



Using Nuclear Introns to Infer the Evolutionary History of the Understudied Australian Red Robins

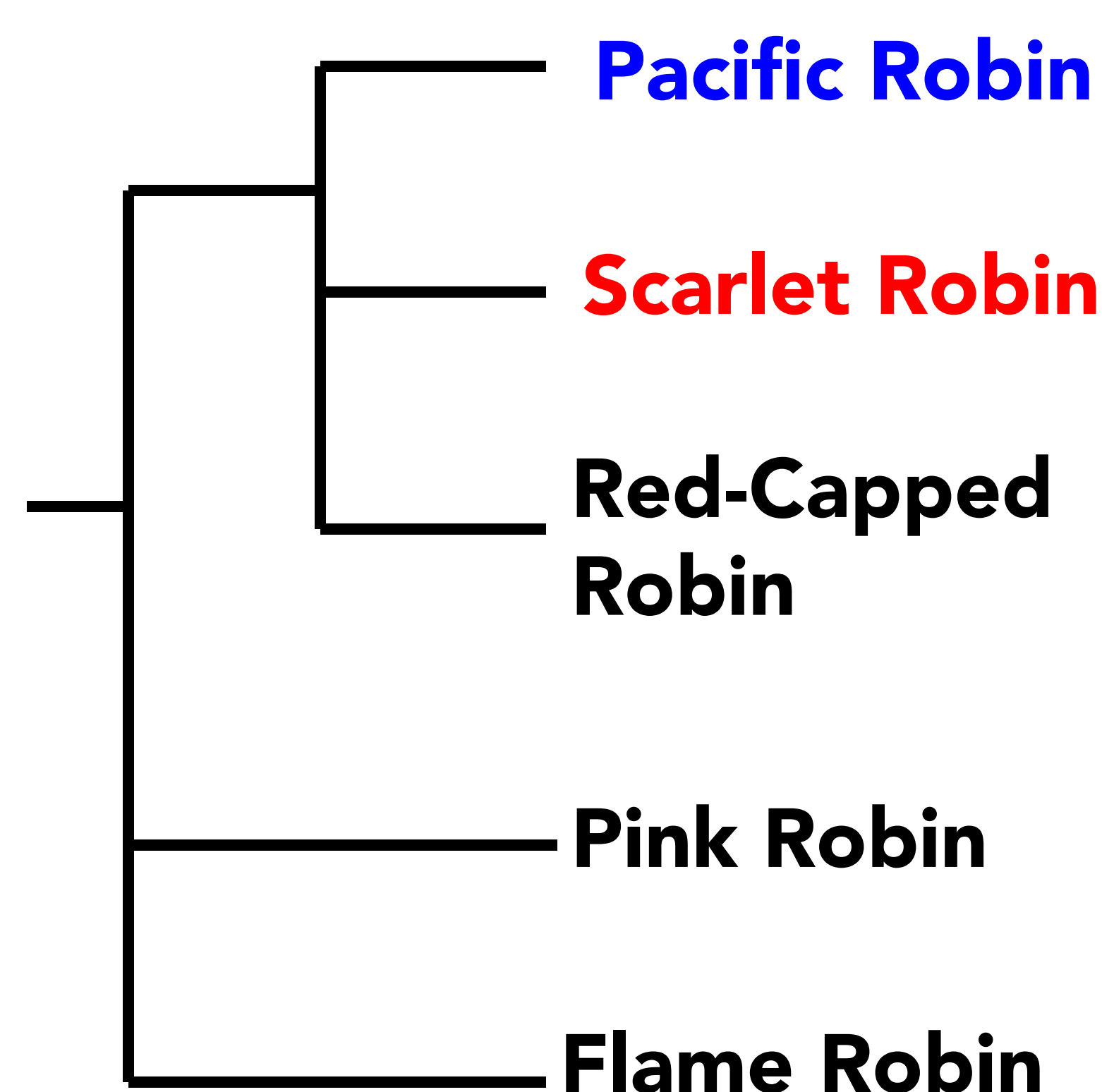


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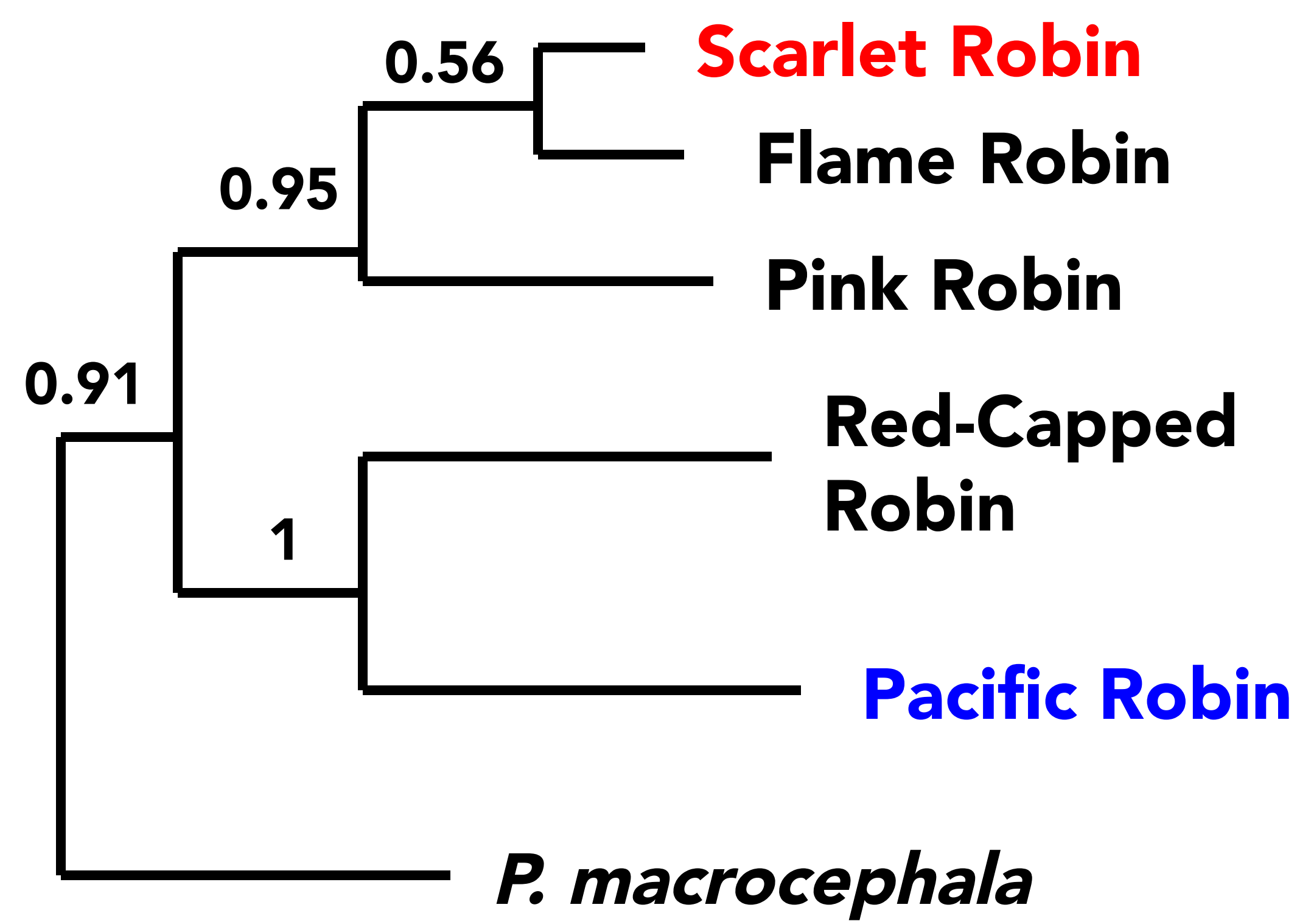
Introduction

The Australasian red robins (genus *Petroica*) are commonly used as a textbook example of island speciation due to the radiation of the species outward from the Australian mainland (Mayr, *Animal Species and Evolution*, 1950). Although their common name sounds familiar, the Australian Robins are a distinct group not at all closely related to our American Robin. Traditionally, the evolutionary relationships within the genus have grouped the mainland Scarlet Robin (*Petroica boodang*) with the Pacific Robin (*Petroica multicolor*) which is found on nearby islands, such as Solomons Island, Vanuatu, Fiji, and Norfolk Island. However, recent molecular based phylogenies suggest this traditional view to be flawed. A mitochondrial DNA study by Christidis et al. (2011) puts the Scarlet Robin with the Flame and Pink Robins instead of with the Pacific Robin. In previous studies by the Omland lab, mitochondrial gene trees have been shown to be problematic in inferring species trees (Jacobsen and Omland, 2011). Therefore, here we test the validity of the traditional and mitochondrial phylogenies using nuclear DNA to infer a species tree of the *Petroica* genus.

Traditional Morphological Relationship

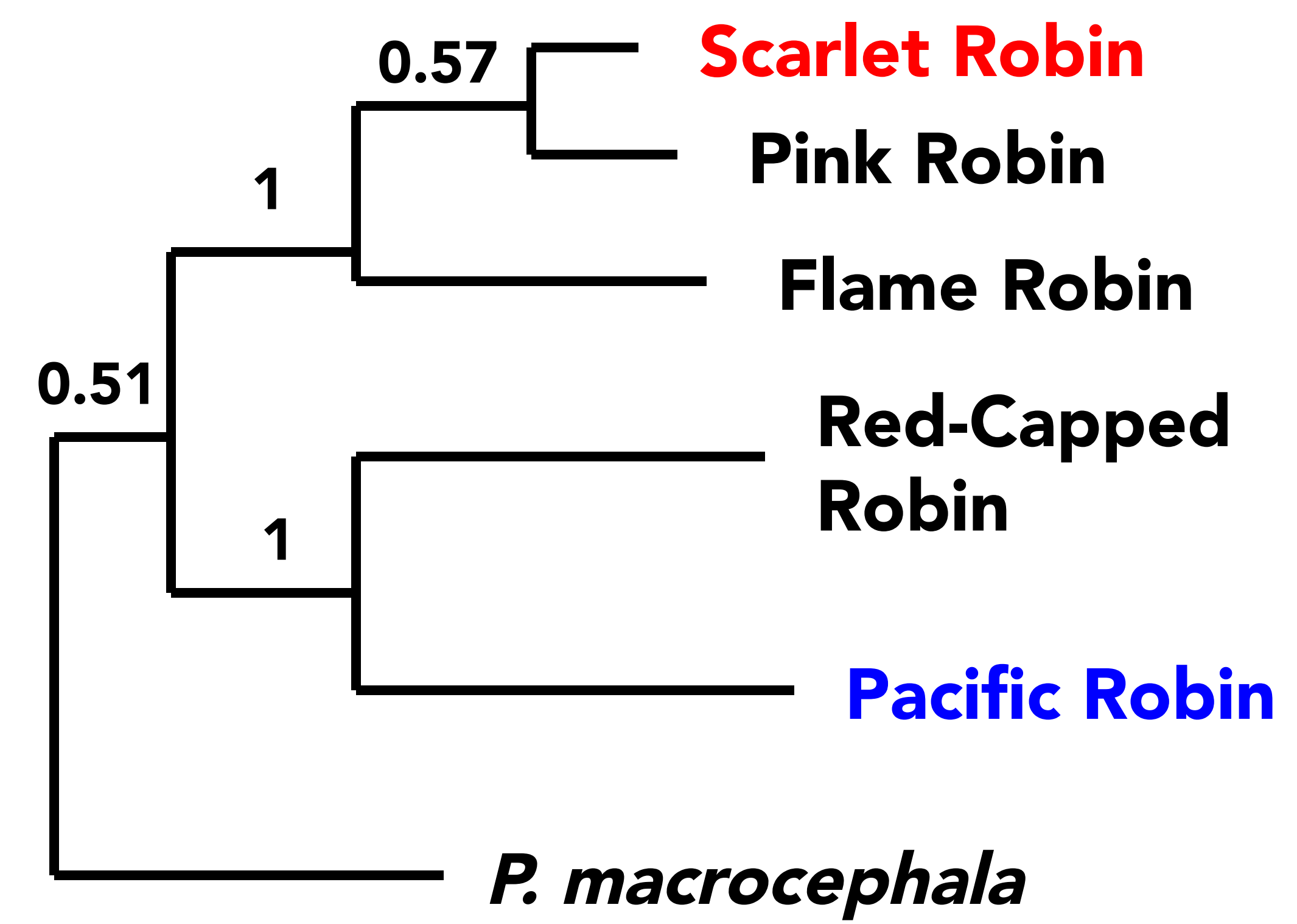


Mitochondrial DNA Relationship



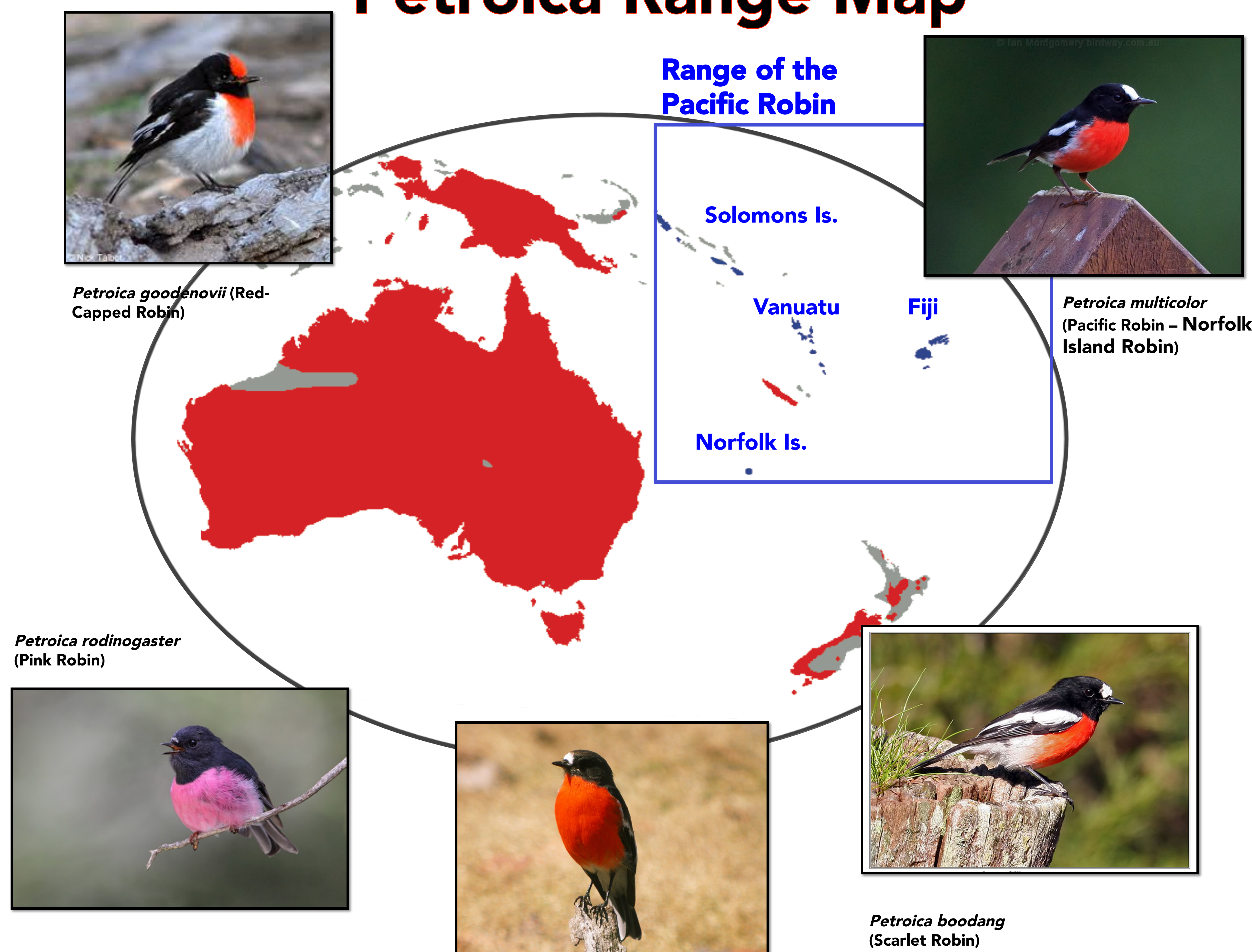
Christidis et al. (2011). Analysis performed with MrBayes 3.1.1 (Huelsenbeck and Ronquist, 2003). Branch labels are posterior probabilities.

Nuclear DNA Relationship



Analysis performed with *BEAST 1.8.0 (Drummond et al. 2012). Branch labels are posterior probabilities.

Petroica Range Map



Conclusions

The nuclear DNA results support the mitochondrial DNA study for the overall clades. In both analyses, the Scarlet, Flame, and Pink Robins are together in one clade, and the Red-Capped and Pacific Robins are in a separate clade.

Both analyses debunk the traditional view of Scarlet and Pacific Robins as sister taxa.

The nuclear DNA analysis puts the Scarlet and Pink Robins as sister taxa, whereas the mitochondrial analysis places the Scarlet Robin with the Flame Robin.

Further testing is necessary to infer a complete phylogeny of the genus *Petroica*.

Acknowledgements

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