



RHDV for Rabbit Biocontrol – an update

Janine Duckworth



RHDV1 K5

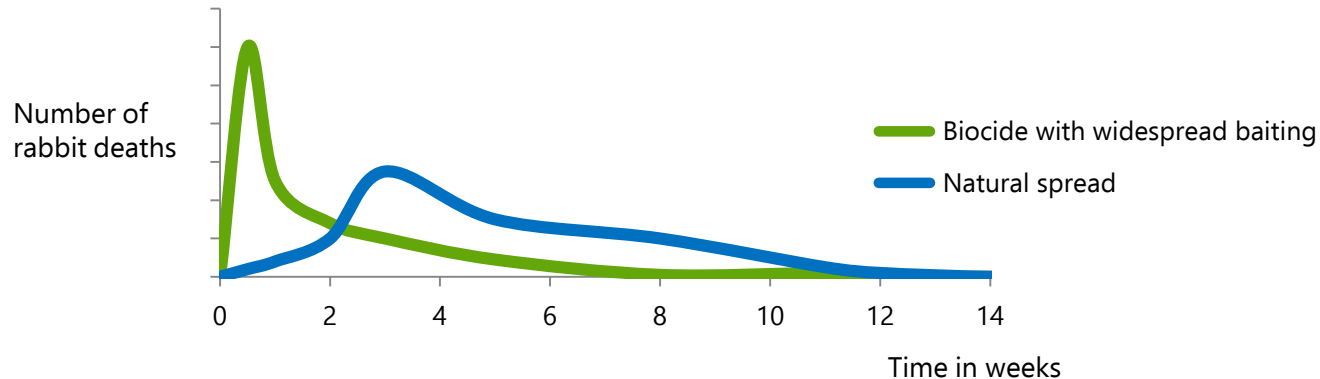


- potentially significant biological control tool for pest rabbits
- not a new virus - a Korean strain of the existing RHDV1 (Czech) strain already widespread in New Zealand
- selected for release in Australia because it can better overcome the protective effects of the non-pathogenic calicivirus (RCV-A1) which occurs in the feral rabbit populations in both Australia and New Zealand
- may assist in overcoming resistance of rabbits to the old virus
- RHDV1 K5 not a silver bullet for rabbit eradication, and a long-term integrated approach to controlling pest rabbits is required
 - Not expecting the huge knockdown experienced in 1997
 - Rabbits no longer a naive population and virus competing with existing strain
- expect to boost knockdown by 25-40% (variable 0 to 70%) - depends on the rabbit population and the number of susceptible animals within the population



RHDV1 K5 Release (March 2018)

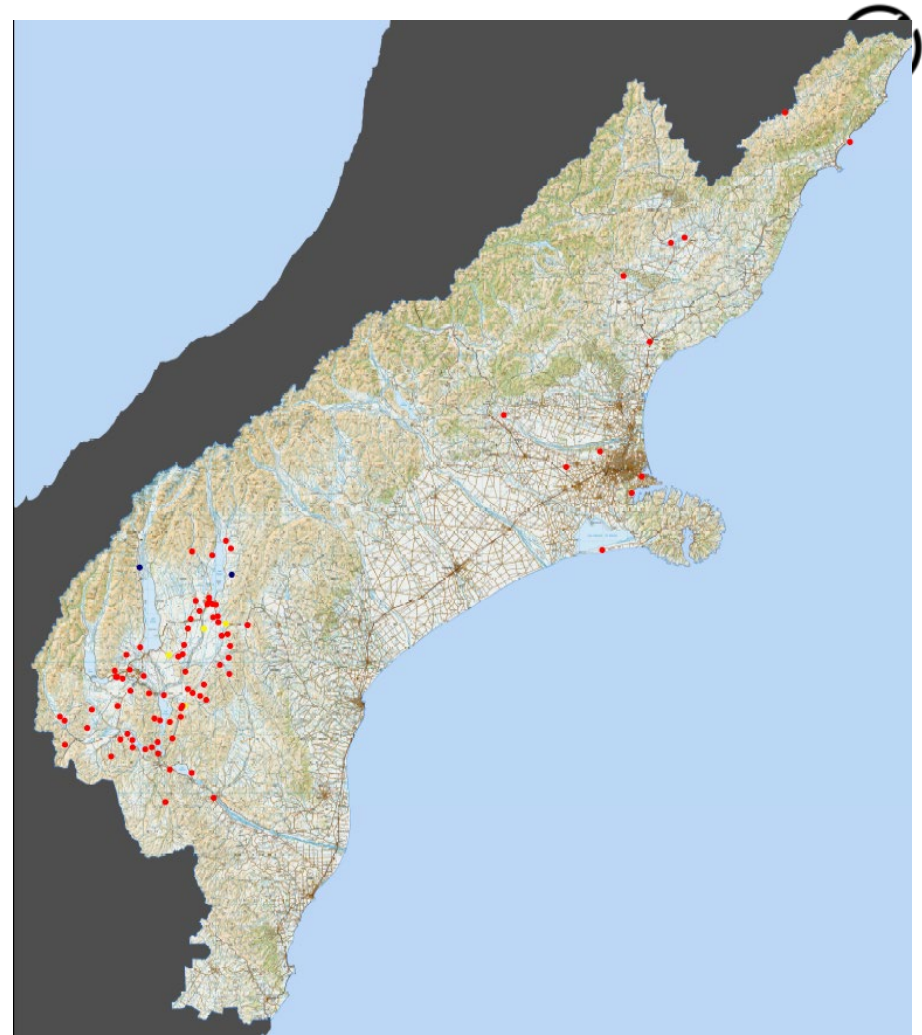
- Released at sites selected by participating local councils (up to 20 km apart)
- Autumn release preferred - when numbers of young rabbits are low and fly vectors are active
- Pre-feeding with untreated carrot or oat bait - essential to ensure good uptake when treated bait is applied
- High quality, commercially prepared product
- Aim to leave site undisturbed to allow the virus to establish and spread
- Assuming rate of spread ~ 7 km per month over 3 months



Release and Distribution

- 450 vials of K5 were imported into NZ in March 2018.
- 8 of the 12 Regional Councils and 2 of the 4 Unitary Authorities participated in the release.
- Northland, Taranaki, Horizons and Westcoast RCs did not participate as the impact of rabbits in these regions is negligible due to unsuitable habitat.
- A total of 271 releases have been undertaken nationally to date with Auckland Council planning 40 releases in 2019.
- The breakdown by regions is:

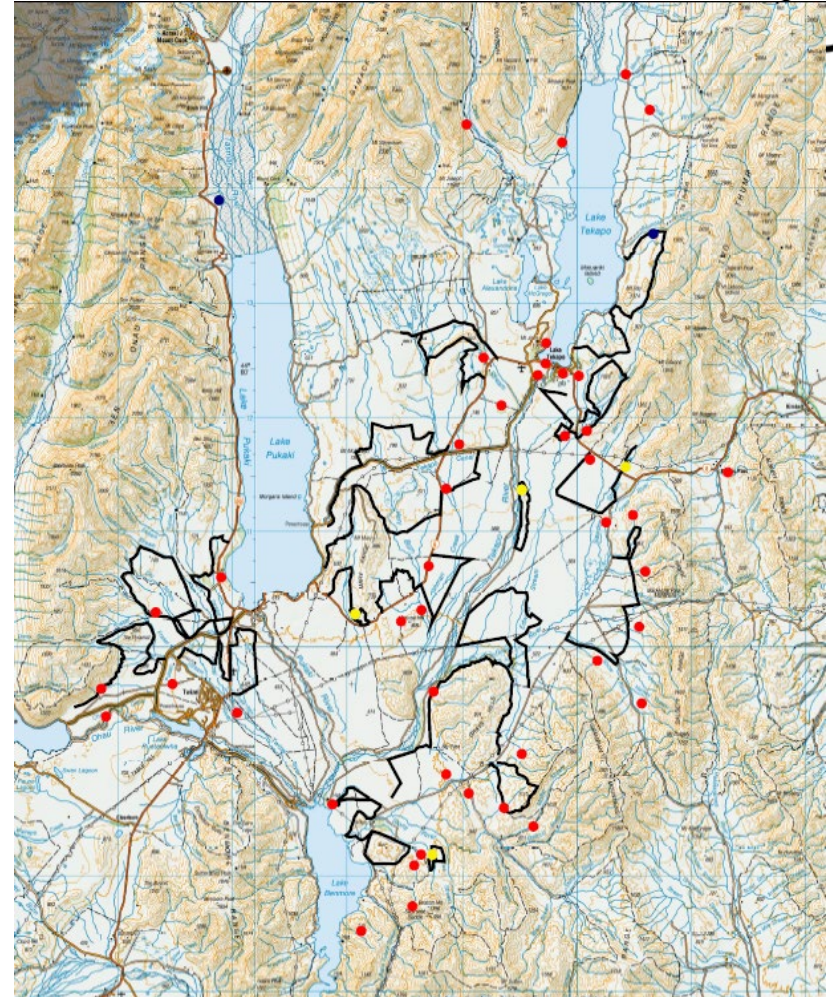
Southland	6
Otago	110
Canterbury	92
Marlborough	13
Tasman	6
Wellington	30
Bay of Plenty	4
Waikato	10



Results: Canterbury Night Counts

- Six to eight weeks post-release night spotlight counts across the 129kms of transect and 4 high-country stations the average reduction was 40%
- Reflects combined impact of K5, Czech, natural mortality and any tradition control.
- On a property basis the reduction ranged from 0%-70% reduction

Graham Sullivan & Brent Glentworth
Environment Canterbury





Research on RHDV1 K5 movement

- To understand the movement of RHDV virus across the landscape
- 4 science study sites (2 Otago and 2 Canterbury) each with 10 satellite sites 1 to 5 km from each release sites
- Monitored temperature, rain and wind direction and speed
- Measured fly abundance
- Collected rabbit carcasses and set up camera traps
- Measured presence of virus in flies and carcasses
- Recorded impact on rabbit numbers
 - Presenting preliminary data today

RHDV1 K5 Release –Science sites

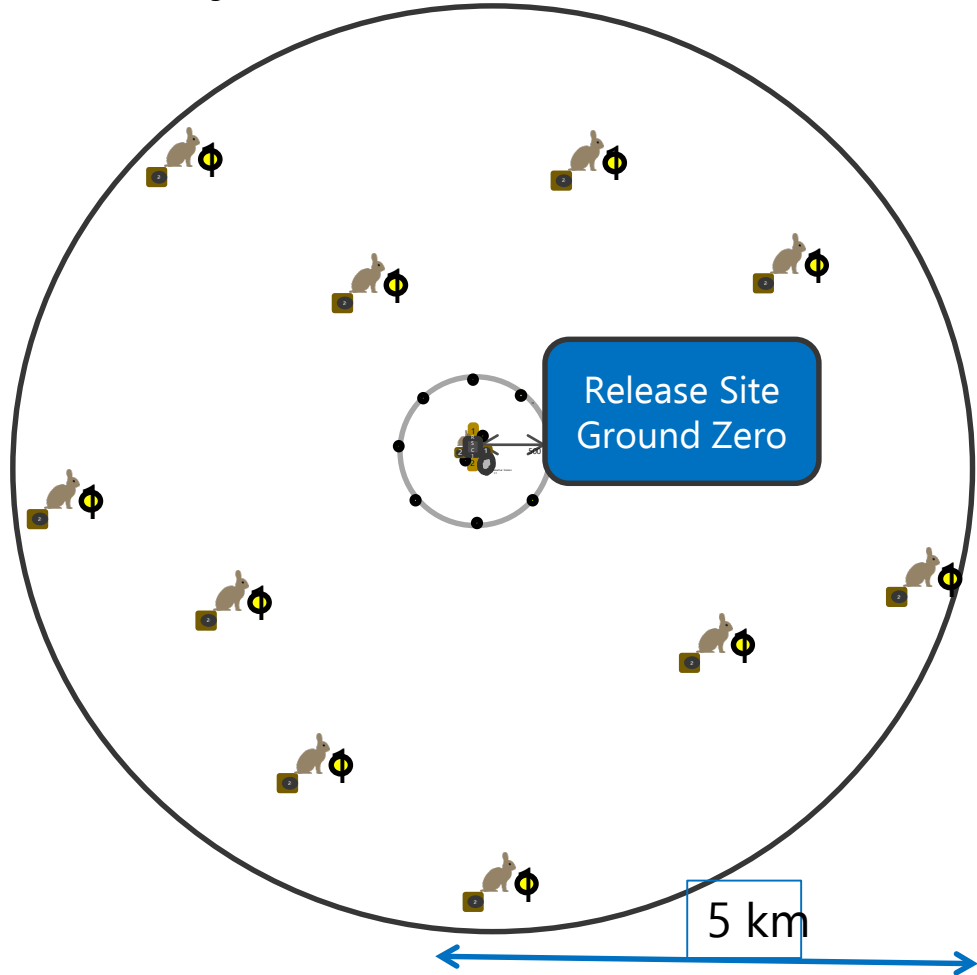


Scientific Study Sites



Monitoring the release and ten satellite sites within 5 km of release

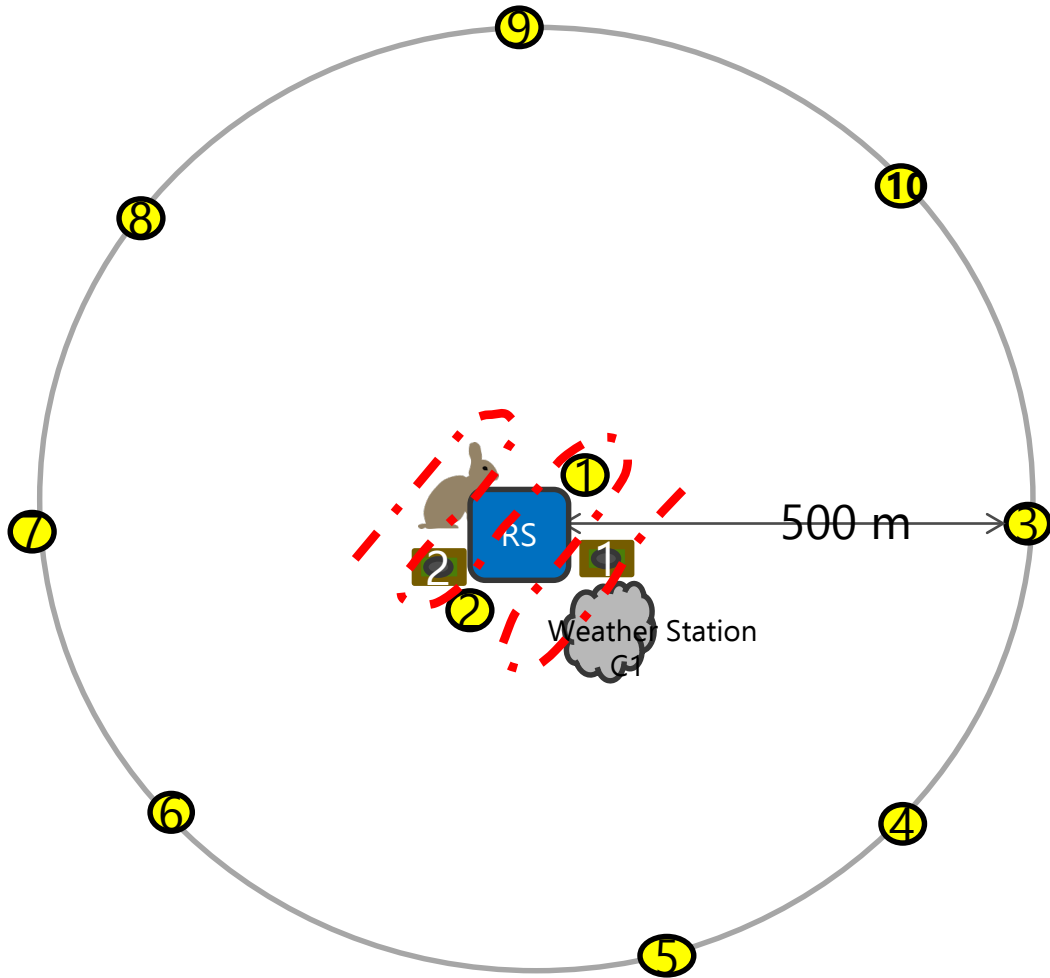
- Wind strength and direction, temperature and rainfall
- Using fly traps to identify fly species
- Using fly traps to collect and analyse viral RNA present on flies
- Numbers of live and dead rabbits over time at each satellite site
- Night spotlight counts



Release Site - Ground Zero



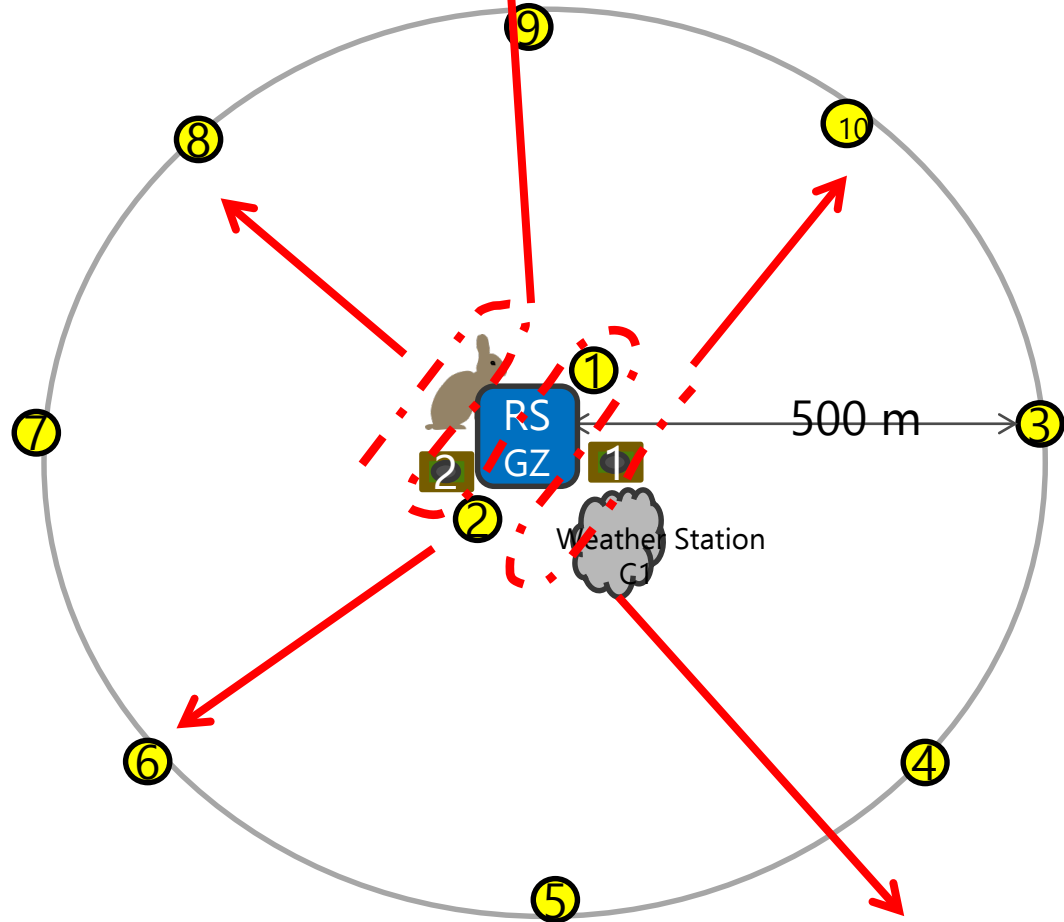
- Release site
- Fly trap
- Camera trap
- Active rabbit area
- Weather Station
- Bait zone



Release Site - Ground Zero



-  Release site
-  Fly trap
-  Camera trap
-  Active rabbit area
-  Weather Station
-  Bait zone





Manaaki Whenua
Landcare Research

**RHDV1 K5
Release –
Science site
RS3
Glentanner**



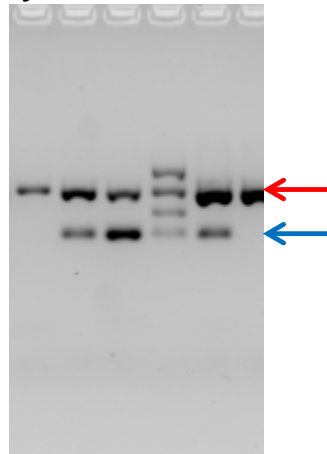
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RHDV1 in flies

1 week before RHDV1 K5 release



3 days after RHDV1 K5 release



Release Site 4 Canterbury

- Original RHDV1 – Czech strain detected in flies at all sites prior to release
- Post release- RHDV1 K5 was also present at all sites in flies
- Over 2000 samples to be analysed - looking at rate of spread and persistence



Research Sites - RHDV1 in dead rabbits



	Pre-release RHDV1 Czech	Post-release RHDV1 K5	Post-release RHDV1 Czech	Total
RS1 Cardrona	1	1	-	5
RS2 Ida Valley	0	0	0	6
RS3 Glentanner	5	4	2	27
RS4 Mt Hayes	1	1	1	5



43 rabbit carcasses recovered (excluding shot/very old)

- Carcasses hard to recover - lots of predators present (cats, ferrets, hawks)
- RHDV1 Czech present pre-release
- Post release: 64% RHDV1 K5, 36% RHDV1 Czech
- No RHDV1 K5 in carcasses at Ida Valley but present in flies
- Virus rate of spread - 53 m to 130 m per day – 1.6–4km/month

RHDV1 K5 Impacts



Night count summary- 6 weeks post release

	Night count pre-release
RS1 Cardrona	107
RS2 Ida Valley	68
RS3 Glentanner	192
RS4 Mt Hay	24

- Moderate to high rabbit numbers
- Varied from 24 to 192 rabbits per km spotlight count



RHDV1 K5 Impacts



Night count summary- 6 weeks post release

	Night count pre-release	Night count Post-release	% reduction
RS1 Cardrona	107	94	12%
RS2 Ida Valley	68	35	48%
RS3 Glentanner	192	121	36%
RS4 Mt Hay	24	9.6	61%

- Overall 39% reduction
- Varied from 12% to 61% decrease



RHDV1 K5 Impacts



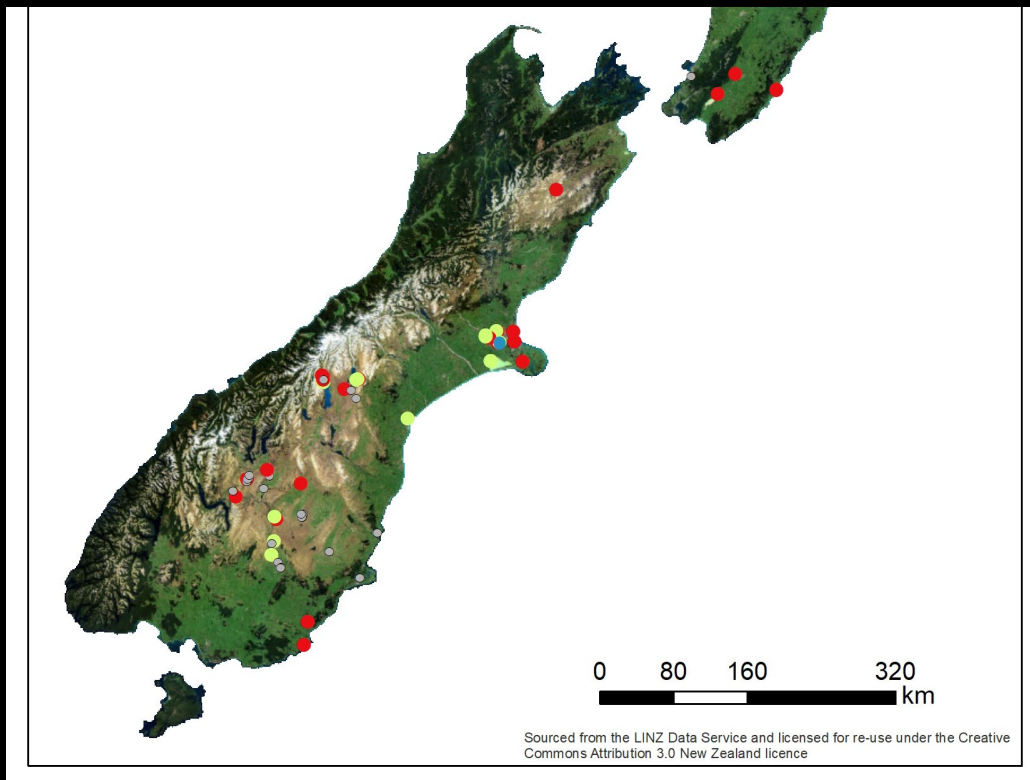
Night count summary- 6 weeks post release

	Night count pre-release	Night count Post-release	% reduction	Seropositive RHDV % Pre
RS1 Cardrona	107	94	12%	86 %
RS2 Ida Valley	68	35	48%	90 %
RS3 Glentanner	192	121	36%	68 %
RS4 Mt Hay	24	9.6	61%	52 %

- Overall 39% reduction
- Varied from 12% to 61% decrease
- Moderate to high immunity present
- Highest reduction associated with lowest % immunity



RHDV1 K5 National Release



Rabbit samples for RHDV1 (August 2018)

- Submitted for testing
- RHDV1 Czech
- RHDV1 K5
- negative



RHDV1 K5 Impacts - Summary

Other wild rabbit samples (councils & public): n=43/88 RHDV positive

- 67% RHDV1 K5
- 26% RHDV1 Czech
- 6% RHDV2 (n=3 rabbits from 2 locations)

Virus Impacts:

- 64-67% RHDV1 K5, 26-36% RHDV1 Czech
- 35-40% decrease in night counts – results varied between locations (0-70%)
- Anecdotally greatest impact reported where no recent RHDV outbreaks

Virus movements:

- Virus movements 53 m to 130 m per day – 1.6–4km/month
- Fastest rate of spread 26 km in 71 days – 366 m per day - 11.5 km/month

RHDV2



- New virus found Europe 2010 and Australia 2015, not found in NZ until 2018
- Dominant virus across Europe and China
- Not species-specific - infects several species of hares and rabbits
- Kills young rabbits (>5 weeks old)
- Low and variable death rates (25-75%)
- Less stable virus - tendency to form recombinants
- Was not considered a suitable biological control agent
- Had to urgently import a new vaccine into NZ to protect domestic rabbits

Impact of RHDV2 is currently not unknown

- Wild rabbits from Marlborough (n=2 sites), Bay of Plenty (n=2, Dec 17) and Wairarapa (n=1)
- Domestic rabbits Nelson and Blenheim/ (n=2)



On the horizon

- Persistence and on-going impact of RHDV1 K5
- Impact of RHDV2 – arrived despite best attempts
- Highlights complexity of rabbit control and management
- Importance of nationally co-ordinated and ongoing partnership approaches to rabbit issues

Acknowledgements:

- Rabbit Coordination Group
 - Regional Councils and District Councils, DOC, LINZ, High Country Fed Farmers
- Landowners providing access and local knowledge; many others including contractors and members of the public
- Australian research teams: IA CRC; Tanja Strive, CSIRO; Andrew Read, DPI
- Funders: MPI, Sustainable Farming Fund , MBIE