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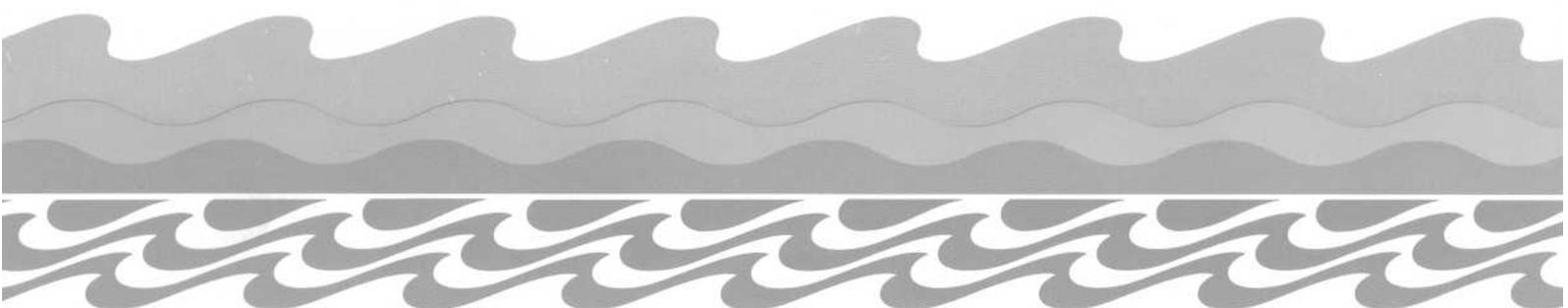
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LOCATION OF SHORT-TAILED BATS USING *DACTYLANTHUS*

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LOCATION OF SHORT-TAILED BATS

USING *DACTYLANTHUS*

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LOCATION OF SHORT-TAILED BATS USING *DACTYLANTHUS*

SUMMARY

Eight *Dactylanthus* sites in Tongariro/Taupo Conservancy were monitored for short-tailed bats while the plants were in flower in 1993 and 1994 but no definite recordings of bats were made at any of these sites. Video and bat detectors linked to tape recorders were used for the monitoring and while both systems were successfully used to locate bats at Pureora and Ohakune the bat detector is recommended for general use because it is much more portable, less expensive and easier to operate.

Two new *Dactylanthus* sites were located and one is considered a possible site for short-tailed bats and should be monitored for bats when the plants are in flower.

PURPOSE:

To provide information on the location of the endangered short-tailed bat in the central North Island so that the species can be managed in an effort to prevent its extinction in the region.

INTRODUCTION

Bats are New Zealand's only native terrestrial mammals. Only two species of bats are currently known to exist in New Zealand, the lesser short-tailed bat (*Mystacina tuberculata*) and the long-tailed bat (*Chalinolobus tuberculatus*). The insectivorous long-tailed bat belongs to the family Vespertilionidae with about 350 other species. It is probably descended from bats blown across the Tasman Sea about a million years ago (Higham, 1992). The lesser short-tailed bat is the sole surviving member of the endemic family Mystacinidae and is thought to be only distantly related to the neotropical superfamily Phyllostomoidea. It is a relict of the Gondwanaland fauna and the *Mystacina*/Phyllostomoid lineages probably separated about 35 million years ago (Pierson et al. 1986). The lesser short-tailed bat weighs 12-15 g, with a wingspan of 28-29 cm (Daniel 1990). A larger species, the greater short-tailed bat (*Mystacina robusta*) has been considered extinct since 1965 after ship rats established and irrupted on its last refuge, Big South Cape Island.

The short-tailed bats are unusually well adapted to feeding on the ground, reflecting the lack of terrestrial mammalian predators in New Zealand. With comparatively strong hind legs, and a unique way of folding their wings into pouches, they are more agile on the ground than many other species of bat. The short-tailed bat feeds on a variety of foods, including fruits and nectar as well as insects.

The lesser short-tailed bat is currently listed as vulnerable (Williams and Given 1981) and is found only on Little Barrier Island, Codfish Island, and a few mainland North Island sites. It has not been reported from the South Island since 1977. Three subspecies of the lesser short-tailed bat have been recognised; the kauri forest short-tailed bat (*M. tuberculata aupaourica*), Volcanic Plateau short-tailed bat (*M. t. rhycobia*) and the southern short-tailed bat (*M. t. tuberculata*). The Volcanic Plateau short-tailed bat has recently been confirmed as present in north Taranaki, Matemataeonga, Pureora Forest Park, and on the lower southern flanks of Mt Ruapehu (Molloy 1994).

Short-tailed bats were found at Pureora forest in 1992 by monitoring the parasitic plant *Dactylanthus taylorii* in flower with time-lapse video (Ecroyd 1993) and were filmed at Pureora again in 1993. This, together with other evidence suggesting that a close relationship had evolved over millions of years between *Dactylanthus taylorii* and its pollinator the short-tailed bat, indicated that it should be feasible to locate these bats at other sites by monitoring *Dactylanthus* plants in flower.

OBJECTIVE

To locate short-tailed bats in Tongariro/Taupo Conservancy using *Dactylanthus* and time-lapse video equipment as used at Pureora.

METHODS

Time-lapse video equipment with infra-red lighting and bat detectors were used to monitor flowering *Dactylanthus* plants protected by netting enclosures. The Batbox III bat detectors were powered by a small rechargeable 12 volt battery with a 9 volt converter and connected to a Sony (model TCM-38V) voice activated tape recorder (O'Donnell and Sedgeley 1994). The bat detectors and tape recorders were housed in two litre plastic containers which were then strapped to small trees near the *Dactylanthus* plants. The bat detectors were generally set at 27 kHz to record short-tailed bats. In some cases where a second detector was used at a site it was set at 42 kHz to record long-tailed bats. A Sony TCM-S68V tape recorder was used to check through tapes and tested with a bat detector.

The equipment was first trialed at Pureora to ensure that it was functioning effectively and to give the operator experience with locating short-tailed bats. The equipment was then moved to *Dactylanthus* sites in the Tongariro/Taupo Conservancy. Sites at Moerangi, One Hundred Acre Bush, Pihanga, Mangamingi Stream (Kakaramea), Taurewa, Erua (two sites) and near the Last Spike Monument were monitored. Each site was monitored for at least four nights.

In addition time was spent out at night with a hand-held Bat-box 3 or a home-made bat detector in an effort to locate short-tailed bats at likely sites. The equipment was also used at known short-tailed bat sites along the Ohakune Mountain Road to verify its effectiveness.

With the assistance of Noel Heath, a local resident of Erua, other sites were searched for *Dactylanthus* plants which could be used to monitor for short-tailed bats.

RESULTS

Monitoring started at Pureora on 21 March with the video equipment and a bat detector being used at different sites. On the first night ship rats were filmed destroying the *Dactylanthus* flowers at a site near Plains Road. On the second night one short-tailed bat was recorded on video tape visiting this site from 4:09.29 am to 4:10.40 am on 23 March. Bats, possibly short-tailed, were also recorded on the home-made bat detector at 10:35 pm on 22 March along a fire-break near Ranganui Road, where long-tailed bats have been frequently heard before. The detector was set to a frequency which had detected short-tailed bats at Ohakune. On 26 March at least two short-tailed bats were recorded on video at Kotukunui Road (Pureora) between 20:19.00 and 23:57.14 pm.

On 28 March all the equipment was moved to Tongariro/Taupo Conservancy. The video was used at Pihanga, Last Spike, and Erua Road sites and two Bat-box 3 detectors with tape recorders were used at Moerangi, One Hundred Acre Bush, Mangamingi Stream (Kakaramea), Taurewa, Erua (two sites) and near the Last Spike Monument. For a few nights the video equipment failed to record due to minor faults and malfunction of the infra-red lighting. The field work finished in the conservancy on 21 April when most of the flowers became rotten after heavy rain. Monitoring was then carried out on 25 & 26 April at non-flowering *Dactylanthus* sites at Pureora and a recording at 27 kHz made of one bat pass on 26 April.

On the video a weasel was recorded at Pihanga moving past the *Dactylanthus* enclosure, near Erua Road a mouse visited the *Dactylanthus* flowers, and possums and ship rats were recorded nearly every night except at the Erua Road site.

At most sites every night the tape recorders recorded some animal activity but this was probably mainly that of rats and possums. At Taurewa, Mangamingi, Last Spike, Erua Road, and Moerangi, there were recordings of bat-like noises consisting of up to two or three distinctive "clicks" in close succession. Opinions vary on what has made these noises with the Moerangi tape appearing to be the most promising as a bat recording. There are no records from these sites which could be said categorically to be bats. There was a strong correlation at another site between bat-like clicks on the tape recorder and the presence of a weta on the video.

A hand-held bat detector was used along the Taurewa Loop Track for at least three hours without recording any bats. A possible recording of bats at 27 kHz was made with a hand-held recorder on the edge of the forest near the Last Spike Monument and on 5 April a long-tailed bat was recorded using 42 kHz in the Makotuku Valley near Horopito.

Noel Heath located *Dactylanthus* plants at a site on the Raurimu Spiral and one plant about 1km north-east of the Makatote Viaduct. Four enclosures were used to protect plants at the Raurimu site and one enclosure at the Makatote Viaduct site.

The Sony TCM-38V tape recorders have an automatic gain system which means that they increased sensitivity until they started recording the background static from the bat detector. To overcome this they had to be set with the volume control on "2" and with the volume control on the bat detector set at about "10 o'clock".

DISCUSSION

The equipment used was effective at relocating short-tailed bats at Pureora and broadened the recorded distribution by a few kilometres. On 24 February the same bat detector and tape recorder was used to record a possible pass by a short-tailed bat at a *Dactylanthus* site on the Pouakai Range, Taranaki. This could be the first record of a short-tailed bat within Egmont National Park.

At some *Dactylanthus* sites within Tongariro/Taupo Conservancy sounds similar to those made by bats echolocating were recorded on audio tape but these were inconclusive and could have been generated by other means. At Pureora and Ohakune recordings were readily made which were definitely short-tailed bats. Long-tailed bats have been previously recorded on the Makotuku Valley track (John Luff pers. comm.) so this was not a new record.

The forest close to the Raurimu Spiral is in good condition and this *Dactylanthus* site could be worth monitoring next flowering season. The other new *Dactylanthus* site near the Makatote Viaduct is on the edge of a stand of Lawson cypress and is not considered good short-tailed bat habitat.

With the Sony TCM-38V tape recorder care needs to be taken in setting the volume controls on the detector and tape recorder otherwise the tapes pick up enough static to continuously record for 90 minutes. The volume control on the Sony TCM-S68V does not alter the volume at which the voice activated recording starts and this model will require further work before it can be used for all-night recording. The Sony 64V is being used very successfully by Colin O'Donnell and it is probably advisable to keep to this model.

CONCLUSIONS

Twenty-five days were spent monitoring eight *Dactylanthus* sites in the Tongariro/Taupo Conservancy with no conclusive proof of any further short-tailed bat sites. If short-tailed bats are present it appears that they are in very low numbers. Future efforts should be directed at new *Dactylanthus* sites in the vicinity of good short-tailed bat habitat. Effort should also be directed at promising areas away from known *Dactylanthus* sites particularly between Ohakune and Whakapapa.

The video equipment and the Batbox III with the Sony TCM-38V have been effective at recording short-tailed bats when used appropriately. During trails with the equipment the known range of the short-tailed bat at Pureora was extended and a probable first record of this bat within Egmont National Park made.

RECOMMENDATIONS

1. That Sony tape recorders preferably the TCM 64V, linked with the Batbox III bat detector should be available and used at 27kHz to detect short-tailed bats in the Tongariro/Taupo Conservancy. They are relatively easy to operate and can be left unattended for several nights.
2. Apart from the Moerangi site, future monitoring should take place at new *Dactylanthus* sites not yet monitored.
3. Preference should be given to sites where short-tailed bats have been recorded in the past, and sites with intact native forest in good condition.

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APPENDIX 1: LOCATIONS MONITORED FOR SHORT-TAILED BATS

Location	Map	Grid reference
Moerangi	T18	373543
One Hundred Acre Bush	T18	388527
Pihanga	T19	499390
Mangamingi Stream	T19	400425
Taurewa	T19	308337
Erua Road	S20	152174
Erua	S20	157133
Last Spike Monument	S20	163113
Makatote Viaduct	S20	169135
Raurimu Spiral	S19	182265