New Zealand Mistletoes

New Zealand's endemic flora contains many unique species, of which the Loranthaceous mistletoes are some of the most fascinating. Generally, they are arboreal xylem parasites, meaning they take water and minerals from their hosts, but can synthesise most of their carbohydrates independently.[1] Ongoing research is important for the survival of these mistletoes, as they are currently threatened and declining throughout much of the country.

Figure 1. Some of the Mistletoe Pollination team beneath *P. tetrapetala*, Lake Ohau, Dec. 1997

The six Loranthaceous species in New Zealand are divided into two groups: bird-pollinated species, *Alepis flavida*, *Peraxilla colensoi*, *Peraxilla tetrapetala*, and *Trilepidea adamsii*; and the insect pollinated *Illeostylus micranthus*, and *Tupeia antarctica*.[2] The extant bird-pollinated *A. flavida*, *P. colensoi*, and *P. tetrapetala*, (*T. adamsii* is presumed extinct since 1954[3]), exhibit further mutualisms with birds for seed dispersal.[4] Honeyeaters such as tui and bellbirds are primarily responsible for both pollination of the three large flowered species and for dispersal of all the species.

Mistletoe distribution varies throughout New Zealand; however, *A. flavida*, *P. colensoi* and *P. tetrapetala* are found most often in beech forest.[5] *P. colensoi* and *P tetrapetala* have numerous, bright-red flowers, while *A. flavida*, a close relative, has smaller, yellow-orange petals.[6] These species provide bursts of colour during the flowering season in particular areas of the country.

However, since European colonisation of New Zealand, mistletoes have declined in much of their former ranges, especially in the North Island.[5] This has been attributed primarily to possum browsing,[7,8,9] as well as habitat clearance and overcollecting.[10] Yet, the local extinction of some mistletoes due to possum browse may not be the whole story. Studies over five years by workers from the Universities of Canterbury and Massey have suggested mistletoes may be the indirect victims of declining bird densities.[11, 12] Dave Kelly, Jenny Ladley (University of Canterbury) and Alastair Robertson (Massey University) postulate that breakdowns in mutualisms between tui and bellbirds and their dependent mistletoe species may have been caused by introduced predators (cats, rats and stoats) which have lowered bird populations.

The Canterbury team, which includes David Norton of the School of Forestry, have been working on mistletoe ecology since 1992 with financial support from the Public Good Science Fund. In this time, the team has investigated mistletoe distributions and host specificity, ageing techniques, response to possum browse, pollination, dispersal and germination studies, fragmentation and disturbance effects, and ecosystem management applications. This publication provides a summary of their recent work.

This newsletter was prepared by Krista McKinzey and Alastair Robertson as a means of communicating to the public the work done via the Public Good Science Fund contract UOC510 "Reproductive biology of native plants". The people involved with this contract were Dave Kelly (Programme Leader), Dave Norton, Brian Fineran and Jenny Ladley of the University of Canterbury and Alastair Robertson of Massey University. Over the years we have recruited a number of research students and summer assistants to be involved with the work including Laura Sessions, Krista McKinzey, and Lisa Crowfoot amongst others. The contribution of these people is significant and gratefully acknowledged here. The work has continued as an objective "Mutualisms" as part of the Landcare Research Programme "Biodiversity and Threatened Species" and it is hoped that we will be able to produce future newsletters that will update our progress.