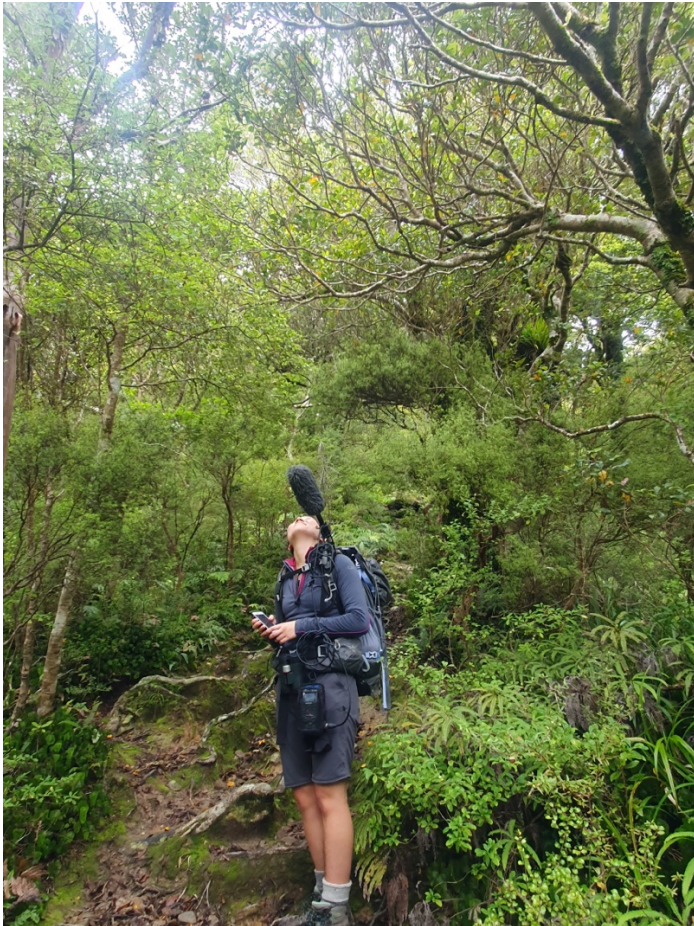


Geographic variation in bird song (bird 'dialects') can form due to vocal learning, dispersal between populations and evolutionary selective pressures (social or environmental). Bird dialects are interesting to study as they can indicate bird dispersal patterns, population connectivity, and functions of different vocalisations. However, historically, study of bird vocalisations has been strongly biased towards Northern Hemisphere species. Many New Zealand native species have been under-studied. Miromiro or ngirungiru (tomtit, *Petroica macrocephala*) are widespread in Aotearoa New Zealand, but are relatively under-studied, with little known about their communication behaviour, or dispersal ecology. To address the research gap on miromiro | ngirungiru, I investigated if song dialects exist (1) between North and South Island subspecies (*P. m. toitoi* and *P. m. macrocephala*), (2) between different North Island populations, and (3) within individual North Island populations.

Between August 2022 and August 2023, this project, through the assistance of the Birds New Zealand Research Fund, recorded male miromiro song from six North Island sites: Bay of Islands, Waitākere Ranges, Coromandel Forest Park, Taranaki National Park, Tararua Ranges and Remutaka Ranges. South Island ngirungiru recordings were obtained from public bird song archives: Xeno Canto and Macaulay Library. Furthermore, DNA samples were collected from North Island miromiro populations, to be analysed as part of a future study investigating genetic similarity of populations and utility of using bioacoustics as a monitoring tool for population connectivity.

I tested for differences in song acoustic frequency, duration, complexity, and composition. My results indicate that macro scale (>2km) song dialects exist between North and South Island subspecies, and between North Island populations. North Island birds had shorter, lower frequency and less complex songs compared to South Island birds. North Island populations displayed a general relationship where geographically distant populations had greater dialect differences than geographically close locations. I found no evidence of micro-dialects (<2km) within North Island populations (neighbouring birds did not sound more similar than non-neighbours), but some evidence for small-scale dialects occurring on scales of 2-10km. Macro-scale patterns indicate that isolation between subspecies and North Island populations has been great enough to allow dialect differences to accumulate. A lack of micro-scale dialects indicates that juvenile miromiro likely learn song pre-dispersal (or only modify their song slightly after dispersal) and disperse between 2-10km away from their natal areas. Overall, this collection of acoustic and DNA data will lay a foundation for future study of miromiro and suggests that dialect studies may be a useful tool for monitoring bird populations and dispersal.



*Recording in the field in  
the Tararua Ranges –  
eyes always upwards!*



*Male miromiro*