Lumpy skin disease virus infection Fact Sheet

1. Disease overview

Lumpy skin disease virus (LSDV) causes lumpy skin disease, an arthropod-borne viral infection of domestic and wild bovines, primarily cattle and water buffaloes. The disease is characterized by fever, cutaneous nodules, and lesions in the alimentary and respiratory tract, often accompanied by enlarged lymph nodes and oedema. Clinical outcomes range from subclinical infection to severe, sometimes fatal, systemic disease (Spickler, 2025; WOAH, 2017; WOAH, 2025).

Lumpy skin disease is a WOAH-notifiable disease, listed in the EU AHL under categories A, D and E.

2. Agent

LSDV is a double-stranded DNA virus that belongs to the *Capripoxvirus* genus within the subfamily *Chordopoxvirinae* of the family *Poxviridae*. It is antigenically closely related to sheep- and goatpox viruses. The virion is large, brick shaped, and measures 293-299 nm in length and 262-273 nm in width. The central region of the genome contains open reading frames (ORFs) that encode proteins essential for virus replication and morphogenesis, while the more variable terminal regions show greater variability and encode proteins involved in virulence and host range. Phylogenetically, LSDV strains are broadly divided into two main clusters. Cluster 1, comprising subclusters 1.1 and 1.2, includes field isolates from southern Africa, Kenya, the northern hemisphere, as well as vaccine strains. Cluster 2 contains recently identified recombinant viruses that contain genomic segments derived from both field and vaccine strains (WOAH, 2017; WOAH, 2025; Spickler, 2025).

The virus can survive for a long time, up to months, in ambient temperatures protected from sunlight. In desiccated crusts it can survive up to 35 days and in air-dried hides at least 18 days. LSDV is inactivated by sunlight, lipid solvents and several disinfectants (Spickler, 2025).

3. Geographical Distribution

Lumpy skin disease is endemic in most African countries and Turkey. According to WAHIS, outbreaks have also been reported from large parts of Asia and in France, Italy and Spain in the last 5 years (Figure 17). Up to date maps based on WAHIS are available in the online version of the Disease Profile (accessible via the button in the top right corner).

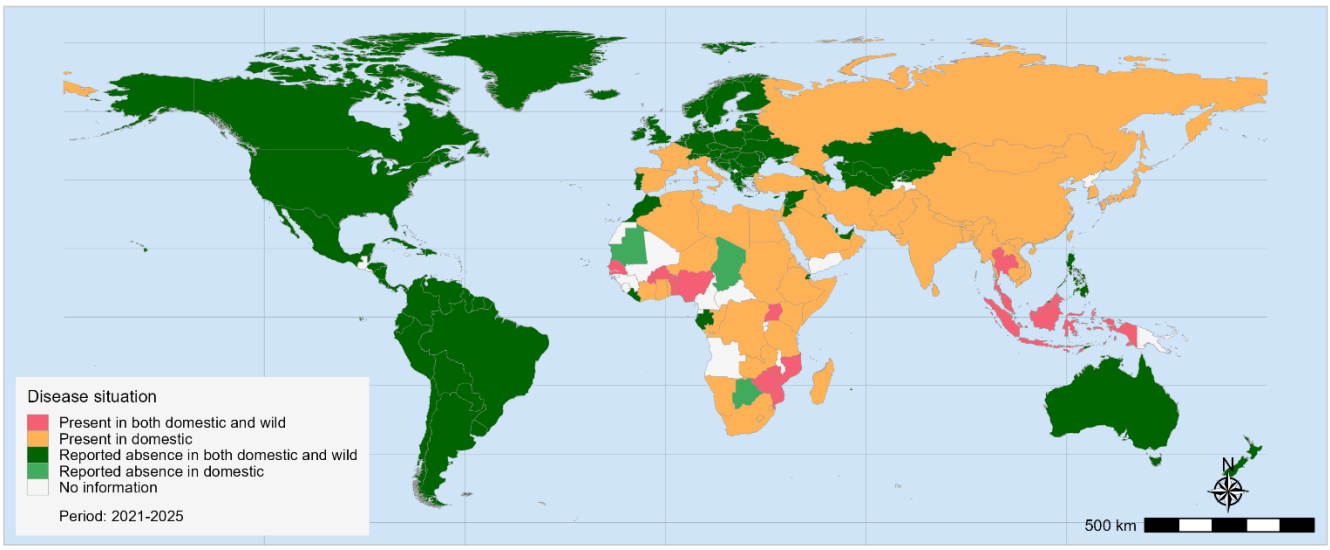


Figure 1. Geographical distribution of LSDV detected events (2021-2025), as reported to WOAH.

4. Animal hosts

4.1. Susceptible hosts

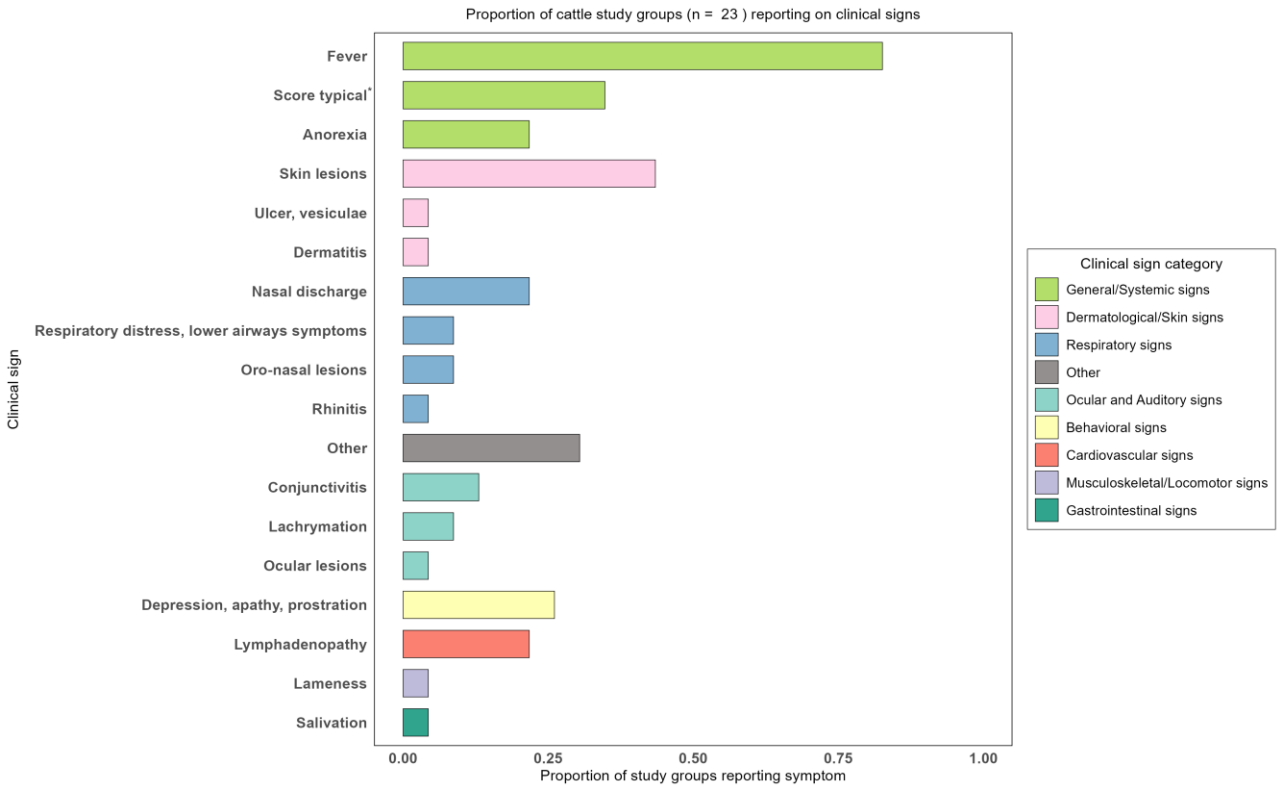
Based on epidemiological knowledge of host–pathogen–vector interactions and outbreak reports, the main hosts of LSDV are cattle. However, other susceptible species have been identified in the SLR. The SLR summary is given in Table 1.

Table 1. Susceptible host species of lumpy skin disease virus.

The systematic literature review reported in the LSDV 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, Capra hircus, Bubalus spp.* **Antibodies were detected in the following animal species:** • Bovidae: *Bos taurus, Syncerus caffer* **Outbreaks reported to WOAH included the following species:** • Bovidae: *Bos taurus, Bos frontalis, Bos gaurus, Bos javanicus, Capricornis sumatraensis, Bubalus spp.*
EXPERIMENTS
Experimental studies demonstrated infection in: • Bovidae: *Bos taurus*

4.2. Clinical Signs

Outcomes of a systematic literature review on clinical signs in 23 cattle study groups are displayed in Figure 2. Most study groups generic and dermatological clinical signs.



*Score typical: firm skin nodules. 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 LSDV.

Clinical signs of lumpy skin disease in cattle range from subclinical to severe. Subclinical infections are difficult to detect, as affected animals may show only fever and enlargement of regional lymph nodes. Typical onset includes high fever (>41 °C), nasal discharge, conjunctivitis, reduced appetite, lethargy, and decreased milk yield in lactating cows. Generalized lymphadenopathy is common. Cutaneous lesions usually appear within 48 hours, most often on the head, neck, limbs, udder, genitalia, and perineum. Nodules (0.5–8 cm) are initially firm, raised, and well circumscribed, involving the epidermis, dermis, subcutis, and sometimes underlying muscle. Early lesions may exude serum and show a grey-white cut surface. Many develop a necrotic, cone-shaped "sit-fast". Secondary bacterial infection is frequent, and healing may take months to years, often leaving scars. Mucosal lesions ulcerate quickly and may occur in the oral and nasal cavities, gastrointestinal tract, trachea, and lungs, occasionally resulting in pneumonia. Pregnant cows may abort or deliver prematurely; bulls may experience temporary or permanent infertility. Ventral oedema (limbs, brisket, scrotum, vulva) may develop. Although most animals recover, convalescence can be prolonged due to emaciation and secondary infections.

Water buffalo seem to have less severe clinical signs than cattle. Similar signs of varying degree can be seen in various wild ungulates (Spickler, 2025).

4.2.1. Incubation Period

The incubation period under field conditions is not well defined, but experimental infections in cattle indicate a range of 1-14 days, with a median of approximately 5 days. The incubation period in the field varies from 1 week up to 5 weeks. However, most sources state an incubation period of around one week (Spickler, 2025; WOAH, 2017, and references in the online version).

4.2.2. Morbidity and case fatality

Morbidity rates in LSD outbreaks varies widely, ranging from 1-2% to as high as 80-90% in cattle (Spickler, 2025). The WOAH reports typical morbidity levels of 10-20%. In experimentally infected cattle, case fatality rates average around 45% (range: 16-50%) (references in the online version).

4.2.3. Zoonotic Potential

LSDV is not known to infect humans under natural conditions.

5. Transmission

LSDV is primarily transmitted mechanically via biting midges of the genus Culicoides (Diptera; Ceratopogonidae), mosquitoes (Diptera; Culicidae) and biting flies flies. (e.g. Stomoxys calcitrans and Biomyia fasciata), Culicoides midges, male ticks (Riphicephalus appendiculatus and Amblyomma hebraeum) and some non-biting flies. Evidence on the potential and likely competent vector species and their geographic distribution can be found in CROSSREF to vector report.

The importance of different vectors probably varies in different areas because of their abundance and behaviour. LSDV in skin lesions are probably the main source of virus transmitted to arthropod vectors (Spickler, 2025; WOAH, 2017a; WOAH, 2025).

Direct contact between animals is considered to be a minor source of infection for cluster 1 LSDV. For cluster 2 LSDV, however, LSDV has infected cattle that shared an arthropod-free room without direct contact and no common feed and water troughs. Apart from skin lesions, LSDV can be shed from saliva, respiratory secretions, milk and semen. Cattle, sharing water through with cattle infected with cluster 1, has been infected with LSDV. Vertical transmission has been demonstrated experimentally through the transmission of infected semen during natural mating or artificial insemination (Akther 2023).

Uterine transmission of LSDV is also possible (Spickler, 2025).

6. Diagnostic tests

WOAH recommended tests (WOAH,2025) for agent detection are PCR, virus isolation (VI) and transmission electron microscopy (TEM).

VI is considered the referencestandard test by WOAH. PCR is the preferred method for LSDV detection due to its rapidity and high sensitivity, and can detect viral genome in skin lesions, saliva, nasal secretions, semen, and blood. VI followed by PCR can confirm the presence of viable virus. TEM can identify poxviruses but cannot differentiate between poxvirus species.

For immune response detection, the WOAH recommended tests are virus neutralisation (VNT), western blot, Immunofluorescence Assay (specifically the indirect fluorescent antibody test, IFAT) and capripoxvirus ELISA.

Table 2 presents data on the sensitivity and specificity of diagnostic tests collected through EFSA's systematic literature review; reported values correspond to the median sensitivity and specificity when multiple study groups investigated the same test and are only included when explicitly stated in the publications.

Table 1. Median sensitivity and specificity of tests to detect LSDV/LSDV antibodies reported in literature included in the systematic literature review.

Target	Test	Species	Sensitivity	N animal groups	Specificity	N animal groups	References
Antibody	ELISA	Cattle	91%	1	87.0%	1	Milovanović et al., 2019
Antibody	C-ELISA	Cattle	-	-	99.6%	2	Milena et al., 2019
Antibody	I-ELISA	Cattle	-	-	99.5%	1	Baselli et al., 2023
Antibody	IFAT	Cattle	88%	1	76%	1	Milovanović et al., 2019
Antibody	VNT	Cattle	100%	1	100%	1	Milovanović et al., 2019

7. Prevention and control

7.1. Vaccination

There are live attenuated homologous and heterologous vaccines against LSDV. The homologous vaccines have been used successfully to control Lumpy skin disease in the field and under experimental infection shown high levels of protection (WOAH, 2025). The duration of immunity is at least 18 months. Side-effects include a local reaction at the injection site, fever, reduced milk production and on rare occasions a "Neethling" response. The heterologous live attenuated vaccine is less effective in protecting cattle than the homologous (WOAH, 2025).

Homologous inactivated vaccines against LSDV have been tested and developed. Although they are safe and tested, the duration of immunity is shorter. They require a booster vaccination after one month and then every 6 months (WOAH, 2025).

Currently, there are no vaccines for LSDV authorized for regular veterinary use by the European Medical Agency, but the European Union keeps a vaccine bank for emergencies. During 2025, following the detection of outbreaks in Italy, France and Spain) OBP Neethling strain vaccines (Onderstepoort Biological Products) supplied from the EU LSD vaccine bank were used as part of the control strategy in all three countries (European Commission, 2025).

7.2. Treatment

In accordance with the EU AHL, susceptible species kept at in the affected holdings shall be culled to prevent further spread of the pathogen. Specific treatments for this disease are not compliant with the AHL.

8. References

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