

First record of barn owls (*Tyto alba*) breeding in the wild in New Zealand

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Abstract A pair of barn owls (*Tyto alba*) was found breeding in Kaitaia farmland in Apr 2008, and observations on their nesting biology and behaviour were made over a period of 24 months. Another injured young barn owl, possibly from an earlier breeding attempt, was found with the pair at the time of their discovery, and brought into captivity. The nest tree was climbed and 2 dead owlets recovered, but the pair re-nested and 3 young successfully fledged. Pellets and prey remains were collected and their diet is described through pellet analysis. This is the 1st record of wild barn owls breeding in New Zealand.

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INTRODUCTION

The barn owl (*Tyto alba*) is a straggler to New Zealand (Turbott 1990), and has been reported here on 8 occasions. It was first reported in Westland (Falla 1948, Falla & Rinney 1958, Grant 1960) with subsequent records from Papatōetoe and Auckland International Airport (Gill & Turbott 1984, 1985), New Plymouth (Guest 1990), Whenuapai Airport (Taylor & Parrish 1994), and Little Barrier I (Smuts-Kennedy & Lovegrove 1996).

This paper describes the 9th record of barn owls in New Zealand and the 1st record of this species breeding in New Zealand. In late Mar 2008, Mark Thompson (MT) and Jo Thompson (JT) observed 2 barn owls flying around at dusk on their rural property near Kaitaia, Northland (Fig. 1). In early

Apr 2008, a 3rd barn owl was found injured in the company of the other 2 owls. At least 2 nesting attempts were made, with 1 nest containing 2 dead barn owl chicks, but a subsequent nesting resulted in the successful fledging of 3 chicks. In this paper, we describe the 1st nesting of barn owls in New Zealand and provide notes on behaviour of the birds and their diet as determined by pellet analysis and prey remains.

METHODS

Regular observations began in late Mar 2008 by MT, JT, and Kevin Matthews (KM). Casual observations by other individuals are also included in this report. The study site was on gently rolling open grass farmland in Kaitaia, and centred around a large old Puriri tree (*Vitex lucens*), amongst small isolated stands of remnant forest trees. KM, MT, JT, Mia

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Fig. 1. View of Kaitaia farmland in which 1st barn owl nest in New Zealand was located. Nest tree visible in lower right of photo.

Jessen and Noel Hyde observed the owls in early Apr 2008 on 4 consecutive evenings. During the day, a search of farmland within several hundred meters of the area where the owls were sighted was made, by checking trees and a hayshed that could possibly hold roosting or nesting barn owls or evidence of their presence. Beginning at dusk each day, the barn owls were observed from a hillside approximately 70 m away, as they moved around the area. We used the behaviour of the birds to locate the likely nesting site. By Jun 2008, the nest was found and the nest tree climbed with the aid of ropes and safety harness. Photographs were taken of the nest hollow, and a hole was cut through a decayed canker ~8 m up the side of the tree to the nest area.

To describe the diet of the owls, we collected dried pellets from below the nest tree. The dried pellets were treated as separate units and refrigerated until analysed. They were then placed individually into petri dishes containing water and soaked until soft. In a white dissecting tray, resting at a 30 degree angle, the soaked pellets were teased apart with forceps, a mounted needle and cleaned using a fine artist's brush. All identifiable material was separated from the fur and dross. After cleaning, the bones were dried before being put into labeled containers. The minimum number of individuals of prey in each pellet was calculated by counting the separate bone elements. Bones were identified by comparison with a reference collection and those species unable to be identified, were later compared with the Museum of New Zealand, Te Papa skeletal research collections.

RESULTS

Nest site and nesting biology

We located the nest of the barn owl pair in Jun 2008. The habitat the owls were using was gently

rolling farmland with stands of remnant forest trees in kikuyu pasture (Fig 1). These small stands included rewarewa (*Knightsia excelsia*), pigeon wood (*Hedycarya arborea*), nikau palm (*Rhopalostylis sapida*), cabbage tree (*Cordyline australis*), puriri (*Vitex lucens*), titoki (*Alectron excelsus*) and taraire (*Beilshmieda taraire*). The nest was located in the deep hollow of a puriri tree (Fig. 2) amongst a group of trees the birds had been seen flying into regularly each evening. The area was situated at the head of a valley 105 m above sea level.

The nest tree was 17 m high and with a 6 m girth at the base. The trunk was largely hollow with a number of known cavities 6 m up from its base (Fig. 3). After cutting into the tree to access the nest, we found 2 dead barn owl chicks. One chick had been dead approximately 7-10 days and was found at the nest; we estimated it to be about 56 days old (Fig. 4). We calculated that the nest had been initiated in early Mar, given the duration of incubation and nestling periods observed overseas. Below the freshly dead owlet was a further owlet, buried at least 100 mm in the bark nest debris (Fig 5). This owlet, although very decomposed, contained a preserved stomach bolus. When examined, this bolus revealed the remains of 7 mice. The discovery of this buried owlet, estimated at 42 days old, suggests there may have been other nesting attempts prior to our discovery of the nest. Assuming an average courtship period of 8-12 weeks, an incubation period of 33-35 days, and a fledging period of 50-55 days (Higgins 1999), the pair of barn owls could possibly have been in the Kaitaia area as early as mid-May to mid-Jun 2007.

On 5 Apr 2008, a 3rd barn owl was found on the ground near the nest of the pair, with a broken wing. It was in the company of the 2 other owls. The pointed, outermost primaries, and the smooth flange on the edge of the 3rd innermost talon (which becomes notched in older birds), indicated

Fig. 2. View of puriri tree in which barn owl was located.



the age of this bird was about 7 months old. Because of the injured owl's age, the courtship behaviour of the adults, and its location in the pair's territory, it was thought that this owl was the progeny from an earlier unnoticed nesting attempt by the pair. Due to its injuries, the bird was transferred to Wingspan Birds of Prey Trust in Rotorua.

In early Aug 2008 a loud continuous begging call was heard from the nest tree, followed a week later by a softer chirping noise. A few days later there was no calling coming from the tree and the birds were not seen. On 30 Aug 2008, the tree was climbed and an inspection was made of the nest cavity. On nearing the top, the female flushed from 2 large clumps of perching lily (*Collospermum hastatum*). It flew to a nearby Puriri tree where it was photographed and its sex confirmed. The top part of the main trunk had a large, rotten hollow cavity that extended down into the tree c.3.5 m. This nest entrance was approximately 11.5 m high with the nest deep inside the hollow (Fig. 3). On the evening of 12 Jul 2009, MT, JT, Shane McPherson and Mia Jessen confirmed the presence of 3 barn owl fledglings (Fig. 6), estimated to be 8 weeks of age being fed by the parents.

On 5 Oct 2009, during 2 hours of observation by KM, MT and Colin Miskelly, the male barn owl was seen to fly from a Puriri adjacent to the nest tree and land in another puriri tree about 50 m away. The female was not seen and presumed to be in the nest tree, possibly in another breeding cycle.

Courtship and other behaviour

Each evening at dusk the owl pair would fly silently into the group of trees near the nest site,

usually from the same direction. This appeared to be courtship behaviour, with one bird flying above and behind the other (Higgins 1999). The pursued owl (presumed female), would quickly disappear from view, but could be heard calling in the distance. The presumed male owl would then take a prominent perch in an old puriri tree, and give an incessant screech (Higgins 1999), for periods up to 15-20 minutes.

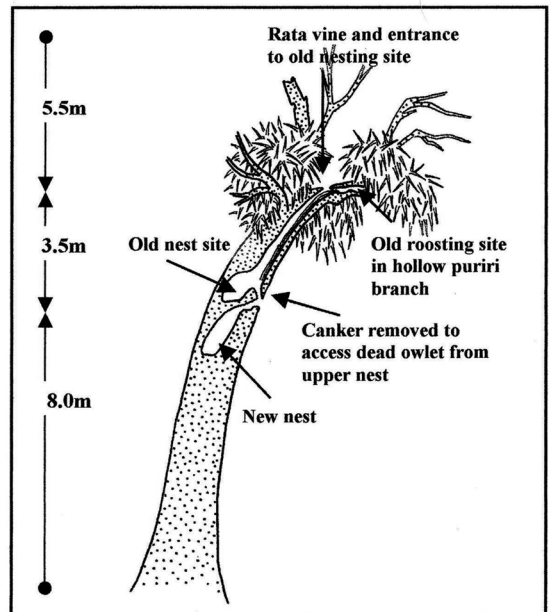


Fig. 3. Diagrammatic cross-section of puriri tree in which barn owl was located. Not to scale.

Table 1. Diet composition of Kaitaia barn owls from 18 regurgitated pellets and 3 prey samples.

	Individuals in prey remains (n=5)	No. of pellets containing traces (n=18)	Estimated no. of individuals	% of total individuals	Estimated weight captured (g)	Estimated % by weight
Mice	1	12	29	58	493	23
Rats	1	3	5	10	995	47
House sparrow	0	8	9	18	279	13
Greenfinch	0	1	3	6	99	5
Yellowhammer	0	1	1	2	30	1
Starling	2	0	2	4	172	8
Fernbird	1	0	1	2	35	2
TOTAL	5	25	50	100	2103	100



Fig. 4. Dead barn owl fledgling recovered near nest, estimated age 7-8 weeks. Note pointed outer primary found in juveniles, and remains of down on back of neck and rump. There were also traces of down on thighs.

Although no copulations were seen, one of the owls remained in the tree while the other owl flew around. The owl in the tree gave soft calling noises but did not emerge. The other owl, presumably the male, was seen to regularly fly up to the tree with food, deliver it, then immediately fly away. It was thought the female was incubating or had chicks at this time.

Owls were observed in a variety of other areas, in addition to the area around the nest site. In early Jul 2008, the male was observed leaving a day roost in a small group of trees that were being cut down on the neighbouring property. Sometime later

another roosting site was found in a small group of trees about 150 m opposite the nest tree.

Diet of barn owls

Eighteen regurgitated pellets were collected from within and below the nest tree, including 3 samples of prey remains (Table 1). The pellets were oval in shape and glazed black or dark brown in colour. Pellets revealed mice (*Mus musculus*), rats (*Rattus norvegicus*), as well as 4 bird species including, house sparrow (*Passer domesticus*), greenfinch (*Carduelis chloris*), and yellowhammer (*Emberiza citrinella*). The prey remains consisted of the partly eaten skeletons

Fig. 5. The decomposed remains of the owlet found buried in the rotten debris of the nest. The stomach bolus contained the remains of 7 mice.



of 2 starlings (*Sturnus vulgaris*) and the part skeleton of a fernbird (*Bowdleria punctata*).

Introduced mammals made up 68.0% and introduced passerines made up 30% of individuals eaten; native passerines made up just 2.0% of the diet (Table 1). Only 10% of prey found in the pellets were rats, but due to their large weight they make up just under half of total prey biomass.

Pellets and prey remains were also collected during feeding observations of the 3 nestlings (Fig. 6). Remains included a half eaten rat, and a whole mouse thought to have been dropped by the owlets. During 45 minutes of observation, changes in the calls and glimpses of adults suggested feeding trips were made to the fledglings at 1819 h, 1827 h, 1835 h and 1840 h. At 1837 h it seemed as though a juvenile fledged and flew 50 m across the gully to another tree. The adult owl immediately changed its softer call to a loud screech. Approximately 1 week later 2 chicks fledged and dispersed from the immediate nest area.

Dispersal of owls

The home range of barn owls is large, and most hunt well away from the roost or nest, up to 6–10 km, and juveniles can disperse quickly and very widely, more than 100 km (Higgins 1999). On 17 Jul 2009 while visiting Whangarei Hospital, a distance of 155 km, MT and JT heard a barn owl call in a stand of trees a few hundred meters away, possibly a Kaitaia juvenile from an earlier nesting.

On 3 Oct 2009 at 0500 h, KM saw a barn owl in a farm-bike headlight as it flew over his farm effluent ponds, located approximately 5.5 km away from the nest tree. KM also heard but did not see the barn owl at 1050 h on 18 Oct 2009, at a distance of 6 km from the nest tree. It was not known if these

were dispersing juveniles or adults foraging. On 5 Oct 2009, barn owl calls were heard approximately 500 m away from the nest tree, and 150 m from a recently installed barn owl nest box. It was thought these calls were from 2 birds, possibly the fledged owlets as the pair male was observed on the same night at the nest tree.

DISCUSSION

The discovery of a wild breeding pair of barn owls, in Kaitaia, Northland is the 1st record of this species successfully breeding in New Zealand. As far as the authors can ascertain, the New Zealand captive population of barn owls became extinct in 2007 and we believe these owls to be vagrants. Barn owls were 1st observed in Kaitaia in late Mar 2008 and were still present and breeding at the time of writing, 24 months later, in Feb 2010. The previous longest confirmed residence of a wild barn owl in New Zealand was a single bird first observed on Little Barrier I in Jun 1992 and last seen 4 months later in Oct 1992 (Smuts-Kennedy & Lovegrove 1996).

In Australia, barn owls breed at any time of year, and eggs have been found in all months (Higgins 1999). It appears the same is true for barn owls in New Zealand as we observed breeding behaviour in Apr 2008, Jul 2008, Nov 2008, Apr 2009, Jul 2009, Oct 2009, and Jan 2010. From our observations over 24 months, barn owls seem capable of a very rapid breeding cycle, possibly every 4–5 months. A week after being discovered in late Mar 2008, the breeding pair were found in the company of an injured juvenile, probably from a previous breeding attempt. At the time the pair were seen courtship chasing, and after the nest tree was identified and



Fig. 6. Night-time view of 3 fledglings from the 1st nesting record of barn owls in New Zealand.

climbed in Aug 2008, 2 dead chicks were found in the nest hollow.

In Mar 2009, MT heard what he thought were chicks, calling further down the gully while watching the parents at the nest tree. The successful breeding and fledging of 3 healthy chicks was confirmed in Aug 2009 when they were observed and photographed at the nest tree (Fig. 6). The 4 food-passes to the chicks we observed in an hour of observation at the nest agrees with McLaughlin (1994) that chicks >45 days old are fed 3.3 prey/hr.

Barn owls specialise in catching rodents, small birds and large insects (Heather & Robertson 1996, Higgins 1999). The high numbers of rodents in the diet of the owls we observed is consistent with previous studies (Debus & Rose 2004, Debus *et al.* 2004, Rose 1996, Smith 1984, Valente 1981). The birds in the barn owl's diet most likely reflect availability, and like the fernbird, are probably taken opportunistically. The only other record of food taken by wild barn owls in New Zealand were kiore (*Rattus exulans*) fur and bone fragments from the pellets of a barn owl found on Little Barrier I (Smuts-Kennedy & Lovegrove 1996).

The only surviving native owl in New Zealand is the morepork (*Ninox novaeseelandiae*). Morepork occur in the area and were heard less than 200 m from the barn owls, but no interactions were witnessed. On Little Barrier I, Smuts-Kennedy &

Lovegrove (1996) saw a morepork watch a barn owl eat a rat from less than 10 m away without any aggression, so perhaps these 2 species can co-exist where their ranges overlap. Both species also co-exist in Australia.

The habitat in which we discovered the owls is typical of the open woodland with a grass understory or open grassland farmland that is preferred by the species (Higgins 1999). This habitat is highly modified with few old remnant puriri trees remaining, providing the deep, hollow rotten cavities needed for nesting and roosting sites. The dispersal of juveniles into marginal habitat is a major cause of mortality in Australia (Bruce 1999, Higgins 1999). Wingspan Trust volunteers have installed one nest box in the vicinity, with plans to install others to assist the birds.

Factors likely to affect the colonisation and spread of barn owls in New Zealand include the presence of cats (*Felis silvestris catus*), both domestic and feral, mustelids (*Mustela* spp.) and brush-tailed possum (*Trichosaurus vulpecular*). During 2 nights of observation, one possum was seen in the nest tree, and 8 possums were shot in the immediate vicinity. Australian magpies (*Gymnorhina tibicen*) are known to kill young barn owls in Australia (Bruce 1999, Higgins 1999), and they were seen harassing the barn owl adults on one occasion.

Our observations record the possible colonization of New Zealand by the barn owl. Although vagrant barn owls have been found in New Zealand on at least 8 occasions previously, our record is the 1st to document breeding. The probability that vagrants successfully found a new population is probably quite rare, both as a result of unsuitable habitat and the lack of potential mates. However, occasionally some vagrants, like the black kite (*Milvus migrans*) first seen in Blenheim in 1992, and still there 17 years later, find themselves in suitable habitat with an adequate food source and are able to survive. If several vagrants arrive simultaneously in suitable habitat then sometimes they can establish themselves. Such a situation may now be occurring with barn owls in New Zealand. Continued monitoring of the current small population of owls in the Kaitaia area could provide a valuable opportunity to study the colonisation of a new and interesting addition to New Zealand's avifauna.

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