

Rising kiwi numbers may mask inbreeding depression

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Credit: Judy Biggs

A boom in the number of little spotted kiwi appears to be a conservation success story, but new research by a Victoria University of Wellington graduand shows that, in some populations, the rapid growth could be masking the potentially devastating impact of inbreeding.

Just over 100 years ago, the little spotted kiwi [population](#) experienced a bottleneck of just five birds. They were translocated to Kapiti Island where their descendants now number nearly 1,200. Subsequently, Kapiti

Island birds were transferred to seven different predator-free locations, mostly offshore islands.

Helen Taylor, who graduates with a PhD in Ecology and Biodiversity in December, has studied the genetics of the two little spotted kiwi populations outside of Kapiti Island, that were founded with the least and most birds. One is on Long Island in the Marlborough Sounds (two founders; today around 50 birds) and the other in Wellington's Zealandia eco-sanctuary (40 founders; today around 120 birds).

The birds in the study had small radio transmitter tags fitted with Chick Timer™ software attached to their legs. These provided Helen with information on the incubation progress of eggs as well as the birds' activity patterns. She only studied males as, in this species of kiwi, they sit on the eggs.

"I wanted to see to what extent inbreeding was occurring in these two locations, and the effect it is having on hatching success and population composition," says Helen.

"These two populations have grown overall and on the surface seem to be doing very well, but because these birds can live for 45 to 80 years in the wild, continued reproductive success of founding birds could be masking problems with later generations.

"This certainly seems to be the case on Long Island, where the majority of the population is composed of the two founders and their first generation offspring. That first generation are all brothers and sisters so subsequent generations of chicks are highly inbred and seem to be failing to survive to adulthood.

"It's been assumed that little spotted kiwi are doing really well because the numbers are increasing, and that could be the case in populations like

Zealandia with larger numbers of founders, but the Long Island population illustrates that this species is not immune to the harmful effects of inbreeding and must be managed carefully."

Helen urges caution with using population size to gauge the overall success of conservation efforts. "The research demonstrates the danger of relying on population growth as a measure of success—by itself it's not always enough. Other pieces of data, such as hatching success, survival and recruitment back into the adult population are really important, but unfortunately that information can be much harder to collect."

Helen says because the [birds](#) are shy, nocturnal and are located in areas that are difficult to access, gathering data about kiwi nesting and survival rates can be challenging and costly.

"While getting to Zealandia every week was easy for me in Wellington, reaching Long Island in the Marlborough Sounds was somewhat more difficult, and I could only go there once every six weeks. But I had enormous help from Cougar Line water taxis in Picton, which collected [radio transmitter](#) data on my behalf from the kiwi on Long Island. I also had help from the Interislander ferry service, which gave me free trips—in exchange I gave talks about kiwi to passengers."

Helen's PhD was also supported with funding from the Ministry of Business, Innovation, and Employment, as well as a scholarship from the Allan Wilson Centre for Molecular Ecology and Evolution.

Helen, who's currently based in Dunedin as a postdoctoral researcher in the Anatomy Department at the University of Otago, is working with the Department of Conservation to co-author a species management plan for little spotted kiwi.

Provided by Victoria University of Wellington

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