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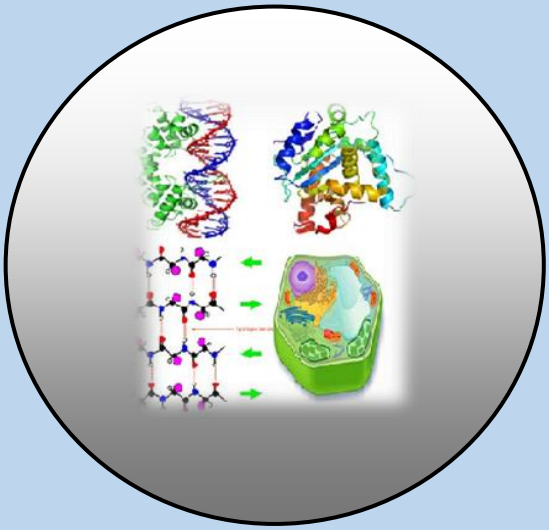

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RESEARCH PAPER

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Epidemiological Studies of Ectoparasites Infestation on Cattle at the Sylhet Region of Bangladesh

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ABSTRACT

To investigate the epidemiology of ectoparasites infestation on cattle of different ages, sexes, seasons and their different areas of Sylhet district. Epidemiological studies on ectoparasites infestation of cattle were undertaken in such localities under different climatic conditions existing in Sylhet district of five different upazilla. Cattle were divided into young and adult groups. Cattles were examined randomly and ectoparasites were collected from the infested cattle during from July 2014 to June 2015. Both physical examination and laboratory investigation were employed in the study.A total of 1800 household live cattle (900 male and 900 female) were examined of which 1121 (62.28%) found positive for ectoparasites infestation. The overall prevalence of tick, lice and mite infestations were 37.67, 17.56 and 7.06% respectively. It was noticed that prevalence of tick infestation was the outstanding ectoparasites followed by lice and mite. The overall prevalence of infestation was higher during rainy while lowest during summer season. The highest prevalence was recorded in adults. Moreover, the overall prevalence of ectoparasites infestation in females was more than male's cattle. Ectoparasites infestation is highly prevalent on cattle in Sylhet district of Bangladesh. Hence, good veterinary services and management practice should be used to effective control of intensive ectoparasites infestation on cattle.

Keywords: Epidemiology, Ectoparasites Infestation, Cattle, Veterinary Services and Bangladesh.

INTRODUCTION

The livestock population in Bangladesh is currently estimated to comprise 26.828 million cattle, 0.544 million buffalo, 16.242 million goat and 1.221 million sheep (BBS 2010) which plays an important role in the rural economy (Kamaruddin 2003). Therefore, cattle are the first priority of livestock populations in Bangladesh which contributes in poverty alleviation and in supplying animal protein of high calorie value in the form of milk and meat. The diseases are major setback to livestock industry, at the risk of decline in production, poor growth and infertility due to number of ecto and endoparasites infection (Nansen 1991, Kusiluka 1994). Ectoparasites commonly known as ticks, mite and lice are important parasites of cattle, which may affect direct and indirectly on their hosts. The ectoparasites are known to cause a wide range of health problems such as mechanical tissue damage, irritation, inflammation, hypersensivity, abscesses, weight loss, lameness, anemia, allergy, paralysis, toxicosis, in severe cases death of infested cattle and by their effect on the physiology of the animals as well as through transmission of different diseases (Wall and Shearer 2001,Radostits et al. 2007,Taylor et al. 2007,Bekele et al. 2011).In Sylhet region of Bangladesh have wide water resources of large irrigated agro-ecological zones adjacent to river of Surma, tea garden, large scale of forest and hilly area but still there is no attention on ectoparasites infestations on cattle in this region.Sylhet region of Bangladesh have favorable geological and climatic conditions for ectoparasites infestations. Considering above points, a thorough investigation is required to study the epidemiology of ectoparasites infestations on cattle based on different age, sex and seasons at different upazilla of Sylhet region.

MATERIAL AND METHODS

Study area and period

This study was conducted in Sylhet region of Bangladesh. Sylhet region is located in North-East part of Bangladesh and between 24^{o}30’ North latitude and 91^{o}40’ East longitudes. The division has an area of 3490.40 square kilometers (Figure 1). More than three quarter of the division consists of mostly tea garden, hilly, forest, water logged and low lying areas. The average maximum and minimum temperatures are 23 ^{o}C and 7 ^{o}C, respectively. The annual average rainfall is 3334 mm and humidity is 80%. The study was carried out in the Laboratory under the Department of Parasitology, Faculty of Veterinary and Animal Science, Sylhet Agricultural University (SAU) from July 2014 to June 2015. Different areas of Sylhet region was selected on the basis of irrigated agro-ecological zones such as Sylhet Sadar, Balagonj, Beanibazar, Bishwanath and Jaintapurupazilla (Figure 1).

Animals

The cattle of various local breeds, sexes and age groups were selected randomly from small holder farmers. The age of the cattle were determined by dentition. The cattle weredivided into two age groups such as young (< 3 years) and adult (≥3 years) age. The sexes of the cattle were recorded by examining presence of penis, testis,vulva or udder.

Experimental design

During the study year, 1800 of cattle samples were collected from five different upazillaof Sylhet region and examined by physically and laboratory investigation for the presence of ectoparasites in the Laboratory of Parasitology, Faculty of Veterinary andAnimal Science, Sylhet Agricultural University, Sylhet-3100,Bangladesh. Identification was done on the basis of morphology (Soulsby 1986).

Statistical analysis

Among the male and female cattle, variationsin the prevalence of ectoparasites infestation on the basis of different agegroups, season, sex and their location and prevalence wereanalyzed by logistic regression using statistical softwareSPSS (Version 15.2) and Microsoft Excel-2007. Values of $p<0.001$ were considered as significant at99.99% confidence interval. The relationship of differentvariables with the infection was observed by this regression analysis.

RESULTS AND DISCUSSION

In the present study, a total of 1800 cattle in different upazilla of Sylhet region were examined of which 678(37.67%), 316(17.56%) and 127(7.06%) were found positive for tick, lice and mite infestation respectively (Table 1).Ticks were 2.15 times more susceptible than lice and 5.34 times than mite significantly ($p <0.001$). This finding showed similarities with the studies on ruminants of Yacob et al. (2008), Amsalu (2011), and Nigatu and Teshome (2012) who reported the predominance of ticks. The result of tick infestation was in agree with findings of Onu and Shiferaw (2013) and lower than Rony et al. (2010) and Islam et al. (2009).Our findings of lice infestation was in consent with the result of Tadesse et al. (2011) and Onu and Shiferaw (2013). On the contrary, disagreement with findings of Rony et al. (2010) and Nigatu and Teshome (2012). The findings of mite infestation in cattle is higher than the findings of Onu and Shiferaw (2013) and Tadesse et al. (2011) and lower than the Nigatu and Teshome (2012). Effect of agro-ecology, climatic conditions, sample size and breed of animal used in the study areas might have contributed for the disparity in the prevalence. The overall prevalence was 62.28%. The highest prevalence of tick, lice and mite infestation were 46.94% in Jaintapur, 23.06% in Bishwanath, 10.28% in Beanibazar and the lowest 30.28%, 11.67%, 3.89% in Sylhet Sadarupazilla respectively, which was examined by physically and laboratory investigation of cattle. The result is shown in the Table 1. The overall prevalence and prevalence of five different upazilla was correlated with the findings of Tadesse et al. (2011), Rony et al.(2010), Islam et al. (2009) and Sajid et al. (2008) who reported the prevalence of ectoparasites infestation in cattle was 73.30%,64.07%, 65.5% and 75.1%,respectively. The geo-climatic conditions, geographical locations, management practices together with the forest-hilly areas in Sylhet region of Bangladesh and most of the animalsgraze on the near the forest land where are highly favorable for the development of ectoparasites. In this study, the overall prevalence of adult (84.56%) age group of cattle were infested significantly ($p<0.001$) higher than young (40%). Adults were 2.11 times more significantly external parasites infestation than young. Moreover, the prevalence of ectoparasites infestation was more significantly recorded in adult's cattle than young in each different upazilla (Table 2 and 3). On the other hand, adult's age groups of cattle were more infested than young may be due to decrease of immunity and poor body condition. Similar observation was reported by Rony et al.(2010) and Islam et al. (2009) who were stated that adults cattle (65.45 and 61.5%) showed greater susceptibility to ectoparasites than youngs (47.05 and 56.00%) respectively. During the present study, the overall prevalence of ectoparasites infestation was significantly ($p <0.001$) higher in female (91.89%) than in male (32.67%). Females were 2.81 times more susceptible to external parasite infestation than males.

Moreover the overall prevalence of ectoparasites infestation was observed that females were more infected than their counter partners in different upazilla (Table 4 and 5). These findings are in agreement with others who have reported of Sakar (2007) and Rony et al. (2010).

Table 1. Prevalence of ectoparasites infestation on cattle and relation with their different areas.

Upazilla	Ectoparasites							
	No. Examined	Tick		Lice		Mite		Overall Prevalence (%)
		No. Positive	Prevalence (%)	No. Positive	Prevalence (%)	No. Positive	Prevalence (%)	
Sylhet Sadar	360	109	30.28	42	11.67	14	3.89	62.28
Balagonj	360	121	33.61	51	14.17	25	6.94	
Beanibazar	360	151	41.94	63	17.50	37	10.28	
Bishawanath	360	128	35.56	83	23.06	23	6.39	
Jaintapur	360	169	46.94	77	21.39	28	7.78	
Total	1800	678	37.67±2.30***	316	17.56±2.13***	127	7.06±1.034***	

***Mean in row with letters shown significantly P <0.001.

Table 2. Prevalence of ectoparasites infestation on cattle in relation to age factor.

Upazilla	Young age (< 3 years)							
	Ectoparasites							
	No. Examined	Tick		Lice		Mite		Overall Prevalence (%)
		No. Positive	Prevalence (%)	No. Positive	Prevalence (%)	No. Positive	Prevalence (%)	
Sylhet Sadar	180	31	17.22	15	8.33	5	2.78	40.00
Balagonj	180	37	20.56	16	8.89	8	4.44	
Beanibazar	180	48	26.67	20	11.11	12	6.67	
Bishawanath	180	41	22.78	28	15.56	8	4.44	
Jaintapur	180	56	31.11	26	14.44	9	5.00	
Total	900	213	23.67±2.41***	105	11.67±1.45***	42	4.67±0.62***	

***Significant differences between age groups p<0.001.

These results are similar to finding of Biu and Nwosu (1998), Stuti et al. (2007), Sanjay et al. (2007) and Salih et al. (2008) were found the highest number of tick infestation in cattle during rainy season then winter and summer.

Table 3. Prevalence of ectoparasites infestation on cattle in relation age factor

Upazilla	Adult age (> 3 years)							
	Ectoparasites							
	No. Examined	Tick		Lice		Mite		Overall Prevalence (%)
		No. Positive	Prevalence (%)	No. Positive	Prevalence (%)	No. Positive	Prevalence (%)	
Sylhet Sadar	180	78	43.33	27	15.00	9	5.00	84.56
Balagonj	180	84	46.67	35	19.44	17	9.44	
Beanibazar	180	103	57.22	43	23.89	25	13.89	
Bishawanath	180	87	48.33	55	30.56	15	8.33	
Jaintapur	180	113	62.78	51	28.33	19	10.56	
Total	900	465	51.67±3.61***	211	23.44±2.85***	85	9.44±1.45***	

***Significant differences between age groups p<0.001.

Table 4. Prevalence of ectoparasites infestation on cattle in relation to sex factor.

Upazilla	Male							
	Ectoparasites							
	No. Examined	Tick		Lice		Mite		Overall Prevalence (%)
		No. Positive	Prevalence (%)	No. Positive	Prevalence (%)	No. Positive	Prevalence (%)	
Sylhet Sadar	180	25	13.89	11	6.11	2	1.11	32.67
Balagonj	180	32	17.78	12	6.67	5	2.78	
Beanibazar	180	43	23.89	15	8.33	9	5.00	
Bishawanath	180	35	19.44	22	12.22	5	2.78	
Jaintapur	180	51	28.33	21	11.67	6	3.33	
Total	900	186	20.67±2.50***	81	9.00±1.26***	27	3.00±0.62***	

***Significant differences between sex's and groups p<0.001.

Sanjay et al. (2007) also reported that lice infestation significantly higher in winter followed by summer and rainy season. Moreover, Bangladesh has a rainy season for four months, which facilitates external parasites survival in such an environment.

Table 5. Prevalence of ectoparasites infestation on cattle in relation to sex factor.

Upazilla	Female							
	Ectoparasites							
	No. Examined	Tick		Lice		Mite		Overall Prevalence (%)
		No. Positive	Prevalence (%)	No. Positive	Prevalence (%)	No. Positive	Prevalence (%)	
Sylhet Sadar	180	84	46.67	31	17.22	12	6.67	91.89
Balagonj	180	89	49.44	39	21.67	20	11.11	
Beanibazar	180	108	60.00	48	26.67	28	15.56	
Bishawanath	180	93	51.67	61	33.89	18	10.00	
Jaintapur	180	118	65.56	56	31.11	22	12.22	
Total	900	492	54.67±3.52***	235	26.11±3.04***	100	11.11±1.45***	

***Significant differences between sex's and groups p<0.001.

Table 6. Season-wiseprevalence of ectoparasites infestation on cattle.

Upazilla	Rainy season							
	Ectoparasites							
	No. Examined	Tick		Lice		Mite		Overall Prevalence (%)
		No. Positive	Prevalence (%)	No. Positive	Prevalence (%)	No. Positive	Prevalence (%)	
Sylhet Sadar	120	62	51.67	14	11.67	4	3.33	84.33
Balagonj	120	69	57.50	17	14.17	9	7.50	
Beanibazar	120	73	60.83	21	17.50	11	9.17	
Bishawanath	120	68	56.57	28	23.33	8	6.67	
Jaintapur	120	85	70.83	26	21.67	9	7.50	
Total	600	357	59.50±3.19***	106	17.67±2.19***	43	6.83±0.97***	

***Significant differences in different season's and groups p<0.001.

It was also observed that females are usually weak and malnourished and consequently are more susceptible to infested besides some other reasons (Blood and Radostits 2000).

Table 7. Season-wise prevalence of ectoparasites infestation on cattle.

Upazilla	Winter season							
	Ectoparasites							
	No. Examined	Tick		Lice		Mite		Overall Prevalence (%)
		No. Positive	Prevalence (%)	No. Positive	Prevalence (%)	No. Positive	Prevalence (%)	
Sylhet Sadar	120	34	28.33	21	17.50	9	7.50	76.17
Balagonj	120	38	31.67	25	20.83	14	11.67	
Beanibazar	120	54	30.00	31	25.83	22	18.33	
Bishawanath	120	46	38.33	42	35.00	12	2.00	
Jaintapur	120	58	48.33	36	30.00	17	14.17	
Total	600	230	38.33±3.80***	155	25.83±3.13***	72	12.33±1.85***	

***Significant differences in different season's and groups p<0.001.

Table 8. Season-wise prevalence of ectoparasites infestation on cattle.

Upazilla	Summer season							
	Ectoparasites							
	No. Examined	Tick		Lice		Mite		Overall Prevalence (%)
		No. Positive	Prevalence (%)	No. Positive	Prevalence (%)	No. Positive	Prevalence (%)	
Sylhet Sadar	120	13	1.08	7	5.83	1	0.83	26.33
Balagonj	120	14	11.67	9	7.50	2	1.67	
Beanibazar	120	24	20.00	11	9.17	4	3.33	
Bishawanath	120	14	11.67	13	10.83	3	2.50	
Jaintapur	120	26	21.67	15	12.50	2	1.67	
Total	600	91	15.17±2.33***	55	9.17±1.18***	12	2.00±0.42***	

***Significant differences in different season's and groups p<0.001.

In addition, overall highest prevalence was found during rainy season (59.50%) followed by winter (38.33%) and summer (15.17%) of tick infestation in cattle. The prevalence of lice and mite infestation was found during winter (25.83 and 12.33%) followed by rainy (17.67 and 7.17%) and summer (9.17 and 1.67%) in cattle respectively (Table 6-8).

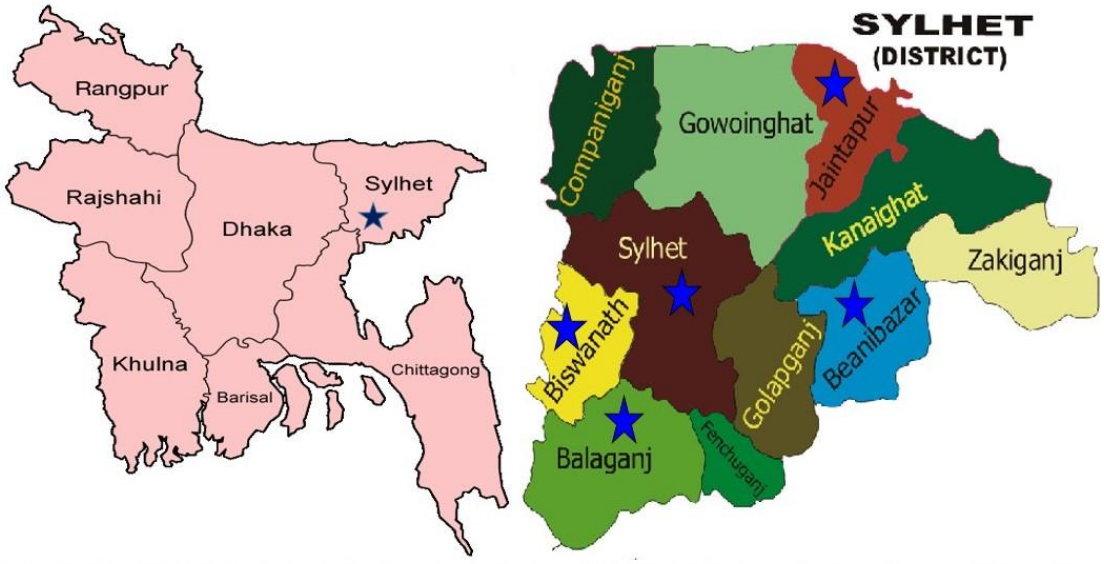

Figure 1. Map of Bangladesh indicating the location of study area (star mark) and map of Sylhet district indicating sampling sites at different upazilla (star mark).

CONCLUSIONS

This study showed that the widespread occurrence of ectoparasites in cattle and the most important ectoparasites identified were tick, lice and mange mite. Further study should be needed to develop an effective control strategy based on the findings of this study to protect the domesticated animals from the harmful effects of ectoparasites infestations in Bangladesh.

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