## Outline

- Introduction
- History
- Etiology
- Transmission
- Clinical Signs
- Diagnosis
- Prevention and Control

# Rabbit Hemorrhagic Disease

**D. Ahmed Ali**
Lecturer of Poultry Diseases
Beni-Suef University

## Introduction

- Severe losses are common in unvaccinated animals;
  - Rapid death (100%)
  - Dramatic declines in some wild rabbit populations
- Rabbit hemorrhagic disease spreads very rapidly.
- The causative virus is very resistant to inactivation if it is protected by organic material for months

## Introduction

- **Synonyms:**
  - Rabbit Hemorrhagic Disease
  - Viral Hemorrhagic Disease of Rabbits,
  - Rabbit Calicivirus Disease
- **Definition**: Rabbit hemorrhagic disease is an extremely contagious and often fatal viral disease of domesticated and wild rabbits.
- This disease affects mainly rabbits of the species Oryctolagus cuniculus.

## Etiology

- Caused by the rabbit hemorrhagic disease virus RHDV
- Family Caliciviridae genus Lagovirus
- Many strains of RHDV appear to circulate in rabbit populations;
  - Only a single serotype is known, but two major subtypes exist: RHDV and the antigenic variant RHDVa.
  - Nonpathogenic strains of RHDV have been identified in wild rabbits.

## History

- Rabbit hemorrhagic disease was first seen in the 1980s
- The first known outbreak occurred in China in 1984
- By the late 1990s, outbreaks occurred in 40 countries
- Worldwide including the Americas have periodic outbreaks in domestic rabbits.
- Wild rabbits in North America are not susceptible therfore, the disease was eradicated from domestic rabbits

## Susceptibility

- RHD affects wild and domestic rabbits of the species Oryctolagus cuniculus.
- Non suscptable rabbit species
  - Cottontails (Sylvilagus floridanus)
  - Black-tailed jackrabbits (Lepus californicus)
  - European brown hares (Lepus europaeus)
- Virus replication is not reported in other mammals, although seroconversion can occur.

## Etiology

- RHDV is very resistant to inactivation when it is protected within tissues. The virus can survive:
  - 7.5 months in tissue suspensions stored at 4°
  - 3 months at 20°C in dried organ homogenates.
  - 20 days in decomposing rabbit carcasses at 22°C
- Unprotected viruses shed in excretions remain viable for few weeks
- RHDV survive exposure to pH 3.0, heat of 50°C for an hour

## Transmission

- Direct contact with infected animals, as well as on fomites.
- Transmitted through the oral, nasal or conjunctival routes.
  - All excretions contain virus.
  - Animals may remain infectious for up to a month.
  - Infected carcass or hair from an infected animal.
  - Long-term, persistent or latent infections have recently been recognized in rabbits.

## Epidemiology

- RHD is endemic in Australia, New Zealand, Cuba, parts of Asia and Africa, and most of Europe.
- Outbreaks were reported from domestic rabbits in the Middle East and the Americas.
- RHD was endemic in domestic rabbits in Mexico till1991
- Limited outbreaks were reported from the U.S. in 2000-2005
- The disease was eradicated in each case, and RHD is not currently endemic in North America

## Clinical signs

- Incubation period 1-3 days
- All rabbits are suscptable, but young animals are resistant to disease.
- Typically, symptoms occur rabbits more than 8 weeks old.
- **In peracute infections:**
  - infected rabbits develop a fever and die suddenly within 12 to 36 hours of its onset.
  - The only symptoms may be terminal squeals followed rapidly by collapse and death.

## Transmission

- RHDV is readily spread on fomites including contaminated food, bedding and water.
- Flies and other insects are very efficient mechanical vectors
- Wild animals can transmit the virus mechanically.
- Although virus replication does not seem to occur in predators or scavengers, these animals can excrete RHDV in feces after eating infected rabbits

## Clinical signs

- Subacute form:
  - Similar to acute from but with milder symptoms and most of the rabbits may survive.
- Chronic, persistent infections are thought to be asymptomatic.

## Clinical signs

- **In acute disease:**
  - Dullness. anorexia, congestion of the palpebral conjunctiva, or prostration may be seen.
  - Neurologic signs including incoordination, excitement, opisthotonos.
  - Respiratory symptoms, including dyspnea, cyanosis and bloodstained frothy nasal discharge
  - Lacrimation, ocular hemorrhages or epistaxis
  - Recovered animals develop severe jaundice, with weight loss and lethargy

## Postmortem lesions

- The primary lesion is hepatic necrosis and splenomegaly.
  - The liver pale, with a fine reticular pattern of necrosis outlining each lobule.
  - In cases with extensive necrosis, the liver can be diffusely pale
  - Liver may be also be yellow, gray, friable or congested.
- The spleen is usually black and engorged, with rounded edges.

## Clinical signs

## Postmortem lesions

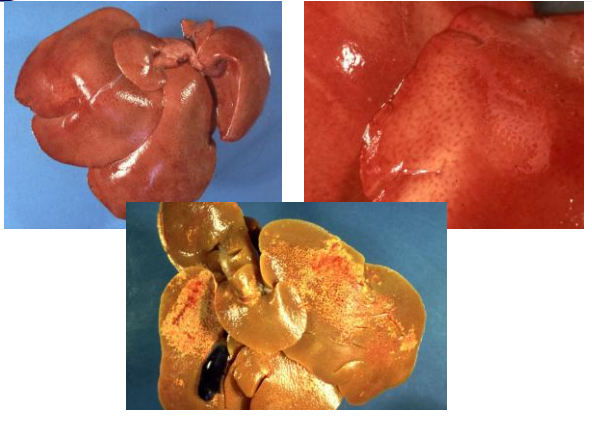
- In subacute disease
  - Catarrhal enteritis of the small intestine
  - Jaundice may also be seen.
  - Congestion of the meninges has been reported.

## Postmortem lesions

- The kidneys may be very dark brown.
- Disseminated intravascular coagulation (DIC) is common
- The trachea is often hyperemic and contains frothy, bloodstained mucus.
- Congestion and multifocal hemorrhages may be seen in the lungs.
- Hemorrhages are also common in the thymus

## Postmortem lesions

## Postmortem lesions



## Differential diagnosis

- RHD should be differentiated from
  - acute pasteurellosis
  - atypical myxomatosis
  - Poisoning and heat exhaustion
  - E.coli enterotoxemia
  - Clostridium perfringens Type E

## Diagnosis

- Clinical:
  - RHD should be suspected when several animals die suddenly after a brief period of lethargy and fever.
  - Hepatic necrosis at necropsy supports the
- Laboratory tests
  - Isolation on cell cultures.
  - RT-PCR, immunoblotting (Western blotting)
  - negative-staining immunoelectron microscopy
  - ELISAs
  - Hemagglutination test (less sensitive and specific )

## Control

- Vaccination may be limited to breeding animals if rabbit hemorrhagic disease has not reported on a farm
- All animals should be vaccinated if an outbreak has occurred.
- Vaccination can interfere with eradication by masking infections.
- Immune serum has also been used to provide short-term protection in an outbreak.

## Control

- In an outbreak:
  - Strict quarantine is necessary
  - Eradication can be accomplished by depopulation, disinfection, surveillance and quarantines.
- RHDV can be inactivated with:
  - 10% sodium hydroxide or 1-2% formalin.
  - 0.5% sodium hypochlorite (10% household bleach).
- Carcasses must be removed immediately and disposed of safely.
- Infected farms should not be restocked immediately