



## Epizootic situation regarding lumpy skin disease worldwide and in Ukraine from 2013 to 2024

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### Article info

Received 03.12.2025

Received in revised form  
01.01.2026

Accepted 26.01.2026

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*Vashchyk, Y. V., Gujvinska, S. O., Paliy, A. P., Kosheliev, V. V., Kornieikov, O. M., Pavlichenko, O. V., Nahorna, L. V., Rebenko, H. I., & Dolbanosova, R. V. (2026). Epizootic situation regarding lumpy skin disease worldwide and in Ukraine from 2013 to 2024. Regulatory Mechanisms in Biosystems, 17(1), e26008. doi:10.15421/0226008*

Monitoring studies of biomaterials from Ukraine's central, northern, southern, western, and eastern regions were conducted. These studies included serological analyses of cattle blood serum using the enzyme-linked immunosorbent assay (ELISA) to determine immunity levels to the lumpy skin disease virus, as well as molecular genetic tests using the polymerase chain reaction (PCR) to detect the lumpy skin disease virus (LSDV) in arthropod collections. Testing 1,800 blood serum samples from cattle using ELISA for antibodies to the causative agent of nodular dermatitis yielded negative results for all samples. PCR testing of 1,125 arthropod pools (Culicidae spp., *Culicoides* spp., Muscidae spp., Oestridae spp., and Ixodidae spp.) revealed no LSDV genetic material. These results indicate that LSDV did not circulate in Ukraine from 2013 to 2024. Ukraine is located in a high-risk zone, making it necessary to enhance the effectiveness of veterinary measures for preventing and controlling nodular dermatitis. The main danger lies in the vector (insect) and cross-border transmission of the virus from the northeastern, Caucasian, and Balkan regions, where the disease is endemic or has been reported periodically. The latest 89 WOAHP reports on lumpy skin disease registrations were reviewed. Notably, 48 reports (53.9%) came from Asian countries, nine (10.1%) from African countries, six (6.8%) from Eurasian countries, and 26 (29.2%) from European countries. According to the WOAHP, 4,853 outbreaks of the disease were reported during the specified timeframe. The total number of outbreaks was 292 in 2013 (6.0%), 98 in 2014 (2.0%), 9 in 2015 (0.1%), 649 in 2016 (13.4%), 806 in 2017 (16.6%), 813 in 2018 (16.8%), 68 in 2019 (1.4%), 90 in 2020 (1.9%), 23 in 2021 (0.5%), 388 in 2022 (8.0%), 748 in 2023 (15.4%), and 869 in 2024 (17.9%). Over 12 years, a total of 4,903,337 susceptible animals were recorded. Of these, 88.3% were from Asia, 0.4% were from Africa, 6.0% were from Eurasia, and 5.3% were from Europe. During this period, there were 574,741 cases of the disease, 543,564 of which (94.5%) occurred in Asia. The remaining cases occurred in Africa – 1,360 (0.2%), Eurasia – 4,538 (0.8%), and Europe – 25,279 (4.5%). The total number of lethal cases in animals was 52,852, 50,563 (95.6%) of which were in Asia, 77 (0.1%) in Africa, 372 (0.8%) in Eurasia, and 1,840 (3.5%) in Europe. Lumpy skin disease in cattle is spreading rapidly around the world and poses a potential threat to our country. Because there is no specific treatment, it is crucial to implement preventive measures, as well as monitoring and early detection and prompt quarantine measures, to maintain the stability of livestock farming and food security in the country.

**Keywords:** lumpy skin disease; monitoring; pathogen; virus; species composition; arthropods.

### Introduction

The globalization of infectious diseases due to expanded logistics, population migration, ethnic conflicts, and climate change threatens the economies and security of countries around the world, including Ukraine. Infectious diseases that were previously considered exotic to European Union countries and indigenous to Africa contribute significantly to the destabilization of the epidemiological situation. These diseases include bluetongue, West Nile fever, African swine fever, lumpy skin disease, and others (Byas & Ebel, 2020; Buzun et al., 2023; Payan-Carreira & Simões, 2025). In recent years, these diseases have become prevalent in the Middle East (Tuppurainen & Oura, 2012). Current control measures do not fully limit the spread of these diseases, which now threaten the biological security of European countries and Ukraine. Some researchers attribute this to the unstable geopolitical situation in the Middle East, which has led to a deterioration of veterinary services for animals. The lack of effective vaccines, coupled with the movement of refugees and unvaccinated domestic and farm animals, has been a driving force in introducing diseases to new territories. Along with geopolitical instability, climate change affects the epizootiology of transmissible infections, extending their range beyond the habitat of their hosts (Bianchini et al., 2023).

A striking example of the emergence of transmissible infections is lumpy skin disease (Uddin et al., 2022; Alam et al., 2025). This

disease remains a significant problem worldwide and poses a growing threat to the global livestock industry (Hidayatik et al., 2025). In the context of emerging and spreading viral infections, nodular dermatitis remains a relevant issue, with reports from many regions worldwide (Ratyotha et al., 2022; Mazloun et al., 2023; Moudgil et al., 2024). This transmissible disease spreads rapidly, causing significant economic losses in agriculture (Anwar et al., 2022; Azeem et al., 2022; Habiba et al., 2022). Therefore, the World Organisation for Animal Health (WOAH) classifies lumpy skin disease in cattle as a disease subject to mandatory registration due to significant economic losses during outbreaks. The disease causes economic losses through a sharp decline in milk productivity, milk and leather quality, growth rates, abortions, stillbirths, and infertility. In some cases, economic losses are also associated with animal deaths from complications caused by the activation of opportunistic microflora, as well as from treatment, veterinary and sanitary measures, and trade restrictions. For example, the total economic damage caused by this disease in Turkey amounted to US\$242.0 million (Ince et al., 2016). Therefore, the World Organisation for Animal Health (WOAH) classifies lumpy skin disease as a quarantine disease.

Lumpy skin disease (LSD, Dermatitis nodularis), also known as contagious nodular dermatitis, is a viral disease of cattle (Machado et al., 2019; Yadav et al., 2022; Khadim et al., 2025). It is characterized by persistent fever and the formation of numerous nodules or

bumps on the skin that subsequently become necrotic. It is also accompanied by generalized lymphadenitis, agalactia, eye and mucous membrane damage to the respiratory and digestive systems, and swelling of the subcutaneous tissue, internal organs, and limbs (Badr et al., 2022; Liang et al., 2022; Kaur et al., 2025).

The causative agent of lumpy skin disease is the lumpy skin disease virus (LSDV). It belongs to the Poxviridae family, the *Capripoxvirus* genus, and the Chordopoxvirinae subfamily (Whittle et al., 2023). Its widespread and rapid transmission is associated with blood-sucking ticks (Ixodidae spp., *Rhipicephalus appendiculatus* Neumann, 1901, and *Amblyomma hebraeum* Koch, 1844), stable flies (*Stomoxys calcitrans* Linnaeus, 1758), mosquitoes (*Aedes aegypti* Linnaeus, 1762; *Anopheles stephensi* Meigen, 1818; and *Culex quinquefasciatus* Say, 1823), biting midges (*Culicoides nubeculosus* Meigen, 1830), and horseflies (*Haematopota* spp.) (Kahana-Sutin et al., 2017; Sohler et al., 2019; Riana et al., 2024).

Cattle and Asian buffalo are susceptible to lumpy skin disease (Sprygin et al., 2019; Haider et al., 2024). Some authors claim that dairy breeds are more susceptible to infection than beef breeds, particularly during lactation. Other susceptible species include sheep, goats, camels, giraffes, and zebu (Dao et al., 2022; Kumar et al., 2023).

Historically, the geographical distribution of the causative agent of lumpy skin disease has been limited to the African continent. It is endemic to southern African countries, such as Zimbabwe and Namibia, as well as to Ethiopia and Egypt (Molla et al., 2017; Rouby et al., 2021; Abewaw, 2024). Since 2012, however, the disease has been reported in several Middle Eastern countries: Israel, Jordan, Iraq, Turkey, and Azerbaijan (Abutarbush et al., 2015; Al-Salihi & Hassan, 2015; Zeynalova et al., 2016). Recently, lumpy skin disease has steadily expanded its range, spreading to European Union countries (Tuppurainen & Oura et al., 2014).

This disease is a serious concern for veterinary specialists because of its rapid spread around the world, which highlights the need for enhanced global surveillance and control (Lubinga et al., 2015; Mishkar et al., 2023).

Given Ukraine's large cattle population, lack of vaccination, and considering the sources of the pathogen, its routes of transmission, and its global prevalence, there is a risk of introducing the lumpy skin disease virus into Ukraine. In this regard, monitoring the circulation of LSDV and the incidence of lumpy skin disease in animals is relevant.

## Materials and methods

The research was conducted in the virology laboratory at the National Scientific Center "Institute of Experimental and Clinical Veterinary Medicine". Biomaterial was collected for serological and molecular genetic monitoring studies. A total of 1,800 blood samples from cattle were collected for serological studies on the intensity of immunity to the causative agent of lumpy skin disease. Additionally, 375 entomological collections of arthropods, which are vectors of infection, were collected for molecular genetic testing to detect the presence of LSDV genetic material.

Based on previously studied data on the distribution of LSDV carriers, ecological and faunistic studies of the main groups of arthropods were conducted on farms and in the natural habitats of nodular dermatitis vectors in various regions of Ukraine. After identifying the locations of these habitats, entomological collections of cattle nodular dermatitis vectors were conducted on farms, in forests, near rivers, in suburban areas, and in parks in Ukraine's central, eastern, western, northern, and southern regions.

The insects were caught using CDC Blacklight (UV) Light Traps, which were manufactured by the John W. Hock Company. The traps were equipped with odor baits and CO<sub>2</sub> additions. The traps were placed one hour before sunset in areas where blood-sucking insects were active, such as pastures, summer camps, animal housing facilities, suburban areas, and natural habitats, which are typical locations for carriers of this infection. The collected arthropods were delivered to the laboratory in thermal containers and stored in 96% ethanol at -20 °C until sorting. The samples were separated by collec-

tion location and then subjected to morphological identification at the genus (or species or group) level using generally accepted diagnostic features for the corresponding taxonomic groups, according to standard identifiers. Pools were then formed.

Ticks were collected using the flagging/dragging method in suitable natural habitats during the active season of ixodid ticks. Collections were carried out in the region's typical biotopes: pastures, forest edges, gardens, and meadows. Ticks were also collected directly from the skin and wool of animals in private households and on farms.

The arthropod pools formed were subjected to molecular genetic testing using the polymerase chain reaction method to detect the genetic material of the lumpy skin disease virus. DNA was extracted from the pools using standard protocols adapted for isolating the virus in carriers and mechanical vectors.

Serological tests using an enzyme-linked immunosorbent assay (ELISA) were performed to detect specific antibodies to the causative agent of lumpy skin disease. Commercial test kits (ID Screen® Capripox Double Antigen Multi-species, IDvet, France) were used for this purpose in accordance with the manufacturer's instructions. A total of 1,800 blood serum samples from cattle were tested. The samples were collected from farms in Ukraine's central, northern, southern, eastern, and western regions. The samples were collected according to aseptic procedures. The serum was obtained by centrifugation and stored at -20 °C until testing. The ELISA results were interpreted according to the instructions provided in the test system documentation.

The epizootic situation regarding lumpy skin disease in the world was determined based on WOA reports (2013–2024).

## Results

According to WOA data, Ukraine did not report any cases of lumpy skin disease in cattle between 2013 and 2024.

From 2013 to 2024, the virology laboratory of the National Scientific Center "IECVM" conducted morphological identification of arthropods as potential carriers of the nodular dermatitis causative agent. From 375 entomological collections, 1,125 pools were formed according to collection location (farms, private farms, suburban areas, and natural habitats in 20 regions of Ukraine) for molecular genetic studies.

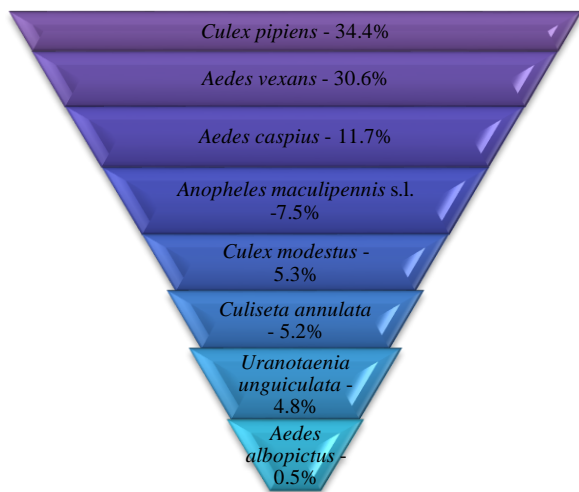
According to the identification results, mosquitoes (Diptera: Culicidae) were found in 85.3% of the insect collections, biting midges (Diptera: Culicoides) in 82.3%, flies (Diptera: Muscidae) in 77.4%, and horseflies (Diptera: Oestridae) in 33.5%.

In the entomological collection of insects, eight species from five genera of mosquitoes (Diptera: Culicidae) were identified: *Aedes vexans* Meigen, 1830, *Aedes caspius* Pallas, 1771, *Aedes albopictus* Skuse, 1894; representatives of the cryptic complex *Anopheles maculipennis* sensu lato (s.l.), *Culex modestus* Ficalbi, 1889, *Culex pipiens* Linnaeus, 1758, *Culiseta annulata* Schrank, 1776, and *Uranotaenia unguiculata* Edwards, 1913. The most common mosquitoes found in entomological collections were *C. pipiens* (34.4%) and *A. vexans* (30.6%), while the proportion of *A. caspius*, *A. maculipennis* s.l., *C. modestus*, and *C. annulata* ranged from 5.2% to 11.0%, *U. unguiculata* accounted for less than 5.0%, and *A. albopictus* accounted for 0.5% of the total number of individuals in the collection (Fig. 1).

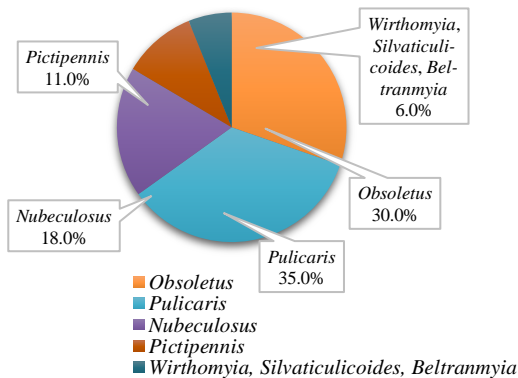
The collection of biting midges mainly included representatives of the subgenera *Avaritia* Fox, 1955 (*obsoletus* group), *Culicoides* Latreille, 1809 (*pulicaris* group), *Monoculicoides* Khalaf, 1954 (*C. (M.) nubeculosus* Meigen, 1830) and *Oecacta* Poey, 1853 (*pictipennis* group), which accounted for about 84.0% of the total number of insects in the collection, the remaining 6.0% were species/subgenus groups *Wirthomyia* Vargas, 1973, *Silvaticulicoides* Glukhova, 1972, *Beltranmyia* Vargas, 1953 (Fig. 2).

The collection included blood-sucking stable flies, which are one of the main carriers of the nodular dermatitis virus. The collection also included *Stomoxys calcitrans* (Linnaeus, 1758) and *Musca autumnalis* (De Geer, 1776), which accounted for 38.3% of the total. A significant proportion of the pools were occupied by houseflies, *Musca domestica* (Linnaeus, 1758) (32.4%), which can act as a mechanical vector and contribute to the spread of LSDV. The virus does

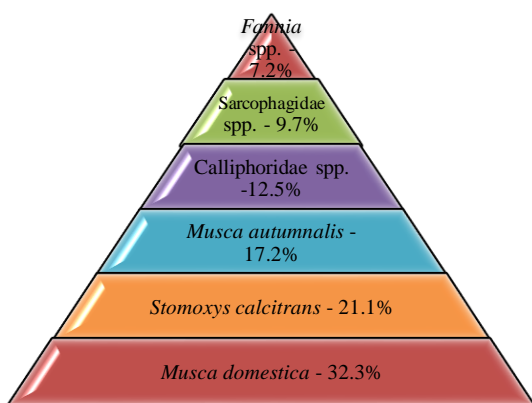
not replicate in *M. domestica*, but it can potentially transmit the nodular dermatitis causative agent on its body, mouthparts, and legs after coming into contact with infected fluids (blood or secretions from affected skin nodules) from sick animals. The remaining 29.4% consisted of saprophagous flies, blue-green flies, blue flies, and other fly species (Fig. 3).



**Fig. 1.** Species composition of mosquitoes in entomological collections, %

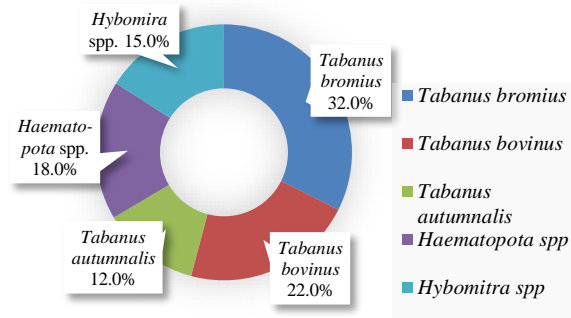


**Fig. 2.** Species/subgenus composition of biting midges in entomological collections, %



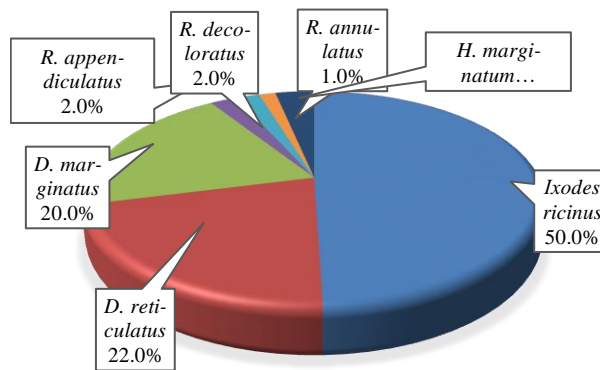
**Fig. 3.** Species composition of flies in entomological collections, %

Horseflies (Tabanidae) are one of the most important vectors of LSDV (they often interrupt blood feeding and fly from one animal to another, thus carrying fresh blood on their mouthparts, which facilitates the transmission of LSDV). In arthropod samples, the largest group among horseflies was *Tabanus* spp. (*Tabanus bromius* Linnaeus, 1758, *T. bovinus* Linnaeus, 1758, *T. autumnalis* Linnaeus, 1761) – 67.0%, *Haematopota* spp. accounted for 18.0%, and *Hybomitra* spp. – 15.0% of the total number of individuals in the collection (Fig. 4).



**Fig. 4.** Species composition of horseflies in entomological collections, %

The tick collection was dominated by *Ixodes ricinus* Linnaeus, 1758 (49.5%) and *Dermacentor* spp. (*D. reticulatus* Fabricius, 1794 and *D. marginatus* Sulzer, 1776) – 41.5%; the proportion of *Rhipicephalus* spp. (*R. appendiculatus* Neumann, 1901, *R. decoloratus* Koch, 1844, *R. annulatus* Say, 1821) was 5.7%, and *Hyalomma* spp. (*H. marginatum* Koch, 1844) etc. – 3.3% of the total number of ticks in the collection (Fig. 5).



**Fig. 5.** Species composition of ticks in entomological collections, %

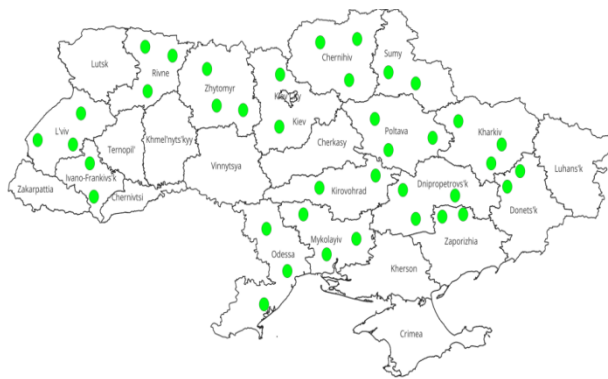
The formed arthropod pools underwent molecular genetic testing. PCR test results showed that none of the 1,125 arthropod pools collected from 20 regions of Ukraine (central: Vinnytsia, Poltava, Dnipropetrovsk, and Cherkasy; eastern: Kharkiv and Donetsk; western: Ivano-Frankivsk, Ternopil, Chernivtsi, Rivne, and Lviv; northern: Kyiv, Sumy, Zhytomyr, and Chernihiv; southern: Kherson, Odesa, Zaporizhzhia, and Mykolaiv) contained genetic material of the causative agent of lumpy skin disease (Fig. 6).



**Fig. 6.** Monitoring molecular genetic studies of arthropods – LSDV vectors in different regions of Ukraine from 2013 to 2024, green color – negative result

From 2013 to 2024, the virology laboratory at the NSC "IECVI" conducted monitoring studies to detect antibodies to the causative agent of nodular dermatitis in cattle blood serum. A total of 1,800 samples were collected from cattle in the private sector and on farms in Ukraine's central (Poltava, Dnipropetrovsk, and Kirovohrad

regions), western (Rivne, Lviv, and Ivano-Frankivsk regions), eastern (Kharkiv and Donetsk regions), southern (Odesa, Mykolaiv, and Zaporizhia regions), and northern (Sumy, Kyiv, Zhytomyr, and Chernihiv regions) areas. An ELISA test was performed on the samples (Fig. 7).



**Fig. 7.** Monitoring serological tests for the intensity of cattle immunity to LSDV in Ukraine, 2013–2024

The results of testing 1,800 blood serum samples from cattle from different regions of Ukraine using an enzyme-linked immunosorbent assay for antibodies to lumpy skin disease virus were negative in all samples. According to the results of PCR testing, 1,125 pools of arthropods – vectors of LSD (*Culicidae* spp., *Culicoides* spp., *Muscidae* spp., *Oestridae* spp., and *Ixodidae* spp.) did not contain LSDV genetic material. The results of serological and molecular genetic monitoring tests indicate that there was no circulation of LSDV in Ukraine during the study period.

## Discussion

An analysis of WOA reports showed that in 2013, lumpy skin disease was registered in three Asian countries. The first occurrence in the region was recorded in Jordan (September 19, 2013), and recurrences of the eradicated disease were recorded in Palestine (May 5, 2013) and Israel (December 21, 2013). In these countries, domestic livestock were affected. The total number of susceptible animals was 60,048, with 5,982 cases of disease and 692 deaths (Table 1).

**Table 1**  
Registration of lumpy skin disease in the World Animal Health Information System database for 2013

Continent	Country	Date of the last report	Number of		
			susceptible animals	cases of disease	deaths
Asia	Palestine	05.05.2013	1,752	216	62
	Jordan	19.09.2013	3,834	65	12
	Israel	21.12.2013	54,462	5701	618
	Total		60,048	5982	692

WOAH reported that in 2014, lumpy skin disease was registered on three continents: Asia, Africa, and Eurasia (Table 2). The following countries reported the first occurrence of the disease in the region: Lebanon (January 30, 2014), Iraq (April 13, 2014), Azerbaijan (September 9, 2014), and the recurrence of the eradicated disease: Egypt (July 8, 2014), Guinea (July 31, 2014), and Azerbaijan (November 25, 2014). During that year, a total of 51,486 susceptible animals were registered, including 1,225 (2.4%) in Asia, 6,014 (11.7%) in Africa, and 44,247 (85.9%) in Eurasia; there were 3,229 cases of the disease, including 170 (5.3%) in Asia, 223 (6.9%) in Africa, and 2,836 (87.8%) in Eurasia; number of deaths – 48, including 6 (12.5%) in Asia, 9 (18.7%) in Africa, and 33 (68.8%) in Eurasia.

In 2015, the number of animals susceptible to nodular dermatitis was 48,304, with 3,017 cases of the disease. No fatalities among animals were recorded (Table 3). The first manifestations of the disease in the region were detected in domestic livestock in two countries: Iran (July 25, 2015) and Saudi Arabia (September 15, 2015).

In 2016, the disease spread throughout the European region (Table 4). The first reported cases occurred in Russia on January 19,

2016; North Macedonia on October 4, 2016; Bulgaria on November 2, 2016; and Serbia on December 9, 2016. The disease was also first recorded in Kuwait (May 17, 2016), Namibia (October 25, 2016), and Kazakhstan (November 26, 2016). A recurrence of the previously eradicated disease was recorded in Burundi (August 16, 2016). That year, 30,276 positive results were recorded. Of those, 28,271 (93.4%) were susceptible animals. 1,935 (6.4%) were cases of disease. 70 (0.2%) were fatalities.

**Table 2**  
Registration of lumpy skin disease in the World Animal Health Information System database for 2014

Continent	Country	Date of the last report	Number of		
			susceptible animals	cases of disease	deaths
Asia	Lebanon	30.01.2014	581	104	4
	Iraq	13.04.2014	644	66	2
Africa	Egypt	08.07.2014	3,351	128	6
	Guinea	31.07.2014	2,663	95	3
Eurasia	Azerbaijan	09.09.2014	3,142	14	0
	Azerbaijan	25.11.2014	41,105	2822	33
Total			51,486	3229	48

**Table 3**  
Registration of lumpy skin disease in the World Animal Health Information System database for 2015

Continent	Country	Date of the last report	Number of		
			susceptible animals	cases of disease	deaths
Asia	Iran	25.07.2015	862	30	0
	Saudi Arabia	15.09.2015	47,442	2,987	0
Total			48,304	3,017	0

**Table 4**  
Registration of lumpy skin disease in the World Animal Health Information System database for 2016

Continent	Country	Date of the last report	Number of		
			susceptible animals	cases of disease	deaths
Europe	Russia	19.01.2016	5,523	130	4
Asia	Kuwait	17.05.2016	5,925	374	27
Africa	Burundi	16.08.2016	3,385	20	0
Europe	North Macedonia	04.10.2016	4,576	353	5
Africa	Namibia	25.10.2016	402	8	0
Europe	Bulgaria	02.11.2016	2,849	324	0
Eurasia	Kazakhstan	26.11.2016	3,557	459	34
Europe	Serbia	09.12.2016	2,054	267	0
Total			28,271	1,935	70

Analyses of reports by the World Organisation for Animal Health revealed that the first cases were registered in Georgia on February 3, 2017; Albania on March 9, 2017; Armenia on March 17, 2017; and Greece on March 24, 2017 (Table 5). Recurrences of the eradicated disease were recorded in Russia on February 28 and December 7, 2017, and in North Macedonia on May 22 and July 10, 2017. That year, the number of positive results increased to 221,698. Of these, 200,763 (90.5%) were susceptible animals, 19,251 (8.7%) were cases of the disease, and 1,684 (0.8%) resulted in death.

Monitoring studies on the spread of lumpy skin disease worldwide in 2018 show that there was a total of 73,827 susceptible animals, 5,194 cases of disease, and 498 deaths (Table 6). The disease was recorded on four continents: Asia, Africa, Eurasia, and Europe. The first outbreak of the disease was detected in Montenegro (January 29, 2018), with recurrences in Saudi Arabia (March 7, 2018), Russia (March 27, 2018), Namibia (July 25, 2018), and Georgia (December 20, 2018). As of 2019, nodular dermatitis remains confined to Europe and Asia (Table 7). Four recurrences of the eradicated disease were registered during this year: one in Greece on February 1, two in Russia on March 18 and May 17, and one in Palestine on December 26. There were 14,029 susceptible domestic animals, 353 cases, and 16 deaths.

It should be noted that nodular dermatitis continues to spread geographically across countries (Table 8). In 2020, the disease was re-

ported for the first time in four countries: Syria (March 9), Bangladesh (March 22), the People's Republic of China (July 29), and Chinese Taipei (November 26). There were also recurrences of the eradicated disease this year: two in Russia (January 13 and December 16), one in Israel (March 19), and one in Syria (May 28).

**Table 5**  
Registration of lumpy skin disease in the World Animal Health Information System database for 2017

Continent	Country	Date of the last report	Number of		
			susceptible animals	cases of disease	deaths
Eurasia	Georgia	03.02.2017	706	11	0
Europe	Russia	28.02.2017	176,856	17,843	1,556
Europe	Albania	09.03.2017	1,138	265	26
Asia	Armenia	17.03.2017	227	4	0
Europe	Greece	24.03.2017	12,651	929	101
Europe	North Macedonia	22.05.2017	34	2	0
Europe	North Macedonia	10.07.2017	158	3	1
Europe	Russia	07.12.2017	8,993	194	0
Total			200,763	19,251	1,684

**Table 6**  
Registration of lumpy skin disease in the World Animal Health Information System database for 2018

Continent	Country	Date of the last report	Number of		
			susceptible animals	cases of disease	deaths
Europe	Montenegro	29.01.2018	2,376	565	0
Asia	Saudi Arabia	07.03.2018	57,024	3,806	455
Europe	Russia	27.03.2018	1,829	26	21
Africa	Namibia	25.07.2018	9,882	784	19
Eurasia	Georgia	20.12.2018	2,716	13	3
Total			73,827	5,194	498

**Table 7**  
Registration of lumpy skin disease in the World Animal Health Information System database for 2019

Continent	Country	Date of the last report	Number of		
			susceptible animals	cases of disease	deaths
Europe	Greece	01.02.2019	234	27	6
Europe	Russia	18.03.2019	7,763	291	10
Europe	Russia	17.05.2019	5,978	26	0
Asia	Palestine	26.12.2019	54	9	0
Total			14,029	353	16

**Table 8**  
Registration of lumpy skin disease in the World Animal Health Information System database for 2020

Continent	Country	Date of the last report	Number of		
			susceptible animals	cases of disease	deaths
Europe	Russia	13.01.2020	5,057	182	1
Asia	Syria	09.03.2020	5,844	225	23
Asia	Israel	19.03.2020	4,162	72	2
Asia	Bangladesh	22.03.2020	750	175	0
Asia	Syria	28.05.2020	182	15	2
Asia	People's Republic of China	29.07.2020	42	11	4
Asia	Chinese Taipei	26.11.2020	1,706	154	1
Europe	Russia	16.12.2020	674	10	0
Total			18,417	844	33

According to the World Organisation for Animal Health, seven countries reported cases of lumpy skin disease in 2021 (Table 9). The disease was detected in Russia on January 20, 2021. The first national cases were detected in Myanmar on June 2, Bhutan on June 29, Laos on August 2, and Hong Kong on November 25. Recurrences of the eradicated disease were detected in Namibia on June 9 and in Chinese Taipei on August 31. Of the 5,970 total cases, 5,354 animals (89.7%) were registered as susceptible, 608 animals (10.2%) as diseased, and eight (0.1%) deaths. Previously, the disease was only found in domestic livestock. However, in 2021, it was also detected in buffalo in

Laos. Of the 2,996 susceptible animals registered in Laos, 978 (32.6%) were buffalo, and 2,018 (67.4%) were domestic livestock. There were 369 recorded cases of the disease in domestic livestock. No fatalities among livestock were registered.

**Table 9**  
Registration of lumpy skin disease in the World Animal Health Information System database for 2021

Continent	Country	Date of the last report	Number of		
			susceptible animals	cases of disease	deaths
Europe	Russia	20.01.2021	346	41	1
Asia	Myanmar	02.06.2021	63	6	0
Africa	Namibia	09.06.2021	580	27	0
Asia	Bhutan	29.06.2021	1,239	147	3
Asia	Laos	02.08.2021	2,996	369	0
Asia	Chinese Taipei	31.08.2021	130	18	0
Asia	Hong Kong	25.11.2021	0	0	4
Total			5,354	608	8

In 2022, the World Organisation for Animal Health reported the registration of this dangerous disease on four continents (Table 10). The first national cases were recorded in Mongolia (08.04.2022), Pakistan (13.04.2022), Nepal (May 18, 2022), the People's Republic of China (June 8, 2022), Afghanistan (June 30, 2022), and Singapore (July 21, 2022). The disease was detected twice in Russia (24.03.2022 and 22.09.2022), four times in the People's Republic of China (08.06.2022), and once in Turkey (23.11.2022). Recurrences of the eradicated disease were reported by Russia (March 24, 2022; March 25, 2022, and November 20, 2022), Djibouti (May 12, 2022), and Mongolia (December 26, 2022). During this year, the number of susceptible animals was 372,330, the number of disease cases was 23,924, and the number of deaths was 775. In all these countries, domestic livestock were affected. In Nepal, buffalo and domestic cattle were affected. There were 40,634 susceptible animals, of which 398 (0.9%) were buffalo, and 40,236 (99.1%) were domestic cattle.

**Table 10**  
Registration of lumpy skin disease in the World Animal Health Information System database for 2022

Continent	Country	Date of the last report	Number of		
			susceptible animals	cases of disease	deaths
Europe	Russia	24.03.2022	6,574	1,456	35
Europe	Russia	24.03.2022	45	2	0
Europe	Russia	25.03.2022	6,979	1,662	61
Asia	Mongolia	08.04.2022	75,097	2,578	67
Asia	Pakistan	13.04.2022	195	13,345	296
Africa	Djibouti	12.05.2022	312	11	0
Asia	Nepal	18.05.2022	40,634	3,252	12
Asia	People's Republic of China	08.06.2022	65	65	0
Asia	People's Republic of China	08.06.2022	70	25	0
Asia	People's Republic of China	08.06.2022	25	3	0
Asia	People's Republic of China	08.06.2022	26	13	1
Asia	People's Republic of China	08.06.2022	26	3	1
Asia	Afghanistan	30.06.2022	12	2	0
Asia	Singapore	21.07.2022	58	13	0
Europe	Russia	22.09.2022	722	14	0
Eurasia	Turkey	23.11.2022	239,127	1,219	302
Europe	Russia	20.12.2022	1,136	222	0
Asia	Mongolia	26.12.2022	1,227	39	0
Total			372,330	23,924	775

In 2023, WOAHA reported the registration of lumpy skin disease in eight countries in the Asian region and one European country. As can be seen from the data in Table 11, the first case in Malaysia was reported on January 8, 2023, and cases were also found in Cambodia (June 23, 2023), India (July 20, 2023), Sri Lanka (July 28, 2023), Indonesia (September 7, 2023), and Vietnam (October 24, 2023). The disease was also detected in India (July 20, 2023), and recurrences of the eradicated disease in Israel (October 10, 2023), Russia (November

20, 2022, and December 21, 2023), and Bhutan (December 11, 2023). We can see how rapidly the number of susceptible animals has grown to 1,506,699, the number of cases to 67,701, and the number of fatalities to 3,026. It should be noted that the reports mentioned the registration of this disease in wild gaur in Malaysia. In this country, there were 25 susceptible gaur and 1,498 domestic cattle. There were 717 sick domestic animals and one gaur, and 4 domestic animals and 1 gaur died. In Cambodia, 12,242 susceptible animals were registered, including 20 buffaloes and 12,222 domestic cattle.

**Table 11**  
Registration of lumpy skin disease in the World Animal Health Information System database for 2023

Continent	Country	Date of the last report	Number of		
			susceptible animals	cases of disease	deaths
Asia	Malaysia	08.01.2023	15,012	718	5
Asia	Cambodia	23.06.2023	12,242	1,687	37
Asia	Cambodia	23.06.2023	413	101	0
Asia	India	20.07.2023	736,592	30,467	0
Asia	India	20.07.2023	150	25	0
Asia	Sri Lanka	28.07.2023	543	83	0
Asia	Indonesia	07.09.2023	423,769	4,506	2
Asia	Israel	10.10.2023	3,200	61	8
Asia	Vietnam	24.10.2023	3,248	12,807	75
Europe	Russia	20.11.2022	2,466	5	0
Asia	Bhutan	11.12.2023	308,220	17,134	2,888
Europe	Russia	21.12.2023	844	107	11
Total			1,506,699	67,701	3,026

A significant spread of nodular dermatitis was observed in 2024 (Table 12). According to the World Organisation for Animal Health, a large number of susceptible animals (2,523,809), diseases (442,703), and deaths (46,002) were registered. The disease has been reported in not only domestic cattle and buffalo but also wild gaurs, bantengs, and serows. This report came from Thailand.

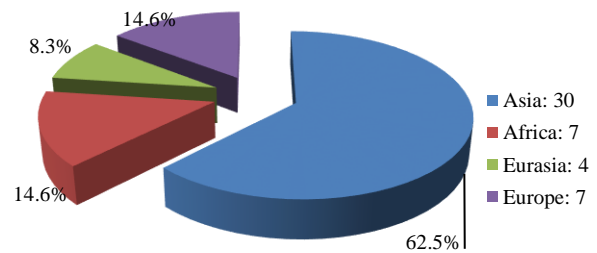
Using the World Animal Health Information System database, an epizootiological study was conducted to monitor lumpy skin disease worldwide from 2013 to 2024. The study showed that the disease was registered in countries on four continents (Fig. 8).

During the studied period, lumpy skin disease was reported in 48 countries worldwide. Thirty (62.5%) of the countries in Asia reported animal diseases, seven (14.6%) of the countries in Africa reported animal diseases, four (8.3%) of the countries in Eurasia reported animal diseases, and seven (14.6%) of the countries in Europe reported

animal diseases. Figure 9–11 shows the geographical distribution of the disease.

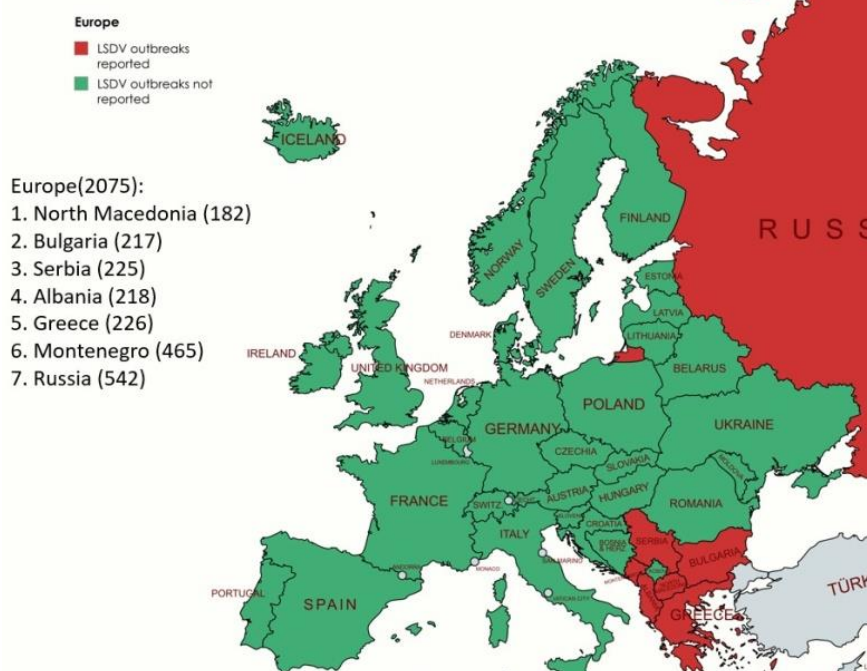
**Table 12**  
Registration of lumpy skin disease in the World Animal Health Information System database for 2024

Continent	Country	Date of the last report	Number of		
			susceptible animals	cases of disease	deaths
Asia	Thailand	10.01.2024	2,513,260	441,742	45,952
Asia	Republic of Korea	05.02.2024	6,761	313	0
Europe	Russia	18.07.2024	2,666	333	1
Asia	Thailand	03.09.2024	5	2	0
Asia	Thailand	18.09.2024	31	6	0
Asia	Hong Kong	30.10.2024	66	20	0
Africa	Algeria	21.11.2024	284	72	10
Africa	Libya	30.12.2024	736	215	39
Total			2,523,809	442,703	46,002



**Fig. 8.** Registration of lumpy skin disease in the WOA database for the period from 2013 to 2024

We analyzed data from the latest WOA reports on the total number of outbreaks of the aforementioned disease from 2013 to 2024. A total of 4,854 outbreaks were registered during this period: 2,075 in Europe (Fig. 9), 2,341 in Asia (Fig. 10), 438 in Africa (Fig. 11). The total number of outbreaks per year was 292 (6.0%) in 2013, 98 (2.0%) in 2014, nine (0.2%) in 2015, 649 (13.4%) in 2016, 806 (16.6%) in 2017, 813 (16.8%) in 2018, 68 (1.4%) in 2019, and 263 (1.4%) in 2020. The numbers for subsequent years are as follows: 2018 – 813 (16.8%), 2019 – 68 (1.4%), 2020 – 90 (1.9%), 2021 – 23 (0.5%), 2022 – 388 (8.0%), 2023 – 748 (15.4%), and 2024 – 869 (17.9%).



**Fig. 9.** Epizootic situation regarding lumpy skin disease in Europe in 2013–2024 (according to WOA data)



**Fig. 10.** Epizootic situation regarding lumpy skin disease in Asia in 2013–2024 (according to WOA data)



**Fig. 11.** Epizootic situation regarding lumpy skin disease in Africa in 2013–2024 (according to WOA data)

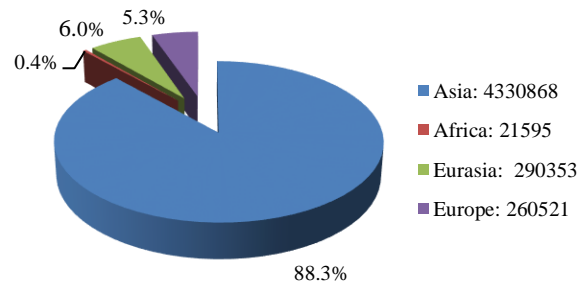
From 2013 to 2024, a total of 89 final reports on the registration of lumpy skin disease were posted to the WOA database. Of these reports, 48 (53.9%) originated from Asian countries, nine (10.1%) from African countries, six (6.8%) from Eurasian countries, and 26 (29.2%) from European countries.

After processing and analyzing the reports, it was determined that, over the course of 12 years, a total of 4,903,337 susceptible animals were recorded. Of these animals, 88.3% were from Asia, 0.4% were from Africa, 6.0% were from Eurasia, and 5.3% were from Europe (Fig. 12).

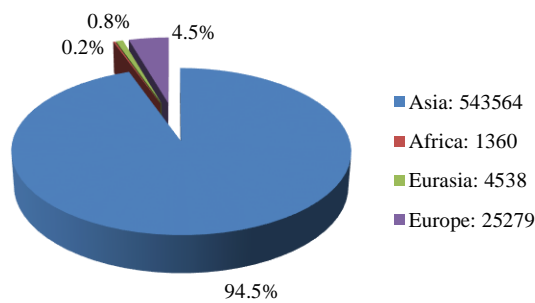
As shown in Figure 13, the reports indicate that there were 574,741 cases of the disease during this period. Of these cases, 543,564 (94.5%) occurred in Asia, 1,360 (0.2%) occurred in Africa, 4,538 (0.8%) occurred in Eurasia, and 25,279 (4.5%) occurred in Europe.

The total number of fatalities was 52,852 (Fig. 14), of which 50,563 (95.6%) were on the Asian continent, 77 (0.1%) on the Afri-

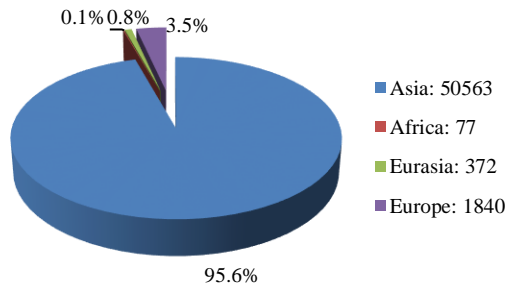
can continent, 372 (0.8%) on the Eurasian continent, and 1,840 (3.5%) on the European continent.



**Fig. 12.** Number of susceptible animals registered in the WOA database for the period from 2013 to 2024



**Fig. 13.** Number of cases registered in the WOA database for the period from 2013 to 2024



**Fig. 14.** Number of animal deaths registered in the WOA database for the period from 2013 to 2024

Lumpy skin disease is spreading rapidly across various countries, causing significant concern among veterinary specialists (Namazi & Khodakaram Tafti, 2021; Akther et al., 2023; Di Giuseppe et al., 2024). Our research confirms that Ukrainian livestock farming is safe in terms of nodular dermatitis. However, the high level of danger associated with the emergence and spread of this disease must be taken into account. This is due to the presence of disease-carrying vectors in livestock habitats. Studies have shown that Diptera: Muscidae representatives are mechanical carriers of helminth eggs (Paliy et al., 2018; AbdAllah et al., 2025; Khan et al., 2025). There are reports of malaria mosquitoes belonging to the *A. maculipennis* s.l. complex being discovered in Southern Ukraine. These mosquitoes are potential carriers of animal viral disease pathogens (Rudik & Chebotar, 2025). Midges are another source of the spread of animal viral disease pathogens. Filatov et al. (2015) reported that 36 species have been registered in eastern Ukraine alone.

The variability of the entomocomplex of parasitic dipterans in the face of natural and anthropogenic changes must also be considered (Paliy et al., 2021a, 2021b; Zhang et al., 2025). This can directly impact the transmission of infectious diseases in humans and animals.

An analysis of reports from the World Organisation showed that lumpy skin disease was registered in three Asian countries in 2013: Israel, Jordan, and Palestine. In 2014, the disease continued to spread, with two additional Asian countries reporting cases: Iraq and Lebanon; two African countries: Guinea and Egypt; and one Eurasian country: Azerbaijan. In 2015, the disease was detected in two Asian countries: Iran and Saudi Arabia. Since 2016, a complex epizootic situation regarding the aforementioned disease has arisen in several European countries. According to an analysis of the WOA database, the disease was registered in one Asian country (Kuwait), two African countries (Burundi and Namibia), four European countries (Russia, North Macedonia, Bulgaria, and Serbia), and one Eurasian country (Kazakhstan) in 2016. In 2017, nodular dermatitis was reported eight times; in North Macedonia (2 outbreaks), Russia (2 outbreaks), Georgia (1 outbreak), Armenia (1 outbreak), Albania (1 outbreak), and Greece (1 outbreak). In 2018, the WOA register added two European countries (Montenegro and Russia), one Asian country (Saudi Arabia), one African country (Namibia), and one Eurasian country (Georgia). Outbreaks of LSD were recorded in Greece, Russia, and Palestine in 2019 and in Syria, China, Taiwan, Bangladesh, Israel, and Russia in 2020. According to reports from the World Organisation for Animal Health, LSD was registered in seven countries in

2021: Namibia, Bhutan, Laos, Taiwan, Hong Kong, Myanmar, and Russia. The latest WOA report for 2022 showed the disease's rapid geographical spread. The disease was registered 18 times on four continents. In Asia, it was recorded in Singapore, Afghanistan, the People's Republic of China, Mongolia, Nepal, and Pakistan. In Africa, it was recorded in Djibouti. In Eurasia, it was recorded in Turkey. In Europe, it was recorded in Russia. In 2023, lumpy skin disease spread to new territories, with the first cases reported in Indonesia, India, Cambodia, Malaysia, Sri Lanka, and Vietnam, and continued to be reported in countries such as Bhutan, Israel, and Russia. Outbreaks of the disease in 2024 were recorded in Algeria, Libya, Thailand, Hong Kong, the Republic of Korea, and Russia.

Over the past decades, the geography of nodular dermatitis has expanded significantly (Allepuz et al., 2018; Azeem et al., 2021; Liang et al., 2022). The disease has been reported in countries such as Jordan (Abutarbush et al., 2015), Azerbaijan (Zeynalova et al., 2016), the Balkans (Mercier et al., 2018), Ethiopia (Molla et al., 2017), India (Sudhakar et al., 2020), Egypt (Rouby et al., 2021), Kazakhstan (Orynbayev et al., 2021), Bangladesh (Uddin et al., 2022), Taiwan (Tsai et al., 2022), Vietnam (Dao et al., 2022), Pakistan (Khadim et al., 2025), and others.

Researchers have noted that lumpy skin disease affects not only cattle and buffalo (Akther et al., 2023; Whittle et al., 2023) but also sheep, goats (Kitching, 2003), camels (Kumar et al., 2023), giraffes, impalas, and antelopes (Parvin et al., 2025). An analysis of WOA reports revealed that, from 2013 to 2024, the disease was reported in domestic cattle, domestic buffalo, wild gaurs, wild bantengs and mainland serows.

Due to the importance of addressing the occurrence and spread of infectious diseases in healthy territories, it is crucial to emphasize veterinary and sanitary measures (Paliy, 2018; Zavgorodnii et al., 2021; Arjmand et al., 2025).

Recent reports indicate that the disease is spreading rapidly in various countries. Between 2013 and 2024, there were 4,903,337 susceptible animals, 574,741 cases, and 52,852 fatalities. Researchers have confirmed that nodular dermatitis is a pressing global problem that causes significant economic losses in the livestock industry.

## Conclusion

An enzyme-linked immunosorbent assay for antibodies to the nodular dermatitis virus was performed on 1,800 blood serum samples from cattle in different regions of Ukraine, and all samples tested negative. PCR testing revealed that 1,125 arthropod pools (including Culicidae spp. mosquitoes, *Culicoides* spp. midges, Muscidae spp. flies, Oestridae spp. horseflies, and Ixodidae spp. ticks) did not contain LSDV genetic material. Serological and molecular genetic monitoring test results indicate that LSDV did not circulate in Ukraine from 2013 to 2024.

Ukraine is located in a high-risk zone, so it is necessary to enhance the effectiveness of veterinary measures for preventing and controlling lumpy skin disease. The main danger lies in vector (insect) transmission and cross-border spread of the virus from the Northern Caucasian, and Balkan regions, where the disease is endemic or has been reported periodically. According to an analysis of WOA reports on lumpy skin disease spread worldwide from 2013 to 2024, LSDV was reported in 48 countries on different continents. During this period, 4,903,337 susceptible animals were recorded, and there were 5,747,441 cases of the disease and 52,852 fatalities.

Lumpy skin disease is spreading rapidly around the world and poses a potential threat to Ukraine. Therefore, it is crucial to monitor LSD in Ukraine and worldwide continuously.

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