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**Distribution and Management of Lumpy Skin Disease in Beef Cattle in Cisempur Village, Cibalong District, Tasikmalaya Regency, West Java Province****Rangga Suandana, Rismasari, Firgian Ardigurnita, Dwi Wijayanti\****Program Studi Peternakan Universitas Perjuangan Tasikmalaya, Jawa Barat, 46115, Indonesia**\*Corresponding E-mail : [wijayantidwi12@gmail.com](mailto:wijayantidwi12@gmail.com)***ABSTRACT**

Lumpy Skin Disease (LSD) is a disease affecting beef cattle in Cisempur Village, Cibalong District, Tasikmalaya Regency. Several alternatives exist for managing the LSD virus, including vaccination, traditional medicine, biosecurity, and quarantine. This study aimed to determine the spread of the LSD virus in the area and the effectiveness of the management measures employed. Primary data were collected from beef cattle farmers in Cisempur Village, with a total sample of 267 cattle from 40 farmers. Field surveys, interviews, and analysis revealed a high rate of LSD virus spread in the Cisempur area; this was evidenced by the fact that all 267 sampled cattle were confirmed to be infected with the virus. Statistical analysis indicated the following effectiveness rates for each alternative: vaccination (83.25%), traditional medicine (73.25%), biosecurity (74.25%), and quarantine (49.50%). These results demonstrate that vaccination is the most effective alternative for managing the LSD virus; while it does not result in an immediate cure, it gradually leads to improvements in the cattle's condition.

*Keywords: LSD, Disease, Treatment, Cows.*

**INTRODUCTION**

Lumpy Skin Disease (LSD) was first detected in Indonesia in the Riau region in February 2022. In response to the disease's spread, the government initiated emergency vaccination campaigns and other measures to minimize transmission. Three years after its emergence, LSD cases continue to be reported across various regions of Indonesia, posing a significant challenge for cattle health management. As of November 2023, data from the Animal Health Information System (ISIKHNAS) indicated that 56,889 LSD cases had been reported across 27 provinces.

Transmission has been recorded in several areas, including West Java and Central Java. For instance, more than 3,800 cases and 75 deaths were reported in Rembang Regency, Central Java, following the outbreak's onset in 2023, while cases were also recorded in Cirebon Regency, West Java. These figures indicate that, despite vaccination efforts, the spread of LSD persists and remains a challenge for cattle production in Indonesia.

LSD is an infectious skin disease caused by the LSD virus of the family Poxviridae genus Capripoxvirus. According to Caminade *et al.*, (2019). LSD is a non-zoonotic disease but can

be transmitted to water buffalo and other cattle through blood-sucking insects. The Food Security and Livestock Service Office of West Java Hamdi *et al.* (2020) stated that LSD can spread through wind, livestock transportation, and direct contact between livestock which can cause losses in the form of weight loss due to lack of appetite, loss of milk production, sterility in male and female cattle, miscarriage, skin damage, and death. Therefore, controlling infectious diseases in cattle is something that needs attention nowadays.

Cisempur Village in Cibalong District, Tasikmalaya Regency, is an area dominated by beef cattle farming, owing to its ecological suitability and land-carrying capacity—characterized primarily by lowlands and drylands. According to data from the Tasikmalaya Regency Statistics Agency, the beef cattle population in the Cibalong area stood at 2,527 head in 2020; this figure declined by 4.1% to 2,424 head by 2022. Coinciding with this period, Lumpy Skin Disease (LSD) was detected in Indonesia for the first time in 2022 (Sutarno & Setyawan, 2015).

Evaluating the spread and management of Lumpy Skin Disease (LSD) in Cisempur Village is crucial for identifying the current local disease situation and assessing how cattle health is managed following the disease's emergence. The information derived from this study is expected to serve as a baseline for identifying management gaps, strengthening

early detection and surveillance, and developing more targeted prevention and control strategies. In the long term, this information can contribute to improved LSD management while supporting cattle health and productivity, as well as the sustainability of beef cattle production in Cibalong.

## **MATERIALS AND METHODS**

### **Animal**

Local cattle are native Indonesian cattle whose bodies are relatively small but have good carcass quality, and are not inferior to European cattle, whose bodies are relatively large. Local cattle also have good antibodies, so they can survive various weather conditions, and because of several diseases, local cattle have the potential to be bred in relatively hot areas.

The cattle used for this research were Limousin cattle because they have a large body posture with excellent endurance. Apart from that, Limousin cattle can adapt to hot climates, making them suitable for breeding in Indonesia. Meanwhile, Simmental cattle are cattle that have high meat production and have good carcasses.

### **Lumpy Skin Disease (LSD) Virus Structure**

The LSD virus, which belongs to the capripoxvirus genus, is a DNA virus that has hairpin loops like other poxviruses. The nucleotide composition of the LSD virus is dominated by A+T (73%) which is evenly distributed uniformly (Lojkić *et al.*, 2018). The poxvirus family has a larger virion size when

compared to most other viruses. Chordopoxvirinae is divided into two clusters phylogenetically. The first cluster is formed by the genus Orthopoxvirus (OPV), while the second cluster is formed by the genera Yatapoxvirus, Leporipoxvirus, Capripoxvirus, Cervidpoxvirus, and Sui Poxvirus. The hosts of Capripoxvirus are ruminant animals, including cattle, goats and sheep (Warsito *et al.*, 2020).

### **Properties of LSD Virus**

LSD virus is temperature sensitive, which at 55°C can last for 2 hours or at 65°C for 30 minutes. At a temperature of -80°C, it can survive for approximately 10 years in nodules and then reproduce for 6 months in tissues at 4°C. The virus is very stable at room temperature, on skin with dry bumps and scabs, and in nodules for up to 35 days (Kumar *et al.*, 2021a). In addition to being sensitive to temperature, the LSD virus is sensitive to pH under both acidic and alkaline conditions. However, the LSD virus is stable at pH 6.6-8.6 within 5 days at 37°C (Sendow *et al.*, 2021). Furthermore, Abutarbush (2017) states that the chemical properties of the LSD virus are inactive in alcohol, ether 20%, chloroform, 1% formalin, and detergent (sodium dodecyl sulfate). Thus, based on the nature of the LSD virus, initial treatment can be carried out by providing good disinfectants to cattle periodically.

### **Disease Forms and Distribution of LSD Virus**

LSD virus is transmitted from livestock to livestock rapidly through vehicles, between humans, direct contact between animals, and through the air (Abutarbush, 2017). LSD virus transmission occurs directly and indirectly. Indirectly through blood-sucking insects (arthropods) mosquitoes, ticks, and biting flies (Namazi and Khodakaram Tafti, 2021). And iatrogenic transmission through needles used for administering drugs or vaccines to a group of sensitized animals (Calistri *et al.*, 2018). Indirect transmission through vectors is considered to play a major role in short-distance disease transmission. Meanwhile, disease transmission among livestock over long distances or between countries can occur through the movement of infected cattle or vectors carried by transportation vehicles, wind, or birds (Nurjanah and Dharmayanti, 2022). LSD virus is very stable even from skin nodules that have been stored for 10 years at 80°C and from infected tissue culture fluid after being stored for 6 months at 4°C (Kumar *et al.*, 2021b). Sunlight and detergents can destroy the virus quickly but the virus can survive for months in dark environments such as animal pens and feed sheds. The virus can be inactivated at 55 °C for 2 hours and 65 °C for 30 minutes. LSD virus is sensitive to highly alkaline or acidic pH but can survive at pH 6.6-8.6 for 5 days at 37°C without significant titer drop. The virus is susceptible to ether (20%), chloroform, formalin (1%), phenol (2% for 15 minutes),

sodium hypochlorite (2-3%), iodine compounds (1:33 dilution) and quaternary ammonium compounds (0.5%) (Mulatu & Feyisa, 2018).

### **Prevention and Control of the LSD Virus**

Prevention and control of LSD can be done in various ways, including vaccination, restricting livestock movement, and quarantine. Vaccination is a quick and economical measure to control the spread of LSD. There are several types of vaccines used to control or inhibit the spread of LSD, including homologous and heterologous vaccines and inactivated vaccines (Tuppurainen and Galon, 2016). In order to prevent and control the spread of the LSD virus, it can be done by implementing biosecurity and sanitation in an effort to increase farmer involvement in preventing the LSD virus and limiting livestock movement (Sendow *et al.*, 2021). In this case, at the research location, it was found that local farmers used traditional medicine in an effort to deal with the virus.

### **METHODS**

This research was conducted using qualitative and quantitative descriptive methods. The purpose of this study was to determine the level of LSD virus distribution in the research location and the effectiveness of four research parameters. The parameters used as testing materials are: vaccine handling, traditional medicine, biosecurity, and quarantine. The data used includes primary data obtained from interviews, observations,

and direct observations. Secondary data is obtained from published research in the form of books, scientific journals, and conferences, as well as documents from related sources (government websites). This study used 267 cattle from 40 beef cattle farmers in Cisempur Village. The research stages carried out are as follows: literature study, field survey and interview data collection, data processing (Kruskal-Wallis test, Mann-Whitney test, Likert scale test), analysis of test results, and conclusion-making.

### **Time and Place of Research**

This research was conducted from November 15 to December 15, 2023, in Cisempur Village, Cibalong District, Tasikmalaya Regency, West Java Province. The majority of people in Cisempur Village own household-scale beef cattle and is the village with the largest beef cattle population in Cibalong Sub-district. The interview process involved selecting the livestock farmers to be interviewed, preparing questions regarding clinical symptoms and economic impacts, and then systematically and ethically recording field data.

### **Statistical Analyses**

The data analysis used in this study is nonparametric, namely the Kruskal-Wallis test, which is used to test whether there is a significant difference between the independent and dependent variables (Indraetianingsih *et al.*, 2024). As for decision-making in the Kruskal-Wallis test. Namely, if the  $P > 0.05$  then

the data is not significantly different. If there is a significant difference in the Kruskal-Wallis test, the data will be further tested using the Mann-Whitney test. As for decision-making in the Mann Whitney test. Namely: If the  $P > 0.05$  then the data is not significantly different. According to Amam *et al.* (2021), the Likert scale is a method for measuring or knowing attitudes and responses, where the responses submitted by researchers are in the form of positive or negative questions. The Likert scale can also be used to measure the attitudes, opinions, and perceptions of individuals or groups regarding current phenomena, with four choices sometimes used for questionnaires (Retnaningsih & Basuki, 2017). The score used as an assessment reference is as follows: ineffective (score 0.1- 1.0), less effective (score 1.1- 2.0), moderately effective (score 2.1- 3.0), effective (score 3.1- 4.0).

## RESULTS AND DISCUSSIONS

### LSD virus distribution in Cisempur Village

Based on field survey results, it was found that a number of cattle in Cisempur village were infected with the LSD virus, affecting both young and adult cattle. According to the data on LSD virus distribution in beef cattle in Cisempur village, as shown in Table 1.

Table 1 shows that young cattle are more susceptible to LSD virus than adult cattle because they do not have strong antibodies. The average age of young cattle that died was below one year. Praveen *et al.* (2024) reported

that calves up to one year of age are highly susceptible to the LSD virus, with the highest mortality rates occurring in calves under five months old.

Table 1. LSD virus distribution in cattle in Cisempur village

| Sample of cattle exposed to LSD (head) | Cattle Age (head) |            | Cattle Recovered (head) |            | Dead Cattle (head) |          |
|----------------------------------------|-------------------|------------|-------------------------|------------|--------------------|----------|
|                                        | Young             | Adult      | Young                   | Adult      | Young              | Adult    |
| 267                                    | 70♀<br>60♂        | 80♀<br>57♂ | 67♀<br>59♂              | 79♀<br>57♂ | 3♀<br>1♂           | 1♀<br>0♂ |
| Total                                  | 130               | 137        | 126                     | 136        | 4                  | 1        |

This heightened susceptibility in calves aged 0–1 years may be attributed to an immune system that is not yet fully stable. The infection is already at a severe level or is like a burn, forming flakes of skin peeling off. Infection lasts more than 35 days. This extended duration aligns with the recovery and healing period for cattle affected by the LSD virus. However, these 35 days should be interpreted as the duration of the clinical course requiring observation, rather than the length of time the virus persists in the body. Previous studies have reported that infectious LSDV can be isolated from skin lesions for up to 35 days, whereas viral DNA may remain detectable for a longer period (Ratyotha *et al.*, 2022). Based on the Kruskal Wallis test results, the comparison of LSD handling in cattle is presented in Table 1.

### Effectiveness of LSD Management in Cattle

Based on the test data in Table 2, it shows that all LSD virus treatment methods provide significantly different levels of effectiveness ( $P < 0.05$ ) on the recovery of

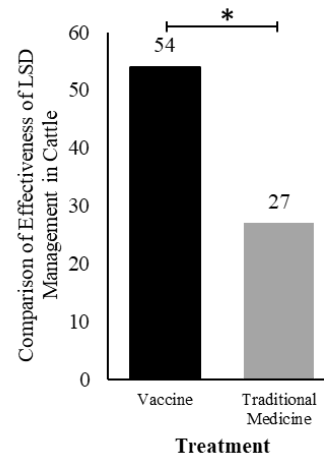
beef cattle. Therefore, further testing is required using the Mann Whitney test.

Table 2. Kruskal Walls Test Comparison of LSD Virus Handling

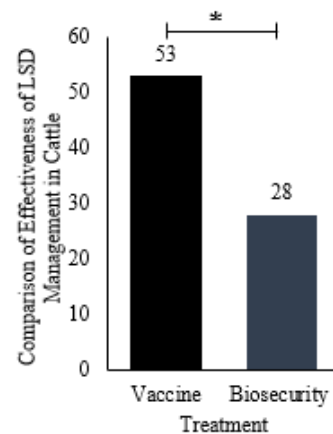
| LSD Handling Method  | Effectiveness Level | P-Value    |
|----------------------|---------------------|------------|
| Vaccines             | 128.38±0,06         | $P < 0.05$ |
| Traditional Medicine | 87.54±0,12          |            |
| Biosecurity          | 78.68±0,23          |            |
| Quarantine           | 27.41±0,20          |            |
|                      |                     |            |

In more detail, the comparison of effectiveness between methods with the Mann Whitney test can be seen in Figure 2. Based on Figure 2, the Mann Whitney test results show a significant difference in all types of LSD handling in beef cattle ( $P < 0.05$ ). Then from the test results it was also obtained that the mean rank value of the average vaccine was higher than the other parameters so that the level of effectiveness of the vaccine was better than the other types of handling. Other research has shown similar effectiveness to vaccines for treating LSD. A recent systematic review and meta-analysis involving 18 studies found that vaccination significantly reduced the occurrence of clinical signs following LSDV challenge exposure, with a pooled odds ratio of 0.06 (95% CI: 0.02–0.23) compared to unvaccinated control animals (Tuppurainen *et al.*, 2021). Field data also showed lower LSD virus infection rates in vaccinated livestock. Furthermore, the severity was significantly higher in unvaccinated livestock.

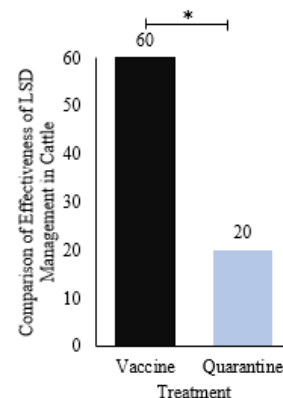
a.



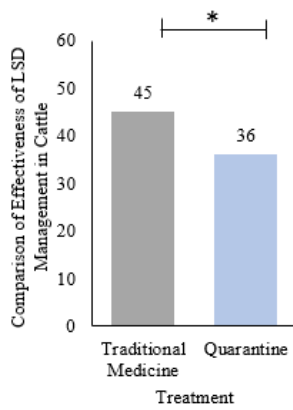
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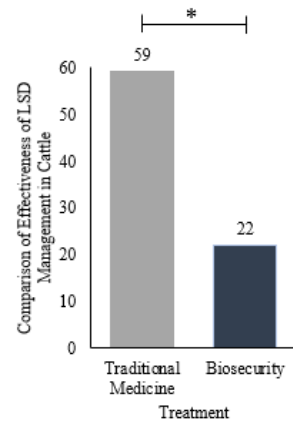
c.



d.



e.



f.

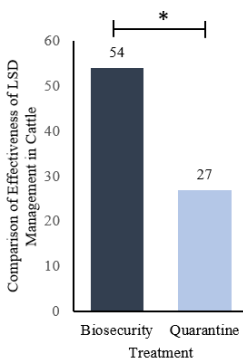


Figure 2. Comparison of effectiveness of LSD management in cattle; a) Significant differences between vaccine and traditional medicine treatments; b) Significant differences between vaccine and biosecurity treatments; c) Significant differences between vaccine and quarantine treatments; d) Significant differences between traditional medicine and

quarantine treatments; e) Significant differences between traditional medicine and biosecurity treatments; f) Significant differences between traditional medicine and biosecurity treatments.

### Effectiveness of Various LSD Virus Treatment Methods

At the interview and field survey stage, the results of the questionnaire 38 out of 40 respondents stated that handling using the vaccine method was effective in terms of the spread of the virus to beef cattle because it was able to prevent the virus properly, besides that in terms of relatively cheap prices and faster handling of the virus. This is confirmed by the results of the Likert score percentage analysis of the interview results of Cisempur village cattle farmers on LSD virus handling as in Table 3.

Table 3. Percentage of Likert Score of Interview Results of Cisempur Village Cattle Farmers on LSD Virus Handling

| Parameters           | Max average score | Average score | Percentage (%) |
|----------------------|-------------------|---------------|----------------|
| Vaccine              | 4                 | 3.32          | 83.25          |
| Traditional Medicine | 4                 | 2.95          | 73.25          |
| Biosecurity          | 4                 | 2.92          | 74.25          |
| Quarantine           | 4                 | 1.96          | 49.05          |

Based on the Likert score calculation as shown in Table 3, vaccines have the highest level of effectiveness in handling the LSD virus compared to traditional medicine, biosecurity, and quarantine. Vaccines show the level of effectiveness in handling the spread of the LSD virus (effectiveness) with a score of 3.32, or a percentage of 83.25%. Then

traditional medicine shows the value of the effectiveness level in handling (quite effective) with a score of 2.95, or a percentage of 73.5%. biosecurity shows the value of the effectiveness level in handling the spread of the LSD virus (quite effective) with a score of 2.92 or a percentage of 73%. and quarantine shows the value of the effectiveness level in handling the spread of the LSD virus in beef cattle (less effective) with a score of 1.96 or a percentage of 50%. Field studies in Albania and Southeastern European countries also found that once high vaccination coverage was achieved, subsequent outbreaks could be halted; vaccine effectiveness was estimated at approximately 70% at the herd level and 77% at the individual level (EFSA, 2017).

## CONCLUSION AND IMPLICATION

The results of surveys and interviews with 40 research samples showed that all research samples were infected by the LSD virus, so the level of spread of the LSD virus in Cisempur Village, Cibalong Subdistrict, Tasikmalaya Regency was significant.

As a solution for handling the virus, from the results of the Kruskal wallis test, the parameter with the highest significance is the vaccine with a Sig value of 0.000 ( $P < 0.05$ ) and a statistical value of 0.288. As for the results of the mann whitney test, the mean rank value of the average vaccine is higher than the other parameters.

Based on the Likert score analysis, the percentage results of the effectiveness level of

each alternative are as follows: Vaccine; 83.25% Traditional Medicine; 73.25% Biosecurity; 74.25% Quarantine; 49.50%. Based on these results, it is found that the alternative to handling the LSD virus with the vaccine method is the most effective alternative.

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