

## Updated Outbreak Assessment #2

# Epizootic Haemorrhagic Disease in Europe

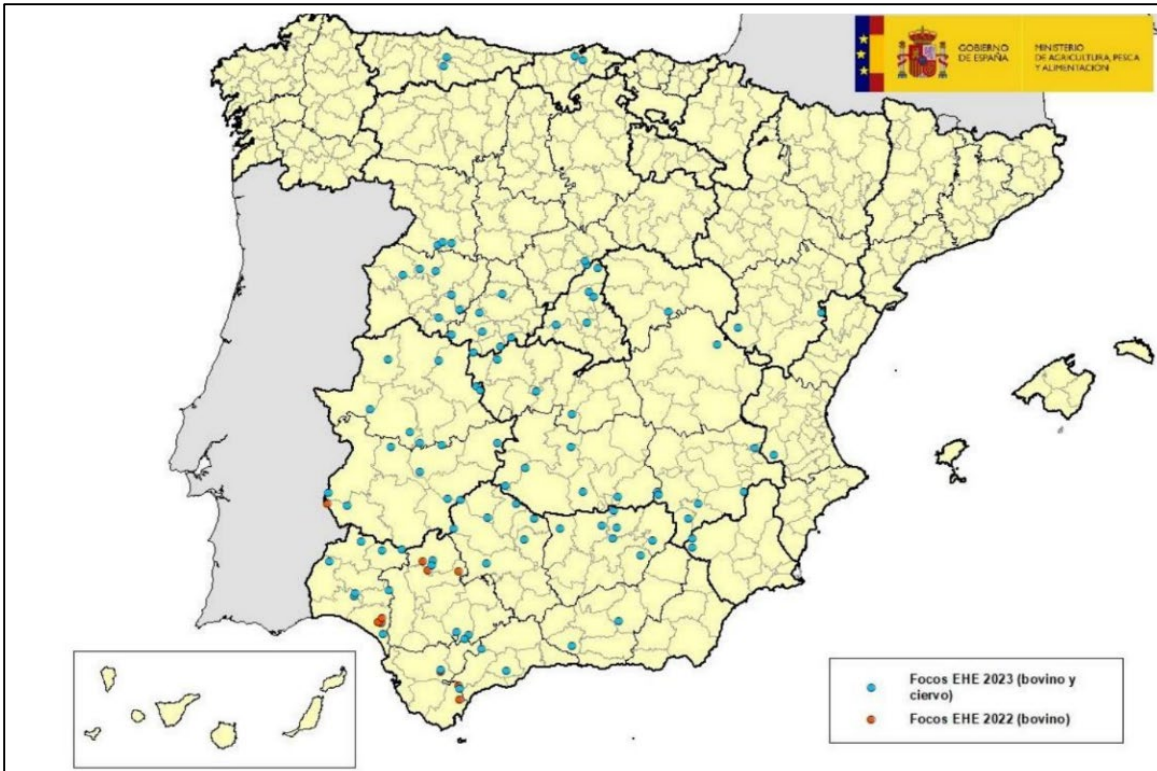
6 September 2023

## Disease report

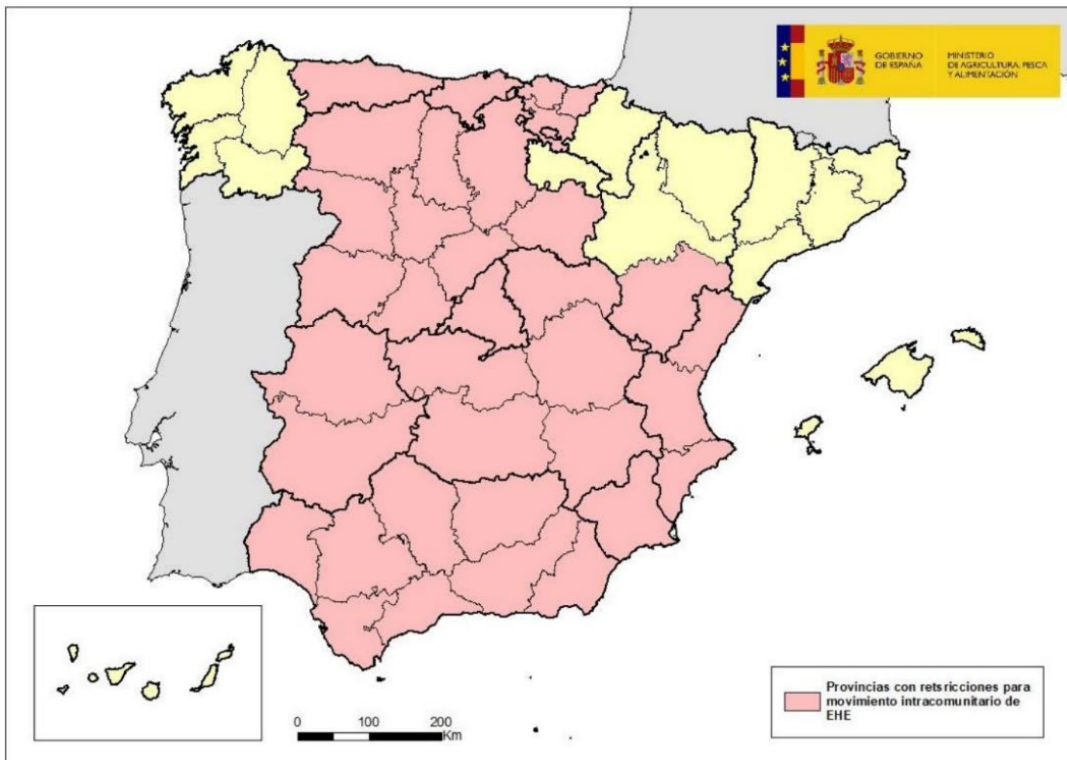
Since our [previous report](#) on Epizootic Haemorrhagic Disease (EHD) in Europe on 24 November 2022 there have been an additional 156 new outbreaks in Europe. Our previous report documented for the first time, EHD outbreaks in Spain, as well as a further 3 outbreaks in Italy. Since then, ADIS has reported an additional 11 outbreaks in Italy and 85 in Spain. Furthermore, in July 2023 EHD was reported for the first time in Portugal, and as of the 5 September, there have been 42 outbreaks in total (ADIS., 2023). Additionally, the Spanish Ministry of Agriculture, Fisheries and Food have reported a further 18 outbreaks in Spain as of 6 September 2023, these are not yet accounted for by ADIS data, bringing the total outbreaks of EHD in Spain to 103.



**Figure 1:** Map showing Epizootic Haemorrhagic Disease outbreaks in Europe reported on ADIS from November 2022 to 3 September 2023 (Source: [Weekly bulletin of international health surveillance BHVSI-SA report](#) 5 September 2023).



**Figure 2:** Map showing Epizootic Haemorrhagic Disease outbreaks in Spain reported by the Spanish Ministry of Agriculture, Fisheries and Food, since November 2022 (Source: [Update on the situation of Epizootic Haemorrhagic Disease](#) 5 September 2023).



**Figure 3:** Map showing Provinces of Spain with restrictions for trade as of 5 September 2023 (Source: Spanish Ministry of Agriculture, Fisheries and Food, [Update on the situation of Epizootic Haemorrhagic Disease](#) 5 September 2023).

## **Situation assessment**

### **Spain**

The Spanish Ministry of Agriculture, Fisheries and Food have documented the spread of EHDV Northeast as far as Santander in Cantabria. Out of the 103 outbreaks in Spain since our last report, 80 have occurred over the summer on cattle farms between 17 July and 6 September. One outbreak occurred near Oveido in North Spain and another near Santander, this indicates a large geographical jump of more than 150 km, which is beyond the scope of initial restriction zones (150 km from new outbreak) (Ministerio de Agricultura, Pesca y Alimentación 2023).

*Culicoides obsoletus* has been implicated as a potential significant vector in the spread of EHDV in Spain (PAFF 2023). This recent surge in outbreaks in Spain is likely associated with *Culicoides* populations peaking, which occurs around mid-summer to late autumn (Savini et al., 2011). Current measures in Spain involve disinfection of animals and farms in affected areas and the monitoring of sheep and goat farms in affected zones, as these may be carriers of EHDV without showing clinical symptoms (PAFF 2023).

### **Portugal**

On 17 July 2023 ADIS reported 2 outbreaks of EHD in Portugal. These outbreaks were on cattle farms located in the regions of Beja and Moura which border Spain. As of 6 September 2023, 36 more outbreaks have been detected on farms further north in Portugal, as well as 2 outbreaks in captive deer, which are yet to be reported by WOA (ADIS. 2023).

### **Italy**

According to ADIS data, In Italy, there have been an additional 10 outbreaks on the island of Sardinia between 18 November to 26 April 2023. This includes 1 outbreak on a cattle farm containing 413 animals and 1 on a sheep farm containing 349 animals, both located in Oristano. This was the first reported instance in Europe of sheep being infected with EHD and demonstrates further spread north. Additionally, on 9 December 2022, there was 1 outbreak on the island of Sicily, located on a cattle farm in Campobello Di Mazara.

Since the previous report, the serotype of EHDV responsible for the ongoing outbreaks in Italy has been confirmed to be the same EHDV-8 strain detected in Tunisia, by EDTA blood samples using Vet-MAX EHDV Kit (Thermo Fisher Scientific) (Lorusso et al., 2023).

The EHD virus (EHDV) has been notifiable to the WOAHA since 2008 and EHD is notifiable in EU Animal Health Law, Commission Implementing Regulation 2018/1882/EU. The virus infects many ruminant species and may manifest as haemorrhagic disease, although sub-clinical infection may also occur (WOAHA, 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 (WOAHA, 2019). The EHDV is transmitted by arthropod vectors, predominantly *Culicoides* biting midge species, with some European species highlighted as potential competent vectors, including *Culicoides obsoletus* (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 such that the survival time of the midge is greater than the EIP allowing transmission through taking subsequent blood meals (Jiménez-Cabello 2023, Wittman et al., 2002).

To date, there are 8 recognised serotypes of EHDV, though it is likely that more exist (Pirbright, 2022). EHDV-8 has been confirmed as the circulating serotype in Italy, while this is currently thought to be the most likely serotype in Spain and Portugal, this has not yet been verified at the time of writing (Jiménez-Cabello et al., 2023).

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). An additional 133 outbreaks of EHDV in Tunisia have now been reported by WOAHA 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 suggested that vectors carrying EHDV may have blown into Sardinia via desert winds (Italy 24, 2022). Although no information was available on the possible route of entry of EHD into Spain at the time of writing, the proximity of southern Spain to the north coast of Morocco would be consistent with vector blow-over, similar to that proposed for Sardinia. Due to the high numbers of recent cases of EHD in Spain, along the border region of EHDV likely entered Portugal via insect vectors from Spain.

## **Conclusion**

A significant number of outbreaks of EHD have been confirmed in southern Europe in Italy, Spain and now Portugal for the first time. Outbreaks in Northeast Spain near Santander is significant as this is close to Basque, Aragon and Catalonia. These regions have high

cattle density and border France. Also, recent outbreaks have highlighted geographical jumps in detections of greater than the 150 km restriction zones is possible.

The situation in Spain will be closely monitored as infections of EHDV edge closer to the border of France. If EHDV can cross the Pyrenees into France, there holds a significantly greater potential for spread within mainland Europe and to Great Britain. Several candidate *Culicoides* biting midge species have been identified as potential vector species in Europe. Fully disseminated infections have been identified in *Culicoides obsoletus* (as has been indicated as the vector of interest in Spain) 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 Great Britain and have huge local abundance on livestock farms during the vector active season between mid-Summer and Autumn. Moreover, higher temperatures during the summer are linked to decreased incubation period of EHDV and greater life span of midges, which may contribute to enhanced transmission and explain the sharp increase in outbreaks recorded in Spain and Portugal (Jiménez-Cabello 2023, Wittman et al., 2002). 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).

The main routes of entry of EHDV into France would be via movement of live viraemic animals and or infected vectors into from an affected area, this is also the case for Great Britain. In Great Britain, there have been no recent trade consignments of live cattle or sheep received in Great Britain from Portugal, Sardinia, Sicily, or Spain since 01 September 2022.

At present, we consider the risk of introduction of EHDV into Great Britain via movement of live animals and/or vectors to be **negligible**. We will continue to monitor the situation.

## Authors

Adem Yusuf

Dr Sonny Bacigalupo

Anthony Pacey

Dr Lauren Perrin

## References

ADIS (2023) Animal Disease Information System Available from: [Animal Disease Information System \(ADIS\) \(europa.eu\) Report Document \(europa.eu\)](#) Accessed 06 August 2023

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

Australian Government (2014) [EHD ANZASDT \(agriculture.gov.au\)](#)

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

Jiménez-Cabello et al. (2023) [Microorganisms | Free Full-Text | Epizootic Hemorrhagic Disease Virus: Current Knowledge and Emerging Perspectives \(mdpi.com\)](#)

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

Lorusso et al. (2023) [Epizootic Hemorrhagic Disease Virus Serotype 8, Italy, 2022 - PMC \(nih.gov\)](#)

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

Ministerio de Agricultura, Pesca y Alimentación (Ministry of Agriculture, Fisheries and Food) (2023) Disease Situation Update [Epizootic hemorrhagic disease \(mapa.gob.es\)](#) Accessed 6 September 2023

PAFF Animal Health and Welfare committee meetings (2023) Update on Epizootic Haemorrhagic Disease (EHD) epidemiological situation in Spain 13 July 2023. [Situación actual de la pandemia de IA \(europa.eu\)](#) Accessed 6 September 2023

Plateforme ESA (2023) Weekly Bulletin of International Animal Health Surveillance (BHVSI-SA) [Weekly bulletins of international health surveillance of 05/09/2023 \(plateforme-esa.fr\)](#) Accessed 6 September 2023

ProMed (2022) [Promed Post - ProMED-mail \(promedmail.org\)](#)

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

Savini et al. (2011) <https://www.ncbi.nlm.nih.gov/pubmed/32313242>

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 \(woah.org\)](https://www.woah.org/)