

Bats and woodrose

FOREST Research Institute scientist Chris Ecroyd has recently made an important ecological discovery. He has been able to confirm that the parasitic woodrose, *Dactylanthus taylorii*, is pollinated by lesser short-tailed bats.

Ecroyd says he had long suspected the flowers of this rare plant were adapted to bat pollination. Their dull colour, strong scent and large quantities of nectar were characteristics consistent with bat-pollinated flowers described in overseas literature.

He also knew that Mike Daniel had reported traces of *Dactylanthus* pollen in bat droppings from Omahuta kauri forest. He also thought that the terrestrial behaviour of short-tailed bats enabled them to pollinate flowers on the forest floor.

Proving this theory, however, wasn't easy. He first studied the timing of nectar flows and flower opening to see whether they correlated with the night-time activity of bats. There was no difference in the characteristics of the flowers between night and day.

Next Ecroyd went to Little Barrier Island where *Dactylanthus* and lesser short-tailed bats were still known to co-exist. He borrowed and set up sophisticated night-vision video camera gear funded by the Lottery Board for kokako research.

Instead of recording bats visiting *Dactylanthus* flowers, the video tape revealed kiore or Polynesian rats destroying them. In April this year Ecroyd had all but given up on proving his theory and turned his attention to filming the effect of possums and ship rats on *Dactylanthus*. He set up the

video gear in Pureora Forest, west of Lake Taupo, where there had been no confirmed sightings of short-tailed bats. When Ecroyd took the recorded tape home to watch during a lunch break it began much as expected, with ship rats visiting the flowers.



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An historic photograph. The first record of a lesser short-tailed bat supping on Dactylanthus nectar. If the compound in the nectar attractive to bats can be synthesised, it could become much easier to find and study these elusive animals.

Half an hour into the tape he nearly dropped his lunch. A short-tailed bat appeared, the first of 40 visits in a night. While thrilled with the discovery, Ecroyd's first reaction was a rational one – to remove the recording tab from the tape. By analysing the tape Ecroyd found all the visits were probably by the same bat, identifiable by tiny markings.

Dactylanthus plants, he believes,

could play an important role in shaping the territories of individual bats and their foraging habits. In the North Island, *Dactylanthus* and short-tailed bat distributions are very closely correlated. In the South Island, outside the known range of *Dactylanthus* today, fossil records overlap.

He believes *Dactylanthus* flowers evolved over millions of years in New Zealand's forests to become dependent on short-tailed bats for pollination.

Today ship rats may carry out the pollination, but they are destructive in the process. The biggest threat to *Dactylanthus* is possums, but Ecroyd's discovery means at least some plants can be protected by wire netting with the mesh size large enough to allow the passage of bats.

He says *Dactylanthus* nectar is likely to have been an important food source for short-tailed bats in the North Island, particularly over autumn, and the increasing scarcity of the plant may be a contributing factor in the decline of the bats. Short-tailed bats are likely to have been present in New Zealand in much higher numbers than even Maori realised, because of their night-time activity which is confined to thick forest. They were also likely to have played a much more important part in forest ecology than is currently realised.

Kiekie, *Collospermum*, nikau, rewarewa, rata and pohutukawa are other plants Ecroyd believes are pollinated at times by bats. In the forest ecosystem, bats probably fulfilled the roles of insect predators, prey for more-porks, hosts for flies and pollinators of plants.

Codfish Island and Little Barrier Island appear to have healthy populations, despite the presence of kiore.

Even the relatively common long-tailed bat has declined markedly in European times through forest clearance and predation. Last century roosts were reported to contain hundreds and even thousands of bats. Few large roosts have been reported in the last 30 years and the majority contain between one and 50 animals, and average only about ten.

Daniel says bats pose unusual conservation management problems, and methods which have proved successful for birds are probably not applicable to bats.

In the vast North Island forest tracts the most immediate problem would

involve location of roost sites. On 1,359-hectare Codfish Island many of the 15 large, periodically-used roosts were found only after considerable effort.

Bats are very susceptible to roost disturbance and if transferred to island refuges would probably try to fly back. Even if roosts could be located the only currently available option is protection of that site from predators and from disturbance by humans.

The only hopeful sign Daniel offers is that the lesser short-tailed bat has to date shown a propensity for "hanging on".

Meanwhile regional DoC offices want to hear from the public about bat sightings, particularly in the lesser short-tailed bat areas of Northland kauri forests,

the volcanic plateau and East Cape, Tararua Forest Park and North-West Nelson Forest Park. All bats are totally protected by law and if found dead should be sent to the nearest DoC office with information about where and when they were found.

A lot more work and some lateral thinking may be required before the draft recovery plan, about to be circulated among conservation managers and scientists, reaches its final form. ♦



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