

**Animal Health Board Project No. R-10644**

**Field Efficacy of Cholecalciferol Gel Baits for Possum Control**

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PREPARED FOR:  
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DATE: September 2005



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## Summary

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### Project and Client

The effectiveness of cholecalciferol gel bait for controlling possum populations was assessed in field trials in the Hopkins Valley (South Canterbury) by Landcare Research, Lincoln, for the Animal Health Board during April–July 2005.

### Objectives

- To test the short-term effectiveness of long-life cholecalciferol gel baits in reducing a possum population of moderate to high density
- To provide efficacy data required for registration

### Methods

In two replicate trials, conducted in beech forest in the Hopkins Valley, the possum population was monitored by trap-catch before and after control at both treated and non-treated sites. Control was conducted at each treatment site by, firstly, presenting non-toxic gel as a prefeed in mid-April, followed a fortnight later by gel bait (containing 0.9% cholecalciferol) which was checked and replenished at intervals of decreasing frequency (i.e. 1–8 weeks). Three months after toxic bait was first presented, effectiveness of control was assessed from (i) the change in numbers of possums trapped before and after control along the bush-edge of the treatment sites, and (ii) mark/recapture of possums ear-tagged before control. Data from treatment sites were corrected for change recorded on the bush-edge of their associated non-treatment sites.

### Results

Population density in treatment sites before control was high as indicated by an average trap-catch of 42%. The mean trap-catch reduction at the two treatment sites, corrected for change at non-treatment sites, was 81%, while there was a 100% reduction in the recapture of tagged possums at both sites. The discrepancy was due to the effect of an average 68.5% change in trap catch at the non-treatment sites having a reducing effect on otherwise very high reductions (average of 94.2%) in the treatment blocks, while the mark/recapture-based estimate was not affected because no tagged possums were caught following control at the treatment sites. Monitoring of the interference at bait stations suggested that the population reduction occurred within the first fortnight of toxic baiting (i.e. by early May).

### Conclusions

The unexpectedly large population reductions in the non-treatment sites are believed to be mainly (possibly entirely) because possums were removed by unauthorised hunters during June (as verified by Department of Conservation staff). The effectiveness of the cholecalciferol gel was therefore underestimated by the trap-catch monitoring and overestimated by mark/recapture. The true mean population reduction was therefore between 81 and 100%. Control of the high-density population was achieved at a cost of about \$35/ha, which is similar to the cost of using other ground-based control methods. However, there is potential for the development of more efficient use of cholecalciferol gel baits, particularly where sustained control at low density is the aim.

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## 1. Introduction

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The effectiveness of cholecalciferol gel bait for controlling possum populations was assessed in field trials in the Hopkins Valley (South Canterbury) by Landcare Research, Lincoln, for the Animal Health Board during March–July 2005.

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## 2. Background

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Possum control using poison baits has traditionally been done with baits that have a field life of only a few days. This was adequate for ‘knockdown’ operations where the principal aim was to ensure a rapid reduction of possum populations to low density. However, such baits are less suitable for efficient maintenance control where surviving or recent immigrant possums are likely to encounter baits less frequently. Indeed, the use of short-lived baits in maintenance control is a strategic weakness since maintenance control may typically be applied to an area for only a few weeks of the year leaving adjoining farms vulnerable to possum-transmitted bovine Tb at other times.

Long-life baits are needed to improve the efficacy and efficiency of maintenance control. Earlier research (R15067, reported in Morgan 2002) assessed the field-life of several long-life baits by measuring the palatability and toxicity of baits sampled at 2-monthly intervals from a high-rainfall site at Taramakau Settlement, Westland. Cholecalciferol gel bait proved the most long-lived bait type tested, remaining palatable and toxic to possums for at least 26 months. A preliminary field trial conducted along bush-edge in the Kokatahi Valley, Westland, showed that this bait type had considerable potential for long-term suppression of possum populations. Although success was initially limited by lack of interference with bait stations because they were placed out of reach of cattle, once bait stations were made more conspicuous and accessible, efficacy was improved. This suggested that more prolonged use of easily accessible gel baits may have eventually resulted in significant declines in the bush-edge possum populations. The potential efficacy of the bait at 5 and 12 months was confirmed by collecting samples in the field and testing them against captive possums. While also having access to their normal diet, captive possums ate large amounts of the gel bait (i.e. mean consumption of 5-month gel was 75 g, and for 12-month gel was 45 g). Mean times until death and mean weight loss at death were similar to the ranges of values previously recorded for cholecalciferol baits (Morgan & Milne 2002).

Since the earlier part of the study predicted that cholecalciferol gel bait should remain effective for longer than 2 years in the field, this new tool has the potential to achieve ‘continuous’ control rather than the present ‘pulsed’ annual control. Furthermore, because the product is known to be relatively unattractive to non-target species (Morgan 1999), its use offers a means of improving the environmental safety of possum control. However, the product is not yet commercially available because robust data on efficacy are required from field trials to meet ACVM registration requirements; these specify that, based on at least two replicate estimates, ‘products must be capable of killing at least 80% and preferably 90% of

the population present'. To gain such data, field trials were planned in collaboration with Kiwicare Corporation and DOC to assess effectiveness in the short term.

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### 3. Objectives

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- To test the short-term effectiveness of long-life cholecalciferol gel baits in reducing a possum population of moderate to high density
- To provide efficacy data required for registration

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### 4. Methods

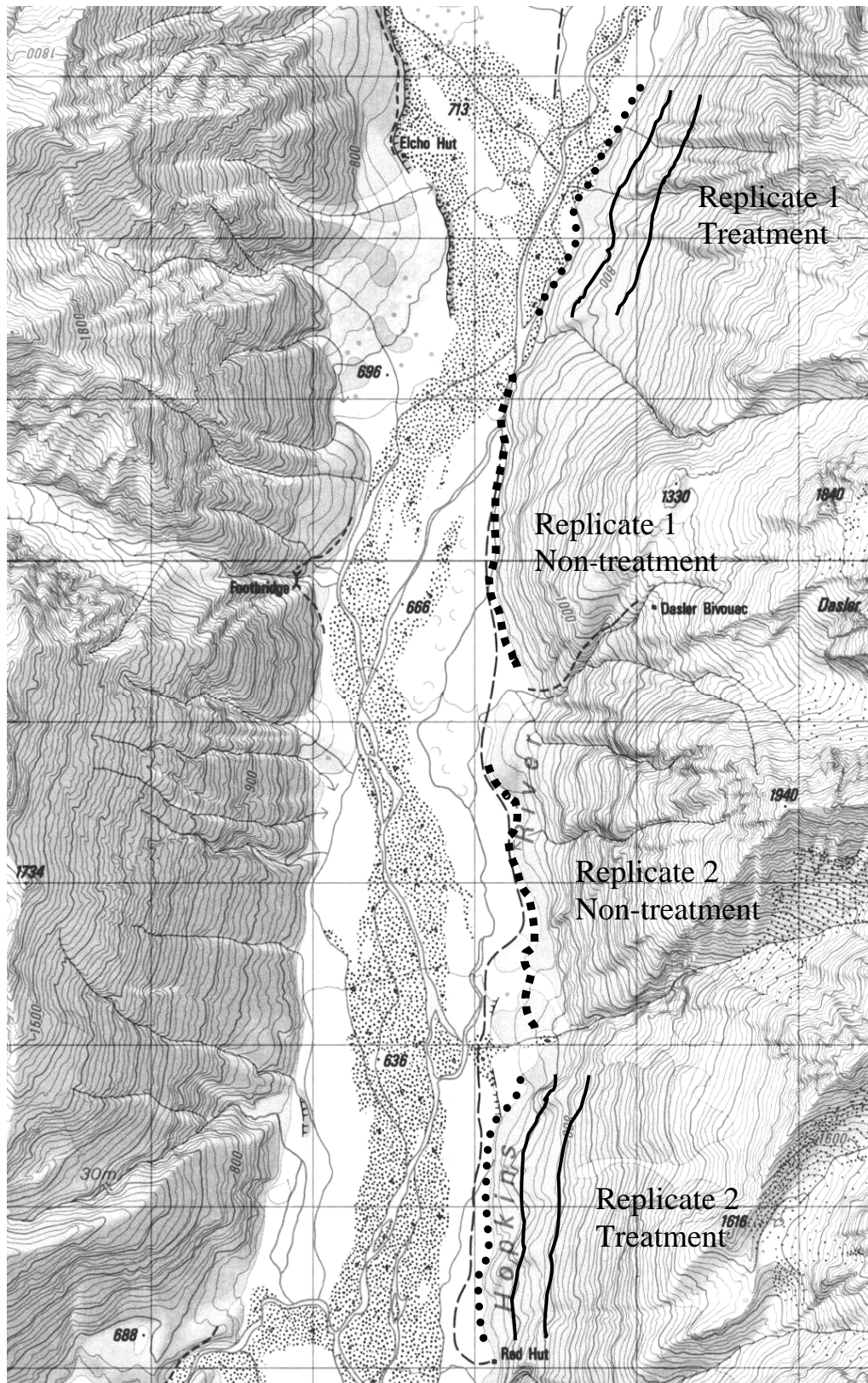
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#### 4.1 Study area

The study was conducted in beech forest in the Hopkins Valley, Canterbury, in conjunction with DOC, Twizel. Four areas of contiguous beech forest, each with a bush-edge measuring 2 km, were identified (Fig. 1) that met the following requirements: possum population density was considered to be moderate to high, livestock and ground-dwelling birds (i.e. kiwi and weka) were absent thus enabling the use of ground-set traps, and the probability of human interference (e.g., poaching) was low. Appropriate permits for the trial were then obtained from Department of Conservation, ACVM (Provisional Registration to permit a field trial), and the Medical Officer of Health, and signs were displayed in the area advising the general public of the trial.

#### 4.2 Preliminary bait quality assurance and assessment of the suitability of a bait station

Non-toxic and toxic gel bait (containing nominally 0.8% wt:wt cholecalciferol) was prepared by Kiwicare Corporation for preliminary tests. Palatability of non-toxic gel was assessed relative to fresh RS5 pellets using 20 possums, each offered a choice of 100 g of each bait type. Consumption was corrected by the mean change in three samples of each bait type unavailable to possums. Palatability was calculated from each possum's consumption of gel bait expressed as the percentage of total consumption, and a mean value of palatability then calculated. Three random samples of toxic gel bait were assayed for cholecalciferol content. Toxic gel was also tested for palatability (as above), and efficacy was assessed from the percentage of animals killed after eating bait. A plastic container (Fig. 2) was identified that was considered suitable for presenting small quantities of gel (100 g) at close spacing in the field. The suitability of these for field use was assessed by presenting four bait stations of two thicknesses (0.25 and 0.4 mm), with and without gel bait, to pairs of penned possums and assessing the consumption of bait, spillage, and damage to bait stations over five nights.



**Fig. 1** Map of study site in the Hopkins Valley, South Canterbury. Circular dotted lines indicate location of monitoring lines and bait stations in treatment areas. Additional lines of bait stations are indicated by solid lines. Square dotted lines indicate location of monitoring lines in non-treatment areas.

### 4.3 Population monitoring

An initial trap-catch assessment was conducted along the bush-edge of each of the four sites (i.e. two treatment sites and two non-treatment sites) during 16–19 March 2005. Victor 1-inch hard-catch traps were set along 10 lines of 5 traps, with traps set approximately 20 m apart, and lines separated by 100 m. To eliminate significant injuries, trap chains were fitted with spring tensioners and trap sites were cleared of obstructions to avoid entanglement. Traps were lured with a blaze of 5:1 flour/icing sugar applied approximately 50 cm vertically up the tree trunk, and set and relured for three consecutive, fine nights. All trapped possums were recorded, ear tagged, and released.

Post-control monitoring was carried out during 21-23 July 2005 following the same procedures, except that all possums were killed, and recapture of ear-tagged animals was recorded.



**Fig. 2** Cholecalciferol gel bait, prepackaged in a plastic bait station being stapled to a tree.

### 4.4 Treatment

The four sites were first divided into two pairs within which treatment and non-treatment were randomly assigned (Fig.1). At treatment sites, cholecalciferol bait, prepackaged in 100 g quantities in plastic bait stations (see Fig. 2), were deployed by stapling the bait stations to trees at a height of 30–40 cm above ground. A photoluminescent lure-tag (Pest Control Research, Christchurch) was also stapled to the tree at a height of about 1 m above ground, directly above the bait station. Bait stations and lure-tags were established approximately 20 m apart along the bush edge, and also along two additional lines (at 25 m spacing) running parallel to the bush edge at 200 and 400 m perpendicular distance from the bush edge. This

was designed to provide control of both resident possums at the bush edge and transients moving from within the bush to the bush-edge. Initially, non-toxic baits were deployed as prefeed during 4–6 April 200. Two weeks later, interference was assessed (check 1) and the baits were replaced with cholecalciferol gel baits which were inspected at successive intervals of one week (checks 2–4), two weeks (check 5), and two months (check 6). Toxic baits were therefore presented for approximately three months. At each check, baits were replaced if less than 20% of bait remained, and the percentage amount of bait removed at each of the 531 bait stations since the last check was calculated.

#### 4.5 Data analysis

Trap-catch data were analysed using ‘PestCalc’ version 1.23 (2002) to calculate mean trap catches before and after control, and percentage change. The proportion of ear-tagged possums recaptured after control was used to provide a second estimate of percentage change. For both methods, the mean changes in these parameters in the non-treatment sites were used to correct mean treatment site values enabling estimation of the mean percentage change attributable to treatment (i.e. the mean percentage kill) and its standard error.

If no control had occurred, then similar pre:post ratios for both trap-catch or numbers of tagged possums trapped would be expected in the treatment and non-treatment site of each replicate trial.

Therefore:

Expected  $Post_t/Pre_t = Post_{nt}/Pre_{nt}$  (where subscripts  $t$  and  $nt$  indicate treatment and non-treatment respectively)

and so,

Expected  $Post_t = Pre_t * Post_{nt}/Pre_{nt}$  if no control had occurred.

The kill was therefore estimated for both monitoring methods by:

$$\% \text{ Kill} = ((\text{Expected } Post_t - Post_t) / \text{Expected } Post_t) * 100$$

## 5. Results

### 5.1 Preliminary bait quality assurance

Preliminary testing indicated that the cholecalciferol gel bait was suitable for use in the field trials. Mean palatability of the non-toxic gel was high at 74.4% (S.E. = 10.6%) (full data in Appendix 1). Three samples of toxic gel showed values of 0.8, 0.98, and 0.94 % wt:wt of cholecalciferol and therefore cholecalciferol concentration on average (i.e. 0.91%) was 14% greater than the nominal concentration. When toxic gel was presented to caged possums, mean palatability was 50.6% (S.E. = 15.9%), and 85% of possums were killed with most dying in 4-6 days (full data in Appendix 2). This result was considered to be a conservative

indication of likely field efficacy due to the simultaneous presentation of RS5 pellets (for palatability assessment), another palatable bait of proven operational performance. Nevertheless, this result indicates a reduction in palatability due to the inclusion of cholecalciferol.

In pen trials of the bait stations, a mean of 70% (SE=12.4%) of the gel bait was eaten during the first night and the remainder was eaten over the next four nights. About 5 g of gel (i.e. 0.6% of total presented) was noticed as spilt from only one of the eight bait stations presented. Over the 5 nights none of the bait stations of either thickness (with or without gel) were damaged, and the design was therefore considered suitable for the field trial.

## 5.2 Efficacy of cholecalciferol gel by reduction in trap catch

The possum population density along the bush-edge of the study area was high (31-67% trap-catch) before control (Table 1). Reductions in trap catch exceeding 90% were recorded in the treatment sites of both replicates, but unexpectedly large reductions were also recorded in the non-treatment sites. When these were taken into account, the estimated mean kill was 81.2% (S.E. = 5.6%).

**Table 1** Estimation of % kill in each replicate trial based on trap catch before and after control.

Replicate	Site	Change recorded in trap catch			Corrected treatment data and % kill	
		Mean trap-catch		% reduction	Expected Post <sub>t</sub>	% kill
		Pre	Post			
1	1 (treated)	31.3	1.3	95.8	10.0	87.0
1	2 (non-treated)	31.4	10.0	68.1		
2	4 (treated)	53.0	4.0	92.5	16.3	75.5
2	3 (non-treated)	67.0	20.6	69.2		

## 5.3 Efficacy of cholecalciferol gel by recapture of tagged possums

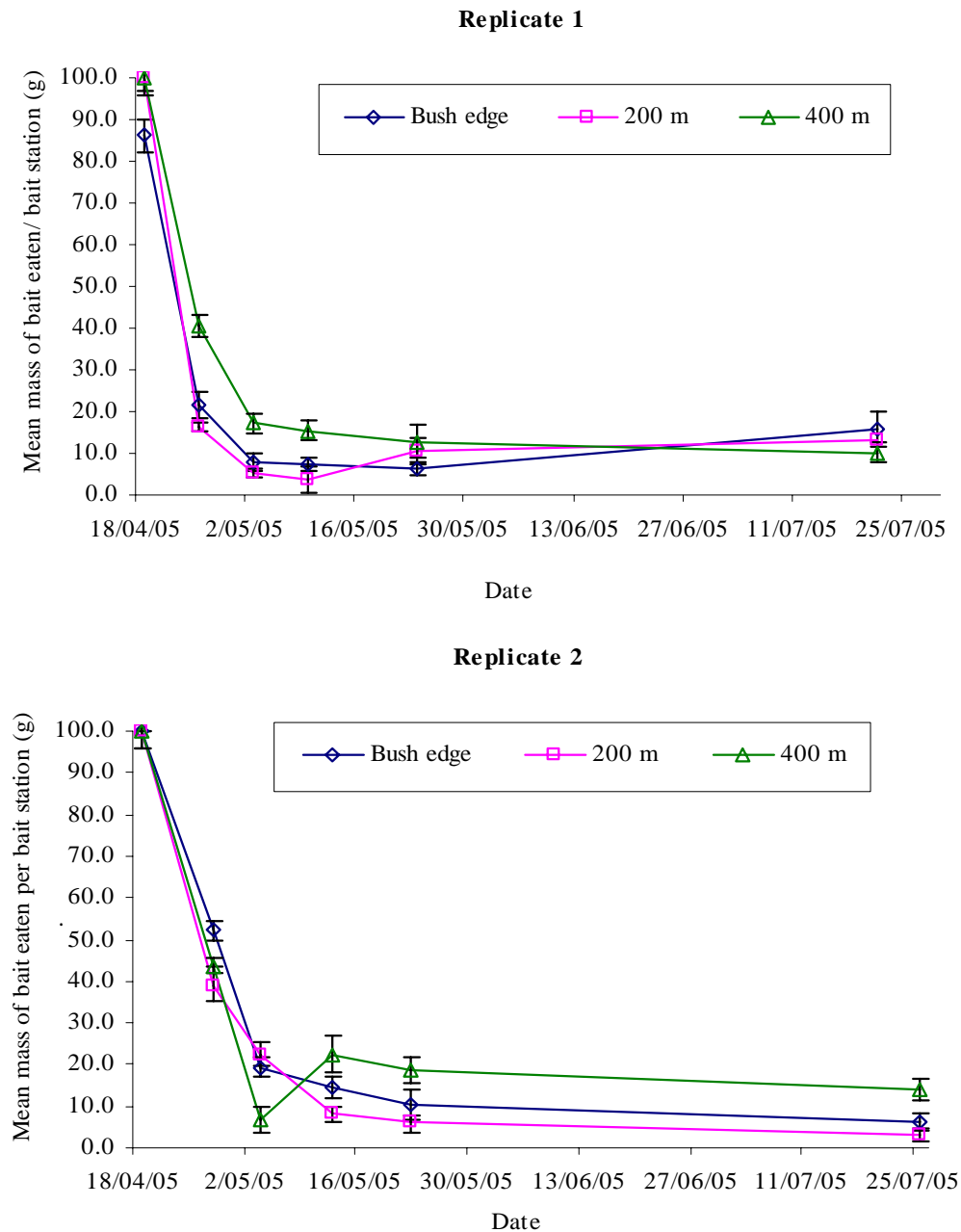
A combined total of 92 possums were tagged and released in the treatment sites, and 100 possums in the non-treatment sites (Table 2). Only 15-16% of animals tagged in the non-treatment sites were recaptured. However, no tagged possums were recaptured in the treatment sites, and the estimated mean kill was therefore 100% (S.E = 0%).

**Table 2** Estimation of % kill in each replicate trial based on recapture of ear-tagged possums.

Replicate	Site	Recapture of tagged possums			Corrected treatment data and % kill	
		No. possums		% reduction in capture	Expected Post (treated)	% kill
		Pre	Post			
1	1 (treated)	33	0	100	4.7	100
1	2 (non-treated)	28	4	85.7		
2	4 (treated)	59	0	100	9.8	100
2	3 (non-treated)	72	12	83.3		

## 5.4 Bait interference

Most of the non-toxic prefeed bait had been removed when bait stations were inspected after two weeks (Fig 3).



**Fig 3** Mean quantity of bait eaten per bait station ( $\pm$ SEM) on three lines in each treatment site. Baits were initially non-toxic (i.e. at 19/04/05 measurement) and thereafter toxic.

On replacing with toxic bait, about 30% was removed at site 1 (replicate 1) and 50% at site 4 (replicate 2) after one week. The reduced consumption is attributed to: (i) possums being killed, (ii) the reduction in appetite that occurs after possums ingest cholecalciferol (Morgan & Milne 2002), and (iii) lower palatability of the toxic bait compared with non-toxic (see

5.1). By the final check, when all remaining baits had been exposed for at least 2 months, about one third had become partly detached from bait stations, while at 16 bait stations the gel had become completely detached and was found on the ground. Characteristic tooth marks in the gel indicated that most removal was due to possums, but 56 bait stations showed evidence of removal by rodents (with mice and rat tooth marks not being clearly distinguishable) of 2-15% of bait when toxic baits were checked after the first week, but not at any later checks. There was no evidence of interference by other non-target species.

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## 6. Discussion

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Cholecalciferol gel baits achieved control (81% kill) that was as effective as that required by the ACVM standard (at least 80% and preferably 90% of the population present). However, this result is conservative and is likely to have underestimated the actual kill because of the large reduction recorded in the non-treatment blocks. This reduction is believed to have resulted at least in part (and perhaps entirely) from reported non-permitted removal of possums in early June along the bush edge in these areas, despite our initial assessment of a low risk of poaching in the area and posting of information signs in the area. When the monitoring results prompted investigation, it was confirmed that a DOC employee encountered possum hunters who had been working in the area for about a week in June (personal communication from M. Beardsley, DOC Twizel). Possum carcasses were also found by Project field staff along the bush-edge of the non-treatment sites during post-control monitoring, but it is not known if any tagged possums were removed from the non-treatment sites by the hunters (which could have preempted their recapture and led to overestimation of kill). The effectiveness of the cholecalciferol gel was therefore underestimated by the trap-catch monitoring. Furthermore, since 8 possums were caught in the treatment sites after control (from 300 trap-nights), the estimate of 100% reduction given by mark/recapture is an overestimate, suggesting that some tagged possums may indeed have been removed by hunters. The true reduction was therefore between 81 and 100%.

The bait consumption data indicate that control was achieved within 2 weeks of replacing non-toxic baits with toxic, despite the high population density (i.e. mean of 42% trap-catch) recorded before control. Thereafter, some further bait removal was recorded throughout. While continuing bait consumption may have been expected along the uppermost (i.e. 400 m) bait station lines where immigration into the treated area probably occurred, it was not expected on other lines, and hence, the data are thought to reflect measurement errors. Accurate estimation of the amount of bait eaten at each bait station became progressively more difficult, particularly at the final check, due to a number of suspected causes. For example, the 100-g gel baits used for this trial resulted in baits being less stable than those previously assessed (i.e. 500 g) in a study of the durability of bait under field conditions (Morgan 2002). The smaller baits were more prone to becoming detached from the container when interfered with by possums. This may have resulted in more rapid dehydration and shrinkage of the bait than previously observed, and consequent overestimation of removal. Baits that came completely detached and fell to the ground may have been overlooked in the leaf litter, or been removed by rats to caches. If the smaller 100-g bait is considered to be a desirable size for commercial production, some redesign of the bait-station mould is

advisable to prevent bait detachment, such as the creation of ridges in the base of the bait station to provide a better surface for adhesion.

Rodents interfered with toxic baits during the first week, and since no later interference was recorded, this suggests that, either, these animals were killed, found the bait unpalatable, or developed bait shyness after consuming a sub-lethal quantity. The impact on rodent populations was not assessed in this study but recent cage trials (pers. comm., C. O'Connor) indicates that palatability to rodents of the present formulation of gel bait is low.

Although the study was designed to assess the level of control that could be achieved using cholecalciferol gel bait rather than identifying 'best practice', an indication of its relative efficiency can be inferred. The area of each treatment site encompassed by the three lines of bait stations was approximately 100 ha. At each site, baits were presented at a total of 265 locations. The cost of non-toxic baits is likely to be around \$3, and \$6 for each toxic bait (personal communication M. Carson, 29 August 2005). Photoluminescent tags cost 65 cents and assuming they can be reused 10 times, an additional 6.5 cents is added per bait station location. Bait stations and tags were deployed at each site in one day by two people, and so a labour cost of \$1000 is assumed for two visits. Therefore, the total cost of materials and labour used in prefeeding and a single presentation of toxic bait (i.e. no replacement) is estimated at \$35/ha. Since the bait consumption data indicate that the measured population reduction was probably achieved by these two phases of baiting alone, this cost compares favourably with the \$32-39/ha range of costs estimated for the materials and labour used in four other established ground-based baiting methods (Speedy 2003). However, because gel baits remain palatable and toxic for at least 26 months under field conditions (assuming they do not become detached from bait stations), and because the baits were deployed at a close spacing, there appears to be potential for reducing both the cost of materials and labour in seeking a more efficient baiting strategy that may also provide for sustained control rather than the pulse of control followed by population recovery achieved by other baiting methods. Furthermore, deployment of cholecalciferol bait for prolonged periods presents lower risks than other bait types because the bait type itself is unattractive or unpalatable to non-target species of concern (Morgan 1999), and incorporation of cholecalciferol offers a further margin of safety towards non-target species (Eason et al. 2000). It would appear therefore that cholecalciferol gel bait presents a promising new option for achieving long-term control of possum populations.

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## 7. Conclusions

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- The estimated mean kill from trap-catch of 81% was underestimated due to poaching in the non-treatment sites.
- The estimated mean kill from mark-recapture of 100% was overestimated as some (unmarked) possums were trapped in the treatment blocks after control.
- The actual mean kill was between 81% and 100%.
- The cost of achieving this level of control of a high-density population was around \$35/ha (similar to other ground-based methods), but more efficient practice should be feasible, particularly where sustained control at low density is the aim.

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## 8. Acknowledgements

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I wish to thank the Animal Health Board for contracting this research and the Department of Conservation (Twizel) for their generous field support throughout this study. In particular, Mark Beardsley provided extensive logistical support, and bait deployment and checking was done by Louisa Hines, Murray Hills, Kevin Donohue and Greg Johnson. Martin Carson of Kiwicare Corporation (Christchurch) was most helpful in ensuring that supplies of bait were manufactured and delivered as required. I also thank colleagues within Landcare Research including: Morgan Coleman and Steve Hough for conducting the trap-catch monitoring; Julie Turner and staff at the Landcare Research Animal Facility for conducting cage and pen trials; Geoff Wright for assaying toxic baits; and, Bruce Warburton, Penny Fisher, Phil Cowan and an anonymous reviewer for constructive comments on the manuscript.

As the study involved the killing of animals by an experimental method, approval was obtained from the Landcare Research Animal Ethics Committee (approval 05/02/01).

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## 9. References

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## 10. Appendices

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Appendix 1: Palatability test report - non-toxic gel bait

Appendix 2: Palatability/efficacy test report - toxic gel bait



## Appendix 1: Palatability test report - nontoxic gel

Test species: Possum  
 Date: 13-Jan-05  
 Treatment: Non-toxic gel (Kiwicare)  
 Control: Non-toxic 6g RS5 pellets (ACP)

Manufactured: 05-Jan-05  
 Manufactured: 01-Oct-04



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### Wt. change controls

#### Control:

Start wt.(g)	End wt.(g)	Corr.	Mean
100.3	99.4	1.009	1.007
102.8	102.2	1.006	
101.4	100.7	1.007	

#### Treatment:

Start wt. (g)	End wt.(g)	Corr.	Mean
97.9	94.6	1.035	1.035
105.1	101.7	1.033	
96.5	93.1	1.037	

Study Director: D.R.Morgan

Data recorder: K.Washbourne

Data input: D.R.Morgan

### Consumption of treatments

#### Control:

No.	Sex	Wt. (kg)	Given (g)	Left (g)	Corr. left (g)	Corr.eaten (g)
6	M	2.55	101.6	101.3	102.0	0.0
7	F	2.62	101.0	55.4	55.8	45.2
8	F	3.24	99.2	79.7	80.3	18.9
10	M	2.68	101.8	90.9	91.6	10.2
13	F	3.36	101.0	56.4	56.8	44.2
14	F	3.29	101.3	100.1	100.8	0.5
16	M	2.85	100.4	75.3	75.8	24.6
23	M	3.40	99.7	35.8	36.1	63.6
24	F	3.64	102.5	84.0	84.6	17.9
29	F	3.31	101.0	72.8	73.3	27.7
26	F	3.46	100.0	62.8	63.3	36.7
31	F	2.42	101.6	100.9	101.6	0.0
32	M	4.00	101.8	30.6	30.8	71.0
33	M	3.31	100.7	93.3	94.0	6.7
34	F	3.69	99.2	96.3	97.0	2.2
35	F	3.59	101.1	100.3	101.0	0.1
36	M	2.85	99.9	81.8	82.4	17.5
37	F	3.89	102.2	95.1	95.8	6.4
38	F	4.12	100.7	57.1	57.5	43.2
39	F	3.80	100.2	99.6	100.3	0.0

Mean 21.8  
 SD 22.1  
 SEM 10.0  
 N 20.0

#### Treatment:

Given (g)	Left (g)	Corr. left (g)	Corr.eaten (g)
95.1	15.4	15.9	79.2
100.8	55.6	57.5	43.3
101.7	53.5	55.4	46.3
104.0	44.3	45.8	58.2
97.7	81.6	84.5	13.2
98.1	26.7	27.6	70.5
95.0	35.2	36.4	58.6
96.3	39.8	41.2	55.1
97.1	31.1	32.2	64.9
101.1	31.9	33.0	68.1
98.8	20.7	21.4	77.4
98.7	42.1	43.6	55.1
97.8	54.7	56.6	41.2
104.4	68.8	71.2	33.2
102.2	0.0	0.0	102.2
101.0	38.5	39.8	61.2
100.4	44.6	46.2	54.2
97.4	52.2	54.0	43.4
102.0	62.2	64.4	37.6
99.2	76.9	79.6	19.6

Mean 54.1  
 SD 20.7  
 SEM 9.4  
 N 20.0

#### Treatment palatability

(%)  
 100.0  
 48.9  
 71.0  
 85.0  
 23.1  
 99.3  
 70.5  
 46.4  
 78.4  
 71.1  
 67.8  
 100.0  
 36.7  
 83.2  
 97.9  
 99.9  
 75.6  
 87.1  
 46.6  
 100.0

Mean 74.4  
 SD 20.0  
 SEM 23.5  
 N 10.6



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**Appendix 2: Palatability/efficacy test report - toxic gel**

**Test species:** Possum  
**Date:** 03-Mar-05  
**Treatment:** Cholecalciferol gel bait (Kiwicare) **Manufactured:** 28-Feb-05 **Chole assay %:** 0.91  
**Control:** Non toxic 6-g RS5 pellets (ACP) **Manufactured:** 31-Jan-05 (Toxicology Lab test report T2354)

**Wt. change controls**

<b>Control:</b>				<b>Treatment:</b>			
Start	End	Corr.	Mean	Start	End	Corr.	Mean
wt. (g)	wt. (g)			wt. (g)	wt. (g)		
100.3	98.4	1.019	1.017	484.0	484.2	1.000	0.999
100.2	98.7	1.015		488.0	489.2	0.998	
100.6	99.0	1.016		490.0	490.0	1.000	

**Study Director:** D.R.Morgan  
**Data recorder:** K.Washbourne  
**Data input:** D.R.Morgan

**Consumption of treatments**

<b>Control:</b>							<b>Treatment:</b>					<b>Treatment palatability</b>	<b>Treatment efficacy</b>	<b>Days to death</b>	<b>Weight at death (kg)</b>	<b>% weight loss</b>			
No.	Sex	Wt. @ 03-Mar-05	Given (g)	Left (g)	Corr. left (g)	Corr.eaten (g)	Given (g)	Left (g)	Corr. left (g)	Corr.eaten (g)	Dose (mg/kg)	%	(Died/Survived)						
1	M	3.14	100.2	89.1	90.6	9.6	488.8	453.6	453.2	35.5	0.0	78.7	D	5	2.81	10.5			
3	M	4.09	100.2	98.6	100.3	0.0	489.0	443.8	443.4	45.5	0.0	100.0	D	5	3.92	4.2			
5	M	4.47	100.4	48.0	48.8	51.6	486.0	472.2	471.7	14.1	0.0	21.5	D	4	4.21	5.8			
7	F	3.17	100.4	3.7	3.8	96.6	487.8	478.4	477.9	9.7	0.0	9.1	D	5	2.99	5.7			
9	F	2.58	100.7	66.1	67.2	33.5	486.0	457.9	457.5	28.4	0.0	45.9	D	10	2.07	19.8			
11	F	2.92	100	41.1	41.8	58.2	489.1	477.7	477.2	11.7	0.0	16.8	D	4	2.64	9.6			
13	F	3.74	100.5	48.7	49.5	51.0	487.0	437.4	437.0	49.9	0.0	49.5	D	5	3.56	4.8			
15	M	3.34	100.2	87.3	88.8	11.4	488.6	460.9	460.5	28.0	0.0	71.0	D	5	2.95	11.7			
17	M	2.68	100	79.4	80.7	19.3	487.4	468.9	468.5	18.8	0.0	49.4	D	4	2.49	7.1			
19	M	2.59	100.3	33.6	34.2	66.1	492.0	489.2	488.7	3.1	0.0	4.5	S	-	-	-			
21	M	3.97	100.4	15.5	15.8	84.6	492.3	489.1	488.6	3.5	0.0	4.0	S	-	-	-			
23	F	2.94	100.9	97.3	98.9	2.0	487.8	462.2	461.8	25.9	0.0	93.0	D	13	2.19	25.5			
33	F	4.42	100.2	63.3	64.4	35.8	488.7	458.3	457.9	30.7	0.0	46.2	D	5	4.09	7.5			
35	M	4.39	100	98.7	100.4	0.0	486.2	440.0	439.6	46.5	0.0	100.0	D	4	4.00	8.9			
37	M	4.01	100.1	61.3	62.3	37.8	486.4	483.8	483.3	2.9	0.0	7.2	S	-	-	-			
39	M	4.53	100.7	39.7	40.4	60.3	487.4	468.8	468.4	18.9	0.0	23.9	D	5	4.26	6.0			
41	F	3.17	100.4	98.8	100.5	0.0	488.6	463.7	463.3	25.2	0.0	100.0	D	4	2.99	5.7			
43	M	3.84	100.6	50.5	51.4	49.2	488.6	441.5	441.1	47.4	0.0	49.1	D	7	3.27	14.8			
45	M	3.95	100.7	100.2	101.9	0.0	486.6	477.9	477.4	9.0	0.0	100.0	D	8	3.51	11.1			
47	F	3.18	100.7	60.1	61.1	39.6	484.6	455.8	455.4	29.1	0.0	42.4	D	4	2.80	11.9			
					<b>Mean</b>	<b>35.3</b>						<b>Mean</b>	<b>24.2</b>	<b>0.0</b>	<b>50.6</b>	<b>Total=85%</b>	<b>Mean</b>	<b>5.7</b>	<b>10.0</b>
					SD	29.6						SD	15.3	0.0	35.2		SD	2.5	5.7
					SEM	13.4						SEM	6.9	0.0	15.9		SEM	1.3	2.9
					N	20						N	20	20	20		N	17.0	17.0