

SHORT NOTE

New Zealand white-capped mollymawk (*Diomedea cauta steadi*) chicks eaten by pigs (*Sus scrofa*)

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The first feral pigs (*Sus scrofa*) were introduced to the Auckland at Port Ross on the main Auckland Island Islands in 1807 (Challies 1975). Their numbers apparently peaked by the 1850s but subsequently declined and by 1880 pigs had spread throughout Auckland Island and the population had stabilised (Challies 1975). Pigs have been implicated in the decline of breeding colonies of the New Zealand white-capped mollymawk (*Diomedea cauta steadi*) on main Auckland Island (Taylor 2000), although predation had not been observed. This note describes recent observations of pigs preying on white-capped mollymawk chicks.

From 1 to 3 March 2001 I assisted an Australian National University (ANU) expedition collecting blood samples from white-capped mollymawks on the Auckland Islands. We sampled 3 colonies: Disappointment Island; Logan Point on Adams Island; and Southwest Cape of Auckland Island. Disappointment Island is home to 70,000 to 80,000 pairs (Taylor 2000); on our visit Adams Island had about 100 pairs and the south slopes of Southwest Cape had 300-400 pairs, although misty conditions mean that this was a rough estimate. We did not visit a larger (about 2500 pairs, Taylor 2000), but less accessible, colony on the western cliffs of the main Auckland Island.

A few late breeders were still incubating in early March although most nests contained chicks. About half of the chicks were still being brooded by parents, though proportions were difficult to estimate without disturbing the adults, because there were also many adults or adolescents occupying empty nest mounds. At that date brooded chicks were likely to have been up to 3 weeks of age (Robertson & van Tets 1982). Non-brooded chicks ranged considerably in size, particularly on Disappointment

Island where some were up to ½ to ¾ adult size, but still completely down-covered. Given that incubation is likely to be about 70 days (Robertson & van Tets 1982) this would suggest that eggs were laid from mid October to mid December.

In February 2000 Josh Kemp, Department of Conservation (pers. comm.) reported seeing pigs in the white-capped mollymawk colony at Southwest Cape. When we visited this colony a year later (1 March 2001) we saw at least 7 pigs, including 3 piglets. One sow came towards us with the head of a freshly killed mollymawk chick hanging from her mouth, while a piglet with her was chewing on a mollymawk chick's foot. Another sow was disturbed snuffling around several freshly destroyed nest mounds and a large boar was seen in another part of the colony where there were destroyed nests. These pigs appeared to be moving freely among the narrow ledges and steep peat-clad slopes on which many of the mollymawk nests were situated. Throughout the colony we found toppled nest mounds and the feet and other remains of several chicks. It is possible that such sign represented only the previous few days' destruction, as skuas (*Catharacta skua*) and other scavengers that were active around the colony may have removed such remains. Two mollymawk chicks had survived the toppling of their nest mounds, probably earlier the same day, and were wet, cold and muddy as a result of the ground conditions and probable nuzzling or trampling by the pigs that we had disturbed from the area. A skua killed 1 of these chicks later the same day. In the few hours that we spent at the site, we saw evidence of only post guard-stage chicks having been killed. It is possible that adult mollymawks were not favoured by pigs or were able to defend themselves and their nests. There was a frequently-used pig den under a rock-overhang near the colony. Pig tracks throughout the area suggested that pigs had been active in the area for at least several weeks. Given the early history of pig

establishment on Auckland Island, it is surprising that mollymawks have persisted at Southwest Cape. The fact that they have suggests either that intensive pig predation is intermittent, or that mollymawk recruitment from nests inaccessible to pigs is sufficient to keep the colony viable.

Intermittent activity by pigs at Southwest Cape is supported by observations from 2 previous expeditions to the Auckland Islands. Both a 1972/73 expedition (Challies 1975) and a 1981 visit (Robertson & Jenkins 1986) coincided with the mollymawk breeding season yet predation by pigs was not seen. An unquantified reduction in colony size was, however, noted by the latter expedition (Robertson & Jenkins 1986) and was attributed to pigs. It was estimated (C. Robertson pers. comm.) that there had been a 30% reduction in the number of nest mounds between the 2 visits. Nevertheless, without repeated counts at the same time of year and a detailed study of white-capped mollymawk breeding ecology, it is difficult to adequately assess the long-term impact of pig predation.

Challies (1975) considered that pigs had reached a balance with their environment and were no longer changing the numbers and distribution of nesting seabirds on Auckland Island. Though Challies (1975) found evidence of both yellow-eyed penguin (*Megadyptes antipodes*) and Auckland Island prion (*Pachyptila desolata*) in pig stomachs and described evidence of predation of Auckland Island shag (*Leucocarbo colensoi*) by pigs, he suggested that pigs no longer had much effect on bird populations. Our observations suggest that, at least periodically, pigs have a serious impact on the white-capped mollymawk colony. Challies (1975) commented that the Adams site "is situated on a similar steep face site" to the Southwest Cape colony, which he thought indicated that pigs were not limiting mollymawk distribution at the latter area. However, we noted considerable differences in the distribution of nests between the 2 colonies. At Adams Island, nest sites were predominantly on ledges with shallow slope separated by cliffs, whereas at Southwest Cape most nests were built on steep faces with few on the more gentle slopes and ledges. Over time, predation by pigs has probably progressively altered the distribution of nests at Southwest Cape and reduced the colony size. The fact that the colony persists is probably attributable to the longevity of adults and the inaccessibility of some nest sites to

pigs. We did not visit the large area of nests to the west of Southwest Cape, so cannot confirm that it is currently pig-free. In 1981 it was assumed from the lush megaherb growth that this site was inaccessible to pigs (C. Robertson pers. comm.). As noted above, this nearby site may be a source of recruits to the southern slopes of Southwest Cape.

Southland Conservancy of the Department of Conservation recently commissioned a report into the feasibility of eradicating feral pigs from Auckland Island (Brown 1997). I hope that my observations might add urgency to the removal of pigs. If eradication cannot proceed in the near future, I suggest that this colony of white-capped mollymawk be accurately counted and photographed so that changes in the population and nesting distribution can be determined. The site is easy of access and would be an ideal subject for the research suggested by Taylor (2000) for ensuring the survival of the white-capped mollymawk.

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Keywords white-capped mollymawk; *Diomedea cauta*; predation; feral pig; *Sus scrofa*; Auckland Islands

Note added in proof: Peter Moore has brought to my attention a reference to predation of shy mollymawks at the same site at the western entrance of Carnley Harbour over 50 years ago. Sorenson (1951: 42) noted that "...large and hungry wild pigs get among the colonies of the shy mollymawks at the Western Entrance, Carnley Harbour. They cause tremendous losses to the birds in eggs and young chicks. Destruction of the wild pigs is the only remedy... The shy mollymawks in this place are now confined to steep and inaccessible faces on exposed cliffs which pigs cannot reach." and again (Sorenson 1951: 57) "But [the pigs'] depredations do not stop with the smaller birds, for whole colonies of the beautiful and endemic Auckland Island shag have been destroyed, and the shy mollymawks are now compelled to nest only on steep slopes inaccessible to marauding pigs."

that resided there. The past absence of a resident species of diurnal raptor from Lord Howe Island would have allowed Providence petrels nesting on that island to visit their breeding grounds at any time without fear of predation by it. The nocturnal arrival of the Providence petrels which nested on Norfolk Island may reflect a behavioural adaptation by that population to predation by a resident species of diurnal raptor.

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Keywords Norfolk Island; Providence petrel; *Pterodroma solandri*; nocturnal habits; diurnal predators



CORRIGENDA

There were two editorial errors in the Note added in proof to Flux, I.A. 2002. New Zealand white-capped mollymawk (*Diomedea cauta steadi*) chicks eaten by pigs (*Sus scrofa*). *Notornis* 49: 175-176. The author's name for the earlier reference to predation of mollymawk chicks at the Auckland Islands was consistently misspelled as Sorenson, and the reference was not cited.

The full reference is: Sorensen, J.H. 1951. *Wild life in the Subantarctic*. Christchurch, Whitcombe & Tombs.