

Bait-Station Spacing for Possum Control in Forest

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CONTENTS

1.	Introduction	5
2.	Background	5
3.	Objective	5
4.	Methods	6
	4.1 <i>Study area and grids</i>	6
	4.2 <i>Bait stations and bait feeding</i>	7
	4.3 <i>Possum trapping and measurement of possum abundance</i>	7
5.	Results	7
	5.1 <i>Proportions using bait stations</i>	7
	5.2 <i>Bait-station spacing and bait consumption</i>	8
	5.3 <i>Possum abundance</i>	9
6.	Conclusions	9
7.	Recommendations	9
8.	Acknowledgements	10
9.	References	10

1. Introduction

This study investigates the proportion of possums using bait stations spaced in 100, 150, and 200m grids in forest and repeats an earlier study in Westland (Thomas & McElrae 1993, unpubl. Landcare Research contract report). The study was carried out for the Department of Conservation in the Waipapa Ecological Area, Pureora State Forest Park, central North Island, in April 1994 by Manaaki Whenua - Landcare Research, Christchurch.

2. Background

Successful and cost-effective control of possums using toxic bait in bait stations is partly dependent on bait-station distribution and density. If bait stations are too sparse, many possums will fail to locate them and kills will be low. Conversely, if they are too closely spaced, unnecessary time to locate and fill them will increase operational costs.

Previous trials showed that when bait stations are spaced in a 100-m grid in forest, more than 90% of possums use them (Thomas 1992 unpubl. FRI contract report), and when 1080 bait was used in bait stations in a 150-m grid, possum numbers were reduced by more than 90% (Thomas in press). However, increasing bait-station spacing to 200 m may allow savings in operational cost because the density of bait stations located in a grid pattern decreases as grid spacing increases. Densities decrease from 1/ha to 0.44/ha to 0.25/ha for 100, 150, and 200-m grids, respectively.

(N.B. These densities are calculated with the inclusion of an area of half the spacing width around the boundaries of the grids, i.e., the “effective area” not the area enclosed by the grid).

3. Objective

- To determine the proportion of possums using bait stations spaced in 100, 150 and 200 m grids in forest.

4. Methods

4.1 STUDY AREA AND GRIDS

The study was conducted on flat terrain in mixed podocarp forest in the Waipapa Ecological Reserve, Pureora State Forest Park, Central North Island. Three grids enclosing areas of approximately 25 ha were marked out at 100, 150 and 200-m intervals using a compass and hip chain (Fig. 1)

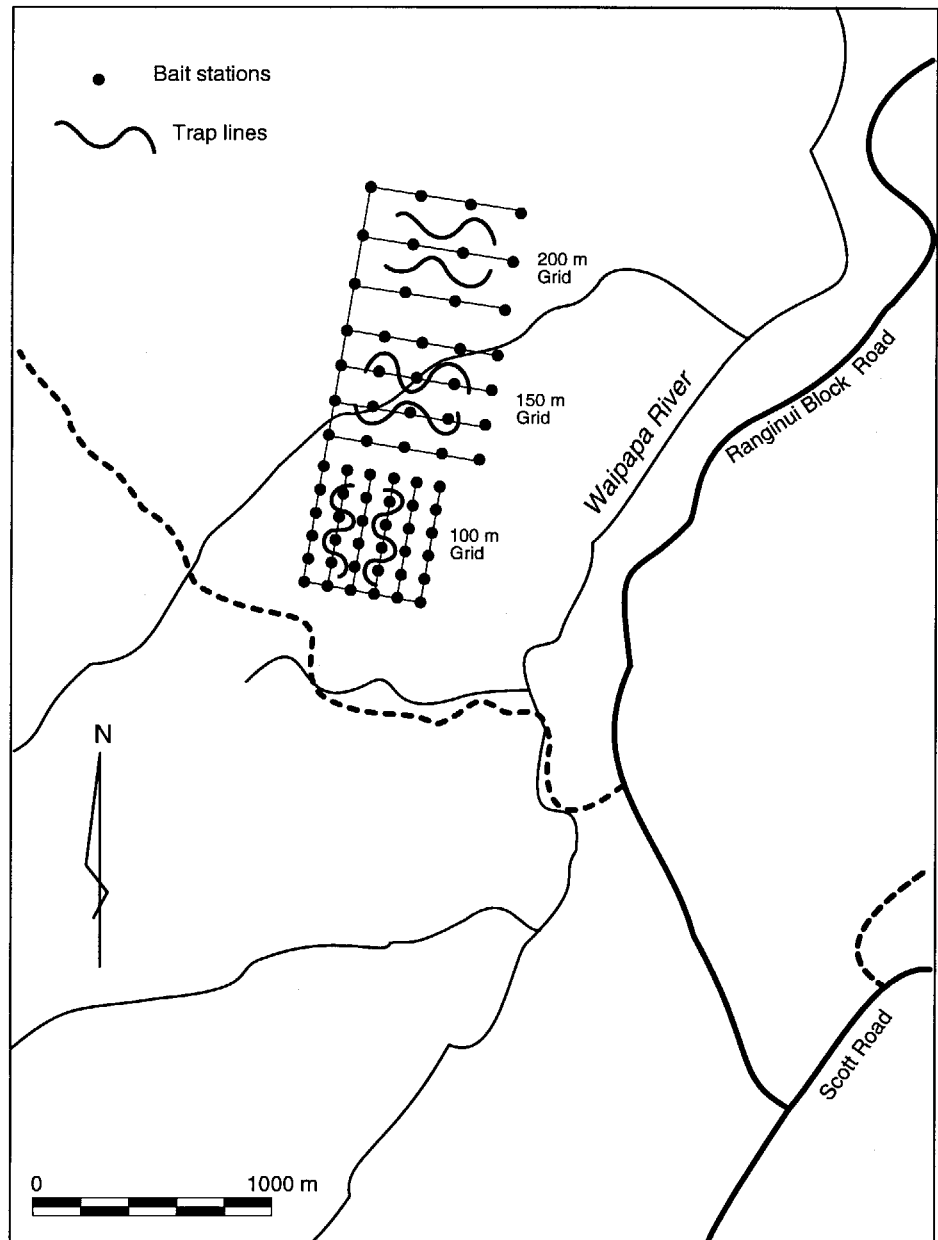


Fig. 1 Location of study site and the bait-station grids.

4.2 BAIT STATIONS AND BAIT FEEDING

“Kilmore Bait Stations”, which hold 2 kg of bait, were located 1.5 m from the ground (to prevent damage by pigs) on trees using the following grids.

100-m grid A total of 36 bait stations effectively covering 36 ha, (a bait station density of 1/ha).

150-m grid A total of 20 bait stations effectively covering 45 ha, (a bait station density of 0.44/ha).

200-m grid A total of 12 bait stations effectively covering 48 ha, (a bait station density of 0.25/ha).

The bait stations were filled twice in 2 weeks with non-toxic RS5 baits and then in the third week were filled twice with the same bait dyed with 0.5% wt/wt rhodamine-B dye (Morgan 1981). This feeding regime was used as it followed that used for prefeeding possums prior to successful possum control using 1080 bait in bait stations (Thomas in press).

4.3 POSSUM TRAPPING AND MEASUREMENT OF POSSUM ABUNDANCE

Two days after the bait stations were last filled, possums were trapped for 4 nights using 50 Victor No. 1 leg-hold traps set within each grid (Fig. 1). Care was taken not to set traps closer than 50 m to the edges of each grid to lessen the chance of capturing possums that resided outside the grids. Captured possums were killed and examined on the paws and mouth and/or in the gut for the presence of the dye. The proportion dyed in each grid was then calculated and compared between grids using χ^2 tests.

Possum abundance was assessed from the frequency of possum capture from the 50 leg-hold traps set in each grid on the first night of trapping. Capture frequencies were then compared using χ^2 tests.

5. Results

5.1 PROPORTIONS USING BAIT STATIONS

The proportion of marked possums did not reduce significantly when the grid spacing was increased from 100 to 150 m, but decreased significantly when the grid spacing was increased to 200 m ($P < 0.001$, Table 1).

TABLE 1. PERCENTAGE OF POSSUMS MARKED FROM EACH GRID (NUMBER CAPTURED IN PARENTHESIS)

	100-m GRID	150-m GRID	200-m GRID
Day 1	92 (13)	80 (10)	33 (9)
Day 2	90 (10)	81 (16)	100 (4)
Day 3	91 (11)	85 (13)	71 (7)
Day 4	78 (14)	75 (8)	19 (16)
Total	87 (48)	81 (47)	42 (36)

5.2 BAIT-STATION SPACING AND BAIT CONSUMPTION

Informal observations during trapping indicated that total consumption per bait station increased as the spacing increased. This was attributed to each bait station having to feed more possums as the spacing increased causing more rapid depletion of bait (Table 2).

TABLE 2. AVAILABILITY OF BAIT STATIONS TO POSSUMS AT DIFFERENT GRID SPACINGS

BAIT STATION SPACING (m)	BAIT STATION DENSITY/HA	ASSUMED NUMBER OF POSSUMS/HA	ASSUMED POSSUMS/BAIT STATION
100	1	4	4
150	0.44	4	9
200	0.25	4	16

There were 4 times more bait stations available to possums in the 100-m grid than in the 200-m grid, and therefore 4 times more bait available (Table 3). The more rapid depletion of bait from the 200-m grid may not have allowed sufficient time for all possums to learn of the presence of the bait. Availability of more bait may have increased the numbers of possums eating the bait.

TABLE 3. BAIT-STATION DENSITY AND THE AMOUNT OF PREFEED BAIT AVAILABLE FOR THE THREE SPACINGS.

BAIT STATION SPACING	BAIT STATION DENSITY/HA	TOTAL BAIT AVAILABLE (KG)	BAIT AVAILABLE (KG/HA)
100	1	289	8
150	0.44	160	3.5
200	0.25	96	2

5.3 POSSUM ABUNDANCE

No significant differences were recorded between catch rates in the three grids calculated from the first night's trapping.

6. Conclusions

Both the 100 and 150-m grid spacings were sufficient to ensure a high proportion of possums used the bait stations and this has been verified with high possum kills in a separate experiment (Thomas in press).

The 200-m grid proved inadequate to ensure a high proportion of possums used the bait stations. This may have been due to insufficient prefeeding and/or the bait stations being too widely spaced.

Because the bait was depleted more rapidly on the 200-m grid twice the visits would be required to prefeed the same amount of bait as used for the 150-m grid and this may negate some of the cost savings achieved using the wider spacing. A more economical option for the 200-m spacing could be to space the bait-station lines at 200 m but locate the bait stations at 100-m intervals along the lines. This would allow 4 kg/ha of bait to be prefed on four visits to the lines, the same as the 150-m spacing.

7. Recommendations

- At present a 150-m spacing should be used with 1080 bait, and possums should be prefed non-toxic bait at the rate of approximately 3.5 kg/ha, i.e., 6-8 kg/bait station.
- Possum kills with 1080 bait in bait stations spaced in a 150-m grid should be compared with kills from a modified 200-m grid (where the bait stations are spaced at 100-m intervals along the lines that are 200 m apart).

- The bait stations for the above trial should be filled 3 to 4 times with non-toxic bait i.e. 6 - 8 kg or 3 - 4 kg/ha.
- Labour costs should be recorded so the most economical spacing can be determined.

8. Acknowledgements

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