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Female tieke accepting a sugar water offering after manipulations



Effects of personality and parasites on song expression in translocated North Island Tieke

The North Island (NI) Tieke or Saddleback (*Philesturnus carunculatus rufusater*) is arguably NZ's most successfully translocated species. On the other hand, NI Tieke is an exceptional carrier of endemic and introduced avian malaria caused by *Plasmodium* spp, with

seroprevalence between 10-40% at different translocation sites. From previous studies in the species, we have learned that serial translocations have resulted in cultural bottlenecks with reduction of the song variability, which has important implications for behavioural evolution (after all males use their song to attract females). However, little is known about how parasite infection may affect song expression and behaviour in the species. With funding from BirdsNZ we investigated whether Tieke in a translocated population (Bushy Park Sanctuary) with a high *Plasmodium* seroprevalence (39%; Schöener 2016) show different behavioural patterns and if there exists a relationship between these and parasitic infection and/or complexity of song.

One of our team's goals was to minimise the welfare costs to wild birds in our research. To achieve this goal, we measured behaviour while handling the bird to collect blood samples and other information, instead of the more common tests that require caging birds. To determine the *Plasmodium* infective status and the parasitic load, we screened blood samples using real-time PCR. Our *Plasmodium* prevalence level was 40% like that of Schöener (2016). Using DNA sequencing, we detected five lineages of *Plasmodium* sp. with mixed infection found in only four samples. We collected song from the individuals we caught using a handheld recorder and microphone.

Initial analysis using behavioural information revealed at least four main behavioural groupings in our birds, but we did not find a significant relationship between these groups and being infected with *Plasmodium*. However, we found that birds positive for *Plasmodium* showed increased struggle behaviour during handling and we also found a positive association between struggling at handling and the number of parasites in the blood, especially in males. Infected females were quicker to accept an offering of sugar water after manipulations, suggesting that the parasite may affect them by making them more risk prone. These findings are important because struggling is part of escape behaviour in birds, which would increase the likelihood of individuals escaping from predators, but also benefit the parasite by increasing its transmission opportunities. Risk taking will affect the survivorship of birds as well, but this behaviour may have positive or negative consequences for survival. Behavioural changes such as the ones we found have been reported in other species of birds elsewhere in the world. These findings could be utilised for translocation purposes by for example, selecting infected males and uninfected females which could arguably result in better post-release survival.

The next step in our research is to evaluate the effect of the avian malaria status on the song characteristics.