

## Review Article

# Review on Lump Skin Disease, its Epidemiology, Diagnosis, Prevention and Control Measured in North Shewa Zone

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**OPEN ACCESS****Keywords**

- Control
- Etiology
- Epidemiology
- Lumpy Skin Disease
- Transmission

**Abstract**

Lumpy skin disease is an acute infectious disease of cattle endemic in most Sub-Saharan African countries and all agro-ecology climatic condition, also North Shewa Zone. It is caused by lumpy skin disease virus in the genus Capripoxvirus and prototype strain Neethling Virus. Lumpy skin disease is characterized fever, enlarged lymph nodes, firm, and circumscribed nodules on skin and ulcerative lesions particularly in the mucous membrane of the mouth. The disease affected all breed, but exotic breeds highly susceptible than local breed however, young animals more severe affected than adult animals. Lumpy skin disease is the most economically significant trans-boundary, emerging a viral disease. The most common method of lumpy skin disease transmission is blood feeding biting flies. Occurrence of lumpy skin disease is highly wet seasons because of the population blood feeding vectors abundant. There is no specific treatment for the disease, but the animal can be treated with antibiotics to prevent secondary bacterial complication. The methods to control lumpy skin disease is mass vaccination; restriction animal movement from disease area to disease free area, restrictions of import and export livestock and its products, control of vectors, quarantine station, proper disposal of animals and contaminated material.

**INTRODUCTION****Background and Justification**

Amhara region is largest number of animal population, accounting with 16.4 million large animals, 17.3 million shoat [1]. North Showa Zone is 1.7 million cattle, 2.5 and million shoat [2]. Domestic animals are contributes 22% from total gross domestic product, 47% from agricultural product and 20% of national foreign exchange [3]. Livestock product is source of protein, power, transportation, and commodities [3]. Livestock production is essential for national economies rural communities in developing countries [4]. In Amhara Region 85% of the human population activities are mixed farming system and the chief sources of cash income small holder farmers [4]. Performance of livestock production are deprived because of wide spread of diseases, poor health activities, inadequate feeding, poor breeding system and inadequate livestock policies [5]. Cattle disease is main problem for farm animal production and productivity and causing economic losses [6]. Disease is a trans-boundary emerging and highly significant affect international trade of live animal and products [7].

Lumpy skin disease is a trans-boundary viral disease that affects all age and breed of farm animals [8]. It can be classified as emerging notifiable disease and cause lumpy skin disease virus family poxviridae, capripoxvirus and neethling virus [8,9].

Disease spread blood feeding arthropod for example ticks, flies, mosquitoes, and the role of husbandry practices for instance common grazing and watering [9,10]. It is economically significant viral disease of livestock production [5]. Characteristics of disease are high fever, enlarged lymph nodes, firm, circumscribed nodules, high morbidity and low mortality [11,12]. Disease is diagnosed clinical symptom, epidemiological occurrence, histopathology, isolation and polymerase chain reaction [13]. It has two infectious of the virus acute and chronic [11]. Disease is epidemic all climate condition and occurrence different regions [14]. Disease is no specific treatment, but control and prevention through vaccination [15]. Therefore, the aim of this review assess associated risk factors, epidemiological occurrence and outbreak information of the disease in Amhara Region North Showa Zone.

**LITERATURE REVIEW****Definition and Etiology**

It is acute and sub-acute forms affected all age and breed of farm animals and cause gentle to severe symptoms [9]. It is highly economic losses on account of weight loss [9]. Disease has been caused by poxviridae, chordepoxvirinae, and capripoxvirus [16].

**Epidemiology and Distribution**

Disease is significant economically devastating notifiable,

which reason production loss in livestock [13]. Epidemiological aspects of LSD related to pathogen, host and environment [8]. Suitable environment conditions for example wet season, summer and autumn, which is facilitating contact hosts to pathogen [8]. Geographic allocation of disease is all regions of Africa also endemic and currently spreading in North Mediterranean [9].

### Source of Infection and Transmission

Source of infection is sick animal [17]. Virus is presents in coetaneous lesions, saliva, nasal discharge and lachrymal secretions infected animal [18]. At rain season, warm temperature and humid agro-climate conditions favorable from arthropod and the inhabitants of arthropod vectors has been increase, then prevalence of disease is high [19,20]. Additionally, husbandry practices such as common grazing and watering points, also introduce new animals into the herd [19,21]. The disease is vector borne and also mechanically transmitted by blood feeding flies and tick [4,22]. Disease is transmitted direct contact as well as increase contaminated feed and water [23]. Also the disease is transmitted by direct contact and seminal [24]. It is transmitted iatrogenically during mass vaccination, which single syringe and needle used in several animals [15]. Lumpy skin disease is transmitted health animal which feeding and drinking contaminated trough [25]. It is transmitted uncontrolled cattle movement of live animal trade and introducing infected animals into disease free area [18].

### Associated Risk Factors

**Host risk factors:** - disease is affect all breeds and age group of cattle [17]. Young animals are severely affected then adult animals [17]. Severity is determining susceptibility, immunological status of host, age of host, dose of virus and route of virus inoculation [20]. \Z

**Pathogen risk factors:** - virus is affect different age and breeds animal, resistant different chemical and physical agents, also survive in necrotic skins, ambient temperature and wet environment [26].

**Environmental risk factors:** - is great role the interaction between agent, host and vectors [30]. Disease is associated with increased population insect vectors [8]. Ambient temperatures, wet environmental condition and mixed farming practices are the pre-disposing factors of disease outbreaks [8,27]. Warm/humid climate agro-climates have been favorable environment condition large number biting flies populations [13].

### Clinical Sign and Pathogenesis

Incubation period of disease is 2 to 4 weeks naturally infected cattle, and acute, sub-acute and chronic stages [28]. Strain of virus, breed of animal, route of transmission, dose of virus, and clinical signs are determining severity sickness [26]. *Clinical signs* are excitement, lachrymation, increased nasal secretion, depression, nodule on skin, and swelling of internal organs also superficial lymph nodes [28]. *Pathogenesis* of the disease is virus

developing viremia by febrile reaction, and then the virus causes lesions because of the replication of the virus in endothelial cells of lymphatic and blood vessels [26,29]. It is causes a localized and systemic reaction, then occurs vasculitis, lymphadenitis, oedema, necrosis and ulcerate [28].

### Diagnosis of Disease

Diagnoses of disease based on its characteristics for example clinical signs, necropsy findings and laboratory [20,13]. *Clinically diagnosis* path-gnomic sign is nodular lesions on skin, develops edema and swelling superficial lymph nodes [13]. It is acute and chronic infectious viral disease [11]. *At necropsy* diagnoses disease is developing nodule and swelling lymph nodes [13]. *Laboratory diagnoses* the diseases can diagnosis isolation, serological tests, histopathological, polymers chain reaction and immune histological stain [20,29].

### Treatment, Control and Prevention of Disease

There is no specific treatment infected animals but supportive treatment to manage secondary infections [25]. Control and prevention the disease is vaccinating animal every year by live attenuated strains of capri-pox-virus of neethling strain vaccine [25]. And also used quarantine method, control movement of insect vectors by applying insect repellent, insect proof housing for animals and application of insecticides, also effectively applied [25] (Figure 1) (Table 1).

### Status of Disease in Ethiopia

It is one of reported diseases In Ethiopia; spread all agro-climatic condition and economically important livestock production [30]. Highest frequency of outbreak is reported in September and December, and midland agro-climate district, because favorable for blood feeding vectors and highest livestock population [30].

### Status of Disease in North Showa Zone

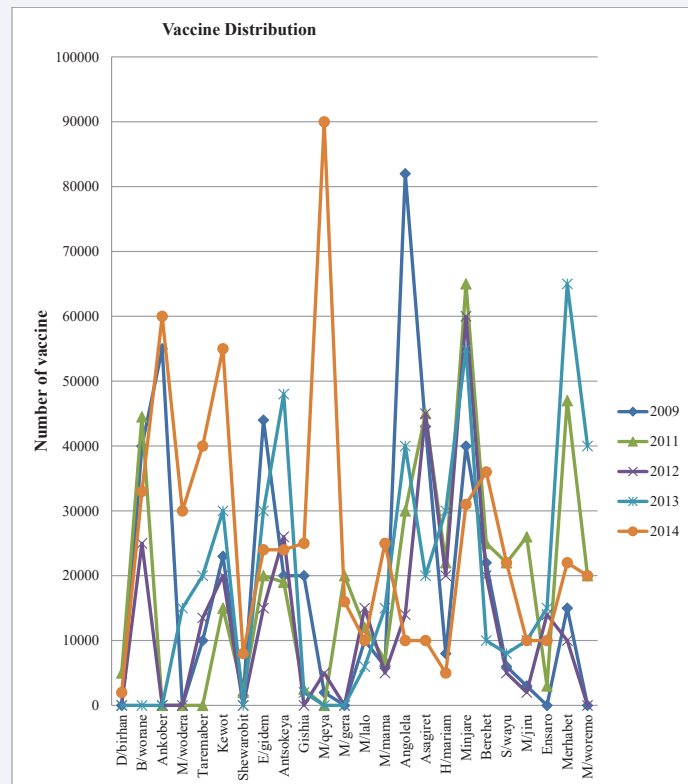
The disease is reported all weredas found in north showa zone, and different agro ecology and highly economically important disease [2]. The highest number of disease outbreaks is reported at the month of August to December, and lowland and midland wereda such as Minjare, Berehet, Efarta-gidem, Shewa-robit, Kewot and Taremaber, because of the highest number of vectors population [30,2]. Furthermore, six year retrospective data from 2009 to 2014 E.C. analysis had figured out the occurrence of 138 outbreaks of lumpy skin diseases in 23 woredas found in north Showa Zone [2] (Table 2,3) (Figure 2,3).

### Economic Importance of Disease

It is one of the economically most important diseases in Africa and the Middle East countries and rationale loss animal products [31]. Economic importance of the disease is high morbidity rate rather than mortality [32]. Impact of disease can be direct and indirect losses [32]. Direct losses have been affect animal health, productivity and animal death, and also indirect losses have been affect herd fertility, productivity and international trade of

**Table 1:** Six year distribution of LSD vaccine in north shewa zone weredas

No	Name of Wereda	Year of distribution and number of vaccine						Total
		2009	2010	2011	2012	2013	2014	
1	D/birhan	0	6000	5000	0	0	2000	13000
2	B/worane	40000	25000	44500	25000	0	33000	167500
3	Ankober	55000	0	0	0	0	60000	115000
4	M/wodera	0	2000	0	0	15000	30000	47000
5	Taremaber	10000	35000	0	13500	20000	40000	118500
6	Kewot	23000	57000	15000	20000	30000	55000	200000
7	Shewarobit	1500	0	2000	0	0	8000	11500
8	E/gidem	44000	0	20000	15000	30000	24000	133000
9	Antsokeya	20000	22000	19000	26000	48000	24000	159000
10	Gishia	20000	0	2500	0	2000	25000	49500
11	M/qeya	2000	20000	0	5000	0	90000	117000
12	M/gera	0	0	20000	0	0	16000	36000
13	M/lalo	10000	0	12000	15000	6000	10000	53000
14	M/mama	6000	0	7000	5000	15000	25000	58000
15	Angolela	82000	20000	30000	14000	40000	10000	196000
16	Asagiret	43000	48000	45000	45000	20000	10000	211000
17	H/mariam	8000	7000	22000	20000	30000	5000	92000
18	Minjare	40000	38000	65000	60000	55000	31000	289000
19	Berehet	22000	10000	25000	20000	10000	36000	123000
20	S/wayu	6000	0	22000	5000	8000	22000	63000
21	M/jiru	3000	3000	26000	2000	10000	10000	54000
22	Ensaro	0	0	3000	14000	15000	10000	42000
23	Merhabet	15000	0	47000	10000	65000	22000	159000
24	M/woremo	0	3000	20000	0	40000	20000	83000
	<b>Total</b>	<b>450500</b>	<b>296000</b>	<b>452000</b>	<b>314500</b>	<b>459000</b>	<b>618000</b>	<b>2590000</b>



**Figure 1** Six years LSD vaccine distribution of in north shewa zone weredas [2].

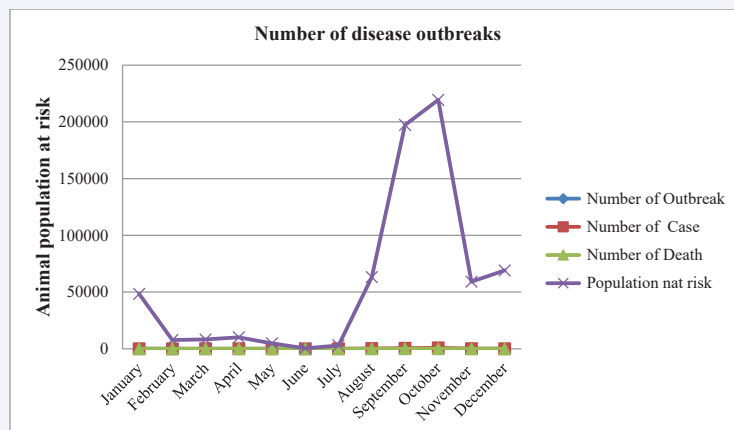


Figure 2 Monthly LSD outbreak report and animal population at risk [2].

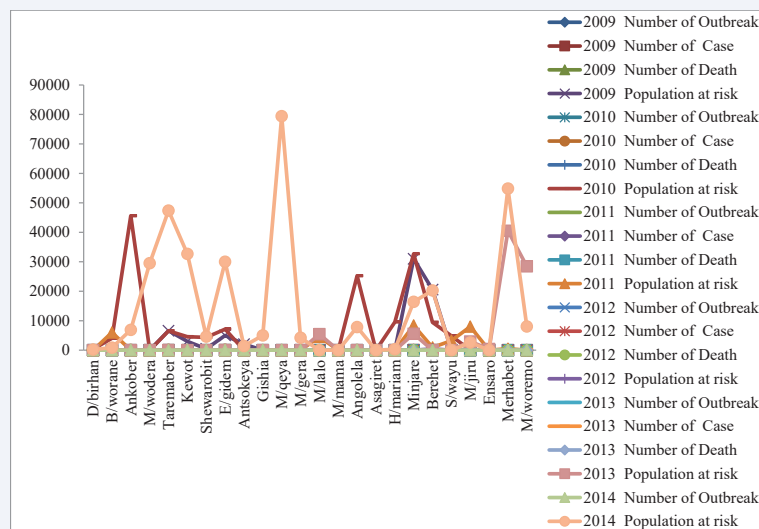


Figure 3 Six years outbreak incidence reports (case, death, at risk) different weredas [2]

Table 2: Six year number of LSD outbreaks in north shewa zone weredas

No	Month	Number of Outbreak	Number of Case	Number of Death	Population at risk
1	January	10	83	9	48339
2	February	1	11	1	7750
3	March	3	22	2	8241
4	April	4	21	1	10135
5	May	3	35	1	4800
6	June	1	5	1	500
7	July	1	23	1	2950
8	August	11	208	13	63170
9	September	33	510	30	197271
10	October	45	828	62	219415
11	November	14	135	15	59151
12	December	12	89	13	69107
	<b>Total</b>	<b>138</b>	<b>1970</b>	<b>149</b>	<b>690829</b>

livestock [31]. Lumpy skin diseases are high economic pressure in national level because of compromise food security, and interrupt live animal and animal products [32-36].

### CONCLUSION AND RECOMMENDATION

Lumpy skin disease is one of the most economically significant trans-boundary, emerging viral diseases caused genus Capri-pox-virus, and occurs in African countries and currently endemic and also north Showa Zone. Main associated risk factors are pathogen, environment and host. Disease has economically significant disease because reduction milk products, damaged hides, death, and control using ring vaccination, restriction of animal movement and eradication infected animals.

Based on the above conclusion the following recommendations are forwarded:-

**Table 3:** 2009 to 2014 E.C. Occurrence/Outbreaks/ of LSD in North Showa Zone Woreda

No	Name of Woreda	Number of Outbreak	Number of Case	Number of Death	Population at risk
1	D/birhan	2	35	2	560
2	B/worane	6	80	4	10891
3	Ankober	12	97	23	52500
4	M/wodera	2	42	3	29510
5	Taremaber	4	102	4	60530
6	Kewot	6	87	2	40229
7	Shewarobit	5	18	0	9400
8	E/gidem	11	165	14	42150
9	Antsokeya	2	20	2	3450
10	Gishia	1	10	2	5000
11	M/qeya	23	469	33	79410
12	M/gera	3	31	7	4234
13	M/lalo	2	19	4	9926
14	M/mama	0	0	0	0
15	Angolela	5	41	10	33100
16	Asagiret	0	0	0	0
17	H/mariam	3	35	4	9850
18	Minjare	11	102	10	94080
19	Berehet	14	145	7	51639
20	S/wayu	3	18	3	8066
21	M/jiru	5	33	2	13550
22	Ensaro	1	22	0	393
23	Merhabet	10	338	13	95878
24	M/woremo	7	61	0	36483
	<b>Total</b>	<b>138</b>	<b>1970</b>	<b>149</b>	<b>690829</b>

- ✓ Should be implement quarantine system before introduced animals to herd.
- ✓ Should be regularly vaccinated which lumpy skin disease endemic areas.
- ✓ Should be implemented ring vaccination and prophylactic immunization risk population.
- ✓ Should be implemented vector control strategies and restriction animal movement.

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