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ABSTRACT

A cat eradication programme was undertaken on Matakohe (Limestone) Island in Whangarei Harbour in July/August 1991 using polymer baits recently developed by Forest Research Institute. Initially, stations containing non-toxic "FRI cat baits" were operated for 24 nights. Tracking tiles were used for the first week to record animal prints. Bait take was monitored throughout this period. Baits surface-coated with 1080 were then placed in the stations for two nights and bait take measured. In November/December 1991, a follow-up operation used non-toxic baits and sardine bait at bait stations, and and gin trap sites to check for the presence of cats. Further trapping was carried out in February-March 1992.

During the pre-feed period cats visited bait stations. Baits disappeared during both the pre-feed and poison periods. Patterns of bait take suggest that there were three to five cats resident on the island. Baits were also chewed by rats. Although baits disappeared, no cat sign was found on the island during the follow-up period, indicating the eradication programme was probably successful.

1. INTRODUCTION

Matakohe Island lies in Whangarei Harbour, Northland, 500 m from the Peninsula to the north and 1250 m from Point to the south-west. It is a 37ha island of pasture with a coastal fringe of mainly native trees. Nearby Rabbit and Rat Islands lie between Matakohe Island and the mainland (Fig. 1).

Earliest known human occupation of Matakohe Island was by the Ngaitahuhu people in the 1700s. First European occupation began in 1832 and in about 1848 a limeworks was established and later expanded to employ up to 270 people at its peak in the early 1900s (Anon. 1990). The remains of buildings are still evident. The presence of cats (*Felis catus*) on the island presumably dates from this period.

The accessibility of Matakohe Island to Whangarei provides an opportunity to create a plant and animal sanctuary for public enjoyment and education. Much of the island is being replanted in native shrubs and trees under the auspices of the Matakohe (Limestone) Island

Management Committee. The southern shoreline provides potential nesting habitat for different species of wader and seabird. However, the presence of cats, rats (*Rattus norvegius*) and possums (*Trichosurus vulpecula*) poses a serious threat to the success of this project.

Possums have probably been eradicated by Northland Regional Council staff. An attempt to remove the rats was carried out by the Limestone Island Restoration Committee in June 1991. A cat eradication programme was launched to coincide with the low rat population level, thereby maximising chances of successful eradication.

The Matakohe (Limestone) Island project provided an opportunity to field test poison baits being developed by the Forest Research Institute (under contract to the Department of Conservation) for feral cat control. The "FRI cat bait" consists of a polymer-bound fismeal/oil base bait that is accepted by feral cats (Morgan et al. 1990). L-alanine and the leaves of the catnip plant (*Nepeta cataria*) rubbed on the baits have both been shown to increase bait acceptance (Eason et al. 1991, Eason et al. 1992).

2. METHODS

Twenty-eight bait stations were established on Matakohe Island on 19 July 1991. They were at least 50 m apart, and covered the whole island, with emphasis on the shoreline (Fig. 1). Fifteen FRI cat baits coated with L-alanine were placed at each station. At a random selection of 14 stations, the baits were rubbed in a handful of freshly-chopped catnip leaves. Half of the stations with catnip, and half of the stations without catnip also contained two or three tracking tiles. These were made of vinyl (27cm x 40cm)coated with blue carpenter's chalk.

The stations were checked for bait take on 26 July 1991 and 4 August 1991. Any baits taken were replaced. Cat and non-target species prints were recorded from the tracking tiles on the first check. The tiles were then removed. After the second check, the stations were modified to provide protection from persistently bad weather, using available jetsam and natural features. The number of baits was reduced to ten per station, and the catnip was not renewed. The stations were checked a third time on 12 August 1991.

The non-toxic "pre-feed" baits were replaced (10 per station) on 12 August 1991 with baits surface-coated with 1080 (Sodium fluoroacetate). Each bait, weighing on average 1.75 g was surface-loaded at FRI to give a final concentration of 2 mg 1080 per bait. Two milligrams of 1080 should be sufficient to kill a feral cat weighing in excess of 5 kg (Eason and Frampton 1991). The stations were checked two days later, and remaining poison baits were removed.

On 13 November 1991, non-toxic baits were again placed at the stations (10/station). Two checks were made on 18 November and 22 November 1991. Non-active stations were then closed down and Timm's traps and/or loose baits placed at the remaining stations (Table 1). The Timm's traps were baited with four or five FRI cat baits threaded onto the bait wire.

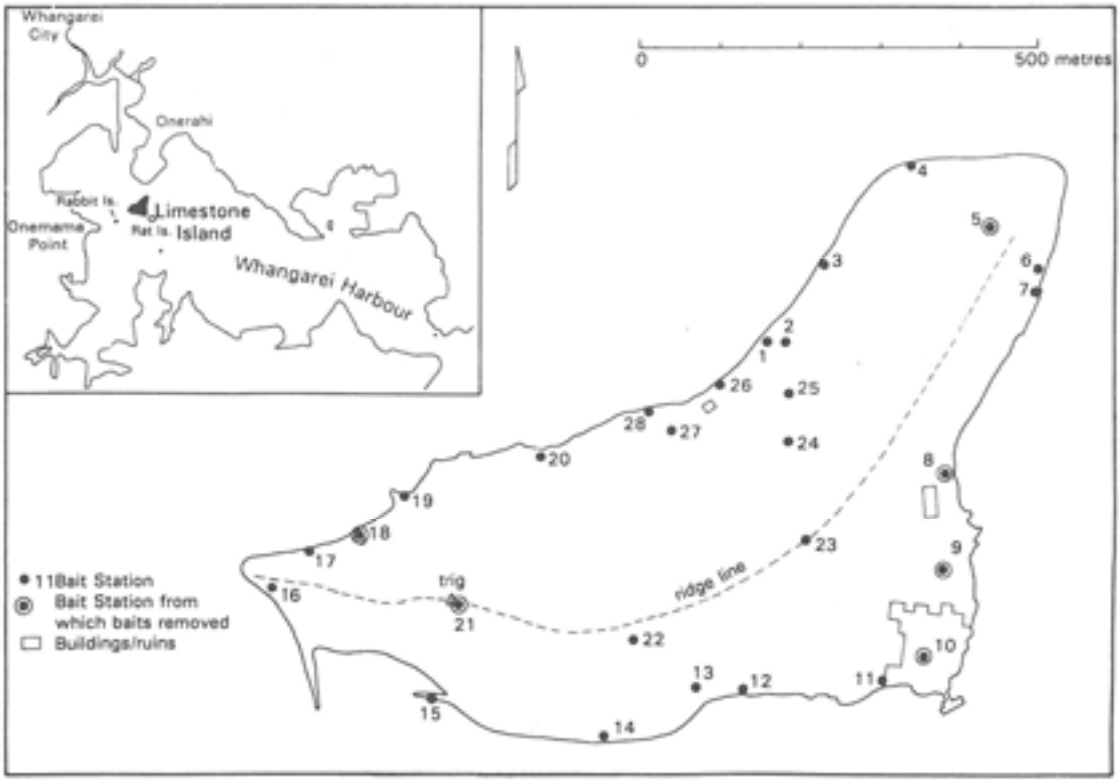

Fig. 1 Matakohe (Limestone) Island in the Whangarei Harbour (inset), and the numbered locations of the bait stations.

The traps were disguised to make the stations look as natural as possible. The stations were checked on 25 November 1991, when Lanes Ace leghold traps were added to most stations, in front of the Timm's trap (Table 1). The stations were checked twice more (26 November and 28 November 1991). The cat baits were then removed from most stations (Table 1), and the gin traps removed to new sites. They were set with canned sardines in aspic as bait, placed above and behind the trap. These new stations, and the two remaining original stations were checked on 30 November 1991. The traps were then removed, the sardine bait renewed, and tracking tiles laid. The stations were checked for a final time on 2 December 1991. Additional gin trapping at four new sites was carried out for 6 nights in February-March 1992. The traps were baited with fresh fish, changed every second day.

3. RESULTS

3.1 Pre-feed Period

Cat prints were recorded on tracking tiles at two out of 14 stations on the first check (Table 2). Baits were taken from 15/28 stations (seven with catnip and eight without). All the baits had been taken from four stations, and more than half removed from a further two stations (Table 2). Bait take had occurred at 12/28 and 8/28 stations on the second and third checks

Table 1 Bating and trapping schedules during the follow-up period.

Date	Station	No. FRI Cat Baits	Sardine bait	Type of Trap, Tiles[1]
18.11.91	All	10	-	-
22.11.91	All	10	-	-
25.11.91	8	-	-	T
	14	-	-	T
	15	-	-	T
	16	10	-	-
	18	-	-	T
	19	2	-	-
	20	2	-	-
26.11.91	8	-	-	T+G
	14	-	-	T+G
	15	6	-	T+G
	18	10	-	T+G
	19	-	-	G
	20	-	-	-
		-		
28.11.91	8	-	-	T+G
	14	-	-	T+G
	15	10	-	T+G
	18	-	-	T+G
30.11.91	8	-	-	T
	8a	-	S	G
	14a	-	S	G
	15	-	-	T
	15a	-	S	G
	18	10	-	T+G
	18a	-	S	G
2.12.91	8a	-	S	TT
	14a	-	S	TT
	15	10	-	TT
	15a	-	S	TT
	18	10	-	TT
	18a	-	S	TT

[1] T = Timm's trap baited with 4-5 FRI cat baits
G = Gin trap
TT = Tracking tiles

checks respectively (Table 2). Takes on the second check included six at stations with catnip and six at stations without catnip. Some remaining baits were nibbled, leaving tooth marks that indicated rat activity.

3.2 Poison Period

Baits containing 1080 were taken from 6/28 stations over the two night poison period (12-13 August 1991). The successful stations had all been active during the pre-feeding period (Table 2). The patterns of bait take suggest the activity of 3-5 cats (Fig. 1).

Table 2 Schedule of bait take during all three periods.

Period	Date	No. Baits Taken	Stations
Pre-feed	26.7.91	15	8,9,14,15
		10	2
		9	21
		6	12
		3	18
		2	5,10,25,27
		1	7,17,24
	4.8.91	15	7,8,9,21
		14	5
		12	12
		9	18
		8	15
		3	2,20
		2	11
		1	24
	12.8.91	9	1
		8	6
		6	22
		5	17,25
		4	2
		3	28
		2	23
Poison	14.8.91	10	9,10,21
		5	8
		2	18
		1	5
Follow-up	18.11.91	10	18,20
		9	8
		1	12,15
	22.11.91	10	15
		9	8,18
		8	16
		4	14
		1	2,7
	26.11.91	6	15
		3	18
	28.11.91	2	15

3.3 Follow-up Period

During the follow-up bait station assessment and trapping periods, no cat activity on the island was confirmed. While substantial bait take occurred at some stations (Table 2), no cat sign was found. Fresh dog prints were found in a muddy area near Station 8 which had most of its baits removed. None of the traps caught cats. Garden snails (*Helix aspera*) were found

at some stations, where baits were nibbled and had a shiny appearance.

4. DISCUSSION

The poisoning operation successfully reduced cat numbers, and probably eradicated cats from Matakohe Island. The tracking tiles confirmed that cats were taking the pre-feed baits. A total of 38 1080 baits were subsequently taken.

The clumping of successful bait stations in different parts of the island suggest that at least three cats were poisoned (Fig. 1). Cats become disoriented and uncoordinated within 1-2 hours, and die within 24 hours of eating a 1080 bait (Eason and Frampton 1991). One or two individuals were unlikely to have moved all around the island eating more baits over the two nights of the poisoning period.

Despite extensive efforts to attract cats to bait stations and traps, no cat activity was confirmed on the island after the poison operation. The bait taken in the follow-up period may have been by rats, a dog, or birds, e.g., magpie (*Gymnorhuna hypoleuca*), myna (*Acridotheres tristis*).

The acceptability of the treated baits has been confirmed in this field situation. The catnip treatment did not increase bait take. This may be because the few cats present on Matakohe Island were not catnip-responders (Tucker and Tucker 1988). While extermination poisoning would have been desirable, we were constrained by the requirements of the Northland Area Health Board which restricted the period of poisoning to two nights only. Even this short poisoning period appears to have been successful.

In other locations the longer life properties of the pelleted bait (which remain palatable for 2 or more weeks: Eason et al. 1992) might offer the potential for cheaper predator control, since bait stations containing durable cat bait could carry on killing cats long after wildlife managers had left the area.

On trips to the island during the follow-up period, in November, one pair of variable oystercatchers (*Haematopus unicolor*) and one pair of NZ dotterel (*Charadrius obscurus*) were nesting on the shore. This is the first time that these species have been found nesting on Matakohe Island in many years (Parrish 1985 and R Parrish pers comm). These records suggest a rapid positive response to reduced predator pressure from both cats and Norway rats which are important predators of eggs and chicks.

Reinvasion of Matakohe Island by cats is unlikely unless they are deliberately released there. The island is close enough to the mainland and other islands to allow Norway rats and stoats to swim across (Taylor 1984, King 1990). The eradication of cats however may allow an irruption in rat numbers on the island. There is now a pressing need for a second attempt at rat eradication.

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