Can translocations help restore ecosystem function?

Linking hihi foraging to habitat restoration

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One of the most devastating consequences of biodiversity loss in New Zealand has been the disruption of mutualisms between native plants and avian pollinators. Translocating birds to degraded habitats is one way we can help restore these lost interactions and rebuild healthy ecosystems. However, it can be difficult to determine which species—and individuals within those species—would be best equipped to achieve these goals. Over the past year, I explored these questions in the hihi (*Notiomystis cincta*), a nationally vulnerable bird limited to six reintroduced populations and a single remnant population on Hauturu. As generalist foragers, hihi contribute to ecosystem health through pollination and seed dispersal; thus, in addition to expanding the hihi's range, translocations can also serve to promote habitat restoration. However, past translocations have faced challenges, largely due to habitat unsuitability. My project aimed to investigate whether we can jumpstart ecosystem recovery by selecting individuals for translocation that will be most successful at pollinating native plants.

My first aim was to quantify how much hihi, as a species, contribute to pollination. To do this, I conducted a pollination study pairing two hihi sites (Tiritiri Matangi Island and Zealandia Ecosanctuary) with two non-hihi sites (Tawharanui and Belmont Regional Parks, respectively) with otherwise similar ecosystems. At each site, I compared fruit set for hangehange (*Geniostoma rupestre*) flowers experimentally exposed to i) bird and insect pollinators, ii) insect pollinators only, or iii) no pollinators. At hihi sites, fruit set decreased when birds were excluded, and hihi made up the vast majority of visitors to plants, suggesting they are important pollinators. However, excluding birds also negatively impacted fruit set at non-hihi sites, suggesting that, in the absence of hihi, other birds may fill this role.

Next, I wanted to determine whether some hihi are better pollinators than others. On Tiritiri Matangi, I expanded my pollination study to 204 plants spread across 50 hihi territories. Pollination outcomes varied widely across territories, and my next step is to explore whether the diets and foraging strategies of territory holders can explain any of this variation. If so, studying individual differences in foraging behaviors could help us identify superior pollinators for translocations.

However, for this approach to be effective, we need to know whether an individual's behavior at its natal site can predict its behavior after translocation. In April 2018, I was fortunate to to take part in a translocation of hihi from Tiritiri Matangi to Rotokare Scenic Reserve and Bushy Park Sanctuary. By tracking changes in individuals' diets as they either i) remained on Tiritiri Matangi or ii) were moved to the mainland, I found evidence that translocation has an immediate effect on shifting birds' diets. While individuals that remained on Tiritiri Matangi became more specialist in their diets, those that moved to the mainland became more generalist, matching the diets of resident birds. While specialization may be a mechanism for avoiding competition in the dense Tiritiri population, birds at the less populated mainland sites may be able to converge on a shared set of preferred foods. This highlights how important it is to consider the environment birds are entering when trying to predict how they will behave after translocation.

Over the past year, I have had the pleasure of meeting and working alongside a number of OSNZ members. I am grateful for their support, as well as the generosity of the Birds NZ Research Fund, which made this fieldwork possible.

Fig. 1) A male hihi feeds on hangehange nectar.

Fig. 2) Organza bags (pictured here) were used to exclude bird and insect pollinators, while coarser wire mesh excluded birds but allowed insects. Some flowers were also left open to all pollinators.