

# THE BLACK-WINGED PETREL ON MANGERE ISLAND, CHATHAM ISLANDS

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## ABSTRACT

The first known breeding of the Black-winged Petrel (*Pterodroma nigripennis*) on Mangere Island was studied in 1987-88 from the pre-laying period to part way through the chick rearing period. The first returning bird was noted on 30 November; eight incubated eggs were found, calculated to have been laid in mid-January. The eggs hatched in late February - early March; fledglings were calculated to have left in late May. The breeding cycle was about 2 weeks later than at more northerly breeding sites. The approximate mean incubation shift was 13.5 days. The colours of chicks are described in detail. Only two of the five chicks that hatched were still alive by the end of the study.

Interference at the nest site by other petrel species apparently caused some nesting failures. No birds were found undergoing active wing or tail moult. The brood patches of most adults examined were largely bare in late January and February and were refeathering in March. The birds were active only at night.

## INTRODUCTION

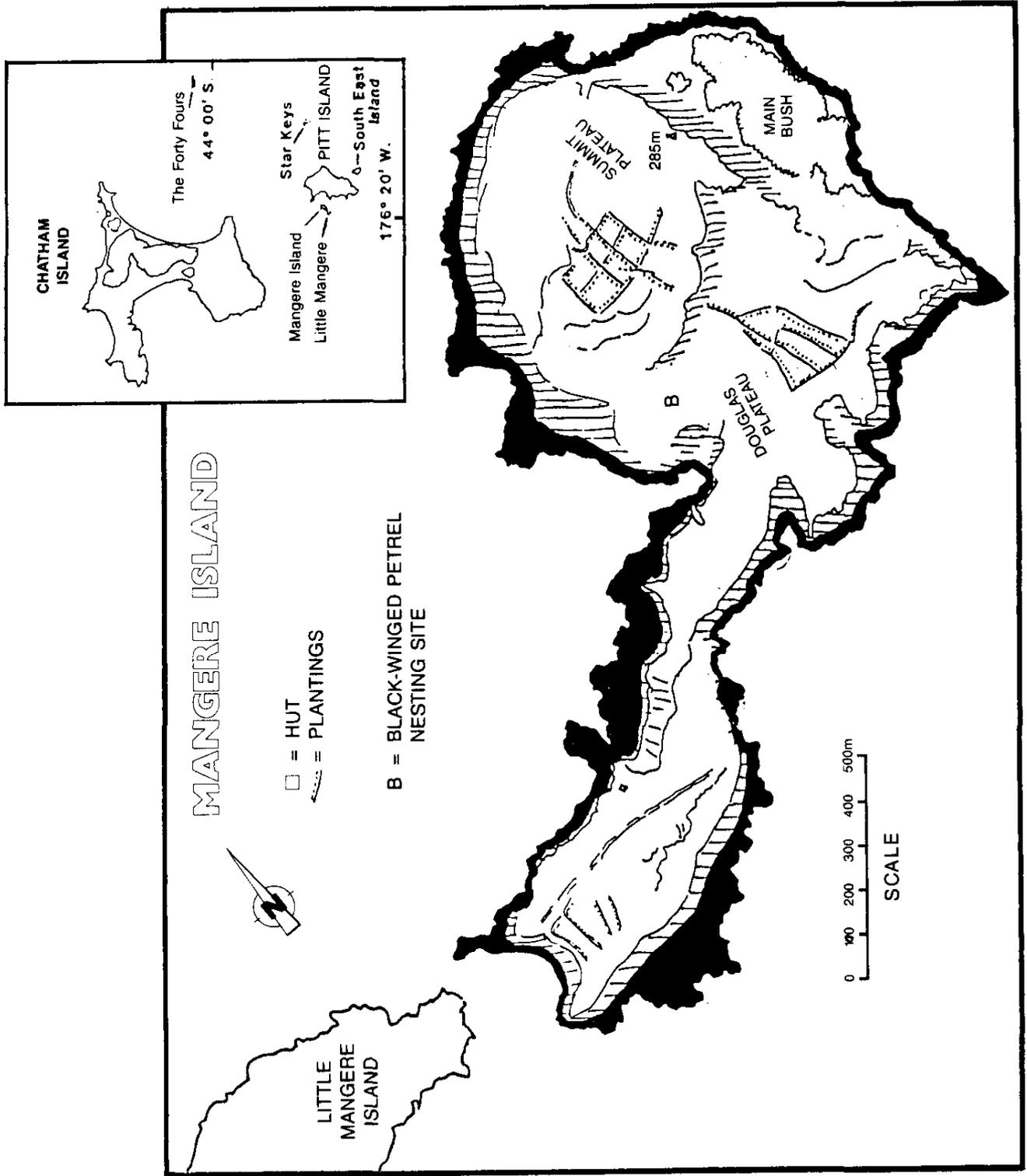
Little has been published on the breeding ecology of the Black-winged Petrel (*Pterodroma nigripennis*). I made such observations between 20 October 1987 and 24 March 1988 at Mangere Island, in the Chatham group (44°00' S 176°30' W). This is a 141 ha island, extensively modified by fire and introduced cats and grazing mammals. It was made a reserve in 1967 and is now free of introduced mammals (Bell 1974). The island has large populations of four species of petrel: the Broad-billed Prion (*Pachyptila vittata*), Fairy Prion (*P. turtur*), Sooty Shearwater (*Puffinus griseus*) and Grey-backed Storm Petrel (*Garrodia nereis*). The Black-winged Petrel was the only other petrel that I recorded breeding on the island.

The Black-winged Petrel, whose main breeding colonies are in the Kermadec Islands, has a wide and expanding breeding distribution in the southwest Pacific (Jenkins & Cheshire 1982). Additional sites off northern New Zealand are Motuopao (Anderson 1982\*), Motupia (Anderson 1986\*\*), Simmonds Islands (M. Bellingham, pers. comm.), Motukokako (Piercy Island; G.A.Taylor pers. comm.) and a small island c.20 m off Cape Brett (P.J.Bellingham, pers. comm.).

Previously, the only confirmed breeding place of the Black-winged Petrel in the Chatham Islands was South East Island (Merton 1984). It has been seen prospecting on Mangere, Pitt, the Star Keys and the Forty Fours Islands (Jenkins & Cheshire 1982; see Figure 1). There is a skin from the Chatham Islands, dated August 1900, purchased from H.W.Travers, in the Cambridge University Museum of Zoology (M.J. Imber, pers. comm.). Scarlett (1982) included the species in a list of subfossil bones from the Chathams.

\* ANDERSON, R.A. 1982. Motuopao Island - change of status. Unpubl. report to the Commissioner of Crown Lands, Department of Lands & Survey.

\*\* ANDERSON, P. 1986. Brief wildlife survey: Motupia I. off Ninety Mile Beach, Aupouri Peninsula. Unpubl. Wildlife Service Report. Whangarei



MANGERE ISLAND

- = HUT
- ▨ = PLANTINGS

B = BLACK-WINGED PETREL NESTING SITE

0 100 200 300 400 500m  
SCALE

CHATHAM ISLAND

The Forty Fours  
44° 00' S.

Star Keys  
 Mangere Island  
 Little Mangere  
 PITT ISLAND  
 South East Island  
 176° 20' W.

LITTLE MANGERE ISLAND

SUMMIT PLATEAU  
286m

DOUGLAS PLATEAU

MAIN BUSH

## RESULTS

### Status on Mangere Island

During my study, the earliest evidence of Black-winged Petrels was fresh remains in a skua midden on 30 November. Birds were first heard calling on 7 December. From then onwards, the amount of calling remained relatively high and remains became more common in skua middens. Remains of 14 birds were found, and 44 birds (including eight pairs of breeders) were banded. It is likely that at least twice this number was frequenting Mangere Island.

I found 16 burrows that Black-winged Petrels occupied on at least one occasion. Eight had an egg, one contained egg-shell, and I found one broken egg on the surface. Fifteen burrows were at the head of a gully on a 40° slope below the southwestern corner of the island's summit plateau. One eggless burrow was closer to the centre of the Douglas Plateau, to the west of the main plantings (see Figure 1). The birds were active mainly in these areas, which are both about 140 m a.s.l.. I searched widely and systematically for nests and so believe that I found most of the burrows in use on the island. On 26 January many birds were calling over Little Mangere Island (see Figure 1), and so they may now be breeding there also.

### Breeding cycle

I do not know when the eggs were laid, as I looked for burrows only after finding the first egg on 21 January. Most eggs were found in the following 10 days. Burrows were in soft soil, usually under grass, and were 20 - 90 cm long. Nests were built of dead grass, and some were bulky.

All five eggs that were fully incubated hatched between 27 February and 10 March. Two eggs were starved for at least eight days before hatching. The two chicks that survived were large and downy when last checked on 23 March.

### The chicks

Chicks of all ages were covered in dark grey down with a ventral white area extending from the bill to the abdomen. The amount of white on the abdomen was variable. One chick had a white area above and in front of each eye. Bills and claws were black. Tarsi and feet were mainly pink, with some black on the toes, webs and lower tarsus. Chicks approximately 21 and 24 days old respectively on 23 March had the following measurements: exposed culmen length 17.2, 17.1 mm; tarsus length 22.7, 23.0 mm; weight 177.5, 256 g. Neither had primary or tail pins visible.

### Nesting success

I checked the nests about every 4 days (range 2 - 6 days, n = 18). Of the eight eggs followed: three failed to hatch; one chick died while hatching; four hatched, but two of these chicks died within 3 days after hatching; two chicks were alive and healthy when about 3 weeks old.

Why the nests failed I am not sure. However, interference by other species seemed to be important. A Sooty Shearwater was found in one breeding burrow. The adult Black-winged Petrels abandoned their egg at

this time and began frequenting a nearby burrow. Two Broad-billed Prions were found with a dead Black-winged Petrel chick in a burrow where, 3 days earlier, a Black-winged Petrel had been incubating a pipping egg. A Fairy Prion was found in a burrow that Black-winged Petrels had occupied but not laid in. In another non-breeding burrow a Black-winged Petrel was sitting on a Fairy Prion egg. In addition, one of the chicks that survived had a large injury on its neck, perhaps caused by another bird. The injury rapidly healed.

Therefore, burrows used by Black-winged Petrels are commonly used by other locally numerous species, and at least two nests failed probably because of interference by other species. In the remaining failed nests, one egg was deserted and two chicks died close to hatching for no obvious reason. One egg was abandoned, probably because I had collapsed the burrow. In all cases where the nest failed, birds subsequently extended the burrow by up to a metre.

### **Nest attendance**

I studied incubation only incidentally and may have missed recording some short incubation shifts. Of 11 approximate shifts, the mean length was 13.5 days and the longest was between 19 and 23 days. I did not record a complete incubation period but one pair incubated for at least 41 days. One egg was deserted for at least one day and it later hatched. The two chicks that survived were found unguarded during the day on the second and fifth day after hatching respectively. Adults were not found with these chicks during the day subsequently. In those burrows where breeding had failed, adults were later found in the nests during the day quite frequently, either alone or with their mates. Failed breeders were found ashore up to 44 days after their breeding had failed, and many were still visiting the breeding grounds on 23 March.

### **Moult and brood patches**

I examined adult birds for moult between January and March, many of them several times. All were in slightly worn plumage. Only two birds showed active moult, confined to the neck; one (examined in January) was a breeder, the other (examined in February) was of unknown status. Another bird had a half-grown outer primary in January. This feather did not seem to be actively growing as it was slightly worn, like the rest of the bird's plumage.

The brood patches of the 16 incubating birds were bare with a downy mid-line varying from wispy to moderately thick. The brood patch of some, but not all, breeders was regrowing down before the end of incubation. One breeder whose nest failed after 7 February had a completely downy patch by 8 March, while another's patch showed little sign of regrowth on 23 March, 46 days after its nest failed.

Of seven birds of unknown status examined on 3 January, six had wholly downy brood patches and one had bare patches at the sides. Most other birds of unknown status caught between mid-January and February had largely bare brood patches whereas most during March were in various stages of regrowth.

### Evening arrival

Black-winged Petrels were not seen over land or on the surface during the day. The earliest birds each evening would call over the breeding areas at dusk.

### Measurements

Measuring methods follow Baldwin *et al.* (1931).

All measurements are presented as mean  $\pm$  1 standard deviation, range, sample size (n).

#### *Adult dimensions (sample included 15 breeding birds) (mm)*

Exposed culmen length	23.8 $\pm$ 0.7	22.2 - 25.2	n = 40
Height of bill at base	11.2 $\pm$ 0.4	10.3 - 12.0	n = 38
Width of bill at base	10.0 $\pm$ 0.5	9.2 - 10.9	n = 38
Closed wing length	226 $\pm$ 4	217 - 233	n = 43
Tail length	99 $\pm$ 3	94 - 105	n = 37
Tarsus length	30.6 $\pm$ 0.8	28.9 - 32.1	n = 39
Middle toe + claw length	36.7 $\pm$ 1.6	33.5 - 40.1	n = 37
Weight (g)	183.5 $\pm$ 16.3	156.0 - 228.0	n = 37

#### *Egg dimensions (n = 8)*

Length	52.1 $\pm$ 2.2,	48.8 - 55.3 mm
Width	37.1 $\pm$ 0.9,	35.5 - 38.0 mm
Weight	37.0 $\pm$ 3.5,	32.5 - 42.5 g

## DISCUSSION

Black-winged Petrels were first noted on Mangere Island in the early 1970s, but breeding had not previously been recorded (B.D. Bell, *in* Jenkins & Cheshire 1982). The proof that it now breeds on the island is further evidence that the species is increasing its breeding range (Jenkins & Cheshire 1982) or perhaps recolonising its former breeding range (Fullagar *et al.* 1974, Scarlett 1982).

The Black-winged Petrel is migratory and returns to the Chathams in mid-November (Imber 1978). If the incubation period is about 50 days, as in the similar Bonin Petrel *P. hypoleuca* (Grant *et al.* 1983), the peak of egg-laying at Mangere Island should be in mid-January. Hatching occurs in late February - early March. If chick development takes about 80 days, as in the similar Pycroft's Petrel *P. pycrofti* (Dunnet 1985), fledglings should leave the island in late May. Therefore at the Chatham Islands and at Portland Island (Eagle 1980), the timing of the breeding cycle appears to be about two weeks later than at the Kermadec Islands (Oliver 1955, Merton 1970, Jenkins & Cheshire 1982) and at Norfolk Island (Hermes *et al.* 1986). This difference corresponds with the later breeding in higher latitudes shown by several other southern seabirds (e.g. skuas, Young 1977; Fairy Prions, Harper 1980; Cook's Petrels *Pterodroma cookii*, Imber 1985).

Little active moult in Black-winged Petrels has been recorded between mid-October and December (Kermadec Islands, pers. obs.), between December and March (this study) and in April (Kinsky 1968). Thus, the main period of moult in adults is presumably in the non-breeding season (June - September). This cycle would be in agreement with the moult cycles of other *Pterodroma* species (e.g. Warham 1967, Imber 1985).

If this was a typical season, the high predation rate and the low reproductive success of Black-winged Petrels at Mangere Island will mean that recruitment of birds raised on the island will be slow. Hence most of the present population are probably immigrants raised elsewhere.

The high proportion of nesting failures thought to be caused by interference by other species (particularly at hatching time) shows that the Black-winged Petrels have similar problems to nesting Chatham Island Petrels *Pterodroma axillaris* (Imber 1985). Problems of burrow competition for the Chatham Island Petrel may be severe on South East Island because the nesting density of petrel species is greater there than on Mangere Island (pers. obs.).

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