

# **The influence of sugar-water feeders on the health and behaviour of New Zealand native birds in urban gardens**

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Feeding birds is perennially popular in New Zealand. According to a recent study, about half of New Zealand households feed birds in their gardens, with almost 20% of them providing sugar water for native birds. While we now understand the negative impacts of feeding bread and seeds on native bird communities, there is still little known about how provision of sugar water affects the behaviour and health of native birds. Having access to artificial food might have some advantages for visiting species, especially over winter when natural food sources are scarce and unevenly distributed. However, there are concerns that this practice risks changing bird behaviour and jeopardising their health.

Sugar-water lacks natural antibiotics preventing pathogen accumulation, so the feeding stations may serve as potential reservoirs of pathogens, increasing the probability of disease transmission among birds. Moreover, the presence of artificial food sources, such as sugar-water, may influence social behaviour, particularly changes in aggression. In turn, increased antagonistic acts resulting in direct body contact may contribute to pathogen transmission and ectoparasite load.

The main goal of this project is to determine the effect of residential garden sugar-water provisioning on the behaviour and health of native New Zealand bird species, such as tūi, bellbirds and silvereyes.

From November 2018–August 2019 I conducted field work in 16 volunteer gardens recruited via social media with already existing sugar-water feeders. Eight of study sites are located in Auckland and another eight in Dunedin. The two cities were chosen as climatic extremes of urban cities in New Zealand, also differing in the presence of bellbird (absent in Auckland). Here I collected two main blocks of data: (1) the direct observations of feeding and aggressive behaviour; and (2) health and body condition data obtained via mist-netting. For the second set of data I captured tūi, bellbirds and silvereyes and sampled them for *Chlamydia*, *Salmonella*, Avian Pox, ecto- and endoparasites. In Dunedin, the proportion of birds captured that were native target species (tūi, bellbirds, silvereyes) was twice as high as for Auckland. Mean sugar-water visit number per feeder, as well as number of antagonistic displays, were also higher in Dunedin compared with Auckland, and in winter compared to summer. Overall body condition of visiting birds was good, though parasite load in Auckland was somewhat higher.

For the experimental phase of my study, I recruited 14 residential gardens in Auckland without sugar-water feeding stations, to setup an experiment to test the influence of different sugar concentrations (7 gardens low sugar vs. 7 gardens high sugar) on the health and behaviour of native birds. Each site has a feeding station with an in-built PIT-tag reader, as well as a camera trap. So far, I have mistnetted birds at each site to individually mark birds via colour bands with embedded PIT-tags and to assess their health and body condition as a pre-treatment baseline measure.

The next step is to undertake additional local mist-netting and tagging sessions to ensure a high proportion of visiting birds are tagged, and to conduct mist-netting sessions for pathogen and disease sampling towards the end of 2019. The experiment will then continue in 2020 after summer break.



Silvereyes which were colour-banded during this research at the sugar-water feeder