

**PREVALENCE OF VETERINARY ECTOPARASITES IN BRAHMANPARA,
BURICHONG AND DEBIDWAR UPAZILAS IN COMILLA DISTRICT,
BANGLADESH**

I. Mannan*, T. Akter, A. F. M. Shahriar and S. Ahmad

*Department of Zoology, Faculty of Biological Sciences, Jahangirnagar University,
Savar, Dhaka-1342, Bangladesh*

Abstract: The study was conducted to assess the prevalence of veterinary ectoparasite of cattle and goats in Brahmanpara, Burichong and Debidwar upazila of Comilla district. In total 560 animals (335 cattle and 225 goats) were examined; among them 373 animals (217 cattle and 156 goats) were found to be infested with several species of ectoparasites. Veterinary animals (cattle and goats) in Brahmanpara upazila showed the highest prevalence (71.80%) and lowest intensity (6.19). Debidwar upazila showed lowest prevalence (55.47%) and highest intensity (12.20). Cattle in Brahmanpara showed highest prevalence (78.50%) and lowest intensity (5.59) and Debidwar upazila showed lowest prevalence (43.00%) and highest intensity (13.66). Goats in Debidwar upazila showed highest prevalence and intensity (100% and 9.97, respectively). Burichong upazila showed lowest prevalence (64.22%) and Brahmanpara showed lowest intensity (6.84). The study of ectoparasites is important, not only for livestock but also for humans, since fleas, lice and ticks also parasitize humans, especially those who work in close contact with the affected animals. Therefore, more studies are needed to estimate the economic losses and control measures of veterinary animal parasitic diseases that are caused by ectoparasites.

Key words: Prevalence, Ectoparasites, Veterinary animal, Cattle, Goat.

INTRODUCTION

Ectoparasites are important parasites because of their voracious blood feeding activity and as vectors for various agents of diseases in both man and livestock (Cumming 1998, Hendrix 1998). As a result of their activity, arthropod ectoparasites may have a variety of direct and indirect effects on their hosts (Wall and Shearer 2001). Nowadays, ectoparasitism represents a major obstacle to development and utilization of animal resource. Ectoparasites affect the host species by the inflammation and the infection they inflict on the skin (Taylor *et al.* 2007) and by their effect on the physiology of the animals as well as

*Author for correspondence: <lipi_ju05@juniv.edu>

through transmission of different diseases (Wall and Shearer 2001, Bekele *et al.* 2011). Infestations by ectoparasites significantly affect the quality of hide thereby affecting the economy of farmers as well as international market (Bekele 2002). The ectoparasites affect the health and productivity of veterinary animals which resulting economic losses (Bekele 2002, Ayele *et al.* 2003, Yacob *et al.* 2008). The losses due to ectoparasites can be categorized into (a) those affecting the productivity of an individual animal and (b) those influencing herd productivity. The first category includes mortality, lower market value, reduction in body weight gain, reduced wool and milk yield, reduced dung output for fuel and fertilizer, and reduced efficiency in food conversion. The second category includes the reduced productive life span of animals, the disturbance of the genetic selection effort and the possibility of immune suppressions and increased susceptibility to diseases (Nari and Hansen 1999).

In Bangladesh the density of livestock population per unit of land is higher compared to other countries of the world (DLS 2011-2012). From the year 1998-99, the production of meat and milk (beef, mutton and chicken) have been increased on a regular basis and reached to a higher rate in the year 2006-07 (DLS March 2007). The current statistics shows that the cattle population in Bangladesh is about 23.7 million (DLS 2011-2012) and annual growth rate of livestock is 3.9 % (BES 2012).

The productivity of cattle is hampered by several factors amongst which ectoparasitism is one of the important factors (Jabber and Green 1983). The economically important ectoparasites are lice, ticks, mites, fleas, flies, ked and so on (Soulsby 1982). Bangladesh earns 2.9% foreign currency by exporting leather and leather goods (DLS 2008). But unfortunately, quality of hides cannot be ensured because of various skin diseases due to the ectoparasitic infestations (Huq and Mollah 1972, Rahman and Mondal 1985, Nooruddin and Dey 1989, Nooruddin and Mondal 1996).

To protect the livestock animals from the harmful effects of ectoparasite, it is urgently needed to identify the commonly prevalent ectoparasites and to study their control measure. The present study was carried out to determine the prevalence and intensity of ectoparasites of veterinary animals in Brahmanpara, Burichong and Debidwar upazila of Comilla district.

METERIAL AND METHODS

This study was conducted in veterinary animals of Brahmanpara, Burichong and Debidwar upazila in Comilla district, Bangladesh. Geographical position of these three upazila is presented in figure 1,2,3,4 and 5. This research work was carried out during the period from December 2013 to November 2014. Sample collection was accomplished 7 a.m. to 4 p.m. randomly. Three villages from each upazila were selected randomly followed by 10-15 household from each of the village selected, from each household 1-5 animals were examined for ectoparasites. A total of 560 animals (335 cattle and 225 goats) were selected randomly from different parts in each village for the convenience of the study and availability of the animals.



Fig.1. Map of Bangladesh showing Comilla district

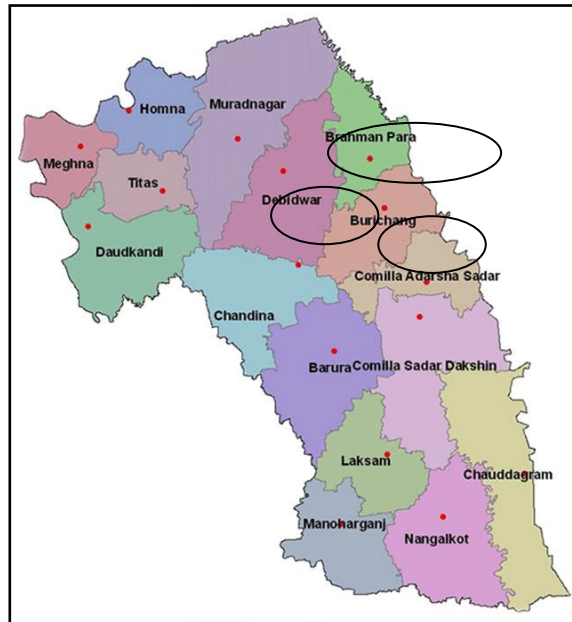


Fig. 2. Map of Comilla showing location of different studied upazila

Collection of ectoparasites: The selected animals were thoroughly investigated by close inspection, parting the hairs against their natural direction for the detection of ectoparasites. Ectoparasites were collected from the different parts of the body of the individual animals. Lice were collected by small camel hair brush or comb. At the time of brushing a sheet of white thick paper was placed just underneath the hair to avoid the chances of losing the lice during collection. In order to collect the ticks from the host body, the point of attachment was smeared with 70% ethanol to loosen attachment of parasite with the host body surface. After that these were collected by slow and gentle pull with fine forceps. Flies specimens were caught with the help of a swiping net and sometimes by the hand with great care so that the flies were not damaged or missed. They were caught from different body parts such as around the face, horn, base of the ears, head, abdomen and legs. For collection of fleas, the hairs of the host body was carefully examined and after located the parasite, hairs are pressed two sides by the tip of finger and smeared a drop with 70% ethanol.

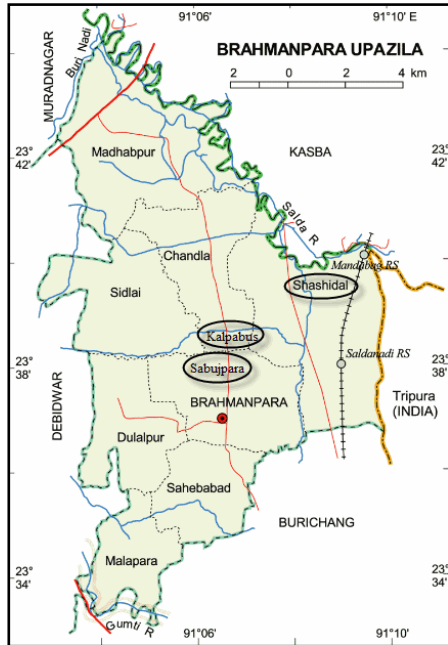


Fig.3. Map of Brahmanpara upazila showing location of study sites

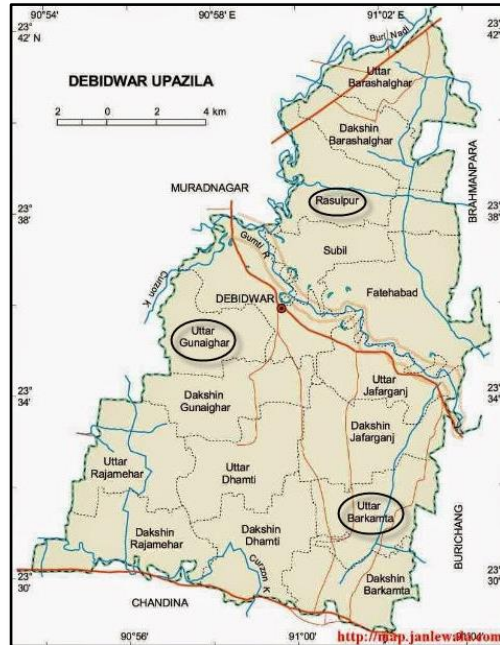


Fig.4. Map of Debidwar upazila showing location of study sites



Fig.5. Map of Burichang upazila showing location of study sites

Cleaning and preservation of ectoparasites: In order to clean the collected specimen were keep in a petri dish contains 70% ethanol. The petri dish was placed under the dissection microscope and the specimens were cleaned by removing the hairs and debris attaching to their bodies with the help of specimen brush and dissection needle. After cleaning specimens were preserved in 70% ethanol in clean well-stopper glass vials which were labeled properly. Some specimens were preserved in tissue paper to protect their natural color for photography and after photography they were preserved in glass vials with 70% ethanol. Flies were preserved in well stopped plastic bottles for 2 to 3 days to protect their natural color for photography. After that flies were also preserved in 70% ethanol in glass vials.

Identification of ectoparasites: Ectoparasites were identified on the basis of their external morphological characters (Body shape, size, color, appendages present or absent) with the help of dissecting (4x) and compound (10x, 40x) microscope. Identification of ectoparasites up to genera and species level were done following Imms (1942), Wall and Shearer (1997), Soulsby (1982) and Encyclopedia of Flora and Fauna of Bangladesh, 2010.

RESULTS AND DISCUSSION

In this study, a total of 560 animals were examined in which 59.83% cattle and 40.18% goats. Total 373 animals were infested in which 58.18% cattle and 41.83% goats. A total of 2846 ectoparasites were collected from the host body in which 57.70% from cattle and 42.31% from goats. During this investigation a total of 18 types of ectoparasites were collected i.e., *Haematopinus quadripertusus*, *Haematopinus eurytenuis*, *Linognathus vituli*, *Damalinea bovis*, *Stomoxys calcitrans*, *Musca domestica*, *Tabanusstriatus*, *Diachlorus* sp., *Armigeres subalbatus*, *Ctenocephalides felis*, *Boophilus microplus*, *Haemaphysalis bispinosa*, *Haemaphysalis kinneari*, *Hyalomma anatolicum*, *Rhipicephalus sanguineus*, *Dermacentor* sp., *Ixodes* sp. (adult) and Ixodid larvae but no mites were detected. In Brahmanpara 195 animals were examined in which 140 were infested. A total 866 ectoparasites were collected where the prevalence was 71.80% and intensity was 6.19 respectively. In Burichong, a total 1114 ectoparasites were collected from 162 infested hosts where 237 animals were examined. The prevalence and intensity of ectoparasites were 68.36% and 6.87, respectively. In Debidwar, 128 animals were examined and a total 866 ectoparasites were collected from 71 infested hosts. Prevalence and intensity of ectoparasites was 55.47% and 12.20, respectively (Table 1). In present study, veterinary animals (cattle and goats) in Brahmanpara showed the highest prevalence of ectoparasitic infestation, 71.80% and lowest intensity,

6.19. Debidwar upazila showed lowest prevalence (55.47%) and highest intensity (12.20). In Brahmanpara total 408 ectoparasites of cattle were collected from 73 infested hosts where 93 cattle were examined. The prevalence and intensity were 78.50% and 5.59 respectively. In Burichong upazila, 142 cattle were examined and 101 cattle were infested. A total 647 ectoparasites were collected and prevalence and intensity were 71.13% and 6.41, respectively. A total of 100 cattle were examined in Debidwar and 43 were found infested. A total 587 ectoparasites were collected; and the prevalence and intensity were 43.00% and 13.66 respectively (Table 2). Cattle in Brahmanpara upazila showed the highest prevalence of ectoparasitic infestation (78.50%) and lowest intensity (5.59) and Debidwar upazila showed lowest prevalence (43%) and highest intensity (13.66).

In Brahmanpara, a total 458 ectoparasites of goats were collected from 67 infested hosts where 102 goats were examined. The prevalence and intensity of ectoparasites were 65.69% and 6.84 respectively. In Burichong 95 goats were examined and 61 goats were found infested. A total 467 ectoparasites were collected and prevalence and intensity were 64.22% and 7.66, respectively. In Debidwar, total 28 goats were examined, all were infested. A total 279 ectoparasites were collected from infested host and the prevalence and intensity were 100% and 9.97 respectively (Table 3). Goats in Debidwar showed the highest prevalence and intensity of ectoparasitic infestation and it was 100% and 9.97, respectively. Burichong showed the lowest prevalence (64.22%) and Brahmanpara showed lowest intensity (6.84).

During this study, at Brahmanpara, a total number of 408 arthropod ectoparasites were collected from 73 infested cattle. *Musca domestica* showed the highest prevalence of infestation. Total 119 individuals of *Musca domestica* were collected from 59 infested hosts. Its prevalence was 80.83%. *Diachlorus* sp. showed the lowest prevalence of infestation. Two parasites were collected from one infested host. Its prevalence was 1.36%. *Linognathus vituli* showed the highest intensity of infestation. Total 43 parasites were collected from 07 infested cattle. Its intensity was 6.15. *Haemaphysalis bispinosa* showed the lowest intensity of infestation. Total 20 parasites were collected from 17 infested hosts. The intensity was 1.18 (Table 4). From goats, total numbers of 458 arthropod ectoparasites were collected from 67 infested goats. *Ctenocephalides felis* showed the highest prevalence of infestation. Total 132 parasites were collected from 53 infested hosts. Its prevalence was 79.11%. *Haemaphysalis bispinosa* showed the lowest prevalence of infestation. Total 19 parasites were collected from 07 infested hosts. Its prevalence was 10.45%. *Linognathus vituli* showed the highest intensity of infestation. Total 70 parasites were collected from 13 infested hosts. Its intensity was 5.39. *Haemaphysalis kinneari* showed

the lowest intensity of infestation. Total 26 parasites were collected from 11 infested hosts, intensity was 2.37 (Table 5).

In Burichong, from cattle, a total number of 647 arthropod ectoparasites were collected from 101 infested cattle. *Musca domestica* showed the highest prevalence of infestation. Total 201 parasites were collected from 97 infested hosts. Its prevalence was 96.04%. *Haematopinus eurysternus* and *Stomoxys calcitrans* showed the lowest prevalence of infestation. From three and three infested host 19 and three parasites were collected respectively. Their prevalence was same, 2.98%. *Haematopinus eurysternus* showed the highest intensity of infestation. Total 19 parasites were collected from three infested hosts. Its intensity was 6.34. *Stomoxys calcitrans* showed the lowest intensity of infestation. 03 parasites were collected from 03 infested hosts. The intensity was 1.00 (Table-4).

From goats, a total numbers of 467 arthropod ectoparasites were collected from 61 infested hosts. *Ctenocephalides felis* showed the highest prevalence of infestation. Total 133 parasites were collected from 58 infested hosts. Its prevalence was 95.09%. *Boophilus microplus* showed the lowest prevalence of infestation. Total 15 parasites were collected from 07 infested hosts. Its prevalence was 11.48%. *Damalinia bovis* showed the highest intensity of infestation. Total 176 parasites were collected from 34 infested hosts. Its intensity was 5.18. *Haemaphysalis kinneari* showed the lowest intensity of infestation. Total 34 parasites were collected from 23 infested hosts and intensity was 1.48 (Table 5).

In Debidwar from cattle, a total 587 arthropod ectoparasites were collected from 43 infested cattle. *Linognathus vituli* showed highest prevalence of infestation. Total 81 parasites were collected from 27 infested hosts. Its prevalence was 62.80%. *Haematopinus eurysternus* showed the lowest prevalence of infestation. Total 19 parasites were collected from 08 infested hosts and its prevalence was 18.61%. *Musca domestica* showed the highest intensity of infestation. Total 98 parasites were collected from 21 infested hosts. Its intensity was 4.67. *Hyalomma anatolicum* showed the lowest intensity of infestation. Total 18 parasites were collected from 12 infested hosts, and intensity was 1.50 (Table 4). From goats, a total number of 279 arthropod ectoparasites were collected from 28 infested goats. *Ctenocephalides felis* showed the highest prevalence and lowest intensity of infestation. Total 40 parasites were collected from 28 infested hosts. Its prevalence and intensity were 100% and 1.43 respectively. *Dermacentor* sp. and Ixodid larvae showed the lowest prevalence of infestation. Total 21 and 47 parasites were collected from same number of infested host 13; prevalence was same, 46.43%. *Linognathus vituli*

showed the highest intensity of infestation. Total 76 parasites were collected from 19 infested hosts. Its intensity was 4.00 (Table 5). In the present study, result revealed that veterinary animals (cattle and goats) in this study area were found infested with several species of ectoparasites like lice, flies, flea and ticks but no mites were count. In Comilla district there is no previous work on ectoparasitic survey so here is no chance to compare with present survey. But few works found on the one or two upazila of some districts of Bangladesh. Most of the researchers have worked on one or two categories of veterinary ectoparasites (Ahmad 1987, Islam *et al.* 2006, Islam *et al.* 2009, Kamal *et al.* 1996, Mondal *et al.* 1995, Mollah *et al.* 1970, Rony *et al.* 2010, Roy *et al.* 2000).

During this study in terms of lice, *Haematopinus quadripertusus* (Brah. 53.43%, Buri. 65.35% and Debi. 53.49%) and *Haematopinus eurysternus* (Brah. 16.43%, Buri. 2.98% and Debi. 18.61%) was only found in cattle in all upazila but totally not found in goats in any upazila. Here prevalence of *Haematopinus quadripertusus* was highest in cattle in Burichong upazila, 65.35% and prevalence of *Haematopinus eurysternus* was highest in Debidwar 18.61%. Kakar and Sulemankhel (2009) recorded *Haematopinus quadripertusus* 23.5% and *Haematopinus eurysternus* 17.7% from buffaloes in various farm houses in Quetta city, Pakistan. Kumsa and Bekele (2008) found the prevalence of *Haematopinus eurysternus* was 1.8% of cattle in Edegagn district in Southern Ethiopia. *Linognathus vituli* and *Damalinia bovis* was the common ectoparasitic lice of both cattle (Brah. 9.58%, Buri. 11.89%, Debi. 62.80% and Brah. 0%, Buri. 12.88% Debi. 39.54%) and goats (Brah. 19.40%, Buri. 36.07% and Debi. 67.86% and Brah. 100%, Buri. 55.74% and Debi. 60.72%) in all upazila but *Damalinia bovis* not found in cattle in Brahmanpara. *Linognathus vituli* and *Damalinia bovis* showed highest prevalence in cattle in Debidwar 62.80% and 39.54% respectively. In goats *Linognathus vituli* showed highest prevalence in Debi. 67.86% and *Damalinia bovis* showed highest prevalence in Brahmanpara, 100%. Rony *et al.* (2010) reported that most prevalent lice species was *Linognathus vituli* and prevalence was 25.45% in goats at Gazipur district, Bangladesh. George *et al.* (1992) recorded 66.7% *Linognathus vituli* in cattle of northern Nigeria. In this study, flies were collected only from cattle and it was observed that the prevalence of *Musca domestica* comparatively higher than other species of flies on the host examined. *Musca domestica* in Burichong showed highest prevalence, 96.04%. *Stomoxys calcitrans* and *Tabanus striatus* both are showed highest prevalence in Debidwar upazila and prevalence was 20.94% and 23.26% respectively. Mondal *et al.* (1999) reported that among the blood sucking flies, prevalence of *Stomoxys calcitrans* was 24% and *Tabanus*

striatus was 20.6% on cattle from Bangladesh Agricultural University dairy farm, Mymensing. *Diachlorus* sp. was a rare species in this study time and only 02 specimens were collected from one infested cattle in Brahmanpara upazila and prevalence was 1.36%. During this study, mosquito species *Armigeres subalbatus* were only collected from the cattle in Burichong and Debidwar, prevalence was 3.96% and 30.24% respectively. Karim *et al.* (2013) reported that *Armigeres subalbatus* (1%) showed the lowest abundance followed by other mosquito species in Dhaka city. Kirti and Kaur (2015) reported that *Armigeres subalbatus* was found to be prevalent in three regions of Punjab i.e., Malwa, Majha and Doaba. However

Table 1. Prevalence and intensity of ectoparasites of veterinary animals (cattle and goats) at Brahmanpara, Burichong and Debidwar upazilas in Comilla

Name of upazilas	No. of host (cattle&goats) examined	No. of host (cattle&goats) infested	Total no. of ectoparasites collected	Prevalence (%)	Intensity
Brahmanpara	195	140	866	71.80	6.19
Burichong	237	162	1114	68.36	6.87
Debidwar	128	71	866	55.47	12.20
Total	560	373	2836	-	-

Table 2. Prevalence and intensity of ectoparasites of cattle at Brahmanpara, Burichong and Debidwar upazilas in Comilla

Name of upazilas	No. of host (cattle) examined	No. of host (cattle) infested	Total no. of ectoparasites collected	Prevalence (%)	Intensity
Brahmanpara	93	73	408	78.50	5.59
Burichong	142	101	647	71.13	6.41
Debidwar	100	43	587	43	13.66
Total	335	217	1642	-	-

same researcher in 1999 reported this species only from the Malwa region of Punjab, which shows that with the changing ecology of Punjab and *Armigeres subalbatus* has emerged as one of the most abundant mosquito species in the state. In West Bengal, India, Rudra *et al.* (2013) recorded that during the study

Table 3. Prevalence and intensity of ectoparasites of goats at Brahmanpara, Burichong and Debidwar upazilas in Comilla

Name of upazilas	No. of host (goats) examined	No. of host (goats) infested	Total no. of ectoparasites collected	Prevalence (%)	Intensity
Brahmanpara	102	67	458	65.69	6.84
Burichong	95	61	467	64.22	7.66
Debidwar	28	28	279	100	9.97
Total	225	156	1204	-	-

Table 4. Prevalence and intensity of ectoparasites of cattle at Brahmanpara, Burichong and Debidwar upazila in Comilla district

Name of ectoparasites	Total no. of cattle infested			No. of cattle infested by individual species			Prevalence (%)			No. of ectoparasites collected			Intensity		
	Brah.	Buri.	Debi.	Brah.	Buri.	Debi.	Brah.	Buri.	Debi.	Brah.	Buri.	Debi.	Brah.	Buri.	Debi.
<i>Haematopinusquadripertusus</i>				39	66	23	53.43	65.35	53.49	51	178	47	1.31	2.70	2.05
<i>HaematopinusEURYSTERNUS</i>				12	03	08	16.43	2.98	18.61	27	19	19	2.25	6.34	2.37
<i>Linognathusrituli</i>				07	12	27	9.58	11.89	62.80	43	32	81	6.15	2.67	03
<i>DamaliniaBOVIS</i>				00	13	17	00	12.88	39.54	00	47	59	00	3.62	3.48
<i>Stomoxyscalcitrans</i>				07	03	09	9.58	2.98	20.94	16	03	17	2.29	01	1.89
<i>Muscadomestica</i>				59	97	21	80.83	96.04	48.84	119	201	98	2.02	2.08	4.67
<i>Tabanusstriatus</i>				07	05	10	9.58	4.96	23.26	09	07	17	1.29	1.4	1.70
<i>Diachlorus sp.</i>				01	00	00	1.36	00	00	02	00	00	02	00	00
<i>Armigeressubalbatus</i>				00	04	13	00	3.96	30.24	00	17	44	00	4.25	3.39
<i>Ctenocephalidesfelis</i>	73	101	43	00	00	00	00	00	00	00	00	00	00	00	00
<i>Boophilusmicroplis</i>				35	15	26	47.94	14.86	60.47	71	45	49	2.03	03	1.89
<i>Haemaphysalisbispinosa</i>				17	33	00	23.29	32.68	00	20	67	00	1.18	2.04	00
<i>Haemaphysaliskinneari</i>				19	13	23	26.03	12.88	53.49	31	31	56	1.64	2.39	2.44
<i>Hyalommaanatolicum</i>				03	00	12	4.11	00	27.91	08	00	18	2.67	00	1.50
<i>Rhipicephalussanguineus</i>				03	00	00	4.11	00	00	11	00	00	3.67	00	00
<i>Dermacentorsp.</i>				00	00	00	00	00	00	00	00	00	00	00	00
<i>Rhipicephalusannulatus</i>				00	00	00	00	00	00	00	00	00	00	00	00
<i>Ixodessp. (adult)</i>				00	00	20	00	00	46.52	00	00	45	00	00	2.25
<i>Ixodid larvae</i>				00	00	14	00	00	32.56	00	00	37	00	00	2.65

N.B.:Brah. =Brahmanpara, Buri. =Burichong and Debi. =Debidwar.

Table 5. Prevalence and intensity of ectoparasites of goats at Brahmanpara, Burichong and Debidwar upazila in Comilla district

Name of ectoparasites	Total no. of goats infested			No. goats infested by individual species			Prevalence (%)			No. of ectoparasites collected			Intensity		
	Brah.	Buri.	Debi.	Brah.	Buri.	Debi.	Brah.	Buri.	Debi.	Brah.	Buri.	Debi.	Brah.	Buri.	Debi.
<i>Haematopinusquadripertusus</i>				00	00	00	00	00	00	00	00	00	00	00	00
<i>HaematopinusEURYSTERNUS</i>				00	00	00	00	00	00	00	00	00	00	00	00
<i>Linognathusrituli</i>				13	22	19	19.40	36.07	67.86	70	109	76	5.39	4.96	04
<i>DamaliniaBOVIS</i>				67	34	17	100	55.74	60.72	188	176	61	2.81	5.18	3.59
<i>Stomoxyscalcitrans</i>				00	00	00	00	00	00	00	00	00	00	00	00
<i>Muscadomestica</i>				00	00	00	00	00	00	00	00	00	00	00	00
<i>Tabanusstriatus</i>				00	00	00	00	00	00	00	00	00	00	00	00
<i>Diachlorus sp.</i>				00	00	00	00	00	00	00	00	00	00	00	00
<i>Armigeressubalbatus</i>				00	00	00	00	00	00	00	00	00	00	00	00
<i>Ctenocephalidesfelis</i>	67	61	28	53	58	28	79.11	95.09	100	132	133	40	2.50	2.29	1.43
<i>Boophilusmicroplis</i>				00	07	00	00	11.48	00	00	15	00	00	2.15	00
<i>Haemaphysalisbispinosa</i>				07	00	00	10.45	00	00	19	00	00	2.72	00	00
<i>Haemaphysaliskinneari</i>				11	23	15	16.41	37.71	53.58	26	34	34	2.37	1.48	2.27
<i>Hyalommaanatolicum</i>				00	00	00	00	00	00	00	00	00	00	00	00
<i>Rhipicephalussanguineus</i>				00	00	00	00	00	00	00	00	00	00	00	00
<i>Dermacentorsp.</i>				00	00	13	00	00	46.43	00	00	21	00	00	1.62
<i>Rhipicephalusannulatus</i>				00	00	00	00	00	00	00	00	00	00	00	00
<i>Ixodessp. (adult)</i>				00	00	00	00	00	00	00	00	00	00	00	00
<i>Ixodid larvae</i>				00	00	13	13.43	00	46.43	23	00	47	2.56	00	3.62

N.B.:Brah. =Brahmanpara, Buri. =Burichong and Debi. =Debidwar.

period of year in tribal residence indoor-resting collection of *Armigeres subalbatus* was only 18, which was 1.65% of the total catch and in non-tribal residence the figure was 489 and 14.82% respectively. Only one flea species named *Ctenocephalides felis* was found in this survey and collected from goats in all upazilas (Brah.79.11%, Buri. 95.09% and Debi. 100%). Similar observations were reported by Mulugeta *et al.* (2010). These authors found that the abundance of *Ctenocephalides felis* infestations in goats were 11.1% in Ethiopia. Ferdousi *et al.* (2004) reported this species from goats in Savar region of Bangladesh. Tesfaye *et al.* (2012) recorded that this species was the most frequently observed flea species in goats of Bahir Dar area, Ethiopia. Kisiluka *et al.* (1995) recorded *Ctenocephalides felis* was the only flea species in north Botswana, 66% herds and 63.1% goats were infested with this species.

In terms of tick's species, *Boophilus microplus* was collected from cattle in all upazila (Brah. 47.94%, Buri. 14.86% and Debi. 60.47%). Cattle in Debidwar, *Boophilus microplus* showed highest prevalence, 60.47%. But in goats, these ticks were only collected from Burichong and prevalence was 11.48%. Similar findings were also reported by Rony *et al.* (2010). They reported that the prevalence of *Boophilus microplus* (45.45%) was higher than other tick species in goats in Gazipur district, Bangladesh. Stuti *et al.* (2008) observed *Boophilus microplus* was the most common and predominant tick species followed by others and the prevalence was 96.44%. *Haemaphysalis bispinosa* was found in cattle in Brahmanpara and Burichong upazila but not found in Debidwar, prevalence was 23.29% and 32.68% respectively. Only goats in Brahmanpara affected by this tick species and prevalence was 10.45%. Roy *et al.* (2000) revealed that the prevalence of *Haemaphysalis bispinosa* was 7.6% and collected from cattle at Modhupur forest area in Tangail. Similar observation was also reported by Kabir (2009). He reported that the prevalence of this species was 12.63% and only found in cattle at Chittagong district. *Haemaphysalis kinneari* was the most common tick species in every upazila and collected from both cattle (Brah. 26.03%, Buri. 12.88% and Debi. 53.49%) and goats (Brah. 16.41%, Buri. 37.71% and Debi. 53.58%). This ticks species showed highest prevalence in Debidwar upazila both in cattle, 53.49% and goats 53.58%. *Hyalomma anatolicum* was found in cattle in Brahmanpara and Debidwar, the prevalence was 4.11% and 27.91% respectively but in terms of goats it was not found in any upazila. Mannan *et al.* (2007) recorded the most common and prevalent ticks were *Hyalomma* sp. followed by others in cattle in Peshawar, Pakistan. *Rhipicephalus sanguineus* was only found in cattle in Brahmanpara, prevalence was 4.11% and *Dermacentor* sp. was found in goats in Debidwar, the prevalence was 46.43%. *Ixodes* sp. and Ixodid larvae was found in cattle in Debidwar, prevalence was 46.52% and 32.56% respectively. In goats Ixodid larvae were found in Brahmanpara and Debidwar, prevalence was 13.43% and 46.43% respectively, but *Ixodes* Sp. was not found in goats of any upazila.

CONCLUSION

This study revealed that veterinary animals (cattle and goats) were found to be infested with several species of lice, flies, flea and ticks but no mites were detected. The study quantifies the level of ectoparasitic infestation in cattle and goats which demands immediate control program and more intensive epidemiological study for detail identification of the constraints of animal health and production. The chances of transmission of arthropod-borne diseases to farmers and animal handlers are high. Raising awareness at the grassroots level

need to be mobilized to implement mass treatment programs for urgent action against ectoparasite. The veterinary personnel at the district level and the veterinary technicians need to create awareness and repeat this regularly to the owners. Therefore, more studies are warranted to estimate the economic losses that are resulting by ectoparasites among the veterinary industry in Bangladesh. Additionally, these studies should be developed the control measures techniques for the veterinary animals to improve the overall health status.

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