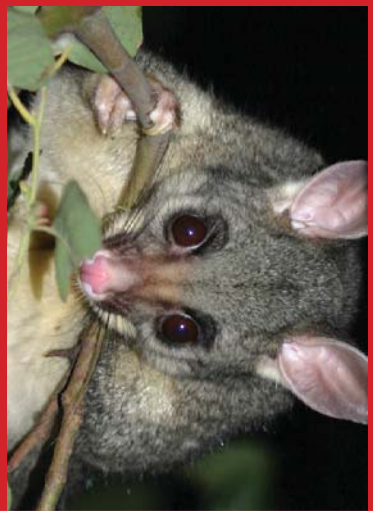
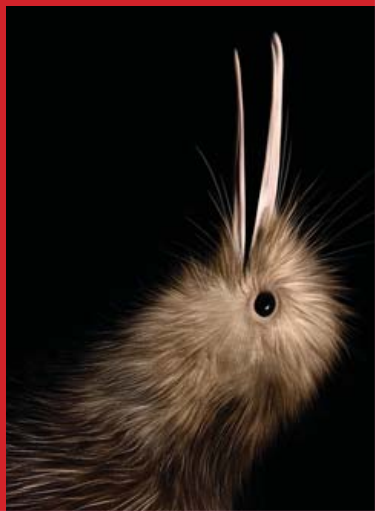
EcoGene®

Working with NZ conservation managers

EcoGene®
DNA-based diagnostics





1 Stoat incursion Kapiti Island

Client: Department of Conservation

Background:

Kapiti Island is one of New Zealand's most important conservation sites, protecting some of the world's rarest and most endangered birds. Free from introduced predators, the island is particularly important for Little Spotted Kiwi with a population estimate of 1200 when there are only 1500 in total and they are extinct on the mainland.

A stoat incursion was detected in November 2010 with a male stoat caught early in 2011 and two pregnant females subsequently caught in mid 2011. Stoats are a significant predator of native bird species, and specifically are a major threat to Kiwi.

Client Request:

Were the stoats found on Kapiti Island the result of a single incursion or have there been several independent incursions? What species were present in their gut contents?

Approach:

The level of relatedness between these three individuals in comparison to nearby mainland samples was determined using genotyping. Gut content analysis was carried out using DNA sequencing.

Results:

The data showed that the three stoats captured on Kapiti Island were highly related with the most likely scenario being a single pregnant female as the founder and the male and second female were her offspring. Species identification of gastrointestinal contents revealed the presence of two native birds, saddleback and bellbird.

2 Possum incursion Great Barrier Island

Client: Auckland Council

Background:

Great Barrier Island is situated approximately 100 kilometres off the north-eastern coast of Auckland, New Zealand. It is the fourth largest island in NZ at 28,000 hectares. The island has remained free of many of the introduced pests that have plagued mainland NZ forests. There are no deer, ferrets, weasels, stoats, possums, hedgehogs, or feral goats, making the island unique ecologically and, with such a reduced suite of pests, a strong contender for warranting a pest free status.

Evidence of a possible brushtail possum incursion was found on a barge transporting a digger to the island in October 2010. This evidence consisted of fur and scat, but no possum.

Client Request:

Was this a case of a single stowaway or more than one individual? What was the sex of the possum? Did it actually disembark on the island or was it still back in the source location of the barge or even the mainland?

Approach:

DNA was extracted from the scat and fur, and genotyped to determine if they were all from a single individual. A sex specific marker was used to determine if the possum was male or female, as the latter could pose a serious risk if it was pregnant. Possums were also caught back on the mainland from the location that the digger had been stored. These were compared with the profiles from the scat and fur to see if the individual had remained behind.

Results:

All forensic samples produced a single genetic profile, which showed that they originated from a single individual. However, this profile did not match any of the individuals caught at the mainland location. The sex determination test indicated a male, thereby posing less of a threat than a pregnant female. The possum was later captured and confirmed as the same individual male as the forensic samples. The DNA profile was vital to the successful conclusion of the incursion response, and certainly saved Auckland Council a lot of money and staff time.

3 Kiwi predation North Island

Client: Department of Conservation

Background:

Northland is the stronghold for Northland brown kiwi, but their range and density have contracted significantly in recent times. A five and a half year study in the 1990s showed that dogs accounted for 70% of all reported kiwi deaths, with several categories of dogs being involved; mainly pet, farm and hunting dogs. As more areas of kiwi habitat are being protected in Northland closer to human habitation, recent dog incidences are becoming more apparent. DNA can provide a powerful tool to help identify the predator and potentially the individual dog concerned.

Client Request:

Two reserves in Northland had separate incidences of adult kiwi deaths. Was this predation due to a dog and could the identity of the individual dogs be determined from each location?

Approach:

Swabs were taken from around the wound sites on the kiwis to try and sample any residual predator DNA. A universal marker for mammals was initially used to determine the predator involved in the deaths. If it was confirmed as dog, then an additional suite of dog specific markers were available to discriminate individuals.

Results:

Of the six kiwis sampled, two from one reserve and three from another all showed dog predation was the cause of their deaths. At each reserve a single dog profile was obtained, implicating that there was one dog in each location that had caused these deaths. This investigation is ongoing, with other surveillance methods being used to try and confirm the identity of these dogs.

Landcare Research
Manaaki Whenua