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Case reports on management of LSD like conditions with ethno-veterinary practices

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Abstract
Lumpy skin Disease (LSD) is an economically important emerging viral disease, affecting thousands of dairy animals in the country in the recent past. In the present study, EVM preparations (two oral and one for external application) were used in 14 LSD suspected cattle (age 1-7 years) in the states of Assam and Maharashtra. Symptomatic recovery of all the animals were recorded within 7-10 days after initiation of the EVM intervention, except in one animal which took 15 days' time to recover due to presence of involvement of lower respiratory tract infection.

Keywords: lumpy skin disease, ethno-veterinary practices, EVM

Introduction
Lumpy skin Disease (LSD) is an economically important emerging viral disease, affecting thousands of dairy animals in the country in the recent past. LSD is predominantly transmitted by the arthropods and in India, this disease was first reported during the year 2019 (Sudhakar *et al.*, 2019) [5]. The LSD virus is closely related to the pox viruses of sheep and goats, causes infection in cattle and buffaloes with nodular skin lesions on the body. In cattle and buffaloes, this causes chronic debility, reduced milk production, poor growth, infertility, abortion, and, occasionally death of the animal. The disease also causes temporary or permanent sterility in bulls. There is no specific conventional treatment for LSD and use of antibiotics for preventing secondary bacterial infections is not only costly but also of limited value.
Several preparations of EVM have been used for the management of common ailments of dairy animals with considerable efficacy (Punniamurthy, 2005; Dutta *et al.* 2020) [3, 2]. In the present study, attempts have been made for the management of LSD in cattle with the use of EVM preparations.

Materials and Methods
EVM preparations are used in 14 LSD suspected cattle (age 1-7 years) in the states of Assam and Maharashtra. Clinical signs exhibited by these cattle are suggestive of LSD, however the laboratory confirmation of the individual samples of infected animals was not possible due to the prevailing covid-19 situation. But the outbreak was confirmed by laboratory testing of samples from different places of Maharashtra and Assam by state animal husbandry department at National Institute of High Security Animal Diseases (NIHSAD), Bhopal.

Ethnoveterinary formulation for Lumpy Skin Disease
The EVM formulation used in the management of LSD like symptoms in animals is given below. The formulations include preparations for both oral administrations and, topical (external) application, if there are wounds in LSD infected animals.

A. Oral administrations
The following two preparations are made for oral administration

Preparation 1
Ingredients: One dose contains:
Betel leaves-10 nos., black pepper-10g, common salt-10g, jaggery – as required

Preparation 2

Ingredients (for 2 doses), Garlic-2 pearls, coriander-10g, cumin-10g, tulsi leaves–1 handful, bay leaves-10g, black pepper-10g, betel leaves–5 nos., shallots-2 bulbs, turmeric powder-10g, chirata leaf powder-30g, sweet basil-1 handful, neem leaves-1 handful, *Aegle marmalos* (bel) leaves–1 handful, jaggery-100g

Ingredients of both the preparations were blended separately to form a paste and mixed with jaggery. Preparation 1 and preparation 2 are to be fed alternatively.

For preparation 1, during first day, one dose was fed every three hours. From the 2nd day onwards, three doses were fed daily (in the morning, afternoon and evening) for a period of two weeks.

For preparation 2, during first day, one dose was fed every three hours. From the 2nd day onwards, two doses were fed daily (in the morning and evening) till the condition resolved.

External/topical application

This preparation was used in case of the presence of open wound on the skin of the affected animals.

Ingredients

Acalypha indica leaves-1 handful, garlic-10 pearls, neem leaves-1 handful, coconut or sesame oil-500 ml, turmeric powder-20g, mehndi leaves-1 handful, tulsi leaves-1 handful.

All the ingredients were blended and mixed with coconut or sesame oil thoroughly. This preparation was briefly boiled and allowed to cool before applying.

Wounds were cleaned by removing debrises and paste was applied directly two to three times daily until healing occurs.

In case of maggoted wounds, anona leaf paste or camphorated coconut oil was applied for the first day. From the 2nd day onwards, the topical preparation was applied.

Results and Discussion

Veterinarians had visited and inspected the animals affected with LSD like conditions. All animals infected were cattle in both the regions. In another instance, animals in Maharashtra were given goat pox vaccine post LSD by the local veterinarian, but clinical improvements were not significant.

All the 14 animals were provided with herbal preparations both for oral and external use as outlined in Materials and Methods.

The table below displays the details of the animals included in the study.

Table 1: Animal wise details Animal no. 1-6 were from Assam and 7-14 were from Maharashtra. The range of initial rectal temperature were in between 101-104°F.

Animal No	Age in year	Sex	Days required for apparent cure	Symptoms (Y: yes; N:no)									
				Depression	Anorexia	Lameness	Swelling in joint	Oedema in limbs and brisket	Swelling of Lymph node	Abortion	Nasal discharge	Lacrimal discharge/ salivation/ corneal opacity	Lung infection
1	5	Female	10	Y	Y	N	N	N	Y	N	N	N	N
2	7	Female	8	Y	Y	N	N	Y	Y	N	N	N	N
3	4	Female	10	Y	Y	N	N	Y	Y	N	N	N	N
4	3	Female	8	Y	Y	N	N	Y	Y	N	N	N	N
5	7	Female	9	Y	Y	N	N	N	Y	N	N	N	N
6	4	Female	15	Y	Y	Y	N	N	Y	N	Y	N	Y
7	6.5	Female	8	Y	Y	N	N	Y	Y	Y	Y	N	N
8	7.1	Female	8	N	Y	N	Y	N	N	N	N	N	N
9	1	Male	8	Y	Y	N	N	N	N	-	N	N	N
10	5	Female	8	N	Y	N	N	N	N	N	N	N	N
11	1.5	Male	10	Y	Y	N	N	N	N	-	Y	Y	N
12	4.5	Male	10	Y	Y	Y	Y	Y	Y	-	N	N	N
13	4	Male	10	N	Y	N	Y	Y	N	-	N	N	N
14	7	Female	7	N	N	N	N	N	N	N	N	N	N
*				71.4	92.9	14.3	21.4	42.9	57.1	10	21.4	7.1	7.1

* % animals exhibited the symptom

All the animals had variable degrees of skin lesions (nodules) on several parts of the body as detailed in Table 2 below:

Table 2: Presence of skin nodules

Animal No	Location of skin nodule						
	Head	Neck	Udder	Trunk	Perineum	Near Eye	Buccal mucosa
1	Yes	Yes	No	Yes	No	Yes	No
2	Yes	Yes	No	Yes	No	Yes	No
3	Yes	Yes	No	Yes	No	Yes	No
4	Yes	Yes	Yes	Yes	No	Yes	No
5	Yes	Yes	No	Yes	No	Yes	No
6	Yes	Yes	No	Yes	No	No	No
7	No	Yes	No	No	Yes	No	No
8	No	Yes	No	No	No	No	No
9	No	Yes	-	No	No	No	No
10	Yes	No	No	No	No	No	No
11	Yes	Yes	-	Yes	Yes	No	No
12	Yes	Yes	-	Yes	Yes	No	Yes

13	No	Yes	-	No	No	No	No
14	No	Yes	No	Yes	No	No	No
**	64.3%	92.9%	10 %	64.3%	21.4%	35.7%	7.1%

** % animals exhibited the symptom

Animals photograph before and after EVM

In a Gaolao cattle breed, Kharangana village, Arvi tehsil, Wardha District, state Maharashtra:

Before EVM

On 7th day of EVM

In a HF crossbred, Panigaon village, Pachim Nalbari tehsil, Nalbari District, state Assam:

Symptomatic recovery of animals was recorded in 7-10 days after initiation of the EVM intervention, except in one animal which took 15 days' time to recover due to involvement of lower respiratory tract. The animals were considered apparently cured when the clinical signs subsided, *viz.*, rectal temperature, disappearance of skin nodules and other symptoms indicated in the table 1 and 2 and in lactating animals, achieving milk production to near normalcy.

Owners of 3 affected animals in Assam which were not given EVM preparations reported their animals having taken more than 30 days for apparent recovery. Out of these 3 animals, two animals subsequently suffered from maggot wounds. As per FAO (2020) [4], LSD affected animals may become debilitated for up to six months. Feyisa (2018) [1] also recorded three months recovery time in a bull affected with LSD.

Conclusion

Management of LSD like conditions by solely using EVM preparations was tried by many farmers with encouraging results. The formulation is not only very cost-effective but also very efficacious, with animals recovering sooner without much reduction in milk production, which significantly reduced the impact of the disease on the farmers' financial returns.

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