

PREVALENCE OF VETERINARY ECTOPARASITES IN BARURA, CHANDINA AND LAKSAM UPAZILAS OF CUMILLA DISTRICT, BANGLADESH

I. MANNAN*, T. AKTER & S. AHMAD

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

ABSTRACT

Studies on the prevalence of veterinary ectoparasitic insects and arachnids of cattle and goats in three upazila of Cumilla district was conducted for one year during December 2013 to November 2014. Three upazila of Cumilla district were Barura, Chandina and Laksam selected for the study. Total 742 animals (cattle 463 and goats 279) were examined; among them 564 animals (353 cattle and 211 goats) were found infested by several species of ectoparasites (e.g., lice, flies, fleas, ticks and so on). Veterinary animals (cattle and goats) in Barura upazila showed the highest prevalence of ectoparasitic infestation (81.43%) and in Chandina upazila showed the lowest prevalence (56.42%). The intensity of ectoparasites infestation was the highest in Chandina (9.08) and the lowest was in Laksam upazila (7.78). Cattle in Barura upazila showed the highest prevalence (80.86%) and intensity (12.11) and in Chandina upazila showed the lowest prevalence (57.96%) and Laksam showed the lowest intensity (9.08). Goats in Barura upazila showed the highest prevalence (82.10%) and the lowest intensity (5.56) and in Chandina upazila showed the lowest prevalence (51.73%) and the highest intensity (5.56). The present study quantifies the level of ectoparasitic infestation in cattle and goats which demands immediate research on intensive epidemiological study, detail identification and management to improve and maintain animal health and production. In addition, studies are needed to estimate the economic losses caused by these ectoparasites.

Keywords: Veterinary animal, Ectoparasites, Prevalence, Intensity, Cattle, Goat.

INTRODUCTION

Skin diseases of veterinary animals e.g., cattle, goats, sheep, camel, buffalo are caused by ectoparasites like lice, ticks, mites, fleas, flies and so on. They are major

*Corresponding author : lipi_ju05@juniv.edu

skin disease causing agent of veterinary animals, responsible for serious economic loss to small holder farmer, tanning industries, and the country as a whole (Morad 2005). The losses due to these 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, reduces body weight, drop wool and reduce milk production, decrease dung output for fuel and fertilizer, and hamper efficiency in food conversion. The second category includes the reduction of productive life span of animals, the disturbs of the genetic selection effort and suppress the immunity and increase the susceptibility to diseases (Nari & Hansen 1999).

Ectoparasites are important because of their voracious blood feeding activity and acting as vectors of various diseases in both man and livestock (Cumming 1998 & Hendrix 1998). Parasites are dependent on their host for survival- through healthy living, growing and multiplying, as ectoparasite cannot live independently. Although an ectoparasite rarely kills the host, in some cases it can happen. The ectoparasites get benefits at the expense of the host, uses the host to gain strength and the host loses weight as a result. Parasites are usually such smaller and reproduce at a faster rate than their host (Wrich 1970)

The productivity of veterinary animals is hampered by several factors; the main factor is ectoparasites (Jabber & Green 1983). The economically important ectoparasites are lice, ticks, mites, fleas, flies, ked and so on. They include about 70% of all the known species of animals of all kinds (Soulsby 1982). Although with the majority of them, are not important to veterinarians, but some species are of great importance worldwide. Ectoparasites act as direct pests as well as vectors of many microbial and parasitic diseases (Soulsby 1982). Their direct and indirect effect lowers the productivity of cattle. Ectoparasitic infestation on majority of animal is not frequent but their direct and indirect effects in terms of reduced milk, meat, hide productions and loss of stamina of working animals are considerably greater (Soulsby 1982). Bangladesh earns 2.9% foreign currency by exporting leather and leather goods (Department of livestock services 2008). But unfortunately the quality of hides cannot be ensured because of various skin disease caused by the ectoparasitic infestations by lice, ticks, mites, fleas, flies, ked and so on (Huq and Mollah 1972, Rahman & Mondal 1985, Nooruddin & Dey 1989, Nooruddin & Mondal 1996). So the present study was undertaken to determine the ectoparasitic fauna, its prevalence and intensity on veterinary animal, cattle and goats in particular.

METHODOLOGY

This study was conducted on cattle and goats of Chandina, Barura and Laksam upazilas in Cumilla district, Bangladesh. This research work was carried out during December 2013 to November 2014. Usually collection was accomplished at 7am. to 4pm. Random sampling was taken for this study. Three villages from each upazila were selected randomly having 10-15 household from each village selected. From each household 1-5 animals were examined to check the infestation of ectoparasites. Total 742 animals (463 cattle & 279 goats) were selected randomly from different locations at each village considering for the convenience of the study and availability of the animals.

Collection of ectoparasites: The selected animals were thoroughly investigated by close observation, parting the hairs against their natural direction for the detection of ectoparasites. Each animal was observed for 10-15 minutes. Ectoparasites were collected from the different parts of the body of the individual animals. Lice were collected by small camel hair brush or comb. In order to collect the ticks from the host body, the point of attachment was smeared with 70% ethanol to loosen attachment of parasites with the host body surface. Then they were collected by slow and gentle pull with a fine forcep. Required ectoparasites were collected by hand picking. A sheet of white paper was placed just underneath the host's body hair to avoid the chances of losing the specimen during collection. 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. After locating the parasite, hairs were pressed two sides using tip of finger and smeared with a drop of 70% ethanol. Then they were collected by hand picking.

Cleaning and preservation of ectoparasites: In order to clean the collected specimen, they were kept in a petri dish containing 70% ethanol. The Petri dish was placed under the dissection microscope and the specimens were cleaned by removing the hairs and debris attached to their bodies with the help of specimen brush and dissection needle or forcep. Cleaned specimens were preserved in 70% ethanol in well cleaned stopper glass vials and were labeled properly. Some specimens were preserved in tissue paper to maintain their natural color for photography. 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 maintain their natural color and later they were preserved in glass vials containing 70% ethanol.

Identification of ectoparasites: Ectoparasites were identified on the basis of their external morphological characters (body shape, size, color, appendages present or absent etc.). Identification of lice, ticks, mites, fleas, flies were done with the help of dissecting (4x) and compound (10x, 40x) microscope. In the present study identification of ectoparasites of most genera and species level were identified using descriptions and figures reported by Imms (1948), Wall & Shearer (1997) & Soulsby (1982). For easy identification of the specimen keys were prepared with the help of Encyclopedia of Flora and Fauna of Bangladesh (2010).

RESULTS AND DISCUSSION

In this study a total of 742 animals were examined of which 463 were cattle and 279 were goats. Total 564 animals were infested of which 353 were cattle and 211 were goats. A total of 4828 ectoparasites were collected from the host body of which 3439 from cattle and 1389 from goats. During this investigation a total 18 types of ectoparasites were collected e.g., *Haematopinus quadripertusus*, *Haematopinus eurysternus*, *Linognathus vituli*, *Damalinea bovis*, *Stomoxys calcitrans*, *Musca domestica*, *Tabanus striatus*, *Diachlorus* sp., *Armigeres subalbatus*, *Ctenocephalides felis*, *Boophilus microplus*, *Haemaphysalis bispinosa*, *Haemaphysalis kinneari*, *Hyalomma anatolicum*, *Rhipicephalus sanguineus*, *Dermacentor* sp. *Rhipicephalus annulatus*, *Ixodes* sp. (adult and larvae) but no mites were found in this study period.

In Barura upazila 350 animals were examined of which 285 were infested. A total of 2579 ectoparasites were collected where the prevalence was 81.43% and intensity was 9.05. In Chandina, a total of 599 ectoparasites were collected from 66 infested hosts where 117 animals were examined. The prevalence and intensity of ectoparasites of Chandina upazila was 56.42% and 9.08, respectively. In Laksam, 275 animals were examined and a total 1650 ectoparasites were collected from 213 infested hosts. Prevalence and intensity of ectoparasites was 77.46% and 7.78, respectively (Table 1). In the present study, veterinary animals in Barura showed the highest prevalence of ectoparasitic infestation (81.43%) and Chandina showed the lowest prevalence (56.42%). Among the veterinary animals in Chandina upazila showed the highest intensity (9.08). Veterinary animals in Laksam upazila showed the lowest intensity (7.78).

In Barura, a total of 1840 ectoparasites were collected from 152 infested cattle where 188 cattle were examined. The prevalence and intensity were 80.86% and 12.11, respectively. In Chandina upazila, 88 cattle were examined of which 51

Table 1. Prevalence and intensity of ectoparasites of veterinary animals (cattle and goats) at Barura, Chandina and Laksam upazilas in Cumilla district

Name of Upazilas	No. of hosts (cattle and goats) examined	No. of hosts (cattle and goats) infested	Total no. of ectoparasites collected	Prevalence (%)	Intensity
Barura	350	285	2579	81.43	9.05
Chandina	117	66	599	56.42	9.08
Laksam	275	213	1650	77.46	7.78
Total	742	564	4828	-	-

cattle were infested. A total of 463 ectoparasites were collected and prevalence and intensity were 57.96% and 9.08, respectively. Total 187 cattle were examined in Laksam of which 150 were infested. A total of 1136 ectoparasites were collected; and the prevalence and intensity were 80.22% and 7.58, respectively (Table 2). Cattle in Barura upazila showed the highest prevalence of ectoparasitic infestation (80.86%). Cattle in Chandina upazila showed the lowest prevalence (57.96%). Cattle in Barura showed the highest intensity (12.11). Cattle in Laksam upazila showed the lowest intensity (7.58).

In Barura, a total of 739 ectoparasites were collected from 133 infested goats where 162 goats were examined. The prevalence and intensity of ectoparasites were 82.10% and 5.56, respectively. In Chandina upazila, 29 goats were examined and only 15 goats were found infested. Total 136 ectoparasites were collected and the prevalence and intensity were 51.73% and 9.07, respectively. In Laksam, total of 88 goats were examined where 63 were infested. A total of 514 ectoparasites were collected from infested host and the prevalence and intensity were 71.60% and 8.16, respectively (Table 3). Goats in Barura upazila showed the highest prevalence of

Table 2. Prevalence and intensity of ectoparasites of cattle at Barura, Chandina and Laksam upazilas in Cumilla district

Name of Upazilas	No. of hosts (cattle) examined	No. of hosts (cattle) infested	Total no. of ectoparasites collected	Prevalence (%)	Intensity
Barura	188	152	1840	80.86	12.11
Chandina	88	51	463	57.96	9.08
Laksam	187	150	1136	80.22	7.58
Total	463	353	3439	-	-

ectoparasitic infestation (82.10%). Goats in Chandina upazila showed the lowest prevalence (51.73%). Goats in Chandina upazila showed the highest intensity (9.07). Goats in Barura upazila showed the lowest intensity (5.56).

During this study, at Barura upazila, a total number of 1840 ectoparasites were collected from 152 infested cattle. *Musca domestica* showed the highest prevalence of infestation. Total 416 individuals of *Musca domestica* were collected from 130 infested hosts. Its prevalence and intensity were 85.52% and 3.2, respectively. *Dermacentor* sp. showed the lowest prevalence of infestation and 10 parasites were collected from 05 infested hosts. Its prevalence and intensity were 3.29% and 02, respectively (Table 4). *Armigeres subalbatus* showed the highest intensity of infestation. Total 83 parasites were collected from 11 infested cattle. Its prevalence and intensity was 7.24% and 7.55, respectively. *Tabanus striatus* showed the lowest intensity of infestation and 21 parasites were collected from 18 infested hosts. The prevalence and intensity were 11.84% and 1.17, respectively (Table 4).

Total numbers of 739 ectoparasites were collected from 133 infested goats. *Ctenocephalides felis* showed the highest prevalence of infestation. Total 256 parasites were collected from 106 infested hosts. Its prevalence was 79.70% and intensity was 2.42. *Haemaphysalis bispinosa* showed the lowest prevalence. Total 17 parasites were collected from 03 infested hosts. Its prevalence and intensity was 2.26% and 5.67 respectively. *Haemaphysalis bispinosa* showed the highest intensity (5.67) of infestation. Total 17 parasites were collected from 03 infested hosts. Its prevalence and intensity were 2.26% and 5.67, respectively. *Boophilus microplus* showed the lowest intensity of infestation. Total 33 parasites were collected from 18 infested hosts and the intensity were 1.84 (Table 5).

Table 3. Prevalence and intensity of ectoparasites of goats at Barura, Chandina and Laksam upazilas in Cumilla district

Name of Upazilas	No. of hosts (goats) examined	No. of hosts (goats) infested	Total no. of ectoparasites collected	Prevalence (%)	Intensity
Barura	162	133	739	82.10	5.56
Chandina	29	15	136	51.73	9.07
Laksam	88	63	514	71.60	8.16
Total	279	211	1389	-	-

Table 4. Prevalence and intensity of ectoparasites of cattle at Barura, Chandina and Laksam.

Name of ectoparasites	Total no. of cattle infested			No. of cattle infested by individual species			Prevalence (%)			No. of ectoparasites collected			Intensity		
	Boru.	Chan.	Lak.	Boru.	Chan.	Lak.	Boru.	Chan.	Lak.	Boru.	Chan.	Lak.	Boru.	Chan.	Lak.
<i>Haematopinus quadripertus</i>	103	12	74	67.77	23.53	49.34	256	48	157	2.49	04	2.13			
<i>Haematopinus eurytenuis</i>	00	05	11	00	9.81	7.34	00	17	36	00	3.4	3.28			
<i>Linognathus vituli</i>	55	00	21	36.19	00	14	129	00	97	2.34	00	4.62			
<i>Damalintia bovis</i>	64	17	07	42.11	33.34	4.67	201	63	54	3.15	3.71	7.72			
<i>Stomoxys calcitrans</i>	00	03	06	00	5.89	04	00	07	17	00	2.34	2.84			
<i>Musca domestica</i>	130	42	98	85.52	82.36	65.34	416	179	213	3.2	4.27	2.18			
<i>Tabanus striatus</i>	18	01	17	11.84	1.97	11.34	21	02	21	1.17	02	1.24			
<i>Diachlorus sp</i>	00	01	00	00	1.97	00	00	01	00	00	01	00			
<i>Armigeres subalbatus</i>	11	03	13	7.24	5.89	8.67	83	17	47	7.55	5.67	3.62			
<i>Ctenocephalides felis</i>	00	00	00	00	00	00	00	00	00	00	00	00			
<i>Boophilus microplus</i>	152	51	150	73.03	23.53	38	347	49	88	3.13	4.09	1.55			
<i>Haemaphysalis bispinosa</i>	74	07	25	68.43	13.73	16.67	114	39	67	1.55	5.58	2.69			
<i>Haemaphysalis kinneari</i>	17	06	25	48.69	11.77	16.67	32	33	74	1.89	5.5	2.97			
<i>Hyalomma anatolicum</i>	29	00	18	19.08	00	12	54	00	57	1.87	00	3.17			
<i>Rhipicephalus sanguineus</i>	13	02	09	8.56	3.93	06	31	05	23	2.39	2.5	2.56			
<i>Dermacentor sp.</i>	05	00	16	3.29	00	10.67	10	00	45	02	00	2.82			
<i>Rhipicephalus annulatus</i>	12	00	07	7.90	00	4.67	21	00	34	1.75	00	4.86			
<i>Ixodes sp. (adult)</i>	56	01	16	36.85	1.97	10.67	85	03	57	1.52	03	3.57			
<i>Ixodid larvae</i>	13	00	11	8.56	00	7.34	40	00	49	3.08	00	4.46			

Baru.=Barura, Chan.=Chandina and Lak.=Laksam.

In Chandina, a total number of 463 ectoparasites were collected from 51 infested cattle. *Musca domestica* showed the highest prevalence of infestation. Total 179 parasites were collected from 42 infested hosts. Its prevalence was 82.36%. *Tabanus striatus*, *Diachlorus* sp. and *Ixodes* sp. showed the lowest prevalence of infestation. No. of ectoparasites were collected 02, 01 and 03 from 01, 01 and 01 infested host, respectively. Their prevalence was 1.97%, 1.97% and 1.97%, respectively. *Armigeres subalbatus* showed the highest intensity of infestation. Total 17 parasites were collected from 03 infested hosts. Its prevalence and intensity were 5.89% and 5.67, respectively. *Diachlorus* sp. showed the lowest intensity of infestation. Only 01 parasite was collected from 01 infested host. The prevalence and intensity were 1.97% and 01, respectively (Table 4).

A total numbers of 136 ectoparasites were collected from 15 infested goats. *Damalinia bovis* showed the highest prevalence of infestation. Total 51 parasites were collected from 13 infested hosts and its prevalence was 86.67%. *Boophilus microplus* showed the lowest prevalence of infestation. Total 07 parasites were collected from 02 infested hosts and its prevalence was 13.34%. *Ixodes* sp. showed the highest intensity of infestation, total 19 parasites were collected from 03 infested hosts and its intensity was 6.34. *Ctenocephalides felis* showed the lowest intensity of infestation, total 20 parasites were collected from 08 infested hosts and the intensity was 2.5 (Table 5).

In Laksam upazila, a total of 1136 arthropod ectoparasites were collected from 150 infested cattle. *Musca domestica* showed the highest prevalence of infestation, a total of 213 individuals were collected from 98 infested hosts and its prevalence was 65.34%. *Stomoxys calcitrans* showed the lowest prevalence of infestation, total 17 parasites were collected from 06 infested hosts and its prevalence was 4%. *Damalinia bovis* showed the highest intensity of infestation, total 54 parasites were collected from 07 infested hosts and its intensity was 7.72. *Tabanus striatus* showed the lowest intensity of infestation, total 21 parasites were collected from 17 infested hosts and the intensity was 1.24 (Table 4).

A total number of 514 ectoparasites were collected from 63 infested goats. *Linognathus vituli* showed the highest prevalence of infestation, total 190 parasites were collected from 42 infested hosts and its prevalence was 66.67%. *Rhipicephalus sanguineus* showed the lowest prevalence of infestation, total 17 parasites were collected from 03 infested hosts and its prevalence was 4.77%. *Rhipicephalus sanguineus* showed the highest intensity of infestation, total 17 parasites were

Table 5. Prevalence and intensity of ectoparasites of goats at Barura, Chandina and Laksam

Name of ectoparasites	Total no.of goats infested			No. of goats infested by individual species			Prevalence (%)			No. of ectoparasites collected			Intensity		
	Boru.	Chan.	Lak.	Baru.	Chan.	Lak.	Baru.	Chan.	Lak.	Baru.	Chan.	Lak.	Baru.	Chan.	Lak.
<i>Haematopinus quadripertus</i>	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
<i>Haematopinus eurytenuis</i>	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
<i>Linognathus vituli</i>	34	03	42	25.57	20	66.67	174	18	190	5.12	06	4.52	3.08		
<i>Damalinia bovis</i>	96	13	27	72.19	86.67	42.86	215	51	83	2.24	3.93				
<i>Stomoxys calcitrans</i>	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
<i>Musca domestica</i>	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
<i>Tabanus striatus</i>	00	00	00	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	00	00	00
<i>Armigeres subalbatus</i>	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
<i>Ctenocephalides felis</i>	133	15	63	106	08	41	79.70	53.34	65.08	256	20	56	2.42	2.5	1.37
<i>Boophilus microphilus</i>	18	02	18	13.54	13.34	28.58	33	07	57	1.84	3.5	3.17			
<i>Haemaphysalis bispinosa</i>	03	00	37	2.26	00	58.74	17	00	74	5.67	00	02			
<i>Haemaphysalis kinneari</i>	19	00	13	14.29	00	20.46	44	00	24	2.31	00	1.85			
<i>Hyalomma anatolicum</i>	00	05	00	00	00	33.34	00	00	21	00	00	4.2			
<i>Rhipicephalus sanguineus</i>	00	00	03	00	00	4.77	00	00	17	00	00	5.67			
<i>Dermacentor sp.</i>	00	00	07	00	00	11.2	00	00	13	00	00	1.86			
<i>Rhipicephalus annulatus</i>	00	00	00	00	00	00	00	00	00	00	00	00			
<i>Ixodes sp.</i>	00	03	00	00	00	20	00	00	19	00	00	6.34			

Baru.=Barura, Chan.=Chandina and Lak.=Laksam.

collected from 03 infested hosts and its intensity was 5.67. *Ctenocephalides felis* showed the lowest intensity of infestation, total 56 parasites were collected from 41 infested hosts and the intensity 1.37 (Table 5).

In present study result revealed that cattle and goats in this study area were found to attack by several species of ectoparasites like lice, flies, flea and ticks but no mites were found. In Cumilla district there was no previous work on ectoparasitic survey so there was no scope to compare the result of the present survey. But few studies were found in one or two upazila of some districts of Bangladesh. Most of the researchers worked on one or two categories of ectoparasites (Ahmad 1987, Huq *et al.* 1972, Islam *et al.* 2006, Islam *et al.* 2009, Kamal *et al.* 1996, Mondal *et al.* 1995, Mollah *et al.* 1970, Nooruddin *et al.* 1989, Rony *et al.* 2010, Roy *et al.* 2000). Present research work revealed that the prevalence of ectoparasitic infestation was higher in Barura upazila than Chandina and Laksam. The prevalence was 81.43% in Barura. If categorized the result, the highest prevalence of infestation on cattle (80.86%) and goats (82.10%) was also observed in Barura. Barura is a hilly area and situated near the Lalmai hill. Owing to hilly area natural foods are available and most of the people are rearing cattle and goats. During this study period, there was less availability of natural water for the cattle and goats are not getting regular bath, as a result parasitic infections is rapidly transmitted. But the animals those were commercially reared, given regular bath and provided treatment against ectoparasitic infection. Non commercial rearing cattle and goats do not get proper health care.

The present study revealed that the lice, *Haematopinus quadripertusus* was found on in cattle in all upazila (Barura 67.77%, Chandina 23.53% and Laksam 49.34%) but not found on goats in any upazila. Here prevalence of *Haematopinus quadripertusus* was the highest in cattle in Barura upazila (67.77%). The lice *Haematopinus eurysternus* was found in cattle in Chandina (9.81%) and Laksam (7.34%) but not found in Barura. Prevalence of *Haematopinus eurysternus* was the highest in Chandina (9.81%). This lice species was totally not found in goats in any upazila. Kakar & Sulemankhel (2009) recorded *Haematopinus quadripertusus* (23.5%) and *Haematopinus eurysternus* (17.7%) from buffaloes in various farm houses in Quetta city, Pakistan. Kumsa & Bekele (2008) found the prevalence of *Haematopinus eurysternus* 1.8% on cattle in Edegagn district in Southern Ethiopia. *Linognathus vituli* is the common lice of both cattle (Barura 36.19% and Laksam

14%) and goats (Barura 25.57%, Chandina 20% and Laksam 66.67%) in all upazila but not found on cattle in Chandina. *Linognathus vituli* showed the highest prevalence on cattle in Barura (36.16%) and goats in Laksam (66.67%). Rony *et al.* (2010) reported the most prevalent lice species was *Linognathus vituli* (25.45%) on goats at Gazipur district, Bangladesh. George *et al.* (1992) recorded 66.7% *Linognathus vituli* on cattle of northern Nigeria. During this study period *Damalinia bovis* was a common lice species in all upazila on both cattle (Barura 42.11%, Chandina 33.34% and Laksam 4.67%) and goats (Barura 72.19%, Chandina 86.67% and Laksam 42.86%). In Barura, the prevalence was highest on cattle (42.11%) and on goats (86.67%) in Chandina.

In the present study, flies were only collected 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 Barura showed the highest prevalence (85.52%). The blood sucking flies *Stomoxys calcitrans* were not found in Barura upazila. This species showed the highest prevalence in Chandina (5.89%) and the lowest in Laksam (04%). *Tabanus striatus* showed the highest prevalence in Barura upazila (11.84%) and the lowest in Chandina (1.97%). In Chandina, only one cattle was infested by *Tabanus striatus* and only 02 specimens were collected. 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. During this study, mosquito species *Armigeres subalbatus* were only collected from the cattle in all upazila (Barura 7.24%, Chandina 5.89% & Laksam 8.67%). Here prevalence of *Armigeres* was highest in Laksam (8.67%) and lowest in Chandina (5.89%). Karim *et al.* (2013) reported that *Armigeres subalbatus* (1%) showed the lowest abundance followed by other mosquito species in Dhaka city. Rudra *et al.* (2013) reported that in tribal area indoor-resting collection of *Armigeres subalbatus* in one year was only 18, 1.65% of the total catch and in non-tribal area the figure was 489, and 14.82% of the total catch in West Bengal, India. Only one flea species named *Ctenocephalides felis* was found in this survey and collected from goats in all upazilas (Barura 79.70%, Chandina 53.34% and Laksam 65.08%). Ferdousi *et al.* (2004) reported this species from goats in Savar region of Bangladesh.

The tick's species, *Boophilus microplus* was the most abundant in every upazila and collected from both cattle (Barura 73.03%, Chandina 23.53%, and Laksam

38%) and goats (Barura 13.54%, Chandina 13.34% and Laksam 28.58%). Cattle in Barura, *Boophilus microplus* showed the highest prevalence (73.03%) and goats in Laksam upazila showed the highest prevalence (28.58%). 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 on goats in Gazipur district, Bangladesh. Stuti *et al.* (2008) observed *Boophilus microplus* as the most common and predominant tick species followed by others and the prevalence was 96.44%. *Haemaphysalis bispinosa* was found on both cattle (Barura 68.43%, Chandina 13.73% and Laksam 16.67%) and goats (Barura 2.26%, Laksam 58.74%) in every upazila except goats in Chandina. 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 on cattle in Chattogram district. *Haemaphysalis kinneari* was found both on cattle (Barura 48.69%, Chandina 11.77%, and Laksam 16.67%) and goats (Barura 14.29%, Laksam 20.64%) in every upazila except goats of Chandina. This ticks species showed highest prevalence on cattle (48.69%) in Barura and on goats (20.64%) in Laksam. *Hyalomma anatolicum* was found on cattle in Barura and Laksam upazila, the prevalence was 19.08% and 12%, respectively. In Chandina upazila, its prevalence was 33.34% only on goats. *Rhipicephalus sanguineus* was found on cattle of each upazila (Barura 8.56%, Chandina 3.93% and Laksam 6%) but on goats only found in Laksam (4.77%). *Dermacentor* sp. was found on cattle in Barura and Laksam and the prevalence was 3.29% and 10.67%, respectively but on goats only found in Laksam upazila and prevalence was 11.2%. *Rhipicephalus annulatus* was not found on goats in any upazila. On cattle it was only found in Barura and Laksam and the prevalence was 7.90% and 4.67%, respectively. *Ixodes* sp. was found on cattle in all upazila (Barura 36.85%, Chandina 1.97% and Laksam 10.67%) but only found on goats of Chandina and the prevalence was 20%. *Ixodid* larvae were found on cattle of Barura and Laksam upazila and the prevalence was 8.56% and 7.34%, respectively. *Ixodid* larvae were not found on goats of any upazila.

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REFERENCES

- AHMAD, Z.U., AHMAD, A.T.A., KABIR., S.M.H., AHMAD, M., RAHMAN, A.K.A., BEGUM, Z.N.T., HASSAN, M.A. & KHONDKER, M. (Eds.). 2010. Encyclopedia of Flora and Fauna of Bangladesh. Vol. **18** (part-I). Arthropoda: Arachnida. *J. Asiat. Soc. Bangladesh*, Dhaka. Pp. 28-43.
- AHMAD, Z.U., KABIR, S.M.H., AHMAD, M., AHMAD, A.T.A., RAHMAN, A. K. A., HAQUE, E.U., BEGUM, Z.N.T., HASSAN, M.A. & KHONDKER (Eds.). 2010. Encyclopedia of Flora and Fauna of Bangladesh. Vol. **19**. Arthropoda: Insecta I (Apterygota and Pterygota). *J. Asiat. Soc. Bangladesh*, Dhaka. Pp. 251-254.
- AHMAD, Z.U., AHMAD, M., KABIR, S.M.H., AHMAD, A.T.A., RAHMAN, A.K.A., BEGUM, Z.N.T., HASSAN, M.A. & KHONDKER (Eds.) .2010. Encyclopedia of Flora and Fauna of Bangladesh. Vol. **21**. Arthropoda: Insecta III (Pterygota). *J. Asiat. Soc. Bangladesh*, Dhaka. Pp. 283-284, 345-346,387-389, 408-409.
- AHMAD, T.U.,1987. Check list of the mosquitoes in Bangladesh. *Mosq. Syst.* **19** (3): 187-200. CUMMING, G.S. 1998. Host preference in African ticks (Acari: Ixodidae) a quantitative data set. *Bull. Entomol. Res.* **88**, 379-406.
- DEPARTMENT OF LIVESTOCK SERVICES (DLS), 2008. Ministry of Fishery and Livestock, Government of Peoples Republic of Bangladesh, Dhaka, Bangladesh.
- FERDOUSI, S., ISLAM, M. R., MONDAL, M. M. H. & AHMAD, S. 2004. Seasonal prevalence of some medical and veterinary arthropod in Savar region of Bangladesh, *Bangladesh J. Zool.* **32**,19-25.
- GEORGE, J.B., OTOBO, S., OGUNLEYE, J. & ADEDIMINIYI, B. 1992. Louse and mite infestation in domestic animals in northern Nigeria. *J. Trop. Agric. Biol.* **7** (4), 694-697.
- HENDRIX, C.M. 1998. Diagnostic Veterinary Medicine, 2nd Ed, Mosby Publication. Ltd., pp200-201, 221-226, 275-276.
- HUQ, M.M. & MOLLAH, M.A. 1972. A survey of the prevalence of ticks on sheep and goats of Dhaka and Mymensing, East Pakistan. *Pak. J. Vet. Sci.* **6**, 21-25.
- IMMS, A.D. 1942. A general text book of Entomology, 5th Ed. Methuen and Co. Ltd., London.

- ISLAM, M.S., RAHMAN, S.A., SARKER, P. & ANISUZZAMAN, M.M.H. 2009. Prevalence and population density of ectoparasitic infestation in cattle in Sirajgonj district, Bangladesh. *Bangladesh Res. Pub. J.* **2**, 332-339.
- ISLAM, M.K., ALIM, M.A., TSUJI, N. & MONDAL, M.M.H. 2006. An investigation into the distribution, host-preference and population density of Ixodid ticks affecting domestic animals in Bangladesh. *Trop. Anim. Health Prod.* **38**, 485-490.
- JABBAR, M. & GREEN, D.A.G. 1983. The status and potential of Livestock within the content of Agricultural policy in Bangladesh. The University of Wales, Aberystwyth UK, p. 113.
- KARIM, M.R., ISLAM, M.M., FARID, S.M., RASHID, M.A., AKTER, T. & KHAN, H.R. 2013. Spatial Distribution and seasonal fluctuation of mosquitoes in Dhaka city. *IJFBS.* **1** (1), 42- 46.
- KABIR, M.H.B. 2009. **In:** RONY, S.A., MONDAL, M.M.H., ISLAM, M.A. & BEGUM, M. 2010. Prevalence of Ectoparasites in goat at Gazipur in Bangladesh. *Int. J. Bio. Res.* **2** (9), 19-24.
- KAMAL, A.H.M. UDDIN, K.H. ISLAM, M.M. & MONDAL, M.M.H. 1996. Prevalence of Economically important ticks in cattle and goat at Chattogram hilly areas of Bangladesh. *Asian-Aust. J. Anim. Sci.* **9**, 567-569.
- KAKAR, M.N. & SULEMANKHEL, J.K. 2008. Prevalence of endo (Trematodes) and ecto-parasites in cows and buffaloes of Quetta, Pakistan. *Pak. Vet. J.* **28** (1), 34-36.
- KUMSA, B. and BEKELE, M. 2008. Lice infestation on cattle in Endegagn district, southern Ethiopia: species composition, prevalence and seasonal pattern. *BAHPA.* **56** (3), 213-222.
- MONDAL, M.M.H., ISLAM, M.K., HAQ, S. & TAIMUR, M.J.F.A. 1999. Prevalence and temporal distribution of blood- sucking flies of cattle in Mymensing, Bangladesh. *The Bangladesh Veterinarian.* **16**, 53-55.
- MONDAL, M.M.H., ISLAM, M.K. & KIBRIA, A.K.M.G. 1995. Ecological studies of *Hyalomma anatolicum anatolicum* in cattle of Barind Area in Bangladesh. *Bangladesh Vet. J.* **29**, 63-66.
- MOLLAH, M.A. HUQ, M.M. & SHAIKH, H. 1970. A survey on the prevalence of lice of cattle and buffaloes of Dhaka and Mymensingh district, Bangladesh. *Bangladesh Vet. J.* **4** (1), 3-9.

- MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT (MoRAD), 2005. Mange, Lice and Sheep Ked control project in Amhara, Tigray and a far regions, Animal Health Department, Addis Ababa.
- NARI, A. & HANSEN, J. W. 1999. Resistance of ecto and endoparasites. Current and future solutions. 67th General Session International Committee. Office International de Epizooties (OIE) , Paris.
- NOORUDDIN, M. & MONDAL, M.M.H. 1996. Otocariasis in Bengal goats of Bangladesh, Small Ruminant Research. **19**, 87-90.
- NOORUDDIN, M & DEY, A.S. 1989. Further study on the prevalence of skin disease in domestic ruminants in Bangladesh. *The Bangladesh Veterinaria*. **7**, 75-81.
- RAHMAN, M.H. & MONDAL, M.M.H. 1985. Tick fauna of Bangladesh. *Indian J. Parasitol.* **9**, 145-149.
- ROY, A.K., RAHMAN, M.H., MAJUMDEA, S. & SARKER, A.S. 2000. Ecology of ticks and tick-borne blood protozoa in Madhupur Forest Area, Tangail, Bangladesh. *Veterinarian*. **17** (2), 90-94.
- RONY, S.A., MONDAL, M.M.H., ISLAM, M.A. & BEGUM, M. 2010. Prevalence of ectoparasites in goats at Gazipur in Bangladesh. *Int. J. Bio. Res.* **2**(9),19-24.
- RUDRA, S.K., PRAMANIK, M. & CHANADR, G. 2013. Studies on *Armigeres subalbatus* mosquitoes in tribal and non-tribal areas of Bankura district, West Bengal, India. *J. Mosq. Res.* **3** (3), 14-20.
- SOULSBY, E. J. L. 1982. *Helminths, Arthropod and Protozoa of Domesticated Animals*, 7th edition, Bailliere, Tindal and Cassell Ltd. Pp. 136-346,365-491 and 763-778.
- STUTI, V., YADAV, C.L., KUMAR, R.R. & RAJAT, G. 2008. Prevalence of Ixodid ticks on bovines in foothills of Uttarhhand State, India. *J. Anim. Sci.* **78**(1), 40-42.
- WALL, R. & SHEARER, D. 1997. *Veterinary Entomology*, 1st edition, Chapman and Hall. London, UK. P. 265 and 290.
- WRICH, M.J. 1970. Horn fly and Face fly control of Beef cattle. *J. Econ. Ent.* **63** (4), 1121- 1123.

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