Disappearance of New Zealand birds 100 years ago makes life tough for plants: study

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Male New Zealand Bellbird Anthornis melanura Karori Wildlife Sanctuary Wellington. Image: Wikipedia

(PhysOrg.com) -- A team of scientists in New Zealand has found the local disappearance of pollinating birds over a hundred years ago is having a detrimental effect on the species they pollinated.

The researchers, led by Professor Dave Kelly from the University of Canterbury, had already shown that many species of mistletoe are facing possible extinction through the disappearance of the birds that pollinated

them, and turned their attention to New Zealand gloxinia (*Rhabdothamnus solandri*), a large (two-meter-high) native shrub found only in the forests of northern New Zealand. The shrub, known for its bright orange flowers, was pollinated by the bellbird, stitchbird and tui, which all have long tongues able to reach into the flowers, which are about 10 mm long.

On the North Island, the tui (*Prosthemadera novaeseelandiae*) now appears to feed higher in the forest canopy, and the bellbird (*Anothornis melanura*) and stitchbird (*Notiomystis cincta*) have been wiped out by introduced predators such as cats, ship rats, stoats and possums brought by European settlers. The birds now survive only on a few islands off the North Island, where there has been little human interference, or where feral predators have been eradicated.

The researchers analyzed areas of the North Island and three small islands nearby to see how gloxinia was faring. They found that on the mainland where the bellbird and stitchbird have gone, the fruit is smaller, containing just 37 seeds on average compared to 232 seeds in plants on the islands. Only a quarter of the mainland flowers showed evidence of bird visitation, compared to almost 80 percent of the flowers on the island plants. The population densities of adult plants were around the same but on the mainland there were 55 percent fewer young plants growing.

When the biologists encased plants on the islands and mainland in wire mesh they also produced fewer seeds, which shows birds are needed for pollination, with insects playing a smaller role, if any, probably because the flowers are too long and narrow for insects to effectively pollinate them. When the researchers sowed seeds and manually pollinated the plants, they immediately boosted their numbers.

In a paper published in the journal *Science*, Dr Kelly said the stitchbird

and bellbird probably disappeared from the mainland around 1870. The decline in the plants had been gradual, and could easily have escaped notice as people generally disregard reports of how abundant plants were long ago. The gloxinia plant is known to be long-lived, and Dr Kelly estimates it may live as long as 150 years.

Dr Kelly said the same kind of declines in plant populations could well be occurring elsewhere in the world. The research is continuing on other bird-pollinated plants in New Zealand.

More information: Cascading Effects of Bird Functional Extinction Reduce Pollination and Plant Density, *Science*, Published Online 3 February 2011, DOI:10.1126/science.1199092