

# EXOTIC

## European brown hare syndrome

### Fact sheet

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#### Introductory statement

European brown hare syndrome (EBHS) causes an acute and severe, contagious, necrotising viral hepatitis that occurs in European brown hares and mountain hares (Billinis et al. 2005; Syrjälä et al. 2005). EBHS is **not present** in Australia. The European brown hare belongs to taxonomic order *Lagomorpha*, which includes the rabbit. European brown hares were introduced into Australia from the United Kingdom and have the ability to proliferate rapidly and over time have become an agricultural and pastoral pest.

#### Aetiology

The European brown hare syndrome virus (EBHSV) is a small non enveloped, single stranded RNA virus. It is classified as a calicivirus of the genus *Lagovirus*. Based on its viral genome, it is similar to rabbit haemorrhage disease virus (RHDV), which causes rabbit haemorrhagic disease and results in high mortality amongst wild and farmed rabbits. The number of EBHSV strains identified by molecular techniques is steadily increasing and the virus continues to evolve (Duff and Gavier-Widén 2012). In a transmission and protection study of the virus in United Kingdom hares, the virus failed to produce disease in rabbits and did not effectively protect against subsequent challenge with the rabbit calicivirus (Chasey et al. 1992).

#### Natural hosts

The virus is highly host specific and no cross infection between the hare and rabbit disease occurs (Duff and Gavier-Widén 2012). It occurs in European brown hares (*Lepus europaeus*) and mountain hares (*L. timidus*).

## World distribution

This disease was first reported in the 1980s in Sweden. EBHS is commonly present in many European countries (Syrjälä et al. 2005; Duff and Gavier-Widén 2012). Apart from a report from Argentina (Frändölich et al. 2003) it has not been found outside Europe. Australia is free of EBHS.

## Epidemiology

EBHSV is highly contagious and transmission is primarily through direct or indirect oral faecal or respiratory routes. The virus is present in all secretions and excretions of diseased animals. It is documented that hares succumb to disseminated EBHSV within 2 days post infection. Morbidity and mortality rates can be as high as 100 percent, especially in susceptible adult hares. The EBHSV transmission rate is affected by host population density. It is thought that high hare population densities may reduce EBHSV mortality because of increased transmission and resulting infections of hares at a young age (< 3 months of age), that results in development of protective antibodies (Duff and Gavier-Widén 2012).

The origin and reservoirs of EBHS are not known, but it is suggested that European brown hares can spread and maintain the disease (Syrjälä et al. 2005). The role of birds in the epidemiology has been raised due to the occurrence of the disease on separate islands in Sweden and Denmark.

Understanding of the impact EBHS has on European hare populations is highly difficult due to environmental factors such as predation, weather conditions and other diseases, especially parasitism (Syrjälä et al. 2005).

There are no public health implications as EBHS is not transferable to humans.

## Clinical signs

Clinical signs can be variable but affected animals often develop disease rapidly, characterised by depression, anorexia, muscular tremors and incoordination. More progressive disease is marked by severe necrotic hepatitis and circulatory dysfunction of various organs (Duff and Gavier-Widén 2012).

## Diagnosis

Diagnosis involves examination at necropsies, histopathology of specimens and reverse-transcription polymerase chain reaction (RT-PCR) for the presence of EBHS. The virus can be also detected usually in the liver, by electron microscopy. There is no current information available on clinical pathology changes.

## Pathology

At post mortem, gross lesions are not consistent but there is usually generalised oedema, congestion, extensive haemorrhages affecting the lungs, trachea and hepatic necrosis. Splenic enlargement, renal congestion and enlarged and discoloured livers may also be seen.

## Laboratory diagnostic specimens

Tissue samples from the liver, lungs, spleen and kidneys can be fixed in 10% buffered formalin and routinely processed for histopathology.

## Conclusions

The population of hares in Australia, although relatively small when compared to the wild rabbit numbers, is free of the EBG virus. In areas where rabbit numbers are lower, hare numbers appear to have moderately increased; this is because rabbits can out-compete hares in regard to prolific breeding, food selection and environmental protection in burrows. European brown hares are an endangered species in some European countries in Europe. A virus free population in Australia may represent a potential source of uninfected animals for re-wilding in areas of Europe if they become locally extinct.

## References and other information

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## To provide feedback on this fact sheet

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