Department for Environment, Food and Rural Affairs

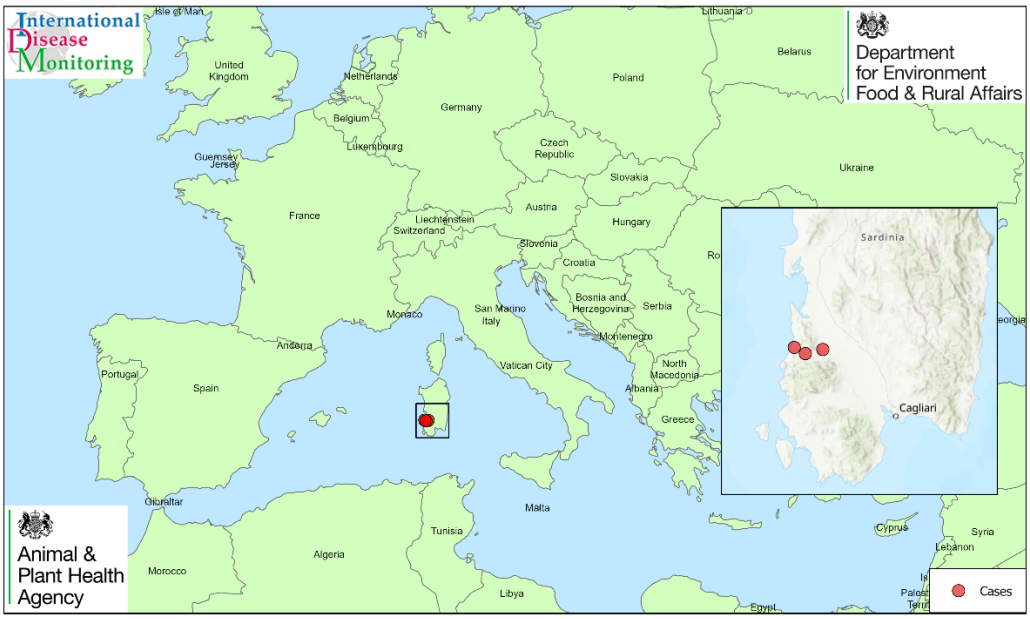
Preliminary Outbreak Assessment

Epizootic haemorrhagic disease in Sardinia, Italy

17 November 2022

Disease report

Epizootic haemorrhagic disease (EHD) has been reported for the first time in Europe. Three outbreaks of EHD have been reported by the World Organisation for Animal Health (WOAH), all of which occurred on cattle farms with between 16 and 30 cattle in southern Sardinia, Italy. Across the 3 outbreaks, there was a total of 5 cases of EHD and one death reported. Disease was confirmed by the National Reference Centre at the Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise (IZSAM) on 7 November 2022. The outbreaks were initially suspected to be caused by bluetongue virus (BTV) but then subsequently tested positive for the EHD virus (EHDV). Control measures have been applied, including restriction zones, tracing and surveillance. According to media reports, the Sardinian Ministry of Health has ordered a total closure period lasting between 3 and 4 weeks, during which time cattle, sheep and other ruminants may only be moved within the regional territory for slaughter and there may be no movement on or off the island (Italy 24, 2022a). In addition, 3 cattle have been confirmed positive for EHDV in Trapani, Sicily on 14 November. The animals were tested as part of increased surveillance along the west coast of the island following the confirmations of EHDV in Sardinia (Communication from the European Commission, 2022). All movements of susceptible animals from the whole territory of Sicily have been immediately suspended, and a monitoring plan is to be put in place (Italy 24, 2022b). These confirmations for Sicily are yet to be reported by the WOAH and no mapping data are available currently.



Situation assessment

EHDV has been notifiable to the WOAH since 2008 and is a notifiable disease in the EU Animal Health Law, Commission Implementing Regulation 2018/1882/EU. The virus can infect many ruminant species and may manifest as haemorrhagic disease, although sub-clinical infection may also occur (WOAH, 2019). Due to the clinical presentation, bluetongue is a key differential diagnosis, along with foot and mouth disease (FMD) in deer and cattle. Additional differential diagnoses in cattle are bovine viral diarrhoea (BVD), infectious bovine rhinotracheitis, vesicular stomatitis, malignant catarrhal fever, and bovine ephemeral fever (WOAH, 2019). EHDV is transmitted by vectors, predominantly Culicoides biting midge species, with some European species highlighted as potential competent vectors (EFSA, 2009). Increasing temperatures through climate change may promote transmission of EHDV in Culicoides midges as has been well documented for bluetongue viruses (Jones et al., 2019). This could include both expansion in the range of competent vectors and increased transmission efficiency by the midge due to the shorter extrinsic incubation period (EIP) at higher temperatures. After initial infection in the midge midgut, the virus has to move to the salivary glands to be transmitted by biting, before the midge dies. The time for this (the EIP) shortens with increasing temperature, to a point where the survival of the midge is greater than the EIP.

To date, there are 8 recognised serotypes of EHDV, though it is likely that more exist (Pirbright, 2022). The serotype of EHDV responsible for the outbreaks in Sardinia was not available at the time of writing. Though this report documents the first occurrence of EHD in Europe, the disease has been confirmed in a number of neighbouring countries across the Middle East and North Africa such as Tunisia, Turkey, Morocco, Algeria (all EHDV-6), and Israel (EHDV-7), dating as far back as 1950 for Israel. In North America, EHD occurs

from mid-summer through to late autumn, in line with vector seasonality. Serotypes 1, 2 and 6 have been confirmed in North America to date. Australia has shown the greatest heterogeneity with serotypes 1, 2, 5, 6, 7 and 8 all reported across the country (Australian Government, 2014).

EHDV is present in neighbouring countries to Europe, across the Middle East and North Africa. In late September 2021, over 200 confirmed outbreaks of EHD occurred in central/western Tunisia and these were caused by an EHDV-8 serotype (Sghaier et al., 2022). Four outbreaks of EHDV in Tunisia were reported by WOAH during this time period. There have been further reports of EHD in Tunisia since August 2022, though no further information on the serotype is currently available (ProMed, 2022). Media reports from Italy have suggested that vectors carrying EHDV may have blown into Sardinia via desert winds (Italy 24, 2022), which could be plausible as the north coast of Tunisia is less than 200km from the south coast of Sardinia. Based on distribution of vector species and host density, the whole peninsula of Italy is thought to be suitable for EHDV transmission, should it be introduced (Federici et al., 2016). The introduction of BTV strains, such as BTV-3, in the last few years have followed a similar pathway of introduction into Southern Italy from North Africa.

Conclusion

The outbreaks of EHD reported herein are the first to be reported in Europe, although the disease has been present in neighbouring countries for many years. Several candidate Culicoides biting midge species have been identified as potential vector species in Europe. Fully disseminated infections have been identified in Culicoides obsoletus and Culicoides scoticus following experimental infection with EHDV (Maurer et al., 2021), and EHDV has also been detected in a single field-caught Culicoides punctatus specimen in Japan (Yanase et al., 2005). These 3 species are widespread across northern Europe and the UK and have huge local abundance on livestock farms during the vector active season. However, at this time of year as we head into the winter months, any potential vectors that are present in the UK would be at low population numbers. Transmission rates at the lower temperatures would be low too. Furthermore, different strains of EHDV from North America have been shown to be transmitted with different efficiencies in Culicoides sonorensis (McGregor et al. 2019). The minimum temperature required for EHDV replication within the midge is 15.2 degrees Celsius (Wittmann et al., 2002). This is higher than that for BTV and also for African horse sickness virus (AHSV), another midge transmitted virus, thus further lowering the likelihood of transmission, particularly during the colder months. The main route of entry of EHDV into the UK would be via movement of live viraemic animals and/or infected vectors into the UK from an affected area. There have been no recent trade consignments of live cattle received in the UK from Sardinia or Sicily since 1 September 2022. At present, we consider the risk of introduction of EHDV into the UK via movement of live animals and/or vectors to be **negligible**. We will continue to monitor the situation.

Authors

Dr Lorna Freath

Dr Sonny Bacigalupo

Dr Paul Gale

Dr Lauren Perrin

Anthony Pacey

Dr Helen Roberts

Dr Marion England

References

Australian Government (2014) EHD ANZASDT (agriculture.gov.au)

EFSA (2009) Scientific Opinion on Epizootic Hemorrhagic Disease - - 2009 - EFSA Journal - Wiley Online Library

Federici et al. (2016) Epizootic haemorrhagic disease in Italy: vector competence of indigenous Culicoides species and spatial multicriteria evaluation of vulnerability - PubMed (nih.gov)

Italy 24 (2022)a https://news.italy24.press/local/187080.html

Italy 24 (2022)b EHD virus in Sicily, animal movements at risk (italy24.press)

Jones et al. (2019) Bluetongue risk under future climates | Nature Climate Change

McGregor et al. (2019) Vector Competence of Culicoides sonorensis (Diptera: Ceratopogonidae) for Epizootic Hemorrhagic Disease Virus Serotype 2 Strains from Canada and Florida - PMC (nih.gov)

Pirbright (2022) EHDV | The Pirbright Institute

ProMed (2022) Promed Post - ProMED-mail (promedmail.org)

Sghaier et al. (2022) Epizootic Haemorrhagic Disease Virus Serotype 8 in Tunisia, 2021[v1] | Preprints

Wittmann (2002) Effect of temperature on the transmission of orbiviruses by the biting midge, Culicoides sonorensis - Wittmann - 2002 - Medical and Veterinary Entomology - Wiley Online Library

WOAH (2019) AETIOLOGY (woah.org)