
Diversification analysis of a songbird lineage within a remote archipelago suggests a role for intra-island speciation

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Abstract

Island endemic congeners can be sister species that have arisen through intra-island speciation following initial colonization by a common ancestor, or they may represent multiple independent colonization events. These two contrasting scenarios provide different expectations regarding the relative roles of natural selection and geographic isolation in driving speciation. However, discriminating between the two scenarios has proven difficult and demonstrating intra-island differentiation has remained elusive. The Reunion grey white-eye (*Zosterops borbonicus*) is a species complex that harbours four geographically structured forms with abutting ranges on a small and remote volcanic island, providing an interesting system to test for intra-island divergence. We generated genome-wide SNP loci using GBS (Genotyping-By-Sequencing) data from a large sample of individuals and a high-quality genome sequence for the species. Using a population genomic framework as well as phylogenetic inferences, we reconstructed the evolutionary histories of the different forms on Reunion island. We first confirmed the monophyly of the species relative to its sister species *Zosterops mauritianus*. Then, we show that the paraphyly and basal position of one of the lowland forms strongly argues in favour of intra-island divergence. Expansion analyses suggest sequential colonisations from the North to the South of the island. The marked genomic structure found indicates that gene flow between forms is limited and suggests that these forms may be reproductively isolated.

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