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A feather precipitation hydrogen isoscape for New Zealand

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Forensic isotopic assays of feathers from historical Maori cloaks are a potential tool to link historical artefacts back to their native locales (Iwi) in New Zealand. In order to test this approach, we sampled feathers from extant museum archived birds of known origin for their feather hydrogen isotopes ($\delta \mathrm{yH}_f$) to assign their regional origin and location over time. We obtained feathers from two non-migratory bird species widely distributed around New Zealand, tui (*Prosthemadera novaeseelandiae*) and quail (*Callipepla californica*). Feathers were sampled from archived birds collected between 1880-2002 held in 3 New Zealand museum collections. We determined regression coefficients of $\delta^2\mathrm{H}$ on location, latitude, $\delta^2\mathrm{H}_{precipitation}$, and age. The data showed that ground dwelling quail had higher regression coefficients with respect to latitude (r^2=0.46) than the nectar feeding tui (r^2=0.39). On the whole, both resident birds showed promise as regional geographical indicators of their habitat (r^2=0.58). Year of collection had no meaningful effect on isotopic composition. We conclude that isotopic assays may therefore be used to aid in regional assignments relevant to the interpretation of historical artefacts.