August 2011
Issue 2

The Marlborough Rabbit

Special Interest Articles:

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RHD Immunity Testing

Every year Council Biosecurity staff shoot samples of rabbits from various locations within the region to test the level of immunity against the RHD virus.

This sampling is carried out in mid-late April each year as young rabbits born the previous spring/summer would have only been exposed to one epidemic of the virus which historically flares in Autumn. If they survive and get 'sampled', this information is important for understanding how rabbits are building resistance.

With all the results now in, the immunity data can be collated against the two age classes - Young and Adult.

From here, a percentage immunity figure can be obtained to represent that particular sample for the year at that location.

Results

2011 Sampling Site	Overall Immunity	Young Immunity	Adult Immunity
Honeymoon (Upper Awatere) (n=20)	65%	45% (n=11)	100% (n=8)
Tone (Upper Awatere) (n=26)	65%	59% (n=22)	100% (n=2)
Long Range (Upper Awatere) (n=26)	77%	80% (n=15)	83% (n=6)
Avon Valley (n=25)	80%	82% (n=17)	75% (n=8)
Wairau Valley (n=28)	79%	77% (n=13)	80% (n=15)

* Note - not all eyeball samples were usable hence the disparity between the Young, Adult and Total sample size (n).

RHD Sampling Discussion

Taking samples from the Wairau Valley

The main area of interest with the 2011 results was the relationship of immunity data with current rabbit population levels.

The Tone and Honeymoon sample sites were subjected to large scale aerial control in 2007. Population levels have been suppressed with maintenance and numbers are still low-medium.

The other three sampling sites have experienced substantial population increases in the last 2-3 years. As a result the sample was obtained from high rabbit population levels.

The results suggest that knocking the population to low levels can result in an increase in 'help' from the RHD virus.

Current Rabbit-related Research Update

Landcare Research commenced a block of rabbit-related research as a flow-on from the Lough report produced in 2009.

Three main research themes are:

a) looking at current (50 year old) practices of sowing aerial 1080 carrot and possibilities of fine tuning rates;
b) assessing various secondary control practices and investments; and
c) addressing concerns over the residues and non-target risks of Pindone as it is being used more in the landscape.

Extracts from the most recent issue of the Landcare Kararehe Kino magazine highlights this research which can be found appended to this newsletter.

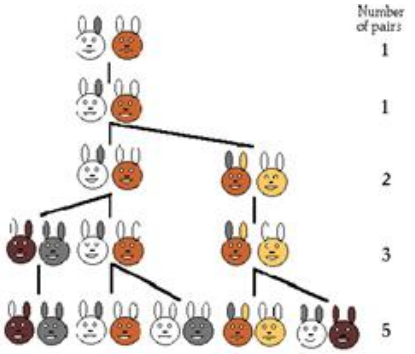
For those who are interested, full copies of the Vertebrate Pest Research magazines can be found at:

www.landcareresearch.co.nz/publications/newsletters/index.asp.

Alternatively, email jono.underwood@marlborough.govt.nz for a copy.

An example of a rabbit-proof fence in Central Otago

Curly Question?



Fibonacci Sequence

As early as 1200AD, the famous mathematician Leonardo Fibonacci tried to establish how fast rabbits would breed under ideal circumstances. Using some obvious (out far from reality) assumptions, and the number of pairs per month as a base, the Fibonacci sequence was born.

"Each number is the sum of the previous two numbers"

Question: Using the Fibonacci sequence, how many pairs of rabbits would there be after 12 months?

Hint - Use the figure to the left as the first 5 months.

Answer on Page 4.

Envirolink Small Advice Grant – Possible 'New' Rabbit Toxins

Rising out of the wealth of research into alternative toxins for 1080 and possum control, a Small Advice Grant (SAG) was applied for by Marlborough District Council. This SAG was to allow Lincoln University primary toxin specialist, Dr Charlie Eason, to assess both novel and recently registered toxins for their possible suitability for use with rabbits.

The report highlighted two possible toxins that would show promise: microencapsulated zinc phosphide and sodium nitrite.

Zinc phosphide has been readily used in the United States and Australia for rodent control. It is nearing registration in New Zealand in a paste form for possum and could be readily applied to carrots. A cereal bait is also under development for possums which could be useful for rabbits.

Sodium nitrite is a common meat preservative found in salami. However, at higher doses it is a highly effective and humane toxin.

Current research has been targeted at possums and pigs. It was suggested this toxin would be very suitable for application in cereal baits for rabbits.

Both of these toxins have very low secondary poisoning risks which makes them that much more desirable.

BUT – assessing and registering toxins for use is a very time consuming and expensive process. This issue is currently being discussed at the Rabbit Coordination Group Forum.

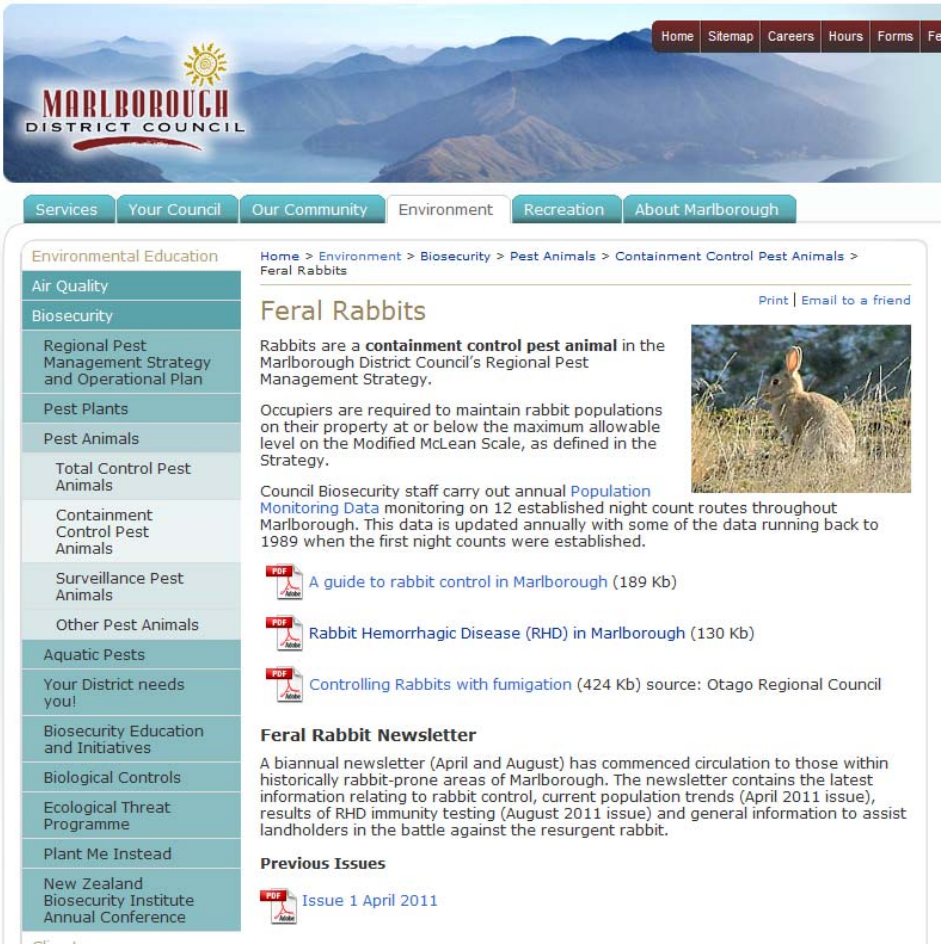
Feral Rabbit Website 'Beefed Up'

To help provide as much information as possible, the feral rabbits webpage has now been 'beefed up'.

You can find the regional Population Monitoring data, some basic guides to rabbit control, RHD information and previous issues of this newsletter.

Just navigate through the Council website (www.marlborough.govt.nz) as shown to the right.

Feral rabbits are a Containment Control Pest Animal.



Poison Licensing

A Controlled Substance Licence (CSL) is required to broadcast spread Pindone pellets. A CSL and Approved Handler Certificate is required for other rabbit-related vertebrate pest toxins.

For further requirements, contact an ERMA approved Test Certifier.

Test Certifiers serving Marlborough:

- CanTrain NZ Limited (Geoff Allinson)
  Phone: 027 493 3034 or Mobile: 027 675 1929
  Email: geoff.allinson@xtra.co.nz
- AsureQuality (David Harman)
  Phone: 03 545 7772 or Mobile: 021 752 179
  Email: harmand@asurequality.com

Cereal Pellet Trailer for Hire

Council has recovered a spreading trailer (with tyne) from the Service Delivery era that was used primarily for oats in the past.

It has also been tested and calibrated for use with Pindone pellets.

It is available for hire at **NO COST** on the proviso that best practice instructions are followed. This can involve getting it dropped off with a short induction on its use.

For details and bookings, please contact Jono Underwood (jono.underwood@marlborough.govt.nz; 520 7503; 021 911 480).

Please Note – a Controlled Substance Licence for Pindone is an ACVM requirement to broadcast Pindone (see "Poison Licensing" to the left).

Suppliers/Useful Contacts

Poison Products

Enquire through your rural supply store, or through your service provider.
Direct contact can also be made with:

Pest Management Services

Phone: 03 348 9293
Fax: 03 348 9291
www.nopests.co.nz

Service Providers

Tasman Pest Control

Contact: Bruce Waddell

PO Box 17
Brightwater
Nelson 7051

Phone: 03 542 4347
Mobile: 027 212 3849

Service Providers

Excell

PO Box 171
Kaikoura 7340

Phone: 03 319 5084
Fax: 03 319 5839
Mobile: 021 687125
bsmith@excellcorp.co.nz

Feral Animal Services

Contact: Nick Latter

63 Gibsons Road
RD 3
Blenheim 7273

Phone: 03 572 7353
Mobile: 021 0263 1283
feral.a.s@farmside.co.nz

Service Providers

Andrew Withers

Mt Riley Road
RD 1
Havelock 7178

Phone: 03 572 9565
Mobile: 021 270 2849
valleypestcontrol@paradise.net.nz

Amuri Rabbit Control

Contact: Jason Hawker

226 Pahau Downs Road
Culverden 7392

Phone: 03 315 8369
Mobile: 027 542 2888
www.amurirabbit.vpweb.co.nz

Council gives no warranty as to the accuracy, completeness or currency of the Service Providers listed. Nor does it make any statement on the competence or other technical attributes of the listed parties. Council recommends that persons wishing to avail themselves of the services of any one of the listed operators undertake their own enquiry as to the suitability of that party.

Curly Question Answer (Page 2): 144 pairs (46,368 pairs after 24 months)

Impact of rabbits (and sheep) on drylands

Regional pest management strategies for rabbits set indices of rabbit density above which landowners are generally obliged to conduct rabbit control. Most strategies set these trigger points at an index of 3–4 on the McLean's Scale (an exponential index of 1 to 10 based on rabbit sign). In the Mackenzie Basin, a McLean's Scale Index of 3 translates to about 2 rabbits/km and an index of 4 equates to about 8 rabbits/km on the alternative spotlight-count index. While the relationships between the indices and actual rabbit densities are unclear, these trigger indices are based on the expectation that rabbits at such densities (and before the outbreak of rabbit haemorrhagic disease) rapidly increase to very high levels unless control is instituted. If the decision to control is left too late, the costs of control are substantial.

Such input-based justification for control is weak when arguments arise as to the real benefits of rabbit control. Surprisingly, few people have measured the effect of changing rabbit densities on vegetation growth, at least in the rabbit-prone drylands in the eastern South Island. John Parkes and colleagues set out to remedy this: they measured vegetation growth across seasons at six sites in three places in Otago using a series of plots that allowed access by both rabbits and sheep, just rabbits, and neither rabbits nor sheep. The team knew the density of sheep at each site and indexed rabbit density (rabbits/km) on spotlight routes across the sites. They then used the data to model the effects of changing rabbit and sheep numbers on the seasonal growth rate of the vegetation.

To illustrate model predictions, on the two most degraded sites (in the foothills of the western Dunstan Mountains), if there were neither sheep nor rabbits present, pasture biomass was predicted to grow in spring, just grow in summer, and decline in winter. If there were no sheep but the number of rabbits varied from 5, 10, and up to 50 rabbits/km, then pasture growth was predicted to stop in summer at 5 rabbits/km, almost stop in spring and decline in summer and winter at 10 rabbits/km, and not grow in any season at 50 rabbits/km. This same pattern was revealed at the less degraded sites in the foothills of the Old Woman Range and in eastern Otago at Macraes Flat, although the model predicted some pasture growth in spring and summer even at 50 rabbits/km.

John's team also used the model to predict maximum stocking rates for sheep in each season given different rabbit densities but still allowing for at least zero or some pasture growth. On the most fertile site, some sheep could be grazed even where rabbit densities exceeded about 30 per kilometre, except in winter. On the least vegetated site, a few sheep could be grazed where densities were below 10 rabbits/km but only in spring (*Fig.*).

Using this approach, for example, a farmer that needed at least 5 ewe-equivalents/ha to farm profitably, and did not wish to see a reduction in pasture biomass between years, could achieve this stocking rate year-round on the most productive dryland sites studied if rabbits were held below about 5 per kilometre, but only in the spring on the least productive sites. Therefore, as a rule of thumb, setting intervention triggers at McLean's Scale 3–4 seems about right

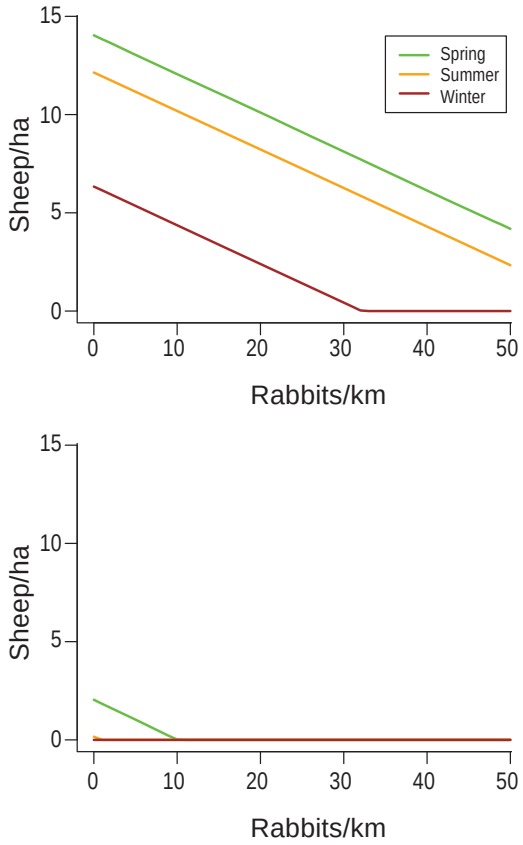


Fig. *Maximum stocking rates for sheep at the most (top) and least (bottom) vegetated sites for spring, summer and winter under varying rabbit densities. Note: the summer and winter lines coincide at zero sheep per hectare on the least vegetated site.*

for land with moderate amounts of vegetation but is unlikely to allow badly degraded land to recover, or to support sustained sheep grazing at economic stocking rates.

The team next seeks to partition pasture growth by species (palatable and unpalatable) and turn their estimates of benefit (ewe-equivalents/ha) into some measure of on-farm economic benefit (the value per stock unit) to compare with the costs of various forms of rabbit control. This approach will demonstrate whether control on one part of the farm is being 'subsidised' from other parts of the farm or requires input from external funders, and whether investment in research to make rabbit control (especially expensive aerial poisoning, which is required for rabbits at high densities) more efficient and so reduce the need for subsidies.

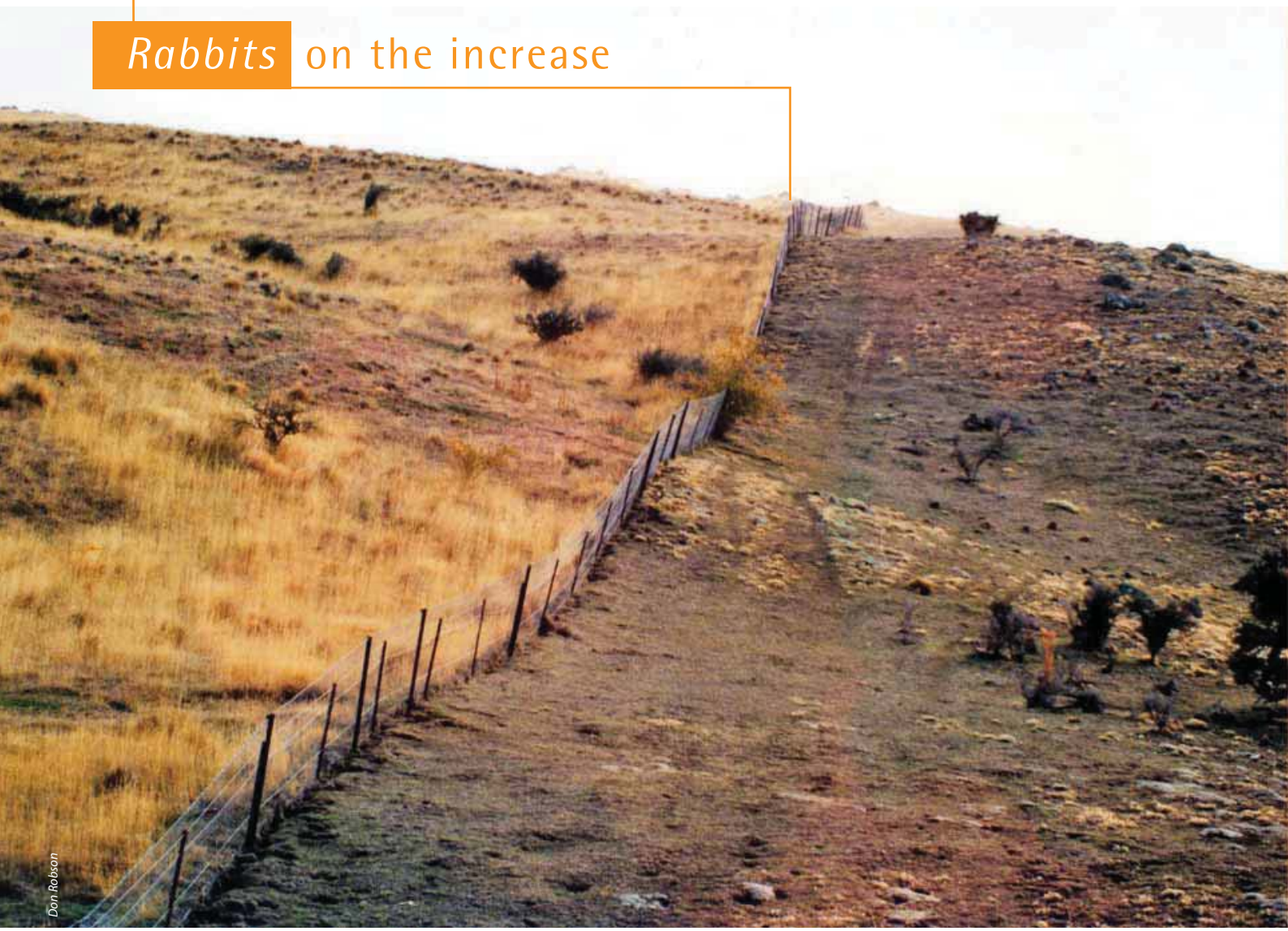
This work was funded by the Ministry of Science and Innovation.

John Parkes
parkesj@landcareresearch.co.nz

Ben Reddiex, Richard Heyward, Grant Norbury, Andrea Byrom.

Michael Scroggie (Arthur Rylah Institute in Melbourne) developed the model.

Rabbits on the increase



Don Robson

Dryland habitat in Central Otago with (right) and without (left) rabbits.

It is somewhat intriguing that in the Chinese Year of the Rabbit, there is growing concern about the numbers of rabbits infesting our drylands. In 1997, rabbit numbers over large areas of New Zealand were decimated by rabbit haemorrhagic disease (RHD). However, in the intervening years their numbers have recovered, due mainly to rabbits developing immunity to the RHD virus.

Such increases in rabbit numbers have led to a resurgence in the use of conventional control tools, including baiting with either 1080 or pindone. Landowners are required to control rabbits when numbers exceed specified population levels (see Parkes et al. p. 17 in this issue) and some landowners are again incurring high rabbit control costs.

It is therefore perhaps not coincidental that for the first time in more than 10 years, Landcare Research scientists, led by Bruce Warburton, have received funding from the Crown to extend recent research on possum control to the control of rabbits.

The research has three main strands: (1) reducing the cost and amount of toxic bait used in aerial baiting, (2) identifying cost-effective strategies currently used by farmers for secondary control, and (3) understanding the toxicology of pindone poisoning in order to reduce the cost of application and impacts on non-target species.

As a first step, published papers and reports from previous relevant research were catalogued within a searchable web-accessible bibliography (http://rabbits.landcareresearch.co.nz). The catalogue helped identify key research that could be used to update current best practice for controlling rabbits with aerially sown 1080-carrot bait. Such control typically involves sequential sowings of 20–40 kg each of prefeed (non-toxic) and toxic bait per hectare, depending on rabbit density, and costs up to $100 per hectare. Based on research into baiting for possums, Bruce believes that current bait sowing rates and control costs for rabbits are too high and can be significantly reduced.

To test this hypothesis, Bruce and his team are working with staff from Regional Services (Otago Regional Council) to develop and run a series of trials this winter to test a range of different bait sowing rates and applications (*Table*). Even if the lowest toxic sowing rates (i.e. treatments 5, 6, 7 in the *Table*) are not effective, the team is confident treatments 3 and 4 will be. If so, the cost of control should be reduced by as much as 50% and the sowing rate of bait by 66%.

Some farmers undertake secondary control of rabbits to slow or halt population recovery. To determine how control is currently being carried out, farmers are being interviewed by James Smith to identify the control methods they use based on variations in habitat, percentage cover, farming practices, and the density of rabbits on their property. Preliminary results show that investment in rabbit control varies greatly; some farmers have long-standing control programmes costing tens of thousands of dollars per year, whereas others invest very little, instead relying on the RHD virus and the efforts of meat shooters to suppress rabbit numbers.

Farmers and rabbiters engaged in control use a wide range of tools to limit rabbit populations. Shooting is the most common control method used, though its application varies. For example, in areas where access by 4WD or motorbike is possible, night shooting is effective when rabbit densities are low. On steeper, less accessible country, rabbits are shot from helicopters. Other complementary methods include fumigation of burrows and patch-poisoning with pindone.

Pindone (a first-generation anticoagulant toxin) is used by some farmers and contractors to control rabbits because of the regulatory and stock-withholding-period requirements when using 1080. However, baiting with pindone raises concerns over toxin residues and risk to non-target species. Penny Fisher has been assessing the residual concentrations of pindone in tissues from caged rabbits after they have eaten a lethal amount of pindone and has found relatively high levels of the toxin in rabbit liver and fat. Tissue testing is ongoing, and the final results will be used to review assessments of risk to non-target species that prey on or scavenge rabbits, such as Australasian harriers and dogs.

Table. *Sowing rates of prefeed and toxic bait and flight-path spacing for each treatment (T1–T7). SR = sowing rate. Note T1 is current best practice as applied by Regional Services.*

	Prefeed 1 SR (kg/ha)	Prefeed 2 SR (kg/ha)	Toxic bait SR (kg/ha)	Flight-path spacing (m)	Approximate cost/ha	Quantity of bait relative to T1
T1	30	30	30	25	$75	100
T2	30	30	10	75	$56	33
T3	30	10	10	75	$40	33
T4	30	10	10[1]	75	$40	33
T5	30	10	5	75	$39	10
T6	30	10	5	75	$39	10
T7	10	10	5	75	$23	10

[1] The difference between T3 and T4 is that the swath width of toxic bait in T4 is reduced from 25 to 10 m.

This work is funded by the Ministry of Science and Innovation (Programme C09X1007).

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Dave Latham, Graham Nugent, James Smith and Penny Fisher


Don Robson