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Arthropod ectoparasites of cattle and goats from three upazilas of Comilla district, Bangladesh

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Abstract

The prevalence of ectoparasitic arthropods of cattle and goats in Daudkandi, Homna and Titas upazilas of Comilla district were investigated. During this study (December 2013 to November 2014) 299 cattle and 196 goats were examined; and among them 180 and 117 were found to be infested respectively. Seventeen species of ectoparasites (both larvae and adult) were identified and they are *Haematopinus quadripertusus*, *Haematopinus eurysternus*, *Linognathus vituli*, *Damalinia bovis*, *Stomoxys calcitrans*, *Musca domistica*, *Tabanus striatus*, *Diachlorus* sp., *Armigeres subalbatus*, *Ctenocephalides felis*, *Boophilus microplus*, *Haemaphysalis bispinosa*, *Haemaphysalis kinneari*, *Hyalomma anatolicum*, *Rhipicephalus sanguineus*, *Dermacentor* sp. and *Ixodes* sp. The highest prevalence of ectoparasitic infestation (69.94%) were found in Titas and the lowest (53.34%) in Homna upazila. The intensity of ectoparasitic infestation was highest in Titas (12.20) and lowest in Homna (5.21) upazila. Cattle in Titas upazila showed highest prevalence (67.53%) and intensity (8.04) and Homna upazila showed lowest prevalence (48.63%) and intensity (5.55). Goats in Titas upazila showed highest prevalence (76.09%) and intensity (8.38), and Daudkandi upazila showed lowest prevalence (49.37%) and goats in Homna showed lowest intensity (4.80). This study quantifies the level of ectoparasitic infestation in cattle and goats which demands immediate control program and needs more intensive epidemiological study for detail identification of the constraints of animal health and production.

Key words: Cattle, Goats, Ectoparasites, Prevalence, Intensity, Comilla, Bangladesh.

INTRODUCTION

The arthropod contain over 80% of all known animal species and occupy almost every known habitat, as well as a plethora of small and little known groups. As a result of their activity, arthropod ectoparasites may have a variety of direct and indirect effects on their hosts (Wall & Shearer, 2001). 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). The occurrence of ectoparasites in cattle and goats is frequently reported in Bangladesh but is seldom quantified.

In Bangladesh the density of livestock and poultry population per unit of land is higher compared to other countries of the world (Department of Livestock Services, 2011-2012). The current statistics shows that the cattle population in Bangladesh is about 23.7 million (Department of Livestock Services, 2011-2012) and annual growth rate of livestock is 3.9

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% (Bangladesh Economic Survey, 2012). The large, small and marginal farmers including the destitute women put their whole hearted efforts in livestock rearing and production (Department of livestock services, 2011-2012).

The productivity of cattle is hampered by several factors amongst, which the ectoparasites is important one (Jabber & Green, 1983). The important ectoparasites of cattle and goats are lice, ticks, mites, fleas, flies, ked and so on. Ectoparasites act as direct pests as well as vectors of many microbial and parasitic diseases. Their direct and indirect affects lower the productivity of cattle. The direct and indirect effects of ectoparasitic infestation are reduced milk, meat, hide productions and loss of stamina of working animals (Soulsby, 1982). Bangladesh earns 2.9% foreign currency by exporting leather and leather goods (Department of livestock services, 2008). But unfortunately quality of hides cannot be ensured because of various skin disease due to the ectoparasitic infestations (Huq & Mollah, 1972; Rahman & Mondal, 1985; Nooruddin & Dey, 1989; Nooruddin & Mondal, 1996). This study was undertaken to investigate the prevalence of lice, ticks, fleas, flies, mites as veterinary ectoparasites in Daudkandi, Homna and Titas upazilas in Comilla district, Bangladesh.

MATERIALS AND METHODS

The present research was conducted in veterinary animals of Daudkandi, Homna and Titas upazilas in Comilla district, Bangladesh during the period from December 2013 to November 2014. Usually collection was accomplished 7a.m. to 4p.m. Random sampling was performed in the selected three villages from each upazila and 10-15 household from each of the village and 1-5 animals were examined from each household for ectoparasites. Total 297 infested animals (180 cattle and 117 goats) were selected randomly from different parts in each village for the convenience of the study and availability of the animals.

Collection of ectoparasites: The selected animals were thoroughly investigated by close inspection for 10-15 minutes, 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. 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. Then they were collected by slow and gentle pull with fine forceps or hand picking. A sheet of white paper placed just underneath the host's body hair to avoid the chances of losing the ectoparasites 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, and 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. Then they were collected by hand picking.

Cleaning and preservation of ectoparasites: In order to clean the collected specimen were keep in a petri dish contains 70% ethanol and placed under the dissection microscope for removing the hairs and debris attaching to their bodies. 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 with naphthalene and then finally 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 & Shearer (1997), Soulsby (1982), Ahmad, 2010 (a, b), Ahmad, 2010.

RESULTS AND DISCUSSION

A total 2013 ectoparasites were collected from the host body in which 1304 from cattle and 709 from goats. A total of 17 types ectoparasites were identified namely *Haematopinus quadripertusus, Haematopinus eurysternus, Linognathus vituli, Damalinia bovis, Stomoxys calcitrans, Musca domistica, Tabanus striatus, Diachlorus* sp., *Armigeres subalbatus, Ctenocephalides felis, Boophilus microplus, Haemaphysalis bispinosa, Haemaphysalis kinneari, Hyalomma anatolicum, Rhipicephalus sanguineus, Dermacentor* sp. and *Ixodes* sp. (both larvae and adult). In Daudkandi upazila 152 animals were examined in which 87 were infested. A total 585 ectoparasites were collected where the prevalence was 57.24% and intensity was 6.73 respectively. In Homna, a total 500 ectoparasites were collected from 96 infested hosts where 180 animals were examined. The prevalence and intensity of ectoparasites of Homna upazila was 53.34% and 5.21 respectively. In Titas, 163 animals were examined and a total 928 ectoparasites were collected from 114 infested hosts. Prevalence and intensity of ectoparasites was 69.94% and 8.15 respectively (Table 1). In present study, veterinary animals in Titas showed the highest prevalence of ectoparasitic infestation, 69.94% and Homna showed the lowest prevalence, 53.34%). Among the veterinary animals in Titas upazila showed highest intensity (8.15) and in Homna upazila showed lowest intensity (5.21).

Table 1. Prevalence and intensity of ectoparasites of veterinary animals (cattle and goats) at Daudkandi, Homna and Titas upazilas in Comilla district

Name of Upazilas	No. of hosts (cattle and goats) examined	No. of hosts (cattle and goats) infested	Total no. of ectoparasites collected	Prevalence (%) of host infested	Intensity (per host)
Daudkandi	152	87	585	57.24	6.73
Homna	180	96	500	53.34	5.21
Titas	163	114	928	69.94	8.15
Total	495	297	2013	–	–

In Daudkandi, a total 375 individuals of ectoparasites of cattle were collected from 48 infested hosts where 73 cattle were examined. The prevalence and intensity were 65.76% and 7.81 respectively. In Homna upazila, 109 cattle were examined where 53 infested and a total of 294 ectoparasites were collected, on which the prevalence and intensity were 48.63% and 5.55 respectively. A total of 117 cattle were examined in Titas and only 79 were found infested. A total 635 ectoparasites were collected on which the prevalence and intensity were 67.53% and 8.04 respectively (Table 2). Cattle in Titas upazila showed the highest prevalence of ectoparasitic infestation and it was 67.53%. Cattle in Homna upazila showed the lowest prevalence and it was 48.63%. Cattle in Titas showed the highest intensity and it was 13.66. Cattle in Homna upazila showed lowest intensity and it was 5.22 respectively.

Table 2. Prevalence and intensity of ectoparasites of cattle at Daudkandi, Homna and Titas Upazila in Comilla district

Name of upazila	No. of cattle examined	No. of cattle infested	No. of ectoparasites collected	Prevalence (%) of host infested	Intensity (per host)
Daudkandi	73	48	575	65.76	7.81
Homna	109	53	294	48.63	5.55
Titas	117	79	635	67.53	8.04
Total	299	180	1504	–	–

In Daudkandi, a total 210 ectoparasites of goats were collected from 39 infested hosts where 79 goats were examined. The prevalence and intensity of ectoparasites were 49.37% and 5.39 respectively. In Homna upazila, 71 goats were examined and only 43 goats were found infested. A total 206 ectoparasites were collected and prevalence and intensity were 60.57% and 4.80 respectively. In Titas, total 46 goats were examined and 35 were infested. 293 ectoparasites were collected from infested host and the prevalence and intensity were 76.09% and 8.38 respectively (Table 3). Goats in Titas upazila showed the highest prevalence of ectoparasitic infestation and it was 76.09%. Goats in Daudkandi upazila showed the lowest prevalence and it was 49.37%. Goats in Titas upazila showed the highest intensity and it was 8.38. Goats in Homna upazila showed the lowest intensity and it was 4.80.

Table 3. Prevalence and intensity of ectoparasites of goats at Daudkandi, Homna and Titas upazila in Comilla district

Name of upazila	No. of goats examined	No. of goats infested	No. of ectoparasites	Prevalence (%) of host infested	Intensity (per host)
Daudkandi	79	39	210	49.37	5.39
Homna	71	43	206	60.57	4.8
Titas	46	35	293	76.09	8.38
Total	196	117	709	_	_

During this study, at Daudkandi upazila, *Musca domistica* showed the highest prevalence of infestation in cattle. Total 100 individuals of *Musca domistica* were collected from 35 infested hosts. Its prevalence and intensity were 79.25% and 2.86 respectively. *Stomoxys calcitrans* showed the lowest prevalence and intensity. 01 parasite was collected from 01 infested host. Its prevalence and intensity were 2.09% and 1 respectively (Table 4). *Linognathus vituli* showed the highest intensity of infestation. Total 41 parasites were collected from 03 infested hosts. Its prevalence and intensity were 6.25% and 13.67 respectively.

A total numbers of 210 arthropod ectoparasites were collected from 39 infested goats of Daudkandi. *Ctenocephalides felis* showed the highest prevalence of infestation. Total 82 parasites were collected from 28 infested hosts. Its prevalence was 71.80% respectively. *Rhipicephalus sanguineus* showed the lowest prevalence and highest intensity of infestation. Total 07 parasites were collected from 02 infested hosts. Its prevalence and intensity were 5.13% and 3.50 respectively. *Boophilus microplus* showed the lowest intensity of infestation. Total 13 parasites were collected from 05 infested hosts and intensity were 2.60 (Table 5).

In Homna, a total number of 294 arthropod ectoparasites were collected from 53 infested cattle. *Musca domestica* showed the highest prevalence of infestation. Total 143 flies were collected from 42 infested hosts. Its prevalence was 79.25%. *Diachlorus* sp. showed the lowest prevalence of infestation. 01 parasite was collected from 01 infested host. Its prevalence was 1.87%. *Hyalomma anatolicum* showed the highest intensity of infestation. Total 05 parasites were collected from 01 infested host. Its prevalence and intensity were 1.89% and 5 respectively. *Haematopinus quadripertusus* showed the lowest intensity of infestation. Total 33 parasites were collected from 18 infested hosts. The prevalence and intensity were 33.97% and 1.84 respectively (Table 4).

From goats, a total numbers of 193 arthropod ectoparasites were collected from 43 infested goats. *Ctenocephalides felis* showed the highest prevalence and lowest intensity of infestation. Total 47 parasites were collected from 33 infested hosts. Its prevalence and intensity were 76.75% and 1.43 respectively. *Linognathus vituli* showed the lowest prevalence and highest intensity of infestation. Total 17 parasites were collected from 02 infested hosts. Its prevalence and intensity was 4.66% and 8.50 respectively (Table 5).

In Titas upazila from cattle a total 635 arthropod ectoparasites were collected from 79 infested hosts. *Damalinia bovis* showed the highest prevalence and lowest intensity of infestation. Total 109 parasites were collected from 67 infested hosts. Its prevalence and intensity were 84.82% and 1.63 respectively. *Dermacentor* sp. showed the lowest prevalence of infestation. Total 03 parasites were collected from 01 infested host. Its prevalence was 1.27%. *Linognathus vituli* showed the highest intensity of infestation. Total 65 parasites were collected from 07 infested hosts. Its intensity 9.29 respectively (Table 4).

Table 4. Prevalence and intensity of ectoparasites of cattle at Daudkandi, Homna and Titas 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		
	Daud.	Hom.	Tit.	Daud.	Hom.	Tit.	Daud.	Hom.	Tit.	Daud.	Hom.	Tit.	Daud.	Hom.	Tit.
Haematopinus quadripertusus				27	18	42	56.26	33.97	53.17	53	33	112	1.97	1.84	2.67
Haematopinus eurysternus				00	00	06	00	00	7.60	00	00	21	00	00	3.50
Linognathus vituli				03	05	07	6.25	9.44	8.87	41	23	65	13.67	4.60	9.29
Damalinia bovis				11	00	67	22.92	00	84.82	60	00	109	5.46	00	1.63
Stomoxys calcitrans				01	00	00	2.09	00	00	01	00	00	01	00	00
Musca domestica				35	42	52	72.92	79.25	65.83	100	143	180	2.86	3.41	3.47
Tabanus striatus				00	03	05	00	5.67	6.33	00	06	12	00	02	2.40
Diachlorus sp				00	01	00	00	1.87	00	00	01	00	00	01	00
Armigeres subalbatus				08	00	00	16.67	00	00	32	00	00	04	00	00
Ctenocephalides felis	48	53	79	00	00	00	00	00	00	00	00	00	00	00	00
Boophilus microplus				09	12	13	18.76	22.65	16.46	31	27	33	3.45	2.25	2.53
Haemaphysalis bispinosa				07	13	00	14.59	24.53	00	39	25	00	5.58	1.93	00
Haemaphysalis kinneari				00	07	27	00	13.21	34.18	00	17	74	00	2.43	2.75
Hyalomma anatolicum				07	01	00	14.59	1.89	00	18	05	00	2.58	05	00
Rhipicephalus sanguineus				00	03	00	00	5.67	00	00	14	00	00	4.67	00
Dermacentor sp.				00	00	01	00	00	1.27	00	00	03	00	00	03
Ixodes sp. (adult)				00	00	00	00	00	00	00	00	00	00	00	00
Ixodid larvae				00	00	11	00	00	13.93	00	00	26	00	00	2.37

N.B.: Daud.=Daudkandi, Hom.=Homna and Tit.=Titas.

Table 5. Prevalence and intensity of ectoparasites of goats at Daudkandi, Homna and Titas upazilass in Comilla district

Name of ectoparasites	Total no.of goats infested			No.of goats infested by individual species			Prevalence (%)			No. of ectoparasites collected			Intensity		
	Daud.	Hom.	Tit.	Daud.	Hom.	Tit.	Daud.	Hom.	Tit.	Daud.	Hom.	Tit.	Daud.	Hom.	Tit.
Haematopinus quadripertusus	39	43	35	00	00	00	00	00	00	00	00	00	00	00	00
Haematopinus eurysternus				00	00	00	00	00	00	00	00	00	00	00	00
Linognathus vituli				00	02	09	00	4.66	25.72	00	17	55	00	8.50	6.12
Damalinia bovis				23	17	17	58.98	39.54	48.58	61	83	101	2.66	4.89	5.95
Stomoxys calcitrans				00	00	00	00	00	00	00	00	00	00	00	00
Musca domestica				00	00	00	00	00	00	00	00	00	00	00	00
Tabanus striatus				00	00	00	00	00	00	00	00	00	00	00	00
Diachlorus sp				00	00	00	00	00	00	00	00	00	00	00	00
Armigeres subalbatus				00	00	00	00	00	00	00	00	00	00	00	00
Ctenocephalides felis				28	33	27	71.80	76.75	77.15	82	47	88	2.93	1.43	3.26
Boophilus microplus				05	00	06	12.83	0	17.15	13	0	18	2.60	0	03
Haemaphysalis bispinosa				00	07	07	00	16.28	20	00	34	09	00	4.86	1.29
Haemaphysalis kinneari				00	03	04	00	6.98	11.43	00	12	13	00	04	3.25
Hyalomma anatolicum				09	00	00	23.08	00	00	28	00	00	3.13	00	00
Rhipicephalus sanguineus				02	00	00	5.13	00	00	07	00	00	3.50	00	00
Dermacentor sp.				00	00	00	00	00	00	00	00	00	00	00	00
Ixodes sp.(adult)				06	00	00	15.39	00	00	19	00	00	3.16	00	00
Ixodid larvae				00	00	01	00	00	2.86	00	00	09	00	00	09

N.B.: Daud.=Daudkandi, Hom.=Homna and Tit.=Titas.

A total number of 293 arthropod ectoparasites were collected from 35 infested goats. *Ctenocephalides felis* showed the highest prevalence of infestation. Total 88 parasites were collected from 27 infested hosts. Its prevalence was 77.15% respectively. Ixodid larvae showed the lowest prevalence and highest intensity of infestation. Total 09 parasites were collected from 01 infested host. Its prevalence and intensity were 2.86% and 9 respectively. *Haemaphysalis bispinosa* showed the lowest intensity of infestation. Total 09 parasites were collected from 07 infested hosts, intensity 1.29 respectively (Table 5).

In present study result revealed that veterinary animals (cattle and goats) in the study area were found to be infested with several species of lice, flies, flea and ticks but no mites were of Comilla district there 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. Nevertheless if we compare with the 3 upazila of Comilla districts we can see the highest prevalence of ectoparasitic infestation on Titas upazila. If we categories by cattle and goats we can find that the prevalence and intensity of ectoparasitic infestation highest in Titas upazila.

In terms of lice, *Haematopinus quadripertusus* was found (Daudkandi 56.26%, Homna 33.97%, Titas 53.17%) only in cattle in all upazila but not found in goats in any upazila and *Haematopinus eurysternus* (7.60%) only found in cattle in Titas. Here prevalence of *Haematopinus quadripertusus* was highest in Daudkandi. Kakar & Sulemankhel (2009) recorded *Haematopinus quadripertusus* (23.5%) and *Haematopinus eurysternus* (17.7%) from buffaloes in various farm houses in Quetta city, Pakistan. *Linognathus vituli* is the common ectoparasitic lice of veterinary animal are available in all upazila (Daudkandi 6.25%, Homna 9.44%, and Titas 8.87%) but absence in goats of Daudkandi (Homna 4.66%, Titas 25.72%). Rony *et al.* (2010) reported the most prevalent lice species was *Linognathus vituli* (25.45%) in goats at Gazipur district, Bangladesh. *Damalinia bovis* is found in the cattle of all upazila except in the cattle of Homna (Daudkandi 22.92% and Titas 84.82%). It's a common goat's lice species in all upazila (Daudkandi 58.98%, Homna 39.54% and Titas 48.58%). Aqter (2009) reported *Damalinia bovis* (8.25%) from cattle and goats at Bhawal forest area, Gazipur.

In terms of flies, they were only collected from cattle but not found in goat. *Musca domistica* in Homna showed highest prevalence (79.25%). Only one specimen of *Stomoxys calcitrans* was found in the cattle of Daudkandi. *Tabanus striatus* were collected at Homna and Titas upazila and prevalence was 5.67% and 6.33%. Mosquito species *Armigeres subalbatus* (16.67%) only collected from the cattle of Daudkandi upazila. Karim *et al.* (2013) reported that *Armigeres subalbatus* (1%) showed the lowest abundance followed by other mosquito species in Dhaka city. Aslamkhan & Wolfe (1972) reported that *Armigeres subalbatus* biting cattle more than man at night in Thakurgaon. Kirti & Kaur (1999) reported that *Armigeres subalbatus* only from the Malwa region of Punjab, which shows that with the changing ecology of Punjab *Armigeres subalbatus,* has emerged as one of the most abundant mosquito species in the state. Rudra *et al.* (2013) recorded that in tribal are indoor-resting collection of *Armigeres subalbatus* in one year was only 18, 1.65% of the total catch and in non-tribal are 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 (Daudkandi 71.80%, Homna 76.75% and Titas 77.15%). Similar observations were reported by Mulugeta *et al*. (2010). He 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 and 66% herds and 63.1% goats were infested with this species.

The tick's species *Boophilus microplus* was not found in the goats of Homna but found both cattle and goats in other upazila. Cattle in Homna, *Boophilus microplus* (22.65%) showed the highest prevalence than other upazilas. Similar findings were also reported by Rony *et al.* (2010). He reported that the prevalence of *Boophilus microplus* (45.45%) was higher than other tick species in goats in Gazipur district, Bangladesh. Roy *et al*. (2000) recorded *Boophilus microplus* (28.3%) and *Haemaphysalis bispinosa* (7.6%) from cattle at Modhupur forest area in Tangail. Similar findings were also reported by some other scientists in abroad. Stuti *et al*. (2008) observed *Boophilus microplus* (96.44%) was the most common and predominant tick species followed by *Rhipicephalus sanguineus* (1.98%). *Haemaphysalis bispinosa* was found both cattle and goats of Homna upazila. upazila. *Haemaphysalis kinneari* (34.18%) showed highest prevalence in cattle in Titas. Both tick species *Hyalomma anatolicum* and *Rhipicephalus sanguineus* were not found in Titas upazila. *Dermacentor* sp. was only found in the cattle of Titas upazila. *Ixodes* sp. was only found in the goats of Daudkandi. Both cattle and goats, Ixodid larvae were only found in Titas upazila.

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