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THE KIORE THREAT TO KAKAPO

(Short Answers in Conservation Science)

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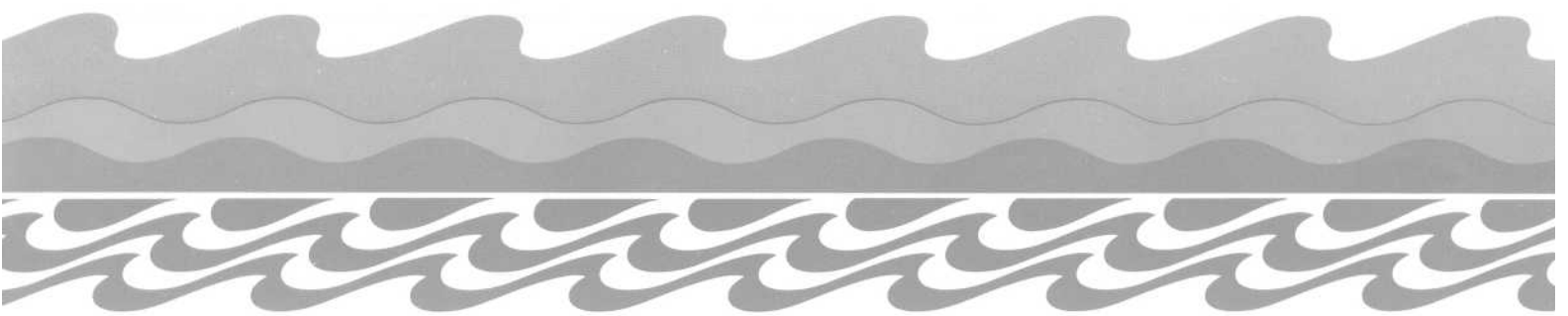
Department of Conservation, P O Box 10-420, Wellington, New Zealand



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THE KIORE THREAT TO KAKAPO

The threat posed by kiore *(Rattus exulans)* to kakapo is now restricted to the two islands, Little Barrier and Codfish, where kiore and kakapo are both present. It arises from the ability of kiore to prey on eggs and chicks, and from the possible overlap of foods eaten by kiore with those eaten by kakapo. These effects could, in some circumstances, be exacerbated by the supplementary feeding that is required for kakapo to breed.

Eggs

Kiore can take eggs up to at least 68 x 48 mm in size as was shown for red-tailed tropicbirds on Kure Atoll by Fleet (1972). He found that, in some years, up to 65% of the egg losses were attributable to kiore. Eggs of wedge-tailed shearwaters (66 x 44 mm) are also preyed on by kiore on this island (Woodward 1972). It should be noted that adult kiore on Kure Atoll, at 63 to 75 g body weight (Wirtz 1972) are smaller animals than the 146 to 158 g weights typical for adult kiore on northern islands of New Zealand (Atkinson and Moller 1990).

Typical egg sizes of kakapo are 50 to 52 x 37-38 mm (Powlesland *et al* 1992). The thin-shelled white egg tapers strongly at one end making it possible that this narrow end is relatively easy for a kiore to grasp in its jaws. *All these characteristics mean that kakapo eggs are always potentially vulnerable to kiore, and particularly when the female leaves the nest at night. These absences from the nest can be for periods of one to four hours (Powlesland *et al.* 1992).

Kakapo eggs appear to be particularly vulnerable to kiore on Little Barrier Island because the kiore are already to some extent keyed in to eating Cook's petrel eggs (Imber 1975) which with a size of 52 x 40 mm is very similar to that of kakapo. The situation is not much better on Codfish Island where other small burrowing petrels are breeding as well as some Cook's petrels.

Evidence of probable predation by kiore on kakapo eggs was observed on Codfish Island in the 1992 season. But we must recognise that we have no measure of egg losses to kiore. At the time when nests are found they may contain one or two eggs but we do not know whether that was the original clutch size. The case histories of known kakapo nests, compiled for the 1981-93 period by Don Merton, do not suggest that egg losses to kiore have been high but information on the early stages of incubation, when the females could possibly sit for shorter periods, is lacking.

Risk of predation on eggs and chicks by kiore is compounded by the time of nesting for kakapo on Little Barrier Island, a period which begins in late January or early February with chick rearing extending to May or June. This overlaps with the March

* Kiore also make holes in the sides of eggs.

to May period when kiore reach their highest numbers. On Codfish Island kakapo do not begin nesting until late February-early March with chick rearing again extending to May and June. Trapping of rats on Stewart Island has shown that kiore numbers tend to peak in June (D.M. Cunningham, pers. comm.) so that again rat numbers are likely to be approaching their highest level when kakapo chicks are being reared.

Chicks

Evidence for predation on chicks by kiore has been recorded for at least 9 species of ground-nesting or burrowing birds (Atkinson 1985), not including the kakapo. The true number of species preyed on in this manner is certain to be greater than this figure which reflects the few proper studies made. It is a common behaviour of kiore to remove food they are going to consume to another place or cache (e.g. Campbell *et al.* 1984). This applies to large seeds and seedlings and M.J. Imber (pers. comm.) has noticed removal by kiore of Cook's petrel chicks from their burrows. This certainly may explain the disappearances from nests of some kakapo chicks.

If the nesting record for the 1985-93 period is studied, it is apparent that as many as 7 (41%) of the 17 chicks hatched could have been lost to kiore. If a further two chicks that were possibly killed by kiore as they hatched (Codfish I., 1992, Susanne) are added, then it is possible that 9 (47%) of these 19 chicks were lost to kiore. These figures will be maximums because other causes for loss are bound to have operated in some cases. If we, quite arbitrarily, halve these figures, we are still looking at a possible 20 to 23% loss of kakapo chicks to kiore.

Such statements as these are not scientific statements. But the unequivocal evidence we would like is not available. For example B.M. Fitzgerald (pers. comm.), examined a 6-day old kakapo chick (c. 150 g) found eaten at a nest on Codfish Island in March 1992. He was able to establish that this chick had been eaten by kiore but he could not of course establish that this was the cause of death. Unequivocal evidence of kiore predation could be obtained by setting up video cameras at all kakapo nests, but this is not a valid option. With effective breeding of kakapo now at a very low level, and a strong circumstantial case for treating kiore as a predator of kakapo eggs and chicks, the only reasonable action is to ensure that kiore are as far as possible removed from kakapo nesting sites.

Food competition

With year-round supplementary feeding of kakapo, it is possible that any competitive effect from kiore, in taking natural foods of high nutritional quality such as fruit, will be of little importance. However we cannot be certain that the best supplementary

feeding regime we can devise for kakapo will make all feeding on natural foods redundant. For this reason, a precautionary approach to the question would aim at removing kiore from the home range area of any female kakapo raising young.

Supplementary feeding

The demonstrated necessity for supplementary feeding to bring kakapo into breeding condition means that additional food will always be available for any kiore in the vicinity. With a high reproductive rate, kiore numbers may be boosted locally thus increasing the predatory and competitive risk to kakapo. This underlines the intensive and sustained effort that must be made to eliminate kiore from places where kakapo are attempting to breed.

Research needs

It has been apparent for some time that kiore will only prey on eggs and chicks of different bird species in certain circumstances of weather, food supply and learning conditions for rats. But the details of these circumstances have never been identified. This basic research could open up new options for protecting birds from rat predation but it cannot be done with kakapo.

For this reason, the most pressing research need relating to the kiore-kakapo problem is to establish beyond argument the most rapid, effective and safe method of removing kiore from a kakapo breeding area. I think that work already done on kiore control and eradication, particularly by Ian McFadden, can provide an effective method for use in the 1993/94 breeding season. But that does not mean that further improvements are not possible. Questions of prebaiting or not, timing, use of one poison or several, additional killing methods such as traps and pit-traps, and the size of the area to be controlled, require further clarification. If we are to have confidence in the results, this information must be obtained from proper trials with controls in similar habitats. The kakapo breeding areas should not be used for this experimental work for the reason that it would restrict the use of proper controls and place other limitations on manipulations that should be tested.

I.A.E. Atkinson

I.A.E. Atkinson
5 May 1993

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