



Mini Review

## **Lumpy Skin Disease: An emerging threat to bovine**

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### **Abstract**

Lumpy skin disease came to the limelight in India affecting a lot of cattle in the past two years with great economic losses. The disease was first recorded in 2019 in Odisha and then spread to many states of India in the past two years with heavy morbidity and mortality. Being a viral disease there is no cure and the vaccines developed so far for prevention are still lacking widespread use due to their poor availability and low efficacy. In this mini-review we present clinical findings, morbidity, epidemiology, economic impact, prevention and control for lumpy skin disease.

**Key words:** Lumpy skin disease, goat pox vaccine, mosquitoes, LSDV

### **1. Introduction**

Lumpy skin disease is a devastating viral disease of cattle and buffalo caused by the lumpy skin disease virus (LSDV), which belongs to the genus capri poxvirus of the poxviridae family [1]. The LSD virus shares antigenic similarities with the sheep pox virus (SPPV) and the goatpox virus (GTPV) or is similar in the immune response to those viruses [2]. It is a contagious vector-borne disease spread by vectors like mosquitoes, some biting flies, and ticks and usually affects host animals like cows and water buffaloes [3].

Infected animals shed the virus through oral and nasal secretions which may contaminate common feed and water [3]. Thus, the disease can either spread through direct contact with the vectors or through contaminated fodder and water [3]. Studies have also shown that it can spread through animal semen during artificial insemination [3]. LSD is not a zoonotic virus; hence the disease cannot spread from infected animals to humans [3].

## 2. Clinical findings:

The incubation period of the disease is 2-5 weeks. The major clinical signs of the disease are characteristics circular skin nodules all over the body in both males and females (Fig. 1, 2) and even small calves, fever, palpable enlarged subscapular and pre-femoral lymph nodes, lacrimation, keratitis, nasal discharge, drop in milk yield, off-fed, emaciation, depression and reluctance movement [3]. Morbidity and mortality of the disease is 5-45 and 1-5%, respectively [1,3]. The nodules (Fig 2) may later turn into ulcers and eventually develop as scabs over the skin. The other symptoms include sharp drop in milk yield, discharge from the eyes and nose, salivation, loss of appetite, depression, damaged hides, emaciation, infertility and abortions. [3].



Fig 1. A cow affected with LSD showing circular nodules on the body Fig 2. A pregnant cow recovering from LSD

## 3. Morbidity and mortality

The morbidity of the disease varies between 2 to 45% and mortality is less than 10% [3], however, the reported mortality of the current outbreak in India is up to 15%, particularly in cases being reported in Rajasthan state of the country. Official reports on the proportion of cows affected and those that died are not available. However, according to one media report 76030 cattle deaths occurred in Rajasthan between 2021-2022 [4]. Media reports from Gujarat reflected that 1.71 lakh cattle were affected and 6000 cattle died [5] and similar reports from Madhya Pradesh reflected that a total of 20,874 cattle got infected with this disease across 31 districts of the state till October 13, 2022 [6]. One media report mentioned that as of 21 October 2022, about 2.4 million animals were affected, with over 110,000 deaths [7]. Many other media reports have come from different parts of India reflecting a high morbidity and probably mortality.

## 4. Epidemiology

The disease was first observed in Zambia in 1929, subsequently spreading to most African countries extensively, followed by West Asia, South-eastern Europe and Central Asia, and more recently spreading to South Asia and China in 2019 [8,9]. The disease is currently endemic in several countries across Africa, parts of West Asia (Iraq, Saudi Arabia, Syria, Arab Republic), The spread in South Asia first affected Bangladesh in July 2019 and then reached India in August that year, with initial cases being detected in Odisha and West Bengal [9]. Since then, it

has spread all over the country including the states of Kerala, Uttar Pradesh, Madhya Pradesh, Gujarat, Rajasthan, Punjab and parts of Chota Nagpur region [9].

The long porous borders between India, Nepal and Bangladesh allow for a significant amount of bilateral and informal animal trade, including cattle and buffaloes may have contributed to the spread of LSD in July-August 2019 between Bangladesh and India. While the 2019 outbreak later subsided, the recent spread in India began in June 2022 [10].

In the year 2022 lumpy skin disease outbreak started in Gujarat and Rajasthan around July and had spread to Punjab, Himachal Pradesh, Andaman & Nicobar and Uttarakhand by early August. It then spread to Jammu and Kashmir, Uttar Pradesh and Haryana [9,10]. Looking to the fast spread of the disease the governments are on the alert mode and stringent measures are needed.

### **5. Economic Impact:**

As the animal becomes weak and also loses appetite due to mouth ulceration and fever, the disease leads to reduced milk production [3]. The income losses can also be due to poor growth, reduced draught power capacity and reproductive problems associated with abortions, infertility and poor value of hides of dead animals [3]. A risk assessment study conducted by the FAO based on information available from 2019 to October 2020 revealed that the economic impact of LSD for South, East and Southeast Asian countries was estimated to be up to \$1.45 billion in direct losses of livestock and production [11].

The outbreak in India emerged as a challenge for the dairy sector. A media estimate suggested there was a direct economic loss of Rs 300 crore till September 2022 [13]. This is given the minimum market value of an indigenous or a cross-breed cow was Rs 30,000. This excludes opportunity cost like the loss on account of milk production due to the cattle deaths, loss in milk yield of recovered cattle, delay in next conception, loss in body mass, and abortions in pregnant cattle and infertility in others [13]. The milk production loss could be between 26 per cent and 42 per cent in indigenous cattle and up to 50 per cent in exotic breeds [13]. Indirect losses resulting in trade barriers including the export of live animals, meat and meat products, dairy products and hides are likely to be higher than direct losses and are estimated at \$5.51 billion [13]. Besides these estimated losses farmers lose their source of livelihood.

### **6. Treatment**

As such there is no treatment available for the disease [3]. The treatment is done on symptom basis. However, the secondary bacterial infections can be avoided by the use of antibiotics and supportive care [14]. Anti-inflammatory drug are suggested to reduce pain and to increase the appetite of cattle. In experimental studies administration of ivermectin suppressed the virus [15] and some clinicians have widely incorporated ivermectin 0.2 mg/kg s/c once or levamisole 7.5 mg/kg for therapy of LSD [16].

### **7. Prevention and Control:**

A set of spread-control measures for LSD, involves vaccination of susceptible populations with more than 80% coverage, movement control of bovines and quarantine of infected animals,

implementation of bio-security through vector control by disinfecting sheds and spraying insecticides, strengthening active and passive surveillance; spreading awareness on risk mitigation among all stakeholders involved, and creating large protection and surveillance zones and vaccination zones [3].

A wide variety of vaccines have been developed globally and suggested for prevention of LSD [17,18]. The OIE manual 2022 has suggested the use of goat pox vaccine for prevention of LSD in cows if LSDV vaccine is not available [19]. The only vaccine available in India during the LSD menace was goat pox vaccine and was used wherever available. The vaccine provides 60 to 70 % protection against LSD without any side effects [20,21]. The vaccine takes 15-20 days to become effective [3]. The population of cattle in India is around 200 million, and already 15 million doses were administered till the third week of September 2022 [22]. The affected States have put movement bans in place and are isolating infected cattle and buffaloes, spraying insecticides to kill vectors like mosquitoes. The Indian Council for Agriculture Research-National Research Centre on Equines (ICAR-NRCE), Hisar (Haryana), in collaboration with ICAR-Indian Veterinary Research Institute (IVRI), Uttar Pradesh has developed an indigenous vaccine for LSD called Lumpi-ProVacInd vaccine. For the LumpiProVacInd which is a homologous vaccine, efficacy is claimed to be 100 % by the ICAR scientists [23]. Commercial availability of this vaccine with extensive usage would pave the way for effective control.

There is no treatment for lumpy-skin disease. Nonspecific treatment (antibiotics, anti-inflammatory drugs and vitamin injections) is usually directed at treating the secondary bacterial infections, inflammation and fever, and improving the appetite of the animal. Complete recovery may take several months and may be prolonged when secondary bacterial infections occur. It may take up to 6 months for animals severely affected by LSD virus to recover fully.

Hence, to combat this devastating viral disease, it is advised to restrict animal movement, and abstain from the participation of animals in cattle fairs, shows etc. Make efforts to minimize vector population's viz. ticks, flies, mosquitoes, fleas, midges at cattle farm. Vaccinate all healthy animals of herd with LSD /Goat Pox vaccine as per manufacturer's instructions.

**8. Conclusions:** Lumpy skin disease is a threat with great economic impact. Stringent measures are needed to control this viral menace in India.

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