



NSWRAB SOP8

Bait delivery of rabbit haemorrhagic disease virus (RHDV)

Background

Rabbit haemorrhagic disease virus (RHDV) is used to minimise the impact of the introduced European rabbit (*Oryctolagus cuniculus*) on agricultural production and the environment. RHDV causes rabbit haemorrhagic disease (RHD), an acute, highly contagious disease that infects wild and domestic rabbits. In most adult rabbits the disease progresses rapidly from fever and lethargy to sudden death within 48-72 hours of infection. The virus causes acute liver damage with resultant blood clotting abnormalities. Death occurs due to obstruction of blood supply in vital organs and/or internal haemorrhages. The virus has a high mortality rate, killing upwards of 70% of susceptible rabbits.

The deliberate release of RHDV into wild rabbit populations can be used to initiate outbreaks in an attempt to maximise the impact of the disease. There are now two RHDV virus types present in Australia. RHDV1 (Czech 351 strain) was first registered as a biological control agent in Australia in 1996. It is now registered for use as a viral suspension that can be delivered via carrot or oat bait. RHDV2 was first identified in the Australian rabbit population in May 2015 after first appearing in Europe in 2010. The epidemiology, pathology and diagnosis is the same as RHDV1; however, RHDV2 is not species specific. It infects both European rabbits and a number of hare species; although its effectiveness in the European hare (*Lepus europaeus*), Australia's only hare species, is unknown. It is not known how RHDV2 entered Australia.

RHDV1 is now prevalent in the majority of wild rabbit populations in Australia and high levels of immunity to the virus occur periodically. It is not recommended to release RHDV1 into a population of rabbits with high immunity. RHDV1 K5 (Korean strain) is a naturally occurring variant of RHDV1, registered as a biological control agent in Australia and released in March 2017. The endemic non-pathogenic rabbit calicivirus in Australia (RCV-A1) can provide some cross-protection to RHDV and reduce the likelihood of death of rabbits contracting other strains of RHDV.

This standard operating procedure (SOP) is a guide only; it does not replace or override the relevant legislation that applies in NSW. The SOP should only be used subject to the applicable legal requirements (including WHS) operating in the relevant jurisdiction.

Individual SOPs should be read in conjunction with the overarching Code of Practice for that species to help ensure that the most appropriate control techniques are selected and that they are deployed in a strategic way, usually in combination with other control techniques, to achieve rapid and sustained reduction of pest animal populations and impacts.

Application

- Introduction or 'seeding' of RHDV into rabbit populations is used as part of an integrated approach to rabbit management and is not meant to be used as a stand-alone method.
- Where RHDV is used as a control agent, follow-up control of remaining rabbits should be undertaken to ensure long-term effects.
- Release of RHDV should take into account the level of existing population immunity, rabbit breeding patterns including presence of young rabbits, natural spread of the virus and insect activity.
- Do not release RHDV into breeding populations. Younger rabbits can become infected with RHDV but are less likely to die as a result of RHD, particularly in the presence of maternal antibodies.
- As RHD is now prevalent in the majority of Australian rabbit populations, high levels of immunity to the virus is expected to occur periodically. Attempting controlled release of the virus in a population of rabbits with high immunity may have minimal impact.
- Populations of rabbits visibly affected by myxomatosis should not be baited with RHDV because they are less likely to succumb to RHD.
- Bait delivery of RHDV has been shown to be more effective in reducing rabbit numbers compared to the original inoculation technique that is no longer used in NSW. This is thought to be due to the larger numbers of rabbits that are initially exposed to the virus. Also, bait delivery is not as labour intensive or costly as inoculation and allows managers to more effectively target populations when they are most susceptible.
- Bait delivery of RHDV is also considered more humane than the inoculation method as rabbits do not need to be caught. Capture, handling and restraint are significant stressors for wild rabbits that can lead to disruption of social structure and also debilitation and sometimes death.
- Baiting of rabbits with RHDV can only be carried out under conditions set down in a specific permit issued by the Australian Pesticides & Veterinary Medicines Authority (APVMA) under Commonwealth legislation (*Agricultural and Veterinary Chemicals Code Act 1994*).
- In NSW, RHDV must also be used in accordance with the [Pesticide Control \(Rabbit haemorrhagic disease virus\) Order](#)
- RHDV suspension is a restricted chemical product (under Regulation 45 of the Agricultural and Veterinary Chemicals Code Regulations 1995). This listing requires special precautions in the preparation, handling, storage and use of RHDV-treated baits, along with specific regulations regarding labelling or availability.
- Handling of RHDV suspension and preparation of baits must only be performed by authorised persons who have the appropriate training as specified in the [Pesticide Control \(Rabbit Haemorrhagic Disease Virus\) Order](#).
- Prepared RHDV baits can only be obtained through authorised government agencies (e.g., LLS).

Animal welfare implications

Target animals

- RHD is an acute, highly infectious usually fatal condition that affects domestic, farmed and wild rabbits of the species *Oryctolagus cuniculus*.
- In most rabbits, death from RHD is sudden. Some animals show no signs of illness prior to death whilst others will have elevated temperature, anorexia, apathy, dullness, prostration and reddened eyes. Respiratory signs (e.g., rapid respiration, bloody nasal discharge) and occasionally nervous signs (e.g., convulsions, paralysis, squealing) may be seen in the later stages. 5 to 10% of rabbits may show a chronic or subclinical course of disease. These animals may have jaundice, weight loss and lethargy for up to 1 to 2 weeks before dying or recovering.

Non-target animals

- All rabbits in Australia are derived from the European rabbit (*Oryctolagus cuniculus*) and are therefore potentially susceptible to infection. Farmed and pet rabbits should be vaccinated against RHDV. Vaccinations are available from veterinary practitioners. There is no evidence that RHDV causes infection in other species of native and domestic mammals and birds.

Workplace health and safety considerations

- Operators using RHDV must strictly follow the directions on the approved label, the [Pesticide Control \(Rabbit haemorrhagic disease virus\) Order](#) and the [NSW DPI Vertebrate Pesticide Manual](#) when preparing for use, using, storing, transporting or disposing of the virus.
- Currently registered RHDV products only affects European rabbits. However, due to the presence of rabbit and viral proteins in the product, it is possible that accidental administration of the product to an operator could be accompanied by an adverse allergic reaction. When mixing the virus in feed material it is advisable to wear gloves and a face shield to prevent contact of the virus with skin, eyes and mucous membranes.
- Appropriate personal protective equipment, including cotton overalls, water-impermeable gloves and a face mask or safety glasses, should be worn when preparing and handling RHDV suspension and treated baits.
- Thoroughly wash exposed skin with soap and water. Wash contaminated clothing and gloves.
- If poisoning occurs, contact a doctor or the Poisons Information Centre (Ph 13 11 26).
- For further information refer to the Material Safety Data Sheet (MSDS), available from the supplier.

Equipment required

Treated baits

- Treated bait is prepared by the application of RHDV suspension to carrots or oats in an enclosed mixing device that meets the standard requirements for 1080 bait mixing.
- Oats should be standard intact oats and carrots should be good quality and freshly diced. One vial of product is used per 15kg of freshly diced carrots OR 6kg grain.
- Prepare the viral solution as per the product label.
- Place the feed material in the mixer, add the prepared viral solution via a fine spray from the spray nozzles and then gently mix while tumbling in the sealed mixing device.
- Once mixed, transfer the treated bait material to appropriately labelled, sealable plastic containers or heavy-duty plastic bags that have significant strength to prevent damage to bait or leakage.
- Store treated baits in a cool, shaded area until ready for use.
- Treated baits should be used within 24 hours of preparation.
- Equipment used to prepare treated baits should be decontaminated after use by rinsing with 0.5% sodium hypochlorite. After rinsing, wash thoroughly with excess water and allow equipment to dry.

Other equipment

- Personal protective equipment (including water-impermeable gloves, face shield, overalls, boots etc.).
- Towel, soap, dish or bucket.
- First aid kit.
- Plastic 'sharps' disposal container for disposal of needles and other sharps.
- Appropriately labelled and leak-proof containers for storing treated bait – refer to permit for specifications.
- 0.5% sodium hypochlorite for decontamination of equipment etc. (e.g., a 1 in 20 dilution in water of household bleach solution containing 10% hypochlorite).
- Bait mixer.
- Carrot cutter (if required).

Suppliers of RHDV

Vials of RHDV are available for purchase to authorised government agencies from NSW Department of Primary Industries, Elizabeth Macarthur Agricultural Institute, Woodbridge Road, Menangle, NSW, phone 02 4640 6333.

Procedures

Always follow the directions on the approved label, the [Pesticide Control \(Rabbit haemorrhagic disease virus\) Order](#) and the [NSW DPI Vertebrate Pesticide Manual](#) when preparing for use, using, storing, transporting or disposing of the virus.

Assessment of site and estimation of rabbit numbers

- Warrens, rabbit harbour and scratching and feeding areas should be located to ensure accurate placement of bait.
- The density of rabbits on the site should be estimated using spotlight counts and warren monitoring. The location and numbers of rabbits on neighbouring properties should also be approximated.
- Contact your local vertebrate pest control authority for more information and advice on site assessment and monitoring of rabbit numbers.

Free-feeding

- Perform free-feeding of at least two feeds with carrots or three feeds for oats. Free-feeding of non-treated bait is an essential step to allow rabbits to become accustomed to eating bait material. It also enables an estimation of amount of treated bait required and assessment of any non-target uptake.
- The rate of bait for free-feeding should be appropriate to the local rabbit density, typically 2 to 5kg/km for oats and 15 to 20kg/km for carrots.
- Distribute free-feeds by broadcast or by trailing.

Placement of treated baits

- Broadcast the treated bait at approximately 10% of the rate applied in the final night of free-feeding.
- Lay the treated bait in or around a small number of warrens in the area targeted for a RHD outbreak.
- If treating individual warrens, select 3-4 within targeted area and apply treated feed by hand around warren entrances. Apply a maximum of 5kg treated carrot or 2kg treated oats per warren.
- Do not apply treated bait to crops or in situations where livestock may have access to the bait.
- The treated baits should be laid as soon as possible after preparation and on the day obtained. It is preferable to lay baits in the evening as rabbits are active between dusk and dawn.
- Equipment used to prepare and distribute the treated feed should be decontaminated at the end of each day use by rinsing with 0.5% sodium hypochlorite. After rinsing, wash thoroughly with excess water and allow equipment to dry.

Procedural notes

Read product label for more detailed information

Preparation and storage of RHVD inoculum

- The viral suspension should be prepared and stored according to the directions on the label.
- The contents of the vial should be used within 48 hours of initial opening.
- Unused vials of virus should be discarded into contaminated waste containers for appropriate disposal.

Disposal of contaminated waste

- Any needles /sharps should be immediately place in a designated and appropriately labelled 'sharps' container.
- Used vials and syringes should be soaked in 0.5% sodium hypochlorite prior to disposal by burial in a local authority landfill.
- All bags used for storing bait must be destroyed by deep burial.
- Sharps containers should be conveyed to a disposal facility equipped for the disposal of biomedical waste. Contact your local waste reduction and disposal services for more information.

References

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