

# The Mating system of Brown Kiwi (*Apteryx mantelli*) from Maungataniwha Forest, Hawke's Bay.

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The mating system of Brown Kiwi (*Apteryx mantelli*) has previously reported to be socially monogamous. Nevertheless, in some populations several unrelated males and females have been found roosting and incubating together. Furthermore, genetic studies on other ratites have shown how most ratite species have variable and rather flexible mating systems that revolve around polygynandry. The apparent sex role reversal in Brown Kiwi (incubation carried by males alone, bigger and more aggressive females) begs for further investigation on their mating system.

By using the eggshells of hatched chicks from the Operation Nest Egg (ONE) program from the Maungataniwha forest from the breeding seasons 2010-2017, we developed a simple and cost-effective method for extracting DNA from eggshells and chorioallantoic membrane remains. We used fragment analysis to compare eight different microsatellite markers from chicks hatched in radio-tagged males' nests. This means that we know which birds were incubating the eggs regardless of genetic paternity. By extracting DNA from the eggshells egg maternity can be assessed as well as relatedness of the chicks.

DNA extraction from eggshells yields very variable concentrations which makes amplification unpredictable, we are currently experimenting with different thermocycling lengths to increase the probability of amplification. Membranes yielded great amounts of good quality DNA which allowed me to assess the relatedness of the chicks using a kinship model. This model determines the probability of two alleles being identical by descent.

By using MSanalyse software I calculated the kinship coefficient of the chicks and using Trex online I used the resulting kinship matrices to create dendrograms to depict the degree of genetic similarity based on the microsatellite markers of all the chicks obtained from one male's nest. The chicks showed varying degrees of relatedness, but all nest showed unrelated chicks (Fig.1), meaning that there are several potential parents for each egg, suggesting a non-monogamous mating system. The next step will be to contrast these results with the maternal DNA obtained from the eggshell determining the putative mother of each egg and their association with the radio-tagged male (Putative father).

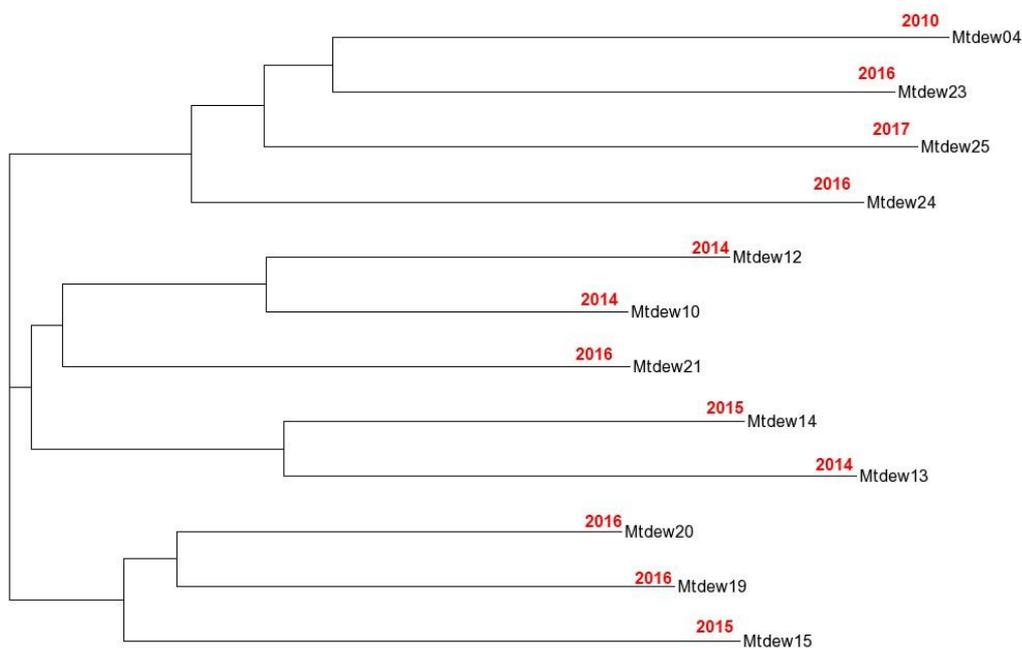


Figure 1. Example of the resulting dendrograms showing the relatedness of the chicks of a single male's nest. In red the year each egg was laid. Each cluster indicates the possibility of different parents.