

SHORT NOTE

Status of Kermadec petrels (*Pterodroma neglecta*) on the Meyer Islets, and prospects for their re-colonisation of Raoul Island, Kermadec group

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Kermadec petrels (*Pterodroma neglecta*) formerly bred in immense numbers, estimated at 250,000 pairs (about half a million individuals (Iredale 1914)), on Raoul Island, Kermadec Islands (29° 16' S, 177° 52' W). This population bred in summer (August-May), laying in late October-November (MacGillivray 1854; Oliver 1955). By 1966, however, they were essentially extinct on Raoul Island (Merton 1970), victims of feral cats (*Felis catus*), and, especially, of Norway rats (*Rattus norvegicus*) that evidently arrived when the schooner *Columbia River* was wrecked on the shore in 1921 (Merton 1968).

There is also a population of Kermadec petrels on the eight Herald Islets (particularly on North and South Meyer), 2-4 km off Raoul Island, which breeds in autumn-winter, January-October, laying in late February-April (Iredale 1914; Oliver 1955). Merton (1970) estimated that there were up to 10,000 breeding pairs in the Herald Islets population in c.1966. This population has been free of introduced predators throughout recorded history, and may have varied relatively little in size in the last 150 years. Thus, MacGillivray (1854), visiting the Kermadec Islands during 2-15 July 1854, wrote (after describing the breeding season of the summer form): "This accounted for the great scarcity upon the large island during our stay - yet a few were seen and they were of the same species which on Saddle Island breeds at a different season as Halstead had told me, and as I subsequently verified." Presumably Saddle Island is the Meyer Islets. Halstead was an American whaler living on the Kermadecs at the time (I.A.W. McAllan pers. comm.).

An expedition to the Kermadec Islands on board MV *Southern Salvor* during 1-14 November 2004 enabled me to land on the Meyer Islands on 7 November 2004: 2 h on North Meyer and 4 h on South Meyer. I found the dried remains of four Kermadec petrel chicks on the former, and 19 on the latter: all had been becoming

feathered, but most had been dead for some months. They were distributed over the north-west slopes of the two islands, the south-east sides being mainly cliffs because of exposure to prevailing winds. In the same areas I found one live fledgling on North Meyer and five on South Meyer: most of these were not obviously at nest sites, and I estimated that all would have departed within 2-3 weeks, one being fully-feathered without down. I saw no adults in these areas, which were clearly the site of the winter-breeding population. Some old nests were evident, and the dead chicks were sometimes at or near these, but time and activities of the many burrowing petrels had obliterated most nests.

Unfortunately I did not quite reach the top of North Meyer Islet because of time constraints. At the top of South Meyer I found its small summer-breeding population and have no reason to doubt that the same existed atop North Meyer, as Merton (1970) described, because adults were flying and calling around both islets' summits in the afternoon. Here they were: the last survivors of the 1-2 million birds of the former Raoul Island population. The small colony was quite dense within a relatively small area of about 50 x 30 m. I found eight eggs being incubated, other vacant nests, nests with a bird but no egg (probably males waiting for mates to lay), and a few pairs on the ground with or without nests. A single isolated nest, with egg being incubated, was just above the coast of South Meyer, and a few birds were on the ground in late afternoon near the landing place of this islet. In total, I saw about 20 nests, and there seem unlikely to have been 50 summer-breeding pairs on this islet. Candling of eight eggs (cupping them in the hands and viewing against the sky) showed no development in any, and an incipient air-sac in only two, so all had been laid since about 31 October. This is completely consistent with historical reports of the laying season of the Raoul Island population (MacGillivray 1854; Oliver 1955; Merton 1970). If we accept a similar number of summer-breeding pairs (less than 50) on North Meyer, and others on four or five of the lesser Herald Islets (Merton 1970), the total number of summer-breeding pairs may not exceed 300 or even 200.

Though Iredale (1910) reported that only about six pairs bred in summer on 'Meyer Island', he subsequently seemed to refute this (1914). Summer-breeding birds (two nests with egg) were first unambiguously reported on the Herald Islets by Edgar *et al.* (1965), while Merton (1970) reported them on North Meyer (25 chicks in late January and two other eggs in December), Napier (several eggs in November and early January), Nugent (two possible eggs), Dayrell (some eggs in late December) and North Chanter (some eggs on 1 January).

He does not mention summer breeders on South Meyer but presumably there was a similar number there to that on North Meyer. Hence, he recorded summer-nesting on five or six of the Herald Islets, but possibly by only 100–200 pairs.

No Kermadec petrels were seen at any time over Raoul Island during our six days anchored in Denham Bay and two days off the Meyer Islets. At sea on the trips from and to New Zealand we saw only one Kermadec petrel, at dawn about 350 km south of the islands.

Historically there were approximately 250,000 summer-breeding pairs on Raoul Island (Iredale 1914), and possibly up to 10,000 winter-breeding pairs spread over seven Herald Islets (Merton 1970). This ratio of 25:1 suggests that this may have been the apportionment of the food resources available for the two populations. If these two populations formed a biological unit, with birds somehow switching breeding seasons depending on intrinsic or environmental stimuli (but philopatry is a serious problem here), one could expect the summer-breeding population on the Herald Islets to have increased much more, so as to attempt to restore the historic ratio. That this has not happened (the ratio now being 0.03:1 if there are 300 pairs of summer breeders on the Herald Islets) suggests that these two populations are distinct entities, as Oliver (1955: 157) suspected: "It may be that a distinct form of the Kermadec Petrel is being evolved on Meyer Island." Of course, he could also have considered the converse. At the Pitcairn Islands, the only other Kermadec petrel population whose breeding has been well studied, the breeding season extends from November to June, peaking in February–March (Brooke 1995), but only 3% laid in November. Thus it is the summer-breeding population at Kermadec Islands that seems unique, and may be evolving from the winter-breeding form that appears to be widespread.

This situation is now ripe for a genetic study based on blood sampling for DNA analyses. Some preliminary work has been done (Brooke *et al.* 2000) which, however, demonstrated some close affinities of these surface-breeding petrels. The 10 birds blood-sampled on 16 October 1996 on North Meyer Islet for Brooke *et al.*'s study comprised six fledglings (therefore, winter breeders) and four adults (possibly both winter and summer breeders) (C. Gardiner pers. comm.). If one considers the haplotypes of these (Brooke *et al.* 2000: table 1), it may be that all haplotype F birds (8) were winter breeders, and that haplotypes I (1) and T (1) were summer breeders. This work is encouraging but the breeding seasons of sampled birds will need to be accurately identified in further studies.

With the recent attempts to eradicate rats and cats from Raoul Island (which seem to have succeeded; I. McFadden pers. comm.), there is hope for the re-colonisation of the island by Kermadec petrels and other birds. However, the

problem faced by this petrel is that there are now only a few hundred pairs of the summer breeders on the Herald Islets to produce the colonists that must re-establish the Raoul Island population. The winter-breeding population may presently be close to or at its maximum potential size, governed by food resources, which would put it under little pressure to expand onto Raoul Island, other than to alleviate adverse factors due to the breeding density on the Herald Islets. The numerous dead chicks may indicate that food supplies are limiting its population size, or that some pairs are nesting in sub-optimal sites, though a bad weather or disease event might also have been responsible.

It may be necessary, even essential, to manage the summer breeders so as to encourage their early re-colonisation of Raoul Island. Broadcast calls (Veitch *et al.* 2004), specifically those of summer breeders, may be the most useful technique. Transfers of fledglings might be attempted, though imprinting on a new site may be poor in these surface-nesters, where chicks may become imprinted on their natal sites at a much earlier stage of development compared with burrow-nesters. Potential sites for broadcasting and/or re-introductions are indicated in Merton (1970: fig. 2) at the sites of former colonies.

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