agriculture, land reform & rural development

Department:
Agriculture, Land Reform and Rural Development
REPUBLIC OF SOUTH AFRICA

# Guidelines for Rabbit Haemorrhagic Disease control

Version 1: November 2022

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# 1. Abbreviation

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| ARC-OVR | Agricultural Research Council – Onderstepoort Veterinary Research |
| DAH | Director of the Directorate Animal Health, DALRRD |
| DALRRD | Department of Agriculture, Land Reform and Rural Development |
| DEA/ DFFE | Department of Environmental Affairs |
| DWS | Department of Water and Sanitation |
| RHD/RHDV | Rabbit haemorrhagic disease Virus |
| SAVC | South African Veterinary Council |
| SAHPRA | South African Health Products Regulatory Authority |
| WOAH | World Organisation for Animal Health |

# 2. Introduction

Rabbit haemorrhagic disease (RHD) was first confirmed in South Africa in November 2022. Reports of die-offs of wild rabbits and hares were received from the Karoo areas in the Western and Northern Cape Provinces. Post-mortems were performed and samples collected, and the cause was confirmed as Rabbit Haemorrhagic disease virus (RHDV-2).

RHD is caused by a virus of the *Caliciviridae* family and of the Genus *Lagovirus*. There are three pathogenic strains, namely RHDV, RHDVa and RHDV2. RHD occurs in wild and domestic European rabbits *(Oryctolagus cuniculus)* and does not infect other animals or people. RHD is endemic in Asia, Europe, North and South America, North Africa, Australia and New Zealand.

South Africa has been historically considered as RHD free and vaccination against the disease has not been allowed in the country. Imports of rabbits, hares or products derived from these animals are subject to very strict import conditions. As a result of not being known to occur in South Africa, RHD is thus automatically regarded as a controlled animal disease in terms of the Animal Diseases Act, 1984 (Act No 35 of 1984). RHD occurrence is of great concern as our indigenous Red Rock Rabbit, endangered Riverine Rabbit and Hare species are susceptible to this disease and occur in the currently affected areas of the Karoo.

## 2. Applicable Legislation, Policies and Codes

2.1 RHD is a controlled animal disease in terms of the Animal Diseases Act, 1984 (Act No 35 of 1984) and any occurrence or suspicion of RHD must be reported to the responsible State Veterinarian. However, no specific control measures have been legislated in Table 2 of the Animal Diseases Regulations proclaimed under the Animal Diseases Act, 1984 (Act No 35 of 1984).

2.2 In terms of the control measures prescribed below, recommendations are made in alignment with the Animal Diseases Act, 1984 (Act No. 35 of 1984).

## 3. Clinical Signs

3.1 RHD is a highly contagious and acutely fatal disease, with very high morbidity (almost 100%) and mortality (70 – 90%) rates.

3.2 Rabbits of all ages can be infected, however it is mostly rabbits older than 8 weeks that present clinically. Rabbits 4 weeks of age or younger typically do not develop disease and rabbits 6-8 weeks of age can become infected but do not develop clinical signs. The incubation period of the virus is 1 – 3 days but has been known to extend to 3-5 days. In acute infections, death usually occurs 12 – 36 hours after onset of fever.

3.3 Clinical signs:

- Acute infection:
    - Fever, anorexia (inappetence/reluctant to eat), apathy, respiratory signs (dyspnoea, bloodstained frothy nasal discharge), neurological signs (paddling, convulsions, paralysis), dullness, prostration, mucous membrane congestion and death.
    - Rabbits may present with one or more of these clinical signs, others can succumb after showing very little or no clinical signs.
    - Rabbits and hares may die suddenly with bleeding in the organs such as the liver, kidney and spleen.
- Subacute infection with signs similar to acute infection, but milder.
- Chronic, persistent infections are asymptomatic.

# 4. Diagnostics

4.1 As RHD is a controlled animal disease, any laboratory conducting diagnostics has to be approved for this purpose by the Director: Animal Health according to Regulation 12. All results must be notified to the local state veterinarian. The only laboratory that is currently approved for the diagnosis of RHD is the ARC-OVR Molecular Biology (Viral PCR) laboratory.

4.2 Should a rabbit or hare show suspicious clinical signs of RHD, the sample of choice is the liver that should be submitted fresh, on ice, for PCR testing to confirm if RHD was the cause of disease/death. Samples of blood, spleen and excretions (urine or faeces) can also be submitted for PCR testing. Do not send whole dead rabbits to the ARC Laboratory.

4.3 Swab samples must be in PBS transport medium. Samples can be sent to the ARC-OVR Molecular Biology (Viral PCR) laboratory at the cost of the owner for RHD PCR testing. Should post-mortem procedures be required to indicate the possible causes of death, the whole animal should be submitted to a SAVC registered veterinarian or veterinary pathology laboratories that are approved by the SAVC.

4.4 In the event of nature conservation groups submitting samples from wild populations, with the support of the local state veterinarian official, payment for the diagnostics conducted at the ARC Laboratory can be considered by the Director: Animal Health. The sampling list and copies of the sample submission forms are to be sent to Epidemiology@Dalrrd.gov.za. All results must be notified to the local state veterinarian, whose contact details must be correctly added on the submission form.

4.5 The laboratory test currently used to confirm diagnosis in South Africa is RT-PCR. Serological test methods are currently not available in South Africa and they may be of limited value going forward as they cannot distinguish between infected and vaccinated. Although the WOAH Terrestrial Manual prescribe ELISA, Haemagglutination and Western Blotting as alternative means for sample testing, these are currently unavailable in South Africa.

# 5. Transmission

5.1 Transmission of the virus can be through direct contact or contact with infected rabbits' excretions (oral, nasal and conjunctival pathways) or blood.

5,2 The virus can be spread indirectly through contact with infected carcasses, food, water, and any contaminated materials such as fodder (e.g. lucerne, hay or bedding). The virus can survive in infected material for up to 3 months. People can spread the virus indirectly by carrying it on their clothing and shoes.

5.3 It may also possibly be transmitted by passive vectors such as haematophagous insects (biting flies, fleas and mosquitos), birds, rodents and wild animals, as well as through predator and scavenger faeces.

5.4 The infective period of an infected animal is 60 days (according to WOAH Terrestrial Animal Health Code), i.e. the longest period during which an affected animal can be a source of infection, usually in chronically infected cases.

# 6. Control measures

6.1 The local responsible State Veterinarian must report suspicion or confirmation of RHD via an SR1 to the Epidemiology Subdirectorate at DALRRD.

6.2 In the case of farmed or privately owned rabbits or hares, any rabbit or hare presenting with suspect clinical signs must be isolated immediately to prevent spread of the disease. The responsible State Veterinarian must put such a property under quarantine (no movement of rabbits in, out or through the property).

6.3 Should RHD be confirmed upon testing, the quarantine must remain on the property. Owners and managers must be advised to adhere to strict movement control where it is in their power and thus prevent rabbits or hares entering or exiting infected premises.

6.4 Disease control in rabbitries relies mainly on biosecurity measures and vaccination. Owners of rabbitries must be advised to implement strict biosecurity to prevent entry into their animals (see below).

6.5 Biosecurity and vaccination are difficult to implement in wild populations. Nature Conservation Authorities will attempt to prevent further spread to yet uninfected wild rabbit populations.

6.6 Vaccination will be considered based on the specifications made by the Directorate: Animal Health of the DALRRD. There are inactivated vaccines available internationally which produces good immunity and is considered effective in protecting rabbits that

have not previously been exposed. The DALRRD is actively working with the relevant bodies - SAHPRA and the Registrar of Act 36 of 1947 - to make provision for the legal use of such vaccines in South Africa. Only legally imported, registered vaccines approved by SAHPRA/Act 36 may be used. For more information on the relevant import permits, interested parties should be advised to contact SAHPRA (https://www.sahpra.org.za/key-contacts/) and Agricultural Inputs Control (Act 36 - https://www.dalrrd.gov.za/Branches/Agricultural-Production-Health-Food-Safety/Agriculture-Inputs-Control).

# 7. Disposal and Disinfection

7.1 The RHD virus is very stable in the environment and prefers a dry and semi-dry environment. The virus can be carried by the wind. It is resistant to extreme temperatures and is stable at pH 4.5-10. RHD can be inactivated at pH greater than 12.

7.2 Carcasses of RHD-infected rabbits may be a major source for viral spreading since the virus seems to be highly resistant and stable even when exposed to harsh environmental conditions. The following carcass handling guidelines are recommended:

- Wear gloves when handling deceased rabbits.
- Double bag the carcass and spray the outside of the bag with disinfectant (refer to disinfectants below).
- If post mortem is required, refrigerate the bagged carcass or pack on ice. The carcass should be sent to the correct laboratory ASAP (see diagnostics section above). Alternatively, once the relevant samples have been collected, the rest of the carcass must be disposed of safely as described hereunder.
- Wash and disinfect your hands after handling the carcass.
- All rabbits (wild or domestic, including pelts) that succumb to RDH should be safely disposed of to avoid further infections. RHD virus can persist in infected frozen carcasses and on pelts from infected rabbits. Therefore, do not freeze carcasses for human or animal consumption and do not process, sell or transport the pelts.

7.3 Safe carcass disposal options if testing is not required, or after sampling:

- Incineration
- Burial

- Disposal at a land fill site as approved by the DEA/DFFE

7.4 Factors to consider for disposal options:

- The plans must comply with the requirements of DEA / DFFE, DWS and municipal bylaws.
- It is preferable that affected material is disposed of on site and as close as possible to the affected houses to minimize the risk of spreading the disease off the property.
- Movement of the affected material from the affected houses to the disposal site must be undertaken in such a manner as to prevent environmental contamination, e.g. using closed bags or bins to transport material, emptying material into burial trenches as close to the bottom of the trench as possible, etc.
- Burial trenches should be covered with soil to a minimum depth of cover of 1.5m over rabbit or hare carcasses. Cover carcasses and other material with layer of calcium hydroxide (quick lime) before topping off with soil.
- The disposal site must be secured against scavengers and waste-pickers (human) in such a manner as to prevent scavengers and waste-pickers accessing the material.
- Any machinery or equipment or personnel used to pack, move or otherwise handle carcasses and material must be effectively cleaned and disinfected before leaving the affected land.
- The responsible state veterinarian should ensure that the vehicle for transport must have a leak proof truck/container. If the vehicle is open at the top, the container should be secured properly to prevent anything potentially falling off the vehicle. A sealed cooler truck would be the best option to transport bagged carcasses.
- Ensure efficient disinfection of the vehicle prior to leaving the farm and the disposal site.
- The owner/manager of the animals should obtain a certificate of disposal from the landfill site.

7.5 Due to the hardy nature of the virus, biodegradable material that cannot be disinfected should be disposed of with the rabbit or hare carcasses. Safe disposal can be achieved as described above.

- Removal of all organic material (bedding, faeces, fur, material on hutches or cages, etc.) via scraping, brushing, or digging before cleaning and disinfection, is critical for disinfection to be effective.

- Remove all visible debris from items to be disinfected (cages, hutches, feeding equipment, waterers, etc.).
- Remove all bedding from cages, hutches, or ground.
- Items made of wood are best burned or safely discarded. For wood that cannot be discarded, remove organic material, and then clean and disinfect.
- Faeces and any feed that has the possibility of being contaminated should be removed and safely discarded.
- Soil beneath rabbit hutches that has been contaminated with rabbit urine, faeces, or bedding should be removed to a depth beyond visible contamination and safely disposed of.

7.6 Recommended disinfectants:

- 10% Sodium hydroxide, 1-2% formalin, citric acid, 1% solution potassium peroxymonosulfate and 10% household bleach. Contact time for proper disinfection is 5 minutes, but 10 minutes for potassium peroxymonosulfate. Rinse surfaces with fresh water following treatment with bleach solutions.
- Wear nitrile, silicon, or rubber gloves, protective clothing, and eye protection when mixing and handling bleach or bleach solution and work in a well-ventilated area.
- The RHD virus is resistant to ethers and chloroforms.

# 8. Lifting of quarantine and restocking

8.1 After cleaning, disinfection and drying of all hutches, water, feed containers, other rabbit equipment or materials is completed, the premises must remain under quarantine for 90 days.

8.2 If all surfaces of the rabbitry could be effectively cleaned and disinfected, new rabbits or hares may be introduced as sentinels after 28 days, at the risk of the owner. Careful monitoring of newly introduced rabbits and hares must be done. If all surfaces could not be effectively cleaned and disinfected, it is recommended that no rabbits should be introduced until the 90 days have passed.

8.3 If rabbits or hares remained alive during the outbreak on a premises, the 90 days quarantine will also apply and the individual animals must be tested by RT-PCR to confirm their negative status before quarantine can be lifted.

# 9. Precautionary measures and biosecurity

9.1 Rabbit owners must be advised to ensure that their rabbits are secured and they must prevent any contact with other rabbits or hares. It will be up to the owner/manager to protect their rabbits by practicing good basic biosecurity. Section 11 of the Animal Diseases Act (Act No 35 of 1984) states that it is the responsibility of the owner of animals and the owner and manager of the land on which animals are kept, to prevent disease into the animal population and if already present, to prevent the further spread thereof.

9.2 Recommended biosecurity practices to be followed:

- Never release or allow farmed or pet rabbits and hares to escape into the wild where they could infect indigenous endangered rabbit and hare species.
- Do not allow pet, feral, or wild rabbits to have contact with farmed or pet rabbits or gain entry to the facility or home.
- Do not allow visitors in rabbitries or let them handle pet rabbits without protective clothing (including coveralls, shoe covers, hair covering, and gloves).
- Always wash hands with warm soapy water before entering the rabbit area, after removing protective clothing and before leaving the rabbit area.
- Do not introduce new rabbits from unknown or untrusted sources, or from sources that mix rabbits from multiple origins.
- New rabbit introductions should be kept separated for 14 days from resident rabbits for isolation and monitoring. Use separate equipment for newly acquired or sick rabbits to avoid spreading disease.
- Disinfect all equipment and cages moved onto or off premises before they are returned to the rabbitry with previously mentioned recommended disinfectants.
- Establish a working relationship with a veterinarian to review biosecurity practices for identification and closure of possible gaps. Breeders or growers who purchase live rabbits should review their practices and take steps to address potential gaps, even if they have existing biosecurity measures in place.
- Try not to source fodder or food (e.g. lucerne, hay or bedding) that originate from an area where RHD outbreaks have occurred recently. It is the owner/ manager's responsibility to remain informed regarding the disease status of the area or food supplier regarding disease suspicions.
- Do not touch any dead wild rabbits.
- Contact a veterinarian if pet of farmed rabbits appear ill or die suddenly.

## Recommended further reading

- Rabbit haemorrhagic disease – WOAH disease card (https://www.woah.org/fileadmin/Home/eng/Animal_Health_in_the_World/docs/pdf/Disease_cards/RHD.pdf)
- Chapter 3.6.2 of the WOAH Terrestrial Animal Manual (https://www.woah.org/fileadmin/Home/fr/Health_standards/tahm/3.06.02_RHD.pdf)
- CSFPH article - Rabbit Hemorrhagic Disease and other Lagoviruses (https://www.cfsph.iastate.edu/Factsheets/pdfs/rabbit_hemorrhagic_disease.pdf)

**Director Animal Health**

Date: 25/11/2022