The Journal of Agricultural Sciences - Sri Lanka
Vol. 21 No 2, May 2026. pp 534-538
https://doi.org/10.4038/jas.v21i2.11074

SHORT COMMUNICATION

Lumpy Skin Disease in *Anuradhapura* District of Sri Lanka: Current Status

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Received: 20th June 2024 / Accepted: 19th January 2026

INTRODUCTION

Livestock plays a significant role in rural livelihoods and the economies of developing countries by providing income and employment for the producers and by providing important source of nourishment for the rural and urban households (Herrero *et al.* 2013). Dairy cattle farming has become one of the major income sources of the small holders mainly in the dry zone of Sri Lanka (Abeygunawardena *et al.* 1997).

The cattle farming in the dry zone of Sri Lanka is challenging due to the diminishing quality grazing lands, low production potential of indigenous cattle, low veterinary coverage, poorly developed milk collecting network, and cattle diseases (Abeygunawardena *et al.* 1997). When considering these challenges, disease prevention and control shown to be the only remedies for improving the productivity and sustainability of cattle farming by the farmers themselves.

Diseases can be defined as an alteration of the state of the entire body or of some of its organs, which interrupts or disturbs the proper performance of body functions (Herholz *et al.* 2006). Animal diseases can be originated by either internal (due to metabolic or endocrine disturbances, degeneration of organs from age, neoplasm and autoimmunity) or external (caused by living organisms such as viruses, bacteria, fungi, and parasites or caused by other factors such as trauma, heat, cold, chemical agents and food deficiencies) causes (Herholz *et al.* 2006).

Among the various types of viral diseases of cattle, Lumpy skin disease (LSD) is a highly contagious viral disease in cattle caused by Lumpy skin disease virus of *Capripoxvirus* genus, subfamily *Chordopoxvirinae*, family *Poxviridae* (Wathes *et al.* 2020). Fever, anorexia, and characteristic nodules on the skin mucous membrane of mouth, nostrils, udder, genital, rectum, drop in milk production, abortion, infertility and sometimes death are the clinical manifestations of the disease (Wathes *et al.* 2020). The disease is endemic in African countries but recently the disease has been reported from new territories around the world such as Israel, Kuwait, Oman, Yemen, China, Bangladesh, Nepal, Bhutan, Vietnam, Myanmar, Thailand, Malaysia, Laos, Cambodia, and India (Wathes *et al.* 2020, Azeem *et al.* 2022). Lumpy skin disease was first detected in the Eastern and Northern provinces of Sri Lanka in 2019 (Ministry of Agriculture 2023) and becoming an emerging issue in domestic cattle population in Sri Lanka. So far, the cases have been reported mainly in Northern, Eastern, North Western, and North Central provinces.

North Central province of Sri Lanka is one of the major contributors to the national milk production, highlighted by owning 8% of the national cattle population and

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producing 15% of the national milk production (Department of Animal production and health 2023, Department of Census and statistic of Sri Lanka 2023). Therefore, the present study aimed to investigate the current status of LSD in the Anuradhapura district, one of the two districts of the North Central Province.

MATERIALS AND METHODS

The data related to the LSD-affected cattle up to August 2023, categorized by each divisional secretariat (DS) within the Anuradhapura district, was acquired from the veterinary division office of Anuradhapura. Density of the LSD affected cattle population in each DS were calculated by dividing the number of LSD affected cattle by the total cattle population in the DS. Out of 826 LSD affected farms in Anuradhapura district farmers of the 66 farms (7.9%) were surveyed using a structured questionnaire. The questionnaire was designed to collect information on affected animals, including sex, breed, production stage, the method of disease diagnosis, major symptoms, and rearing methods (i.e., management system, housing type, and milking method). Data were collected during the period from August 2023 to October 2023 by visiting farms. The survey covered over 5% of LSD-affected cattle in the district covering all 22 DS of the Anuradhapura district. Furthermore, to investigate the effect of LSD on the milk yield, the prerecorded milk yield data of all the affected lactating cattle covered in the present study were recorded for 14 days before, during, and after the recovering the disease. Average milk yields of the affected animals during and after recovering the disease was compared with the average milk yield before the occurrence of disease by using the pared t-test.

RESULTS AND DISCUSSION

A total of 1,223 LSD cases (0.87% of the district's cattle population) were reported among 140,331 cattle up to August 2023, originating from 826 farms, which represents 7.9% of the 31,425 registered cattle farms in the Anuradhapura district. Of the reported affected animals, the majority (53%) were cross bred cattle, while the remaining (43%) were from local breeds. LSD cases were densely reported in the DSs bordering the Northern and Eastern parts of the district compared to the central region, as depicted in Fig. 1. Five DSs, namely Padaviya, Galenbindunuwewa, Palugaswewa, Kekirawa, and Nachchaduwa, had more than 7% of LSD-affected cattle, while another six DSs, namely Mahavilachchiya, Medawachchiya, Kebithigollawa, Horowpathana, Palagala, and Rajanganaya, had between 4 to 7% of LSD-affected cattle from the total cattle population of the respective DS.

The present study collected data from 71 LSD cases out of the total 1,223 LSD-affected cattle in the district, representing 5.8% of the total LSD-affected population in the district. Owners of the most of affected animals (70%) had diagnosed the disease by themselves first and then have confirmed by the veterinarian of the area. Rest of the 30% of the cases have been diagnosed directly by the veterinarian of the area. All 71 affected animals covered in the survey displayed typical LSD symptoms, such as fever, skin nodules, and loss of appetite. Additionally, 15.5% of the affected animals had displayed swollen jaw area. However, none of the animals surveyed were found to be dead due to the LSD. Among the surveyed animals, large proportion was occupied females (93%), and 7% were males.

Additionally, the majority (67%) of the affected females were lactating cows and others were heifers (13%) and female calves (20%). On the other hand, 40% of the affected males were bulls and the rest (60%) were calves. Comparison of the average total milk yield for 14 days before and during the LSD out-break (Fig. 2) found that there was a significant reduction of the milk yield during the outbreak period (140.8 ± 13.8 L vs. 116.0 ± 15.5 L; $P<0.05$). However, the milk yield had been quickly rebounded to pre-outbreak levels soon after the recovering the disease, evident by showing similar (140.8 ± 13.8 L vs. 139.6 ± 13.6 L; $P>0.05$) total milk yields for 14 days between before and after recovering the disease. Additionally, the present study investigated the husbandry practices of the affected animals. It was found that most of the affected cattle had managed semi-intensive

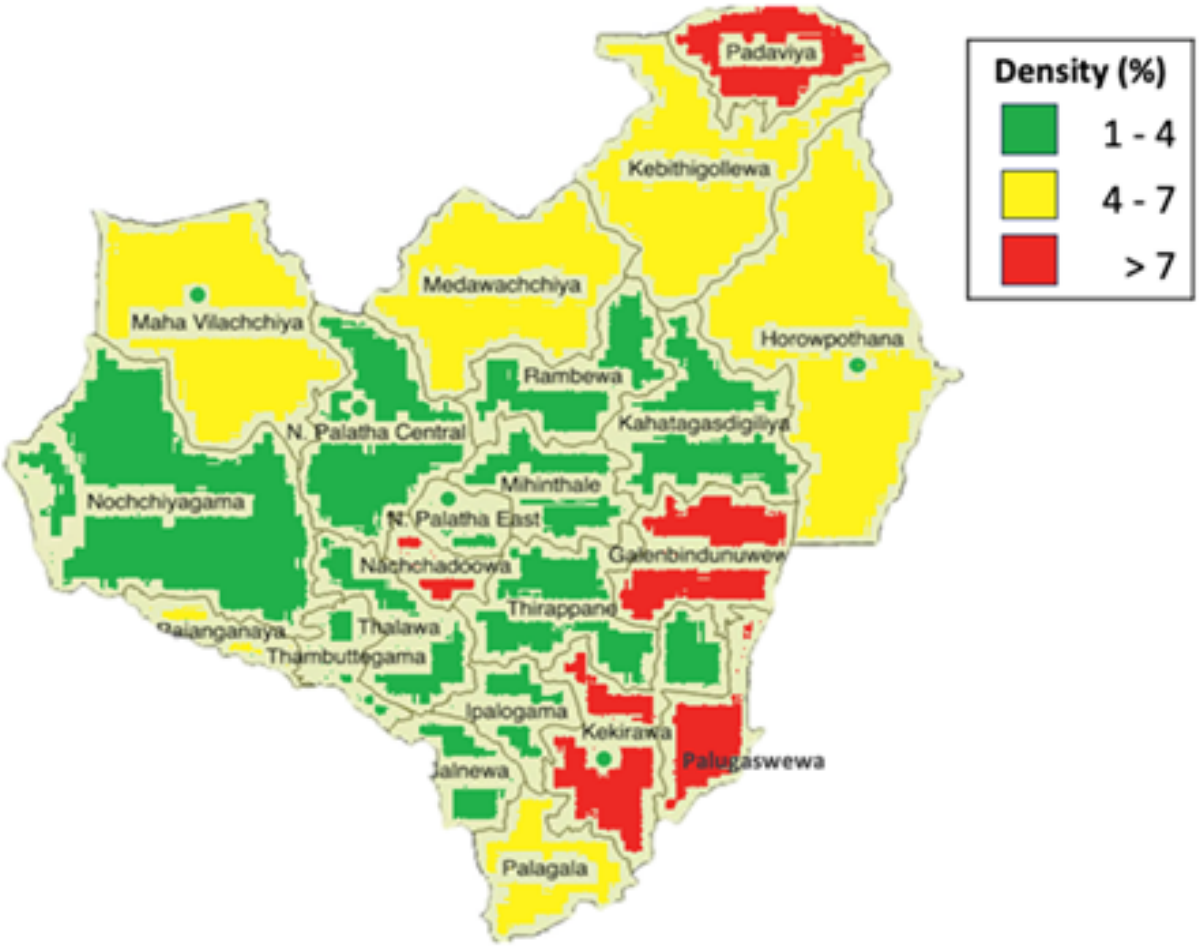

Figure 1. Distribution of the affected animals in each divisional secretariat (DS) within the Anuradhapura district. Density of the LSD affected cattle population in each divisional secretariat were calculated by dividing the number of LSD affected cattle by the total cattle population in the respective divisional secretariat.

management system (91%) and the rest had been managed by extensive (6%) and intensive (3%) management systems. Most of the affected animals had kept under loose-barn system (92%) and only 8% had been kept in tie-barn system. Furthermore, the owners of the 51% of the affected animals had used machine milking as the milking method and the rest (49%) had used hand milking methods to milk their milking herds.

Present study investigated the current status of LSD in the Anuradhapura district, one of the key dairy-producing regions within the North Central province of Sri Lanka. The study focused on the prevalence, clinical manifestations, and the impact of LSD on milk production within the Anuradhapura district. LSD has been increasingly observed in the domestic cattle population, particularly in the northern and eastern regions of Sri Lanka.

The secondary data revealed that 0.87% of the cattle population in the Anuradhapura district had been afflicted by LSD. Notably, the disease exhibited a considerably higher prevalence (over 4%) in DSs bordering the Northern and Eastern parts of the district, compared to the central region. This geographic distribution of LSD cases in the Anuradhapura districts aligns with the overall pattern of the disease's emergence in Sri Lanka, suggesting that the disease had been transmitted to the district from adjacent provinces.

All 71 LSD-affected animals surveyed in this study exhibited typical symptoms, including fever, skin nodules, and loss of appetite (Wathes

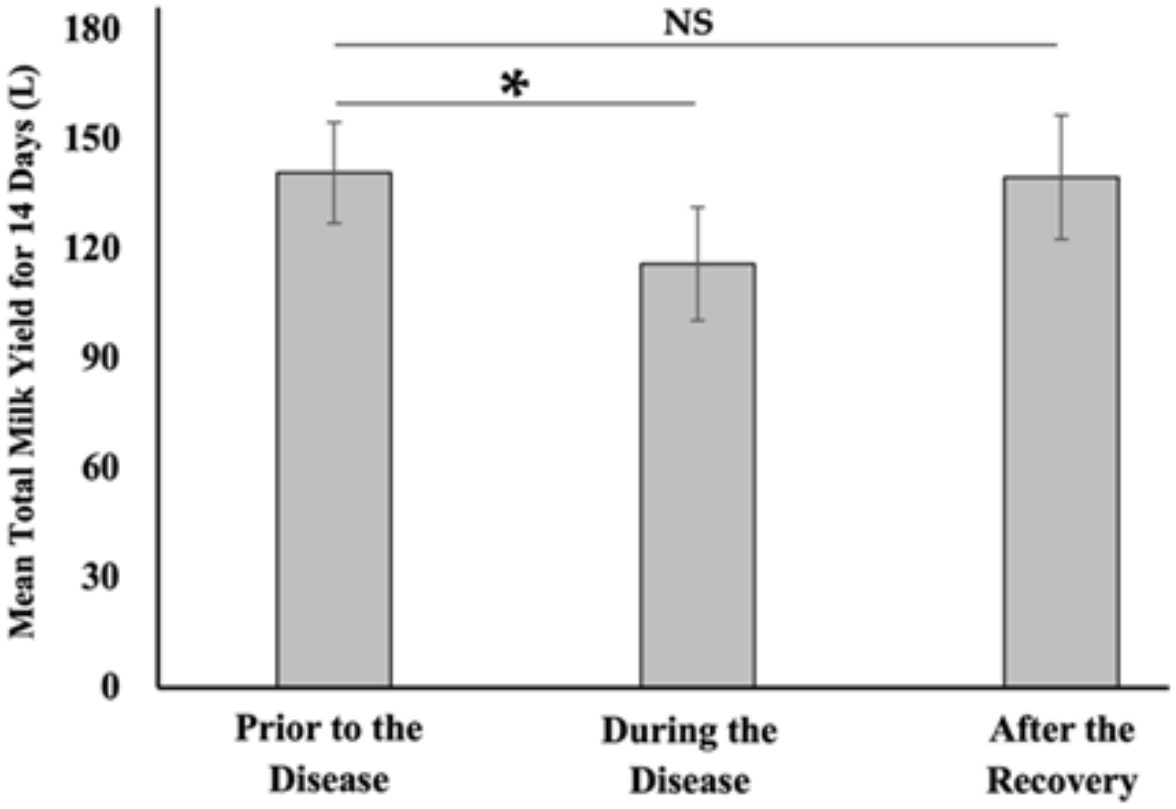

Figure 2. Mean total milk yield of the lumpy skin disease affected animals within 14 days prior to, during, and after recovering the disease. Error bars represent standard deviation (n = 44), An asterisk (*) indicates a significant difference ($p < 0.001$), while NS denotes a non-significant difference ($p > 0.05$). P-values were calculated by Pared t-test.

et al. 2020). A significant number of these animals (15.5%) also displayed swollen jaw area. This might be due to the enlargement of the lymph nodes of the infected cattle (Shumilova *et al.* 2023). Importantly, no LSD-related fatalities were recorded among the surveyed cattle which might be due to the low mortality rate of the cattle affected by this disease (Mulatu & Feyisa 2018).

The majority of affected animals were female (93%), with a significant portion of them being lactating cows (67%). This gender and lactation status distribution is critical as it implies potential economic implications for dairy farming in the region. During the active LSD outbreak, we observed a significant reduction in total milk yield. However, it is noteworthy that milk production quickly rebounded to pre-outbreak levels after the disease had receded.

This suggests that the impact of LSD on milk production is temporary. However, the time taken for recovery from this disease can vary based on the severity of the infection (Mulatu & Feyisa 2018). Animals surveyed in the present study experienced a reduction of 2 liters in their daily milk production, which represents a significant loss for farmers in a dry zone area. This underscores the need for proactive disease management and prevention measures to minimize economic losses.

The study also investigated the husbandry practices of affected animals. It was observed that the majority of affected cattle were housed in loose-barn systems rather than tie-barn systems. In loose barns, animals have more freedom of movement and can interact with each other, which may create a higher risk of disease transmission among the animals. These insights into husbandry practices lay the foundation for considering how management strategies may influence the risk of LSD transmission.

CONCLUSION

Lumpy skin disease is becoming a growing concern in Anuradhapura district, which significantly contributes to the milk production. The findings of this study highlight the need for continuous monitoring, effective disease management, and prevention strategies to mitigate the impact of LSD on the dairy industry. The rapid rebound of milk production following LSD outbreaks is promising, but the potential for economic disruption in the sector necessitates proactive measures to safeguard the livelihoods of farmers and the overall dairy industry in Sri Lanka. The insights gained from this research can inform policies and interventions aimed at protecting cattle health and sustaining dairy production in the face of emerging diseases like LSD.

ACKNOWLEDGMENTS

Authors wish to acknowledge the assistance provided by the officers of the Provincial Director Office of the Department of Animal Production and Health, North Central Province, for the data collection and contacting the cattle farmers in the Anuradhapura district.

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