

Distribution of coccidia in kiwi.

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Bringing kiwi chicks into captivity until they are large enough to defend themselves against introduced mammals has played a major role in the success of kiwi population management¹. However, these captive facilities increase the density of very young kiwi, leading to increased transmission of coccidia (single-celled, environmentally resistant parasites) among these birds and potentially significant disease and mortality^{2,3}. The current diagnostic technique (i.e. faecal flotations) cannot reliably and definitively distinguish between species of coccidia. Thus, when a kiwi dies of coccidiosis, we have no way to determine which species of coccidia caused the most severe disease.

One of the main objectives of my research is to genetically characterise the coccidial parasites in kiwi so we can begin to determine A) which species of coccidia cause acute disease and mortality, B) where they are located in New Zealand, and C) how effective the treatment is.

With support from the Birds New Zealand Research Fund 2018, I used a new sequencing (i.e. Next Generation, Illumina 300bp amplicon sequencing) technique to target a ~450bp section of the COI mitochondrial gene of coccidia in kiwi faecal samples (n=50). This technique yielded vast amounts of data that is currently being assembled and analysed to determine if we can use this gene to distinguish among coccidial species found in brown kiwi, Haast tokoeka, rowi, and great spotted kiwi. Using this data, we plan to develop a rapid, qPCR test to identify key species of coccidia that cause exceptionally severe disease and, thus, are crucial to monitor and manage.

¹ Robertson, H. A., Colbourne, R. M., Graham, P. J., Miller, P. J., & Pierce, R. J. (2011). Experimental management of Brown Kiwi *Apteryx mantelli* in central Northland, New Zealand. *Bird Conservation International*, 21(02), 207-220. doi:10.1017/s0959270910000444

²Morgan, K. (2013). *Coccidiosis in the kiwi (Apteryx spp): Aspects of the Pathology, Epidemiology and parasite biology*. (Doctor of Philosophy), Massey University, Palmerston North, New Zealand.

³Morgan, K. J., Pomroy, W. E., Howe, L., Alley, M. R., & Castro, I. (2017). Description of four new species of coccidia (Apicomplexa: Eimeriidae) from brown kiwi, *Apteryx mantelli*, in New Zealand. *Parasitol Res*, 116(5), 1433-1441. doi:10.1007/s00436-017-5414-1