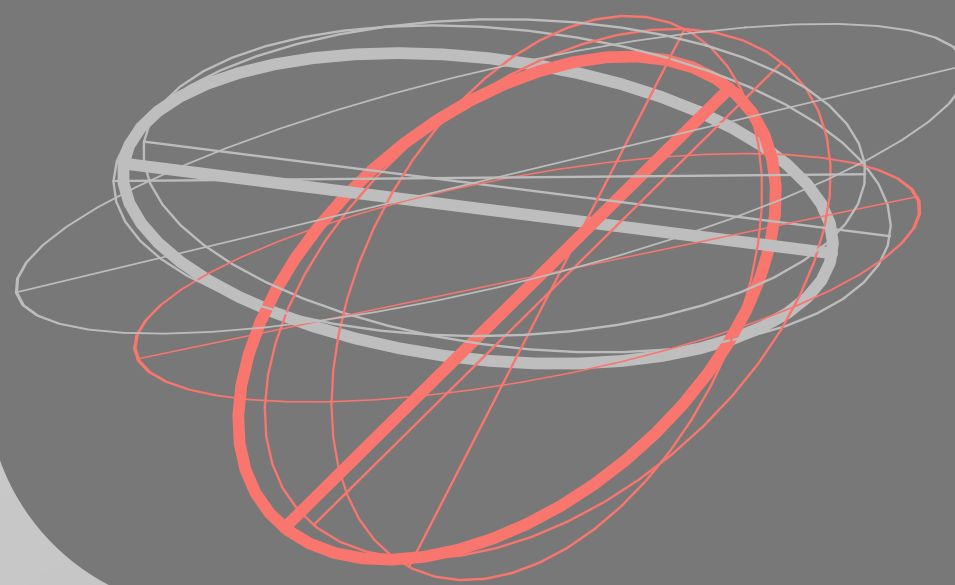


WHICH BIRD HAS THE MOST SPECIAL BEAK ?

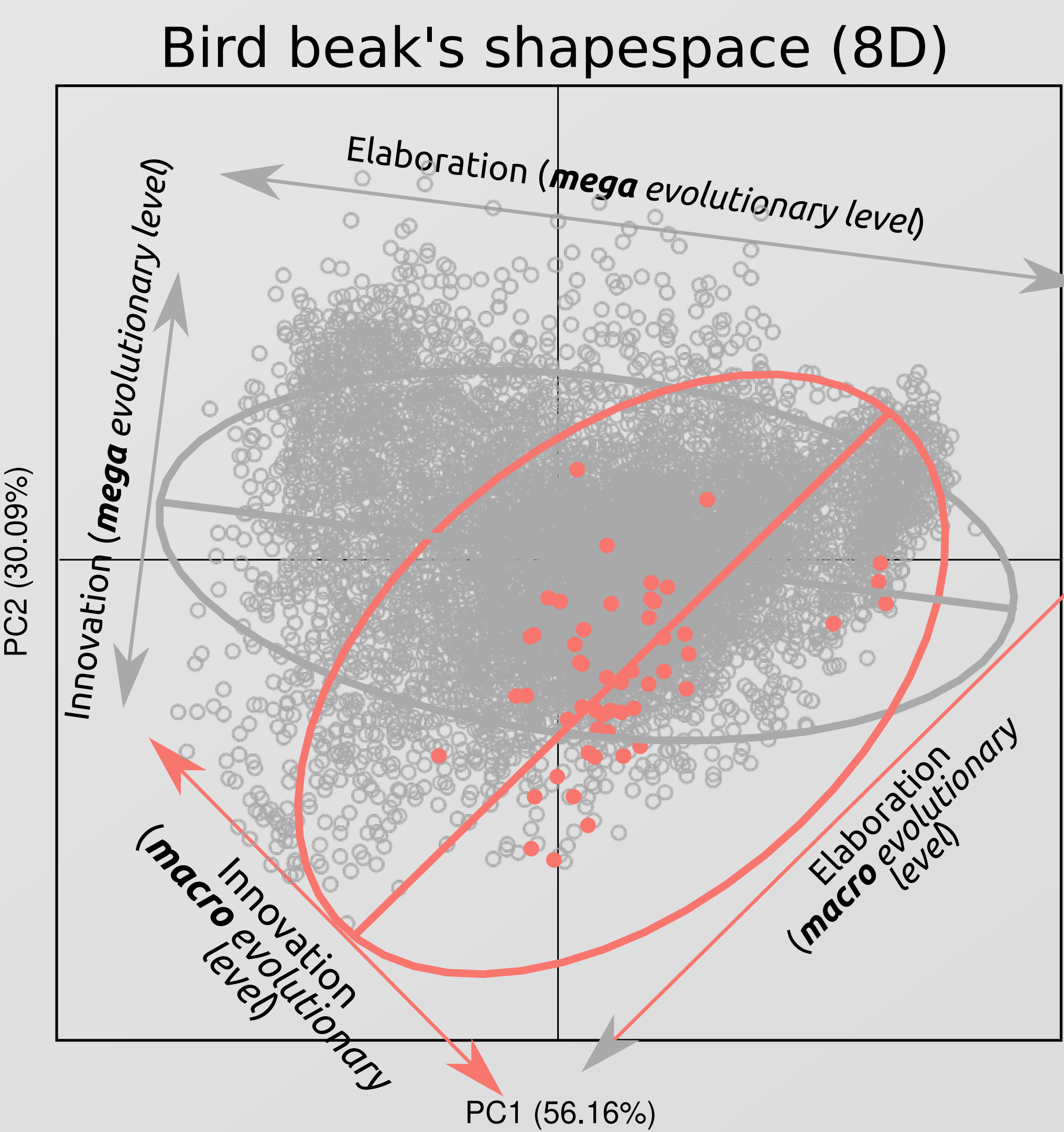
Innovation and elaboration on the avian tree of life across evolutionary scales

Major axes of variance-covariance?
Generalised linear mixed effects model:
 $shapesspace \sim residuals(shapesspace) + random(phylogeny)$



Much more info

What's a special beak?



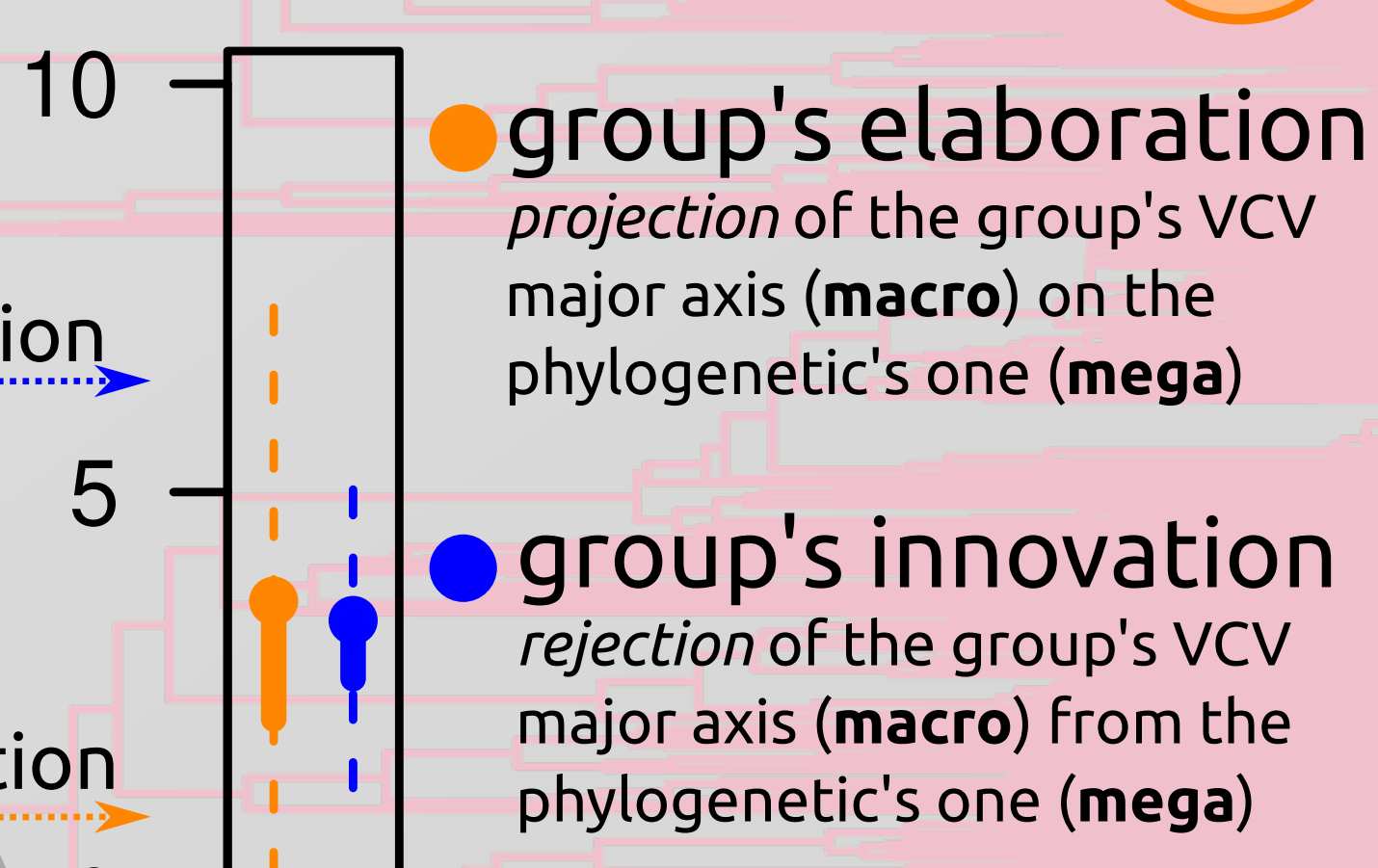
- species' elaboration
species' projection on the phylogenetics' VCV major axis
- species' innovation
species' rejection from the phylogenetics' VCV major axis

elaboration (=projection)
innovation (=rejection)

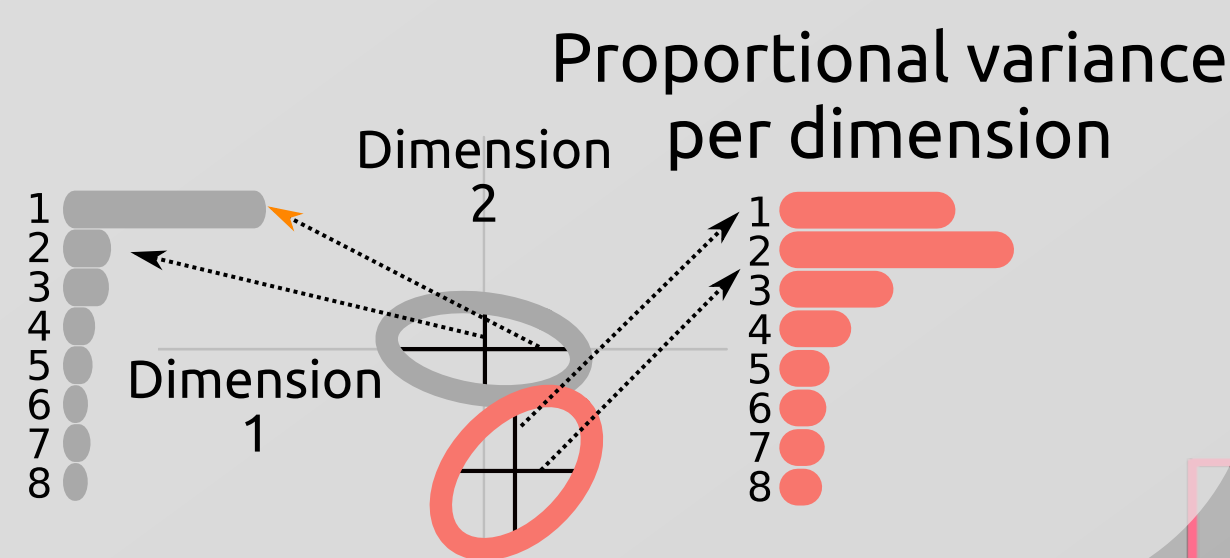


1

2



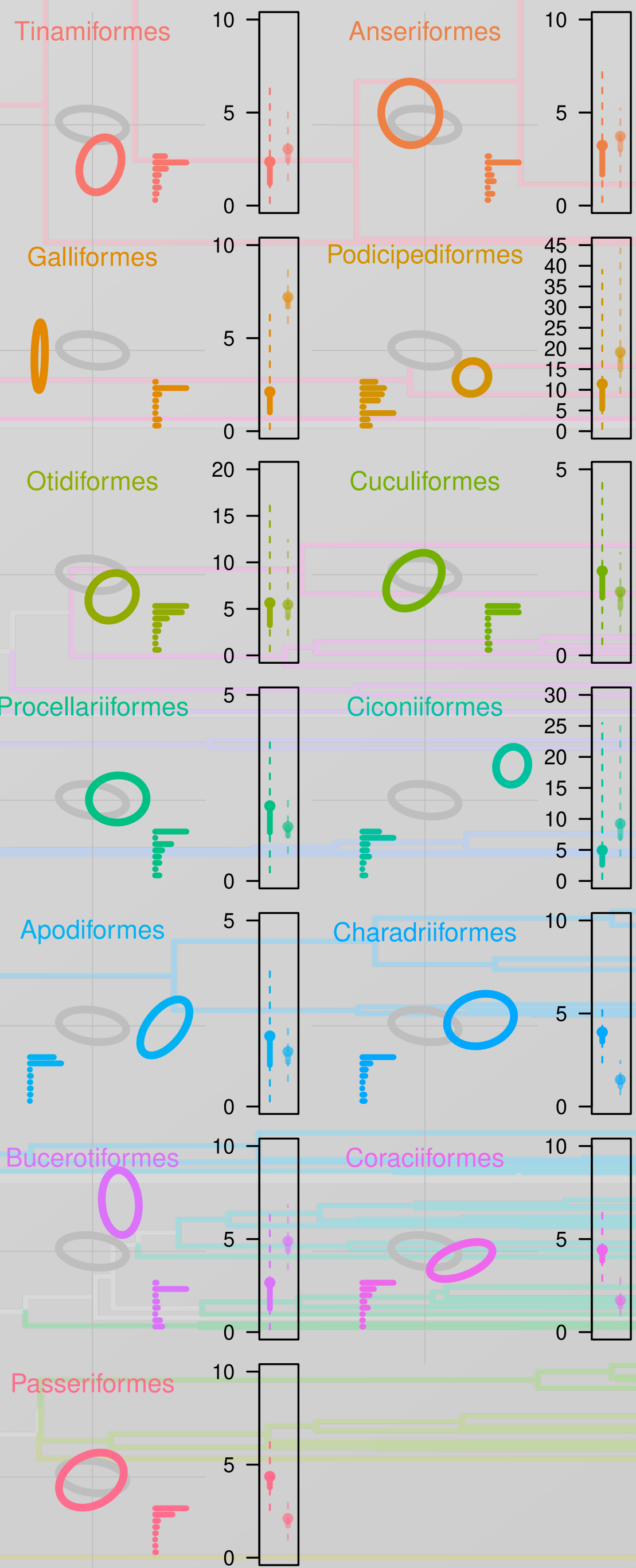
Elaboration and innovation per group:



TL;DR:
Species elaborate
Clades innovate

- Passeriformes (5229 sp)
- Psittaciformes (341 sp)
- Falconiformes (63 sp)
- Piciformes (390 sp)
- Coraciiformes (149 sp)
- Bucerotiformes (66 sp)
- Trogoniformes (41 sp)
- Strigiformes (76 sp)
- Accipitriformes (240 sp)
- Charadriiformes (359 sp)
- Apodiformes (331 sp)
- Caprimulgiformes (23 sp)
- Pelecaniformes (103 sp)
- Suliformes (52 sp)
- Ciconiiformes (19 sp)
- Procellariiformes (112 sp)
- Sphenisciformes (17 sp)
- Musophagiformes (22 sp)
- Gruiformes (139 sp)
- Cuculiformes (134 sp)
- Otidiformes (25 sp)
- Columbiformes (266 sp)
- Pteroclidiformes (16 sp)
- Podicipediformes (18 sp)
- Galliformes (265 sp)
- Anseriformes (156 sp)
- Tinamiformes (41 sp)

Orders



- Embirdzoidea
- Motacillidae
- Passeirdae
- Ploceidae & Estrildidae
- Nectariniidae
- Muscicapoidae
- Bombycilloidea
- Sylvioidea
- Locustelloidea
- Cisticolidae
- Pycnonotidae
- Aegithaloidea
- Hirundinidae
- Fringillidae
- Paridae
- Petroicidae
- Corvoidea
- Orioloidea
- Malaconotoidea
- Meliphagoidea
- Furnariida
- Tyrannida
- Eurylaimides
- Passeriformes
- Psittaciformes
- Falconiformes
- Piciformes
- Coraciiformes
- Bucerotiformes
- Trogoniformes
- Strigiformes
- Accipitriformes
- Charadriiformes
- Apodiformes
- Caprimulgiformes
- Pelecaniformes
- Suliformes
- Ciconiiformes
- Procellariiformes
- Sphenisciformes
- Musophagiformes
- Gruiformes
- Cuculiformes
- Otidiformes
- Columbiformes
- Pteroclidiformes
- Podicipediformes
- Galliformes
- Anseriformes
- Tinamiformes

University of Sheffield

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PDF



preprint



github



mcmcmclmm



dispRity

elaboration
innovation

A lot (> 1)
Not much

1