b>Meliphagidae</b>	<b>196</b>	<b>2</b>	<b>22</b>	<b>2</b> <b>22</b>
Dasyornithidae	3			
Pardalotidae	4			
Acanthizidae	67			
Pomatostomidae	5			
Orthonychidae	3			
Cnemophilidae	3			
Melanocharitidae	12			
Paramythiidae	3			
Callaeidae	5			
Notiomystidae	1			
Psophodidae	6			
Cinclosomatidae	12			
Platysteiridae	32			
Malaconotidae	50			
Machaerirhynchidae	2			
Vangidae	39			
Pityriasidae	1			
Artamidae	24			
Rhagologidae	1			
Aegithinidae	4			
Campephagidae	94			
Mohouidae	3			
Neosittidae	3			

Family	N species worldwide	Radiations (N radiations, N species)			
		Total	Atlantic Ocean	Indian Ocean	Pacific Ocean
Eulacestomatidae	1				
Oreoicidae	3				
Falcunculidae	1				
<b>Pachycephalidae</b>	<b>64</b>	<b>3</b>	<b>12</b>		<b>3 12</b>
Laniidae	34				
Vireonidae	64				
Oriolidae	39				
Dicruridae	30				
<b>Rhipiduridae</b>	<b>55</b>	<b>2</b>	<b>9</b>		<b>2 9</b>
<b>Monarchidae</b>	<b>106</b>	<b>5</b>	<b>25</b>		<b>5 25</b>
Platylophidae	1				
<b>Corvidae</b>	<b>135</b>	<b>1</b>	<b>2</b>		<b>1 2</b>
Corcoracidae	2				
Melampittidae	2				
Ifritidae	1				
Paradisaeidae	45				
Petroicidae	51				
Picathartidae	2				
Chaetopidae	2				
Eupetidae	1				
Bombycillidae	3				
Ptiliogonatidae	4				
Hypocoliidae	1				
Dulidae	1				
<b>Mohoidae</b>	<b>5</b>	<b>1</b>	<b>5</b>		<b>1 5</b>
Hylocitreidae	1				
Stenostiridae	9				
<b>Paridae</b>	<b>64</b>	<b>1</b>	<b>3</b>	<b>1 3</b>	
Remizidae	11				
Nicatoridae	3				
Panuridae	1				
Alaudidae	100				
Pycnonotidae	160				
Hirundinidae	89				
Pnoepygidae	4				
Macrosphenidae	18				
Cettiidae	32				
<b>Scotocercidae</b>	<b>1</b>	<b>1</b>	<b>4</b>		<b>1 4</b>
Erythroceridae	3				
Hylidae	2				
Aegithalidae	13				
Phylloscopidae	81				
<b>Acrocephalidae</b>	<b>61</b>	<b>3</b>	<b>14</b>	<b>1 2</b>	<b>2 12</b>
<b>Locustellidae</b>	<b>67</b>	<b>2</b>	<b>4</b>		<b>2 4</b>
Donacobiidae	1				
Bernieridae	11				
Cisticolidae	167				
Sylviidae	34				
Paradoxornithidae	37				
<b>Zosteropidae</b>	<b>149</b>	<b>2</b>	<b>10</b>	<b>1 4</b>	<b>1 6</b>
Timaliidae	57				
Pellorneidae	65				
Alcippeidae	10				
Leiothrichidae	133				
Modulatricidae	3				
Promeropidae	2				

Family	N species worldwide	Radiations (N radiations, N species)			
		Total	Atlantic Ocean	Indian Ocean	Pacific Ocean
Irenidae	3				
Regulidae	6				
Elachuridae	1				
Hylotidae	4				
Troglodytidae	88				
Poliopitilidae	21				
Sittidae	29				
Tichodromidae	1				
Certhiidae	11				
Mimidae	34	2	8	1 4	1 4
Sturnidae	126	1	2		1 2
Buphagidae	2				
Turdidae	174	4	11	1 2	3 9
Muscicapidae	344	1	2		1 2
Cinclidae	5				
Chloropseidae	13				
Dicaeidae	50				
Nectariniidae	146	3	9	1 2	2 7
Passeridae	43				
Ploceidae	118	1	2	1 2	
Estrildidae	142				
Viduidae	20				
Peucedramidae	1				
Prunellidae	12				
Motacillidae	69				
Urocynchramidae	1				
Fringillidae	234	4	55	3 8	1 47
Calcariidae	6				
Rhodinocichlidae	1				
Emberizidae	45				
Passerellidae	138				
Calyptophilidae	2				
Phaenicophilidae	4				
Nesospingidae	1				
Spindalidae	4				
Zeledoniidae	1				
Teretistridae	2				
Icteriidae	1				
Icteridae	110				
Parulidae	120				
Mitrospingidae	4				
Cardinalidae	53				
Thraupidae	386	3	24	2 6	1 18
<b>Total</b>	<b>6647</b>	<b>44</b>	<b>222</b>	<b>11 31</b>	<b>4 15</b> <b>29 176</b>

**Table S3.** Summary of avian evolutionary radiations on oceanic islands, and their distribution across avian orders and major oceans, when the number of species required to constitute a radiation is increased from 2 to 3. In all other respects, this corresponds to Table 1 (see legend).

Order	N species worldwide	Radiations (N radiations, N species)			
		Total	Atlantic Ocean	Indian Ocean	Pacific Ocean
Struthioniformes	2				
Rheiformes	2				
Apterygiformes	5				
Casuariiformes	4				
Tinamiformes	46				
<b>Anseriformes</b>	<b>178</b>	<b>2</b>	<b>7</b>		<b>2 7</b>
Galliformes	302				
Caprimulgiformes	97				
Steatornithiformes	1				
Nyctibiiformes	7				
Podargiformes	16				
Aegotheliformes	9				
Apodiformes	479				
Musophagiformes	23				
Otidiformes	26				
Cuculiformes	150				
Mesitornithiformes	3				
Pterocliiformes	16				
<b>Columbiformes</b>	<b>351</b>	<b>6</b>	<b>33</b>		<b>6 33</b>
Gruiformes	189				
Podicipediformes	23				
Phoenicopteriformes	6				
<b>Charadriiformes</b>	<b>390</b>	<b>3</b>	<b>12</b>		<b>3 12</b>
Eurypygiformes	2				
Phaethontiformes	3				
Gaviiformes	5				
Sphenisciformes	18				
Procellariiformes	149				
Ciconiiformes	19				
Suliformes	61				
Pelecaniformes	118				
Opisthocomiformes	1				
Accipitriformes	264				
<b>Strigiformes</b>	<b>254</b>	<b>2</b>	<b>8</b>		<b>2 8</b>
Coliiformes	6				
Leptosomiformes	1				
Trogoniformes	43				
Bucerotiformes	74				
<b>Coraciiformes</b>	<b>184</b>	<b>1</b>	<b>7</b>		<b>1 7</b>
Piciformes	449				
Cariamiformes	2				
Falconiformes	65				
Psittaciformes	403	1	13		1 13
Passeriformes	6647	27	188	6 21	2 11 19 156
<b>Total</b>	<b>11093</b>	<b>42</b>	<b>268</b>	<b>6 21</b>	<b>2 11 34 236</b>

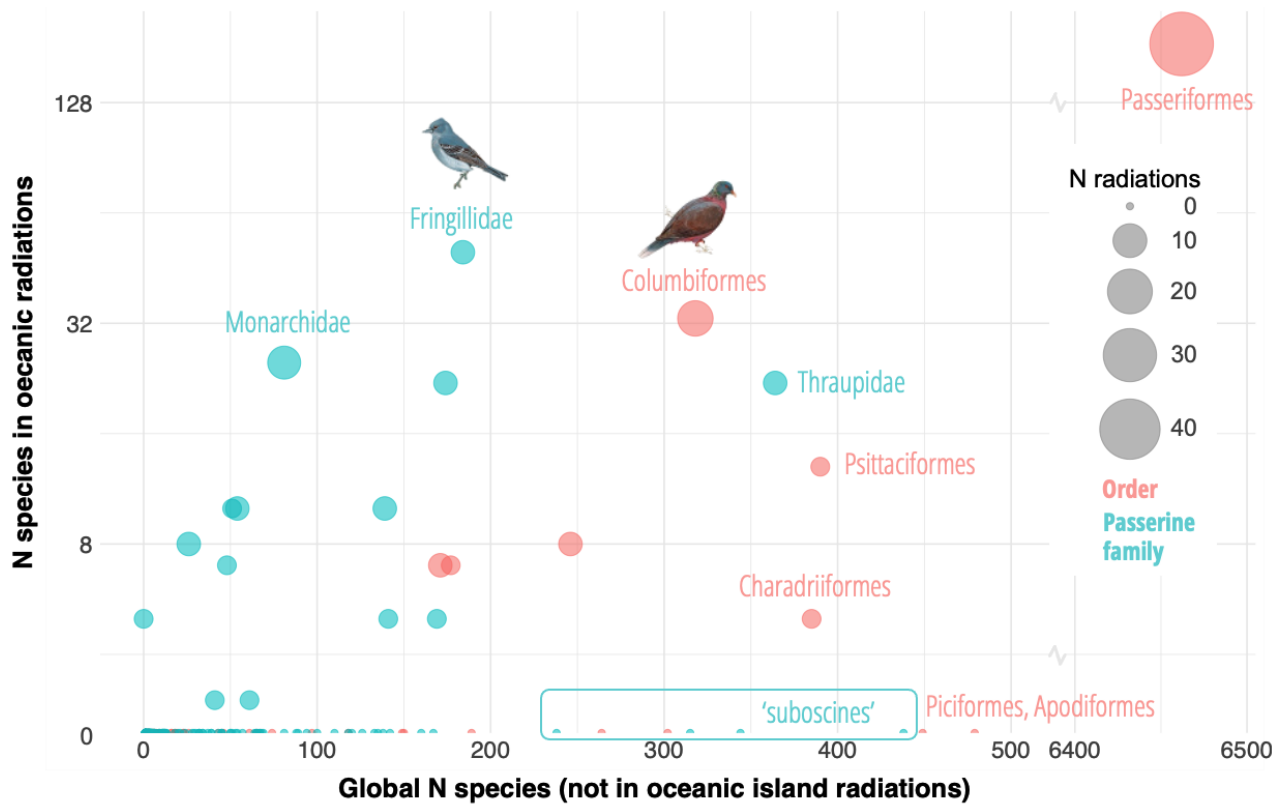
**Table S4.** Summary of passerine evolutionary radiations on oceanic islands, and their distribution across families and major oceans, when the number of species required to constitute a radiation is increased from 2 to 3. In all other respects, this corresponds to Table S2 (see legend).

Family	N species worldwide	Radiations (N radiations, N species)		
		Total	Atlantic Ocean	Indian Ocean
Acanthisittidae	4			
Sapayoidae	1			
Philepittidae	4			
Eurylaimidae	9			
Calypomenidae	6			
<b>Pittidae</b>	<b>44</b>	<b>1</b>	<b>3</b>	<b>1 3</b>
Furnariidae	315			
Thamnophilidae	238			
Formicariidae	12			
Grallariidae	68			
Conopophagidae	11			
Rhinocryptidae	65			
Melanopareiidae	5			
<b>Tyrannidae</b>	<b>438</b>			
Cotingidae	66			
Pipridae	54			
Tityridae	45			
Menuridae	2			
Atrichornithidae	2			
Ptilonorhynchidae	28			
Climacteridae	7			
Maluridae	32			
<b>Meliphagidae</b>	<b>196</b>	<b>2</b>	<b>22</b>	<b>2 22</b>
Dasyornithidae	3			
Pardalotidae	4			
Acanthizidae	67			
Pomatostomidae	5			
Orthonychidae	3			
Cnemophilidae	3			
Melanocharitidae	12			
Paramythiidae	3			
Callaeidae	5			
Notiomystidae	1			
Psophodidae	6			
Cinlosomatidae	12			
Platysteiridae	32			
Malaconotidae	50			
Machaerirhynchidae	2			
Vangidae	39			
Pityriidae	1			
Artamidae	24			
Rhagologidae	1			
Aegithinidae	4			
Campephagidae	94			
Mohouidae	3			
Neosittidae	3			
Eulacestomatidae	1			
Oreoicidae	3			
Falcunculidae	1			
<b>Pachycephalidae</b>	<b>64</b>	<b>2</b>	<b>10</b>	<b>2 10</b>
Laniidae	34			
Vireonidae	64			

Family	N species worldwide	Radiations (N radiations, N species)			
		Total	Atlantic Ocean	Indian Ocean	Pacific Ocean
Oriolidae	39				
Dicruridae	30				
Rhipiduridae	55	1			1 7
Monarchidae	106	5			5 25
Platylophidae	1				
Corvidae	135				
Corcoracidae	2				
Melampittidae	2				
Ifritidae	1				
Paradisaeidae	45				
Petroicidae	51				
Picathartidae	2				
Chaetopidae	2				
Eupetidae	1				
Bombycillidae	3				
Ptilionotidae	4				
Hypocoliidae	1				
Dulidae	1				
Mohoidae	5	1			1 5
Hylocitreidae	1				
Stenostiridae	9				
Paridae	64	1		1 3	
Remizidae	11				
Nicatoridae	3				
Panuridae	1				
Alaudidae	100				
Pycnonotidae	160				
Hirundinidae	89				
Pnoepygidae	4				
Macrosphenidae	18				
Cettiidae	32				
Scotocercidae	1	1			1 4
Erythroceridae	3				
Hylidae	2				
Aegithalidae	13				
Phylloscopidae	81				
Acrocephalidae	61	1			1 10
Locustellidae	67				
Donacobiidae	1				
Bernieridae	11				
Cisticolidae	167				
Sylviidae	34				
Paradoxornithidae	37				
Zosteropidae	149	2		1 4	1 6
Timaliidae	57				
Pellorneidae	65				
Alcippeidae	10				
Leiothrichidae	133				
Modulatricidae	3				
Promeropidae	2				
Irenidae	3				
Regulidae	6				
Elachuridae	1				
Hylotidae	4				
Troglodytidae	88				
Poliophtidae	21				

Family	N species worldwide	Radiations (N radiations, N species)				
		Total	Atlantic Ocean	Indian Ocean	Pacific Ocean	
Sittidae	29					
Tichodromidae	1					
Certhiidae	11					
Mimidae	34	2	1 4		1 4	
Sturnidae	126					
Buphagidae	2					
Turdidae	174	1			1 5	
Muscicapidae	344					
Cinclidae	5					
Chloropseidae	13					
Dicaeidae	50					
Nectariniidae	146	1		1 5		
Passeridae	43					
Ploceidae	118					
Estrildidae	142					
Viduidae	20					
Peucedramidae	1					
Prunellidae	12					
Motacillidae	69					
Urocynchramidae	1					
Fringillidae	234	3	2 6		1 47	
Calcariidae	6					
Rhodinocichlidae	1					
Emberizidae	45					
Passerellidae	138					
Calyptophilidae	2					
Phaenicophilidae	4					
Nesospingidae	1					
Spindalidae	4					
Zeledoniidae	1					
Teretistridae	2					
Icteriidae	1					
Icteridae	110					
Parulidae	120					
Mitrospingidae	4					
Cardinalidae	53					
Thraupidae	386	2	1 4		1 18	
<b>Total</b>	<b>6647</b>	<b>26</b>	<b>192</b>	<b>6 21</b>	<b>2 11</b>	<b>18 160</b>





**Figure S1.** The relationship between global avian species diversity (number of species not in oceanic island radiations) and number of species within oceanic island radiations (the latter excluding cases with low or unresolved support or reflecting likely repeated colonization events; see Table S1), when the number of species required to constitute a radiation is increased from 2 to 3. In all other respects, this corresponds to Figure 3 (see legend). Illustrations by Juan Varela..

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