

Lumpy Skin Disease Virus (LSDV)- Review Article

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Abstract- Lumpy skin disease (LSD) is an infectious disease in cattle caused by a virus of the family Poxviridae, also known as Neethlingvirus[15]

in Haryana who oversaw the vaccine trials.[3]

National centre for Veterinary Type Culture, ICAR-National Research center on Equines (ICAR-NRCE), Hisar (Haryana), in collaboration with ICAR-Indian Veterinary (UP) developed a homologous live-attenuated LSD Vaccine, named Lumpi-ProVac^{Ind}. [4],[10],[16]



Fig-1. Infected Cattle[1]

Keywords- LSDV, Lumpy Skin Disease, Neethling virus, Lumpi-ProVac.

I. INTRODUCTION

Lumpy skin disease (LSD) is an infectious disease in cattle caused by a virus of the **family:** Poxviridae, **Genus:** Capripoxvirus, **Species:** Lumpy skin disease virus, **Kingdom:** Bamfordvirae, **Phylum:** Nucleocytoviricota, **Class:** Pokkesviricetes, **Order:** Chitovirales. Lumpy skin disease virus (LSDV) is double-stranded DNA virus. The capripoxvirus genus consists of LSDV, as well as sheeppox virus, and goatpox. In a significant development, two ICAR institutes have created the **Lumpi-ProVac** vaccine.[2],[9],[11],[15]

II. HISTORY

Lumpy skin disease was first seen as an epidemic in Zambia in 1929. In India July 2022, the outbreak spread in 14 out of 33 districts of Gujarat state of India. By 25 July, more than 37000 cases and 1000 deaths in cattle were reported. As of 1 August 2022, more than 25,000 cases were reported in Rajasthan in which more than 1200 bovines died.[2]

The Lumpi-ProVac vaccine's development during the previous three years was described by *Dr. Naveen Kumar*, a researcher at the ICAR National Research Centre for Equines

Transmission

- It is transmitted by blood-feeding insects, such as certain *species* of flies and mosquitoes, or ticks.
- After Direct contact with infected animals.
- Infected bulls can excrete the virus in their semen and transmission of LSD via infected semen has been demonstrated.
- There has been one report of placental transmission of LSD.
- Some of these could potentially be brought from an infected area on the wind or within vehicles.
- The disease can be also be spread through contaminated feed, water, and equipment.
- The virus is not transmissible to humans.[5],[14]

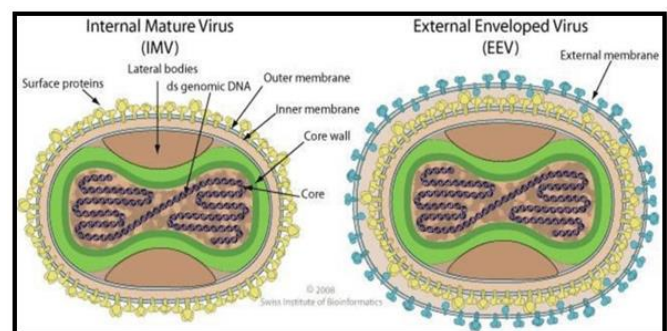


Fig-2. Structure Of Lumpy Skin Disease[6]



Fig-3:- Asia[7]

Survey

- First we met the owner of the cattle and then took some permits and checked the area around the animals.
- Then we found contamination in water and food near infected animals and some unsanitary areas.
- Then asked some questions to the animal owner.

i) How many animals do you have?

Ans:-12

ii) So how many animals were infected with lumpy skin disease virus?

Ans:- 2

iii) When did you know your cattle were infected with Lumpy Skin Disease?

Ans:- High fever is first observed in the infected animal, followed by lower levels of skin lesions 7 to 21 days after infection.

Vaccination

The **Lumpi-ProVac** vaccine's development during the previous three years was described by *Dr. Naveen Kumar*, a researcher at the ICAR National Research Centre for Equines in Haryana who oversaw the vaccine trials.^{[3],[12],[13]}

"Lumpi-ProVac" vaccine was signed in Nagpur on 29th December 2022 in the presence of Shri Parshottam Rupala, Union Minister of Fisheries, Animal Husbandry and Dairying, the Chief Minister and Deputy CM of Maharashtra. Shri Rupala praised the commendable effort put forth by ICAR in developing indigenous vaccine Lumpi-ProVac for LSD. He further said that this MoU will also ensure large-scale production of Goat Pox vaccine for future needs of India's livestock sector. At present Goat Pox vaccine is used for controlling Lumpy Skin Disease in animals and this has been proven effective against Lumpy.

Lumpi-ProVac^{ind} is safe in animals and induces LSDV-specific antibody- and cell-mediated immune response, besides providing complete protection against lethal LSDV challenge. Lumpi-ProVac^{ind} is used for the prophylactic immunization of animals against Lumpy Skin Disease, which illicit protection for about one year. A single dose of the vaccine contains $10^{3.5}$ TCID₅₀ of live-attenuated LSDV (Ranchi strain).

The vaccine is stored at 4°C. The vaccine must be shipped on ice and must be used within a few hours after reconstitution. The patent has been filed by the ICAR for the technology. Most commonly used vaccines registered for use

in cattle against lumpy skin disease (LSD) on following Table. (Links accessed on 22 September 2021).^{[4],[12],[13],[16]}

Manufacturer	Product Name and Virus Strain	Target Species	Titre, Dose, Administration	Presentation Doses/Vial
Onderstepoort Biological Products (OBP) South Africa Email: az.oc.seniccavpbo@ofni http://www.obpvaccines.co.za (accessed on 22 September 2021)	Lumpy Skin Disease Vaccine for Cattle (LSD Neethling strain)	Cattle	Not known 2 ml SC	25/50
Intervet (Pty) South Africa/MSD Animal Health http://www.msd-animal-health.co.za (accessed on 29 September 2021)	Lumpyvax TM (LSD SIS Neethling type strain)	Cattle	$10^{4.0}$ TCID ₅₀ /dose 1 ml SC	20/100
MCI Santé Animale Morocco Email: moc.elaminaetnas-icm@tcatnoc http://www.mci-santeanimale.com/en/ (accessed on 29 September 2021)	Bovivax-LSD TM (LSD Neethling strain)	Cattle	$10^{3.5}$ TCID ₅₀ /dose 2 ml SC	25/50/100
Jordan Bio-Industries Center (JOVAC) Jordan Email: moc.retneccavoj@selas http://www.jovaccenter.com (accessed on 29 September 2021)	LumpyShield-N TM (LSD Neethling strain)	Cattle	$10^{4.0}$ TCID ₅₀ /dose 1 ml SC	5/10/25/50/100

Manufacturer	Product Name and Virus Strain	Target Species	Titre, Dose, Administration	Presentation Doses/Vial
Middle East for Vaccines (MEVAC) Egypt Email: moc.cav_em@gnit ekram https://www.me-vac.com/about (accessed on 29 September 2021)	MEVAC LSD (LSD Neethling strain)	Cattle	10 ^{3.5} TCID ₅₀ /dose 1 ml SC	10/25/50
National Veterinary Institute (NVI) Ethiopia Email: te.tenohte@tr-ivn	Lumpy Skin Disease Vaccine (LSD Neethling strain)	Cattle	10 ^{3.0} TCID ₅₀ /dose 1 ml SC	5/20/100
Kenya Veterinary Vaccines Production Institute (KEVEVAPI) http://www.kevevapi.org/ (accessed on 29 September 2021)	Lumpivax™ (Live attenuated LSDV)	Cattle	TCID ₅₀ not known 2 ml SC	50/100/150
Pendik Veterinary Control Institute/Ministry of Agriculture, Turkey	Penpox-M™ Live SPPV (Bakirköy SPPV strain)	Cattle	10 ^{2.5} TCID ₅₀ /dose 3 ml SC	
Vetal Company Turkey Email: rt.moc.latev@latev http://www.vetal.com.tr (accessed on 29 September 2021)	Poxvac™ (Bakirköy SPPV strain) Lumpyvac™ (LSD Neethling strain)	Sheep Cattle Cattle	10 ^{2.5} TCID ₅₀ /dose 3ml SC 10 ^{3.5} TCID ₅₀ /dose 2 ml SC	20/50/100/200 10/25/50/100

Manufacturer	Product Name and Virus Strain	Target Species	Titre, Dose, Administration	Presentation Doses/Vial
Dollvet Turkey Email: rt.moc.tevlod@tevlod http://www.dollvet.com.tr (accessed on 29 September 2021)	Poxdoll™ (Bakirköy SPPV strain) LSD-NDOLL (LSD Neethling strain)	Cattle Sheep Goats Cattle	10 ^{2.5} TCID ₅₀ /dose 3ml SC 10 ^{3.5} TCID ₅₀ /dose 3ml SC	50/100 10/25/50/100
FGBI-Federal Centre for Animal Health, The Russian Federation Email: ur.hairra@liam http://www.arriah.ru (accessed on 29 September 2021)	Sheep Pox Culyral Dry™ (Arriah SPPV strain)	Sheep Cattle	Not known	50/100

Table-1^[4]

III. CONCLUSION

Cattle and buffaloes are important livestock contributing substantially to the world economy. Lumpy skin disease is a serious disease of cattle and buffalo. As this disease is economically important, spread of this disease to larger geographical regions of Indian subcontinent will surely hamper the rural economy in particular. LSD can also lead to reduction in export of livestock and livestock products. The reasons behind the entry of LSD in India need to be investigated along with epidemiological random screening in different regions to assess the actual disease prevalence. Besides, effective quarantine methods, vector control methods, vaccination is the only method to prevent the disease.^[8]

IV. RESULT

At present Lumpi-ProVac, Goat Pox vaccine is used for controlling Lumpy Skin Disease in animals and this has been proven effective against Lumpy. vaccination is the only method to prevent the disease.

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