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Response of Sub-adult North Island Brown Kiwi to Relocation from Captivity to the Wild.

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Abstract

Brown kiwi (*Apteryx mantelli*) juveniles are raised in captivity and released into the wild as sub-adults due to an extremely high mortality rate of young kiwi in mainland habitats where adequate stoat control cannot be achieved. This management technique is known as Operation Nest Egg (ONE). This thesis research investigated aspects of the behaviour of ONE kiwi both before and after release. The aim was to identify factors influencing activity patterns and dispersal in captive-reared sub-adult kiwi released into the wild, and how these influence survivorship and vigour.

Behavioural responses to relocation and release were examined by comparing kiwi's nightly activity levels before release with those after release. Activity was quantified using motion sensitive transmitters. Observations of kiwi and simultaneous collection of data from the kiwi's transmitter showed that the signal pattern from the transmitters could be used to distinguish kiwi's inactive and active periods with a high degree of reliability. Furthermore, continuous walking or running could be distinguished from other activity such as foraging with moderate reliability when the signal from only one kiwi was recorded continuously.

On the first night after relocation and release into the wild kiwi tended to have unusual and low activity patterns relative to other nights after release. This may have been a result of stress associated with the transportation and release. After their first night in the wild kiwi exhibited higher levels of activity than had been recorded before release. It was hypothesised that this increase in activity was a response to a lower rate of energy intake in the wild than in captivity. In support of this hypothesis, activity of captive kiwi increased when prepared food was distributed in many portions around the enclosure relative to when it was provided in one portion. Support is tentative however, because the sample size was small.

Data on the kiwi's daytime locations were collected for up to two years after release. Almost all of the sub-adult kiwi showed dispersal from their release site. Kiwi released in areas lacking resident kiwi tended to disperse further than those released into an area with

several resident kiwi near their release sites. The different dispersal tendencies among areas could be a result of conspecific attraction but firm conclusions were prevented due to some confounding among variables. Kiwi that were later depredated dispersed further than kiwi not preyed on. This relationship may be due to far-dispersing individuals having low site familiarity or a high likelihood of encountering habitat edges and their associated predators.

All kiwi lost weight after release and many did not recover to their pre-release weights for several months after release. There was an almost significant positive correlation between level of pre- to post-release activity increase and weight loss after release. No relationship between level of activity suppression on the first night in the wild and post-release weight loss was detected. However, small sample sizes in the activity studies made it difficult to draw definite conclusions about the impact activity changes had on the kiwi's post-release vigour. No relationship between dispersal distances and weight change after release was detected.

It was suggested that activity change after release might be minimised by releasing kiwi at times when their activity in captivity is naturally higher and by providing a dispersed feeding regime prior to release. It was also recommended that kiwi be released near resident kiwi if possible, provided that aggression from the adults towards newly released kiwi is unlikely.

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For Putiputi – may you be the first of many,

and in loving memory of Tinkerbelle (1971-2003).

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Note on Data Used in this Thesis

Some of the data used in this thesis were collected specifically for the thesis and some data were being collected already as part of the Tongariro Kiwi Protection Project. Data used in Chapters 2 and 3 were collected specifically for this thesis. For Chapter 4, the experimental procedure and collection of activity data were carried out specifically for this thesis but weight and food intake data were collected by Rainbow Springs staff as part of routine management. Location data used in Chapter 5 and weight data used in Chapter 6 were collected over five and a half years from January 1997 till August 2002, by Department of Conservation staff at Whakapapa (and Rainbow Springs staff who collected the final pre-release weights) as part of the Tongariro Kiwi Protection Project. For three of these years (October 1997 till February 1998 and November 1998 till April 2001), I was one of these Department of Conservation staff and during this time I collected a large portion of the data on location and weights of the sub-adult kiwi.