

## Prevalence of bovine skin diseases at Dinajpur district of Bangladesh

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### Abstract

**Context:** Bangladesh failed to earn the targeted achievements in leather sector for a lots of constrains, among which degradation or decrease in quality of hides and skin is an important cause. Degradation of skin is mainly caused by different types of skin diseases.

**Objective:** The present study was conduct to explore the overall bovine skin diseases prevalence in relation to age, sex, breed, seasons of bovine skin diseases of affected cattle in Dinajpur district.

**Materials and Methods:** A total of 5000 cattle were recorded among which 499 were clinically diagnosed as infected with various skin diseases. The diagnosis of skin diseases were done on the basis of physical examination of animal with skin scraping.

**Results:** The overall prevalence of various skin diseases in cattle population were 9.98%. The prevalence of important skin diseases were dermatophilosis 127 (2.54 %), papillomatosis 56 (1.12%), dermatomycosis 88 (1.76%), stephanofilariasis 35(0.7%), tick infestation 53 (1.06 %), mite infestation 57 (1.14%), lice infestation 54 (1.08%) and myiasis 29(0.58%) infestation. There was no statistically significant difference observed among two categories of age ( $p > 0.05$ ) even though the highest prevalence was observed in young 245 (11.13%) while the lowest 254 (9.07%) in adult cattle. Correspondingly, there was a statistically insignificant variation detected between sexes ( $p > 0.05$ ) even it was higher in female 349 (10.90%) than male 150 (8.33%). There was no statistically significant difference observed between the two categories of breeds ( $p < 0.05$ ) although the higher prevalence was observed in indigenous breed 379 (10.52%) than the cross breed 120 (8.57%). Although clinical prevalence of skin diseases in cattle was recorded highest in summer seasons 250 (10%) followed by rainy 120 (8.57%) and winter 99 (9%) seasons but statistically there was no significant variation. The present study revealed a high prevalence of skin diseases that potentially hamper the production performance and decrease the quality of skin.

**Conclusion:** It is concluded that degradation of skin quality caused by different types of skin diseases leads higher loss in the national economy. Special efforts should be implied against bovine infectious skin diseases as a separate health problem and preventive measures should be considered rather than treating various bovine skin diseases.

**Key words:** Prevalence, Bovine skin disease, Bangladesh.

### Introduction

Bangladesh is densely populated developing country where about 80% people depend on agriculture for their livelihood. Agriculture sector contributes about 20% of the total national economy of Bangladesh (Hossain, 2012). Livestock is an important subsector of agriculture, which adds approximately 1.84% in our GDP (BER 2014).

Hides and skins are valuable wealth of Bangladesh with a glorious future. Apart from meeting the internal demand, these also earn much foreign currency. Leather is the second highest foreign exchange earner of this country. But Bangladesh failed earned the targeted achievements in leather sector for a lots of constrains, among which degradation or decrease in quality of hides and skin is an important cause. Degradation of skin is mainly caused by different types of skin diseases. Annual financial loss amounting to taka 818 cores was estimated due to down grading and rejection of leathers, which associated with the defects caused by skin disease lesions, post- mortem and industrial defects.

Several types of diseases have been found to affect the hides and skin of cattle, which not only affect the general health, production, market value and working capacity of the affected animals but also lower the economic value of their hides and skin. Moreover, some skin diseases of animals such as dermatophilosis (Weber, 1978), ring worm (Anon, 1956) have zoonotic importance.

The predisposing factors of skin diseases are high ambient temperature, high relative humidity, poor nutritional status, poor

hygienic conditions, various stressful factors, ecto and endoparasitism, close contact etc. External parasitism is very much important for the skin lesions in cattle.

Considering these important economical aspects of the skin diseases, the present study was conduct to explore the overall bovine skin diseases prevalence in relation to age, sex, breed, seasons of bovine skin diseases of affected cattle in Dinajpur district.

### Materials and Methods

#### Study areas

The study was conducted at veterinary hospitals of 8 upazila and Veterinary Teaching Hospital (VTH). It lies between 25°10' and 26°04' north latitudes and between 88°23' and 89°18' east longitudes with an annual average temperature of 25 °C (77 °F).

#### Study period and Sample size

The study was conducted from December, 2012 to November, 2013. The cattle brought at upazila veterinary hospital for the treatment purposes were examined to study the prevalence of skin diseases. A total of 5000 cattle population were recorded in 9 veterinary hospitals during the study period. Among which, 499 clinical cases in cattle were found affected with various types of skin diseases.

#### Epidemiological study

On the basis of clinical findings, various skin diseases were recorded such as dermatophilosis, dermatomycosis, papillomatosis, mite infestation, tick infestation, lice infestation, stephanofilariasis and myiasis considering the different epidemiological parameters such as age, sex, breed and

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season. The data collected from the record book maintained by veterinary surgeon at upazila veterinary hospitals and observation of the animal affected with skin diseases brought at hospital on the day of visit.

### Clinical signs

#### Bacterial disease

The animal were brought at veterinary hospital were examined clinically. The external whole body surfaces, different body regions and external orifices of the animal were examined from distant visual inspection without disturbing of the animal. The animal was also examined closely following various techniques like parting of hair, using magnifying glass, to observe the various skin lesions. The various clinical signs were recorded.

#### Viral disease

Examination of skin surface was done to observe the skin lesions. In distant visual inspection, the lesions were appeared as projectile horny structure on skin surface usually densely concentrates at neck and mouth regions and sparsely distributed on whole body surface. In close observation, the horny structure were found as necrotic mass with hard, irregular with different size along with padungculated stock on skin.

#### Fungal disease

The external whole body surfaces, different body regions and natural orifice of the animal were examined from distant direct visual inspection where the animal were found to rubbing the affected skin surface on hard objects due to itching sensation. The animal was also examined closely following various techniques like parting of hair, using magnifying glass and also found alopecia, round circle with centre and elevated border line in the affected area. All the clinical signs were also recorded.

#### Parasitic disease

The animal was closely observed the whole skin surface by parting of hair in opposite direction of hair and palpation to detect the external parasite like tick and lice. The lesion developed by mite infestation also observed. The animal was closely observed the whole skin surface by parting of hair in opposite direction of hair and palpation to observed the various lesion developed by the causal agent of Stephanofilariasis and myiasis.

#### Statistical analysis:

The collected data was analyzed by SPSS version 11.5. Prevalence was determined by the formula described by Thrusfield (2005) as the rate of number of infested animals and total number of animals in the population. Associations between explanatory variables (age, sex, breed and season) and prevalence were done by chi-square test. In all analysis, 95% confidence intervals and  $p < 0.05$  were set to indicate significance.

## Results and Discussion

### Prevalence of bovine skin diseases

The area wise prevalence of bovine skin diseases were shown in Fig 1. The overall prevalence of various skin diseases found 9.98% in cattle at Dinajpur district. The prevalence of bovine skin diseases were higher at Chiribondor upazila (14.58%) and lowest was in VTH (7.14%), Sadar (12.04%), Birol (13.55%),

Parbotipur (11.75%), Kaharol (11.5%), Birganj (9.70%), Fulbari (8%), Birampur (7.94%), in Dinajpur district respectively.

### Prevalence of bovine skin diseases based on disease types

The prevalence of various types of bovine skin diseases were shown in Fig 2. The highest incidence of skin diseases were dermatophilosis, papillomatosis, dermatomycosis, stephanofilariasis in each area. Tick, lice, mite and myiasis infestation were also an important predisposing factors to aggravate the other skin diseases of cattle in study areas. The prevalence of various skin diseases were originate as dermatophilosis 127 (2.54%), papillomatosis 56 (1.12%), dermatomycosis 88 (1.76%), stephanofilariasis 35 (0.7%), tick 53 (1.06%), mite 57 (1.14%), lice 54 (1.08%) and myiasis 29 (0.58%) infestation.

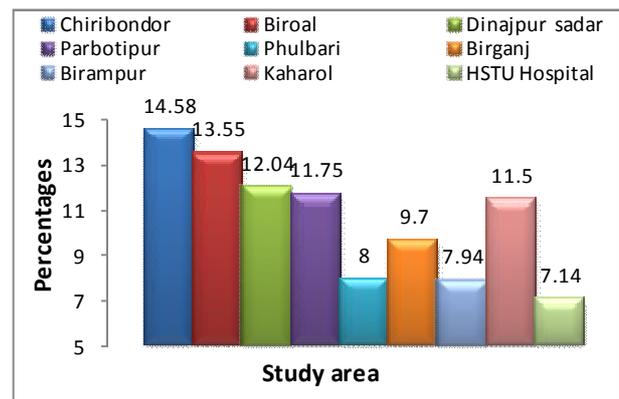


Figure 1. Prevalence of bovine skin diseases based on different areas of Dinajpur District

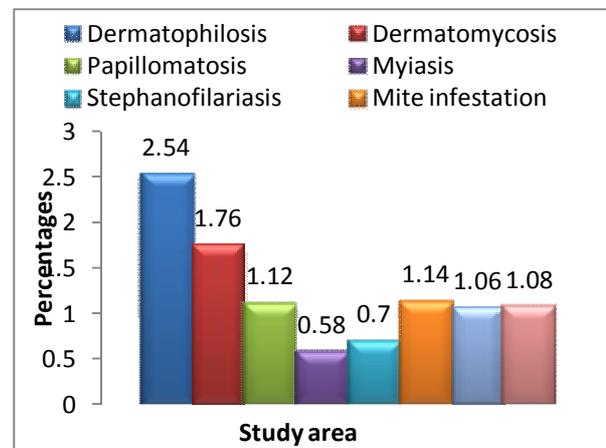


Figure 2. Prevalence of bovine skin diseases based on disease types

### Prevalence of bovine skin diseases based on age

The overall prevalence of bovine skin diseases was higher in young (0-2.5years), 245(11.13%) than the adult (>2.5 years), 254 (9.07%) cattle. Highest prevalence of dermatophilosis in both young and adult animals were 3.6% and 1.67% respectively, The prevalence of dermatomycosis, papillomatosis, myiasis, stephanofilariasis, mite, tick and lice infestations in young cattle were 2.27%, 1.59%, 0.90%, 0.45%, 0.68%, 0.68%, and 0.90% and adult cattle were 1.35%, 0.75%, 0.32%, 0.89%, 1.5%, 1.35%, 1.21%, respectively (Table 3).

**Prevalence of bovine skin diseases based on sex**

The number female animals were higher (n=3200) than the male (n=1800) animal in the study population. Similarly the incidence of various skin diseases was higher in female cattle than the male. The overall prevalence of skin diseases were found higher in female, 349 (10.90%) than the male 150 (8.33%) in cattle. The prevalence of dermatophilosis was highest in both male (2.05%) and female (2.81%) following the lowest prevalence of papillomatosis (0.55%) myiasis (0.59%) was found in both sexes. The prevalence of dermatomycosis, stephanofilariasis, mite, tick and lice infestations were 1.11%, 2.12%; 0.77%, 0.65%; 1.11%, 1.15%; 1.05%, 1.06% and 1.11%, 1.06% in male and female cattle, respectively (Table 4).

**Prevalence of bovine skin diseases based on breed**

There was no significant difference observed between the two categories of breeds although the higher prevalence of bovine skin diseases was observed in indigenous breed cattle 379 (10.52%) than the cross breed 120 (8.57%) (Fig 3).

The prevalence of skin diseases were found in dermatophilosis (3.33%), dermatomycosis (1.80%), papillomatosis (0.91%), myiasis (0.69%), stephanofilariasis (0.77%), mite infestation (0.75%), tick infestation (1.08%) lice infestation (1.16%) in indigenous cattle and similarly in cross breed, the prevalence were found as dermatophilosis (1.92%), dermatomycosis (1.07%), papillomatosis (0.71%) stephanofilariasis (0.78 %), myiasis (0.85 %), mite infestation (1.07 %), tick infestation (1.42 %) lice infestation (0.71 %).

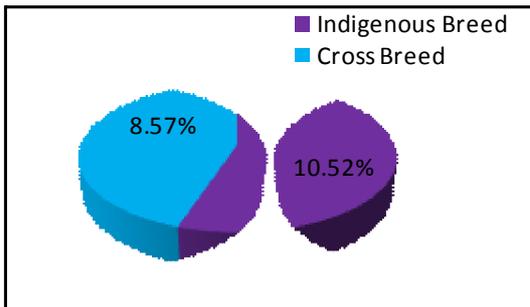


Figure 3. Prevalence of bovine skin diseases based on breed

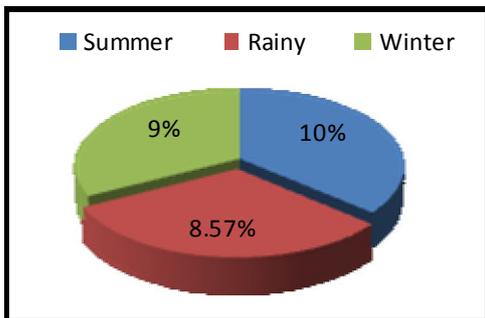


Figure 4. Prevalence of bovine skin diseases based on season

**Prevalence of bovine skin diseases based on seasons**

There was less variation of bovine skin diseases in relation to the season of the year in study areas which shown (Fig 4). There was no significant difference of skin disease prevalence in between the seasons. High prevalence of dermatophilosis

(3.4%), papillomatosis (1.4%) and stephanofilariasis (1.88%) in cattle were found during summer season. In rainy season the prevalence of lice (1.42%), tick (1.42%) and mite (1.07 %) infestation were high and similarly the highest prevalence of dermatomycosis (1.3%) and myiasis (1.2%) were found in winter season.

**Clinical findings**

The clinical findings in all skin diseases are more or less similar. Alopecia, roughened hair coat, erythema of subcutaneous skin, high body temperature, crusts and scale formation found in all type of skin diseases. In case of dermatophilosis along with this clinical signs, oozing with crust formation and paint brush matted hair (Fig.7) was the important pathognomonic signs in early stage and then crust formation in advance stage (Fig.8). Projectile serrated nodule formation especially in neck and thorax including other part of the body was reported in cases of papillomatosis or wart (Fig.4). Severe itching sensation and ring like erythema and scale formation was a common feature of dermatomycosis or ringworm in cattle.



Figure 5. Horney papillomatosis at mouth and neck region in cattle



Figure 6. Severe maggot infestation in cattle



Figure 7: Round matted hair in dermatophilosis in cattle



**Figure 8.** Crust formation at advance stage in dermatophilosis in cattle

In stephanofilariasis, wound and skin disruption of hump region especially in drought cattle was found. Presence of alopecia, thickening of the skin, roughened hair along with the visual inspection of these parasites was reported. Myiasis (Fig5) is common complication of skin diseases especially along with dermatophilosis in Dinajpur district.

The present study revealed that the overall prevalence of bovine skin diseases was 9.98%. This was higher than the reports of the previous studies which were conducted by Chalachew (2001) 1.63% in Southern Ethiopia, Yacob *et al.* (2008) 1.88% in Ethiopia, Regasa (2003) 4.19% in Western Ethiopia and Izdebska (2009) 1% in Poland. But this result is nearest to the previous study of Tewodros *et al.* (2012) who reported 16% in Ethiopia. The current study indicated as if it was one of the highest prevalence which was conducted in Bangladesh earlier. Therefore, it can suggest that the study area was too conducive for the survival, multiplication and development of surface organisms which can influence the level of immunity to be infested by organisms implying that there was a problem on animal management like poor housing, lack of supplement feeding, stress condition and lack of control measures and awareness about the effect of the disease by the owners which can aggravate the disease in the study area.

In the current study, the prevalence rate of skin diseases was 10.52% in indigenous breed cattle and 8.57% in cross breed cattle. The result agrees with the previous work of Yacob *et al.* (2008) who reported higher prevalence of skin diseases in local breed (8.8%) and lower in cross breeds (2.2%). This higher prevalence (10.52%) on local breed of cattle in the current study might be due to the fact that local breeds are more susceptible than the cross breeds. Stress condition might be a factor that can lead to this susceptibility. Since local breeds of cattle are mostly reared in Dinajpur district while cross create conducive environment for cross breeds of cattle due to good management than local breed of cattle that are kept under free range of land.

The prevalence rate of skin diseases was 8.33% in male and 10.90% in female cattle. This can indicate that various types of skin diseases were encountered in both sexes of cattle (Table 4). This is correlated with the report of Andrews *et al.*, (2004) and Radostits *et al.*, (2007) who stated that surface diseases occur in both sexes. But, the current report disagrees with the previous works of Yacob *et al.*, (2008) who reported 2.22% in male and 1.67% in female cattle respectively.

**Table 1:** Cattle population attended at veterinary hospitals in Dinajpur district

Veterinary hospital	No. of total clinical cases
Chirirbandor	425
Birol	450
Sadar, Dinajpur	490
Parbotipur	400
Fulbari	625
Birganj	680
Birampur	730
Kaharol	400
VTH, HSTU, Dinajpur	700
Total	5000

**Table 2.** Cattle population according to various parameter in Dinajpur district

Age		Sex		Breed		Season		
Young (0-2.5 Yrs)	Adult (>2.5 Yrs)	Male	Female	Indigenous	Cross	Summer	Rainy	Winter
2200	2800	1800	3200	3600	1400	2500	1400	1100

**Table 3.** Prevalence of bovine skin diseases based on age

Diseases	Young (0-2.5 Yrs) (n=2200)		Adult (>2.5 Yrs) (n=2800)		Chi-square (p-value)
	No. of affected animal	Prevalence	No. of affected animal	Prevalence	
Dermatophilosis	80	3.6	47	1.67	0.001(0.980)
Dermatomycosis	50	2.27	38	1.35	0.091(0.763)
Papillomatosis	35	1.59	21	0.75	0.364(0.546)
Myiasis	20	0.90	9	0.32	0.145(1.000)
Stephanofilariasis	10	0.45	25	0.89	0.050(1.000)
Mite infestation	15	0.68	42	1.5	0.184(0.649)
Tick infestation	15	0.68	38	1.35	0.406(0.743)
Lice infestation	20	0.90	34	1.21	0.743(0.483)
Overall	245	11.13	254	9.07	

The present study revealed the prevalence was higher in female animals. This might be due to the stress condition during pregnancy and lactation and the less emphasis of the owners on feeding of female animal and a higher emphasis on feeding of male animals since they used them for ploughing, fattening and for higher financial gain in the market.

The overall prevalence of bovine skin diseases was higher in young 11.13% than the adult 9.07% cattle of age group 0-2.5years and >2.5 years old, respectively. This can imply that diseases were occurred in all age categories (Table 3).

This report correlates with the report of Andrews *et al.* (2004) and Radostits *et al.* (2007) who stated that skin diseases occur in all age categories because it is clear that an organism living as a commensal should suddenly become a pathogen by its rapid unpredicted multiplication, immunodeficiency has been

suggested as one cause for this phenomenon to occur. In addition to this, the result is in agreement with the previous work which was done by Yacob *et al.* (2008) who reported 10.06% and 8.3% in young and adult cattle respectively. But, the present study disagrees with the previous work of Bogale (1991) who reported that higher prevalence was recorded in young (5.95%) than adult (2.40%).

The overall prevalence of bovine skin diseases was recorded 10.0%, 8.57% and 9.0% for cattle in the summer, rainy and winter seasons, respectively. This can imply that diseases were occurred in all seasons (Fig 3). This report correlates with the report of Andrews *et al.*, (2004) and Radostits *et al.*, (2007) who stated that skin diseases occur in all seasons all over the year.

The overall prevalence of mite in cattle was 1.14% in the area. The finding was in higher than the 0.4% reported by Tadesse *et al.*, (2011) and lower than the 65.5% in cattle found by Islam *et al.*, (2009) at the other part of the country. On the contrary, prevalence of mites as high as 95.5% (Nigatu *et al.*, 2012) was reported from southern part of the country. This discrepancy might be due to difference in the ideal macro and micro environment (high temperature, humidity and sun light) in the study areas which favors the breeding and multiplication of mite, *Radostitis et al.*, (2008). Although prevalence of mite was lower in this study its potential to cause serious skin lesions should not be undermined, *Radostitis et al.*, (2008). There was no significant dispersion in the infestation of animals by mites with regard to sex, age and breed categories in ruminants. Age and sex are not determinant factors in the infestation of mites Bekele *et al.* (2011).

Table 4: Prevalence of bovine skin diseases based on sex

Diseases	Male (n=1800)		Female (n=3200)		Chi-square (p-value)
	No. of affected animal	Prevalence	No. of affected animal	Prevalence	
Dermatophilosis	37	2.05	90	2.81	1.738(0.419)
Dermatomycosis	20	1.11	68	2.12	4.485(0.106)
Papillomatosis	10	0.55	46	1.43	1.016(0.602)
Myiasis	10	0.55	19	0.59	0.939(0.625)
Stephanofilariasis	14	0.77	21	0.65	0.939(0.625)
Mite infestation	20	1.11	37	1.15	0.715(0.700)
Tick infestation	19	1.05	34	1.06	0.582(0.748)
Lice infestation	20	1.11	34	1.06	0.582(0.748)
Overall	150	8.33	349	10.90	

In this study tick (1.06%) infestation was the outstanding ectoparasites followed by lice (1.08%) and mite (1.14%). This finding was in agreement with earlier studies on ruminants by

Yacob *et al.* (2008) who reported the predominance of ticks. In contrast to our finding, a higher prevalence of 39.6% (Tadesse *et al.*, 2011) and 64.07% (Rony, *et al.* 2010) of ticks has been reported. The lower prevalence of ticks in cattle in the present study area could be attributed to the relatively good access to veterinary services, and it could also be due to the long dry season of the study period, because tick infestations tend to decrease during the dry season compared to the wet seasons. Climatic determinants of the study areas such as humidity and prolonged sunlight favor the multiplication and maintenance of the parasite in the environment (Sajid *et al.*, 2006).

The overall prevalence of lice recorded in the present study was 1.08%. Our finding was in consent with the result of Tadesse *et al.*, (2011) who reported a prevalence of 9.5%. On the contrary, this result was in disagreement with the finding of Rony *et al.*, (2010), Nigatu and Teshome (2012) (63.5%). These disparities could be attributed to differences in the agro-ecology, climatic condition, and sample size used in the study areas. In general the lice species recorded in this study have commonly been identified in ruminant in Dinajpur district. In this study there was no significant difference ( $p>0.05$ ) in the prevalence of lice infestation among the different upazilla areas. This might be due to the management practice in the study area where animals management practice in the study area where animals by direct contact (Taylor *et al.*, 2007).

The result of the present study showed a close range of single and multiple skin diseases with an overall prevalence of 9.98% in the study areas. Variation in geographical locations, climatic conditions, and management practices in the different study areas might have contributed for the disparity in prevalence.

## Conclusions

The study revealed that the female with age group of young (0-2.5yrs), indigenous breed and summer season were observed as the most susceptible to various skin diseases in the study areas. The cattle in Dinajpur district of northern Bangladesh were found to be infested with diverse skin diseases implying their effects on productivity of these animals and responsible for the great economic losses of hides even at a national level.

## Author's contribution

It was the MS thesis experiment of first author. All authors were actively participated in the research work, study design, analyzing the data and writing the manuscript.

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