

## SHORT NOTE

### New Zealand falcons (*Falco novaeseelandiae*) nesting in exotic plantations

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The North Island form of New Zealand falcon (*Falco novaeseelandiae*), the "bush falcon", generally nests in epiphytes, or on the ground, in quiet hill country podocarp or beech forest. Marchant & Higgins (1993) state that "monocultures of exotic pines are not used, especially mature stands"

Anecdotal records of falcons frequenting exotic pine (*Pinus radiata*) plantations and forestry areas, and breeding there, have been noted since the 1930's when, at Waiotapu in 1937, a nest was found in a firebreak in a pine plantation (Buddle 1940). Falcons were reported as "not common" on the Kaingaroa plains in 1940 (Johnson 1940), a survey of bird populations in exotic forest (Whakarewarewa and Kaingaroa) in 1940-1948, listed them as "not common but appears to be on the increase" (Weeks 1949), and a Forest Service employee reported "odd ones to be seen throughout the forest" and located a nest with four eggs (Ryder 1948).

In 1960, a falcon was seen flying over Mamaku Forest in an area that had recently been logged (Edgar 1963) and, in 1975, in a Kaingaroa Forest compartment (Matea area), a falcon was twice seen hunting in an area that had been cultivated prior to planting. In the same year a falcon was seen at Goudies Block near Kaingaroa chasing a skylark (*Alauda arvensis*) (Jackson 1976).

The discovery of an active falcon nest in Kaingaroa Forest in 1994 encouraged us to investigate the use of pine forests by falcons. We attempted to locate and then monitor breeding pairs of falcons within compartments of Kaingaroa Forest.

Kaingaroa Forest comprises approximately 300,000 ha of plantation forest and is a mosaic of numbered compartments of different aged

growth stands. It is located within the central North Island, stretching approximately 100 km east of Rotorua to south of the Napier – Taupo highway. The individual compartments are generally of flat or low hill terrain and extend over about 350 ha. Every year around 11,000 ha of logged compartments are replanted and it was mostly within these open compartments that reports of nesting arose (Fig. 2).

We concentrated our searches in forest compartments from which there were sightings of falcons during the previous breeding season. New Zealand falcons defend their nest territory more strenuously than almost any other raptor (Fox 1977). Key indicators of nesting activity are close aggressive attacks including loud vocalising, and in particular, dive-bombing. Once a nest area has been identified it was approached carefully and as expediently as possible. Divebombing by the pair becomes more intense the nearer the nest is approached. When a nest was found, we recorded the number of eggs or young chicks present and then beat a hasty retreat. Later, when chicks grew to near-fledged juveniles (Fig. 3), we applied colour and metal bands to their legs and collected nest site data e.g., nest aspect, and collected pellet and prey remains.

During the breeding season October 2001 - February 2002, we observed 10 falcons in the forest and located three nests. All nests were on open flat terrain and amongst new (2000/2001) plantings, and several hundred metres from the nearest mature plantation stands. They were shallow depressions or 'scrapes' about 20-25 cm in diameter and 4-7cm deep, with loose linings of dry grass and small twigs, and contained regurgitated pellets and some remnants of prey items. All were on the ground and under logs (type C nests, Fox 1977; Fig. 4). One nest (Fig. 5) was under a small fern *Dicksonia fibrosa* growing obliquely out of the ground affording a little overhead protection. All had a NE-NNE aspect. In these nests we observed one clutch of three eggs and monitored the fledging of five young.

We collected pellet and prey remains from all three nesting territories. Of these, there were eighteen bird, one mammal, and two invertebrate species. The birds were blackbird (*Turdus merula*), Californian quail (*Callipepla californica brunnescens*), chaffinch (*Fringilla coelebs*), greenfinch (*Chloris chloris*), dunnock (*Prunella modularis*), mynah (*Acridotheres tristis*), pheasant (*Phasianus colchicus*), pipit (*Anthus novaeseelandiae*), redpoll (*Carduelis flammea*), shining cuckoo (*Chrysococcyx lucidus*), skylark (*Alauda arvensis*), house sparrow (*Passer*



**Figure 1** A female, originally banded as a fledgling in a plantation nest in 1998 28 km from this site of her 2003 nest.



**Figure 2** Typical nesting and hunting habitat used by falcons in Kaingaroa Forest. The nest was at the base of the stump.

*domesticus*), starling (*Sturnus vulgaris*), song thrush (*Turdus philomelos*), tomtit (*Petroica macrocephala toitoi*), silvereye (*Zosterops lateralis*), whitehead (*Mohoua albicilla*) and yellowhammer (*Emberiza citrinella*). The most common bird remains were of chaffinch, pipit, song thrush and blackbird.

The invertebrates were huhu (*Prionoplus reticularis*) and green cockchafer beetles (*Stethaspis* sp.) with huhu beetles present in significant numbers at all three sites. One stoat (*Mustela erminea*) skull was found half eaten on a plucking post

Our observations demonstrate that falcons are breeding and hunting in exotic pine plantations,

and further suggest the birds are selectively choosing the most youthful cutover plantation areas. Given that newly planted compartments are widely scattered throughout the forest, and that there are about 30-40 of them annually, there is potential habitat for more than 30 pairs in this forest. We are presently assisting with forest-wide surveys to confirm the presence of more pairs.

While monitoring has shown New Zealand falcon to be breeding within the exotic forest of Kaingaroa, it appears to be happening elsewhere. We have received numerous confirmed reports of falcons nesting in exotic pine forest, particularly cutover, in Bay of Plenty, Hawkes Bay, Nelson, Marlborough, Canterbury, and Otago. By utilising these forestry areas, in which introduced prey, especially birds, may abound the New Zealand falcon appears to be extending its breeding range from neighbouring native forest areas.

#### ACKNOWLEDGEMENTS

In particular we acknowledge Fletcher Challenge Forests Ltd, and Kaingaroa Timberlands, who have supported the monitoring efforts by permitted access within Kaingaroa Forest, forwarded reports of falcon sightings from staff and contractors, and provided technical information and mapping of selected compartments. The working relationship with the Department of Conservation, Bay of Plenty Conservancy, has been particularly important, and we acknowledge their continued support of the programme, and for co-ordinating the volunteer assistance at the start of each breeding season. We would like to thank Ricardo Palma of the Museum of New Zealand, for the identification of invertebrates found in falcon prey remains.

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**Keywords** New Zealand falcon; *Falco novaeseelandiae*; nest;



**Figure 3** Near-fledged falcon decamped from nest shown in Fig. 4 and hiding beneath log.



**Figure 4** Typical falcon nest (arrow) with partial overhead cover.



**Figure 5.** Exposed falcon nest site (arrow) with minimal overhead cover.