Bovine ephemeral fever infection Fact Sheet

1. Disease overview

Bovine ephemeral fever virus (BEFV) causes bovine ephemeral fever (BEF) or "3-day sickness", an acute, arthropod-borne viral disease of cattle and water buffalo. The disease is characterised by sudden onset of fever, lameness, stiffness, and marked reduction in milk production, with high morbidity and generally low mortality (Spickler, 2016; Walker and Klement, 2015).

Bovine ephemeral fever virus infection is not a WOAH-notifiable disease, and it is not listed in the European AHL.

2. Agent

Bovine ephemeral fever virus (BEFV) is an enveloped, single stranded, negative-sense RNA virus classified within the genus *Ephemerovirus*, family *Rhabdoviridae*. The virion is bullet-shaped, approximately 180 × 70–80 nm in size. The genome consists of a non-segmented RNA molecule encoding five structural proteins: the nucleoprotein (N), phosphoprotein (P), matrix protein (M), glycoprotein (G), and the RNA-dependent RNA polymerase (L). In addition, BEFV contains several accessory genes (α1, α2, β and γ) located between the G and L genes, which are characteristic of ephemeroviruses. The G glycoprotein is responsible for virus attachment and membrane fusion and induces neutralising antibodies, playing a central role in protective immunity (Kuzmin et a, 2009; Walker and Klement, 2019).

3. Geographical Distribution

BEFV is broadly distributed across Africa, the Middel East, Asia and Australia (Walker and Klement, 2015). Infection with BEFV is not reportable to WOAH. from published studies describing natural infections with this agent, as well as field epidemiological studies, are collected in the EFSA's systematic literature review (updated until 31/12/2025) and summarized in Figure 1. For more detailed information, dynamic maps, and references visit the online disease profile (accessible via the button in the top right corner).

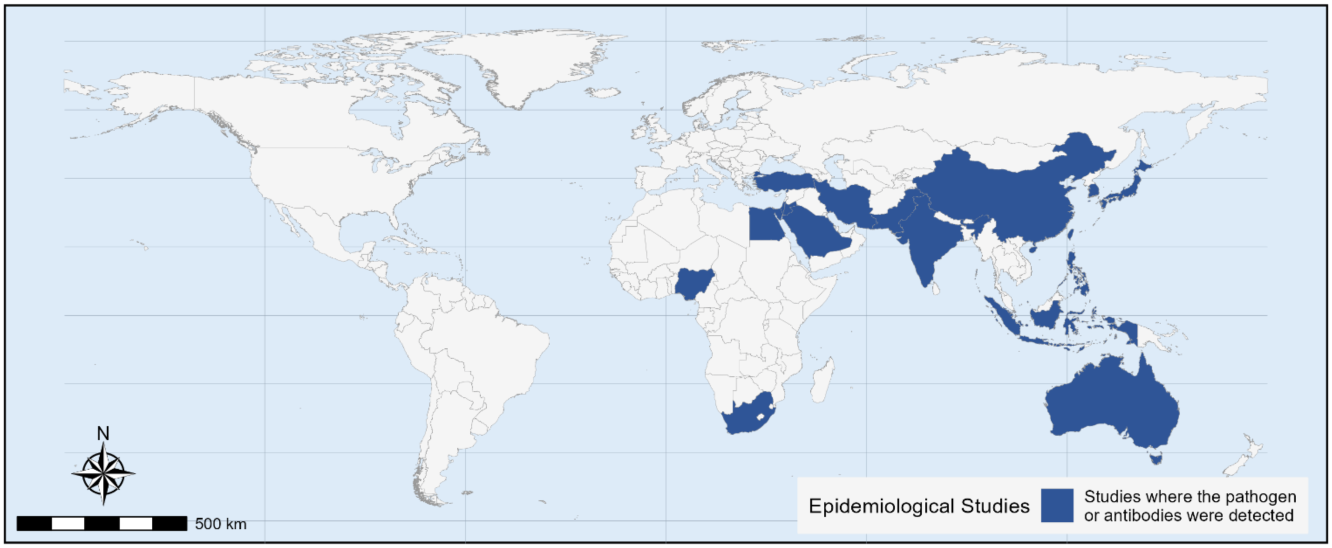


Figure 1. Geographical distribution of epidemiological studies addressing the occurrence of BEFV, as identified by the EFSA's systematic literature review (covering years 1970-2025).

4. Animal hosts

4.1. Susceptible hosts

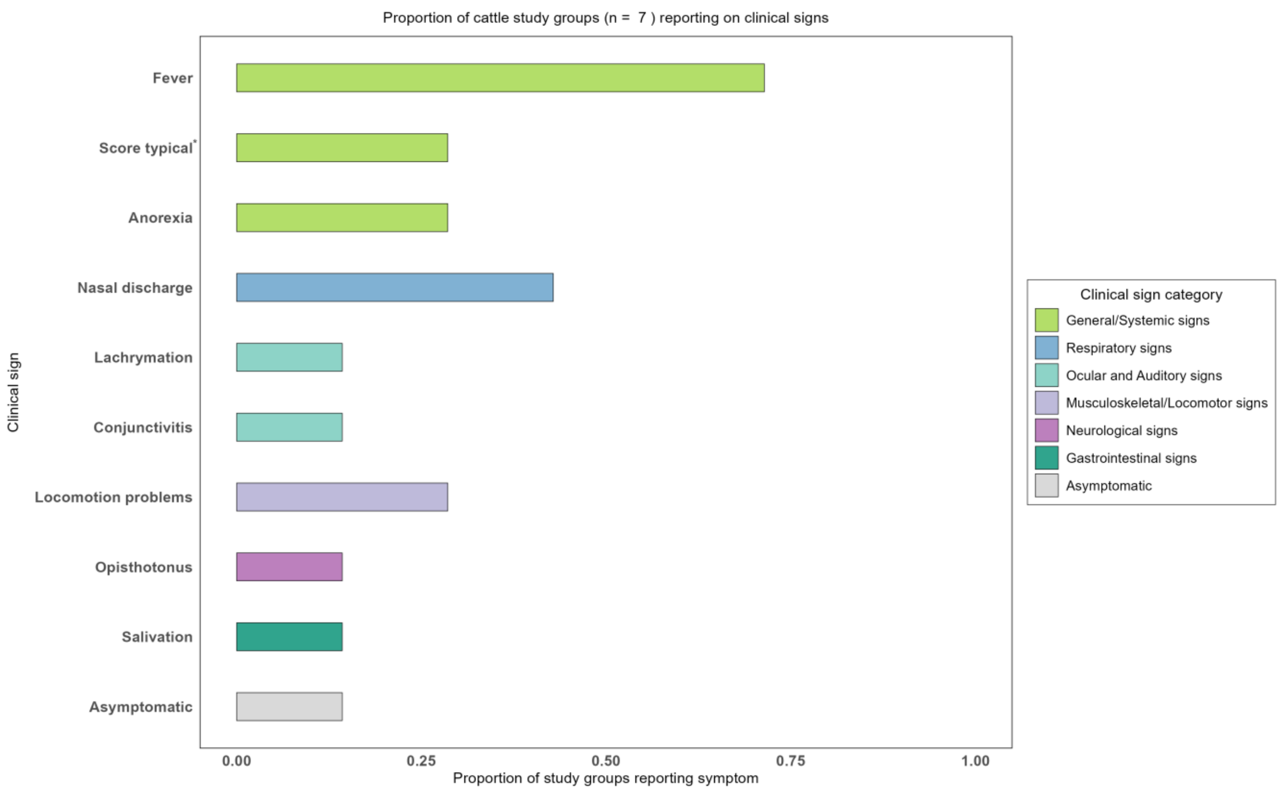
Based on epidemiological knowledge of host–pathogen–vector interactions and outbreak reports, the main hosts of BEFV are domestic ruminants. However, other species have been identified in the SLR. The SLR summary is given in Table 1.

Table 1. Susceptible host species of Bovine ephemeral fever virus.

The systematic literature review reported in the BEFV disease profile, identified the following susceptible species (updated until 31/12/2025, for references see online disease profile)
FIELD
Epidemiological studies carried out in the field **Pathogen was detected in the following animal species:** • Bovidae: *Bos taurus, Bubalus sp.* **Antibodies were detected in the following animal species:** • Bovidae: *Bos taurus, Bison bison, Bos grunniens, Gazella gazella* • Cervidae: *Dama dama, Hydropotes inermis argyropus, Cervus elaphus, Capreolus pygargus, Cervus nippon* **Outbreaks reported to WOAH included the following species:** • No species specified
EXPERIMENTS
Experimental studies demonstrated infection in: • Bovidae: *Bos taurus*

4.2. Clinical Signs

Outcomes of a systematic literature review of clinical signs in 7 study groups of cattle are displayed in Figure 2. Predominantly, general and respiratory clinical signs were reported.



*Score typical:” three-day sickness” characterised by high fever, shivering, lameness, drop in productivity. The SLR was updated until 31/12/2025, for references see the online disease profile.

Figure 2. Clinical signs reported in the main hosts of BEFV.

The disease in cattle is characterised by sudden onset of fever, nasal discharge, locomotion problems lameness, stiffness, recumbency, and a reduction in milk production (SRL, Walker and Klement 2015; Aziz-Boaron et al., 2014).

4.2.1. Incubation Period

Based on experimental studies an incubation period ranging from three to five days in cattle has been observed (full references available in the online version).

4.2.2. Morbidity and case fatality

During outbreaks of BEFV high prevalence and morbidities ranging from 20 to 80% have been reported with generally low case fatalities (Walker and Klement 2015, Grobler et al, 2025). No mortalities due to infection were observed in experimentally infected cattle (full references available in the online version).

4.2.3. Zoonotic Potential

BEFV is not known to infect humans under natural conditions.

5. Transmission

BEFV is transmitted primarily by biting midges of the genus *Culicoides* (Diptera; Ceratopogonidae). For more information on vector distribution, visit the Vector section in the online disease profile.

The disease occurs seasonally (mostly from later spring to autumn), often associated with increased vector activity and climatic conditions favourable to vector abundance. Experimental evidence indicates absence of direct contact transmission with infected animals or fomites and absence of transmission by mechanical arthropod vectors (reviewed by Walker and Klement 2015).

For more information on vector distribution, visit the *Vector* section in the online disease profile.

6. Diagnostic tests

Diagnosis of BEFV relies mostly on the detection of the virus (virus isolation), virus RNA or host antibody responses. Real-time reverse transcription PCR (RT-qPCR) assays are used for the specific detection of BEFV RNA in blood or tissues, offering high analytical sensitivity (Se) and specificity (Sp) in clinical and field samples and appear to be more sensitive than the conventional reverse transcription PCR (RT-PCR) (Solanki et al, 2025; Golender et al, 2025). A evaluation of different diagnostic methods for detection of BEFV in naturally infected cattle found that conventional RT-PCRs (targeting the L or G-genes) had moderate Se (≤64 %) and high Sp (> 89%), virus isolation was highly specific (99 %) but poorly sensitive (30 %) (Grobler at el 2025).

For serological diagnosis, virus neutralization tests and various ELISA formats are used to detect specific antibodies against BEFV, including competitive ELISAs based on inactivated virus or recombinant nucleoprotein antigens. These ELISA tests showed, under laboratory conditions, a high Se (97–99 %) and Sp (100 %) compared with virus neutralisation tests (Benevenia et al, 2024).

To date, the systematic literature review has not found diagnostic tests evaluation studies meeting the eligibility criteria for inclusion.

7. Prevention and control

7.1. Vaccination

There is no commercial vaccine authorized in Europe.

Outside Europe there are three types of vaccines being used in the field: live attenuated vaccines, inactivated vaccines and sub-unit vaccines (Walker and Klement 2015). Live attenuated vaccines have been shown to provide moderate to high protection (vaccine effectiveness) against clinical signs, with VE reported ranging from 60% to 90% (Gleser et al, 2023; Vanselow et al, 1995). Inactivated vaccines are safer but require multiple doses, with VE estimates ranging from 40 to 50% (Aziz-Boaron et al. 2014).

7.2. Treatment

There is currently no specific antiviral treatment for BEFV infection. Flunixin meglumine and phenylbutazone have been studied and used for BEF, but only as supportive, symptomatic treatments in cattle (Uren et al., 1989).

8. References

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