Alexandria Journal of Veterinary Sciences
www.alexjvs.com

AJVS. Vol. 65 (1): 76-80 April 2020
DOI: 10.5455/ajvs.95116

Prevalence of Haemoprotozoan Diseases in Black Bengal Goats of Sylhet Region of Bangladesh

Abul Bashar Jewel [1], Md Motaleb Hosen[1], Md Shahidur R. Chowdhury[1], Md Mukter Hossain[1], Md Masudur Rahman[2], Md Mahfujur Rahman[1*]

[1] Department of Medicine, Faculty of Veterinary, Animal and Biomedical Sciences, Sylhet Agricultural University, Bangladesh.
[2] Department of Pathology, Faculty of Veterinary, Animal and Biomedical Sciences, Sylhet Agricultural University, Bangladesh.

Key words:
Prevalence, Haemoprotozoan disease, Black Bengal goat, Sylhet, Bangladesh

***Correspondence to:**
mahfuj.vetmed@sau.ac.bd

Article History
Received: 01 Mar 2020
Accepted: 15 Apr 2020

ABSTRACT

The study was conducted to ascertain the prevalence of haemoprotozoan diseases in Black Bengal goats at Sylhet District of Bangladesh during the period from January to December 2018. In this study, determination of haemoprotozoan disease in relation to age, sex and season dynamics were studied. A total of 100 goats were examined, among which 25 (25%) was found to be infected with different haemoprotozoan diseases where Babesiosis was (05%), Anaplasmosis was (12%) and mixed infection was (08%). In this study, determination of haemoprotozoan disease in relation to age, sex and season dynamics were studied. Male (15.22%) animals were more susceptible to Anaplasmosis infections than female (9.26%) where Babesiosis were higher in female (5.56%) than male (4.35%). In case of mixed infection male (8.70%) were more susceptible than female (7.41%). In age group, higher prevalence was found (8.11%) in >2 years of age than (4.17%) in 1-2 years in Babesiosis. Slightly higher prevalence was found (13.33%) in <1 years of age followed by (12.50%) in 1-2 years and (10.81%) in >2 years in Anaplasmosis. Higher prevalence was found (12.50%) in 1-2 years of age where (5.41%) in >2 years in case of mixed infection. In Babesiosis highest prevalence was observed in rainy season (7.50%) followed by winter (3.45%) and summer (3.23%). Comparatively higher prevalence was observed in rainy season (15.00%) followed by summer (12.90%) and winter (6.90%) in Anaplasmosis. In case of mixed infection higher prevalence was observed in rainy (12.50%) than summer (9.68%). In this study it was observed that there was no statistically significant relationship of haemoprotozoan disease in relation to age, sex, and seasonal variation.

1. INTRODUCTION

Bangladesh is an agricultural country with a huge population of livestock which are well adapted to the environmental condition of this country. The total number of goat population in the world is over 767.90 million of which 109.8 million (FAO, 2003) are distributed in India, Pakistan and Bangladesh. Of the total livestock population of 64.84 million (DLS, 2001-2002) in Bangladesh, small ruminants constitute 39.2 millions, of which about 20 millions are goats (Hossain, 2003). Out of 20 million of goats in Bangladesh, 10.4 millions are reared in backyard system by rural farmers (Chowdhury et al., 2003).

Bangladesh is a moderately hot and humid country with short winter and prolonged rainy season. The hot and humid weather of Bangladesh favors the growth and multiplication of arthropods vector like tick, flies, mosquitoes that are responsible for transmission of different causative agents from diseased animal to healthy animal resulting different disease including Babesiosis, Anaplasmosis etc. Among the parasites, tick (ectoparasites) and endoparasites are very common. Endemic (tick-borne) diseases particularly Anaplasmosis and Babesiosis have considerable economic importance locally and regionally (Mc-cosker, 1979).

Anaplasmosis is an infectious disease of goat caused by several species of the blood parasite. *Anaplasma ovi* sand *A. marginale* are the most common pathogen of goats (Shompole et al., 1989). Anaplasmosis is also called "yellow bag" or "yellow fever" as affected

animals can develop a jaundiced appearance. *Babesia ovis*and *Babesia motasi* are known to be pathogenic in goats (Soulsby, 1986).The genus Babesia contains tick-borne hemoprotozoan parasites that infect a wide variety of vertebrate hosts. Babesia spp. is transmitted by Ixodid ticks and causes fever, anaemia, haemoglobinuria and icterus in goats (Levine, 1985).

Among the problems encountered, parasitism is thought to be the major causes of hindering the goat production (Dewan et al., 1979; Nooruddin et al., 1987; Shahiduzzaman et al., 1999) with the exception of the relatively wet eastern region of Sylhet, where the annual rainfall is about 4180 mm. (most parts of the country receive at least 2, 300 mm of rainfall per year). The prevalence of parasitic infestation depends on ecology, geographical and agro-climatic condition prevailing in Bangladesh (Hossain et al., 2004). Most of the studies in the past have been carried out on the prevalence of haemoprotozoan diseases in cattle in Bangladesh but there is limited study available on haemoprotozoan disease in goat. Hence, this study was conducted to determine the prevalence of haemoprotozoan disease in Black Bengal goats of Sylhet region of Bangladesh.

2. MATERIALS AND METHODS

2.1 Study area and study period

The study was conducted at Sylhet Sadar, Jaintapur, Bishwanath, Beanibazar, South Surma and Golapgonj Upazilla of Sylhet district during the period from January to December 2018. As three seasons of Bangladesh are prominent such as summer (March- June), rainy (July-October), winter (November-February). The sampling was performed in three seasons.

2.2 Study population

A total of 100 goats aged from <1year, 1-2 year and > 2 years of either sex (male 46 and female 54) were randomly selected from villages in Sylhet district of Bangladesh for collection of blood samples to determine the common haemoprotozoan diseases of goat. Majority of goats are reared as free range and some are in intensive system.

2.3 Procedure

The instruments and appliances were used during study period were Ice-box, vacutainer tube, needle, syringe, hand gloves, tissue paper, clean glass slide, pipette, beaker, conical flax, distilled water, absolute methanol, 10% Giemsa stain, and buffer solution etc. Blood sample collected from jugular vein (Hamedani et al., 2009 and Hussein et al., 2017). The blood samples were collected in vacutainer tubes containing EDTA and held at 4°C until arrival at the laboratory. The collected blood sample were brought to the laboratory in insulated carry box containing ice packs to maintain low (4 °C) temperature and then these were transferred in the refrigerator at 4°C for further processing. Thin blood smear by taken 1 drop in clean glass slide. Thin blood films air-dried for 10 minutes. Fixed in absolute methanol for 1 minute and after that discard the remaining methanol from slide. Then stained with 10% Giemsa stain for 25-30 minutes and washed with distilled water. The slide was observed by light microscope (x100) with oil immersion.

2.4 Statistical analysis

Collected data was arranged in Ms Office Excel and Statistical analysis was carried out by Chi square ($\chi 2$) test using Statistical Package for Social Science (SPSS) version 20. During this work 0.05% level of significance was considered.

3. RESULTS AND DISCUSSION

During this study a total of 100 goats were examined, among which 25 (25%) was found to be infected with different haemoprotozoan diseases. Overall prevalence of haemoprotozoan diseases in goat was highest in Anaplasmosis (12%) followed by mixed infection (08%) and Babesiosis (05%) (Table-1).

Table -1. Overall prevalence of haemoprotozoan diseases in goat at Sylhet District

Name of Diseases	N=100	Prevalence (%)
Babesiosis	5	5
Anaplasmosis	12	12
Mixed Infection	8	8
Total	25	25

N=No of animals, %=Percentage

Table 2: Sex related prevalence of haemoprotozoan diseases in goat at Sylhet District

Variable	Category	N	Babesiosis		Anaplasmosis		Mixed infection	
			%	P-value	%	P-value	%	P-value
Sex	Male	46	4.35(2)	1.000	15.22 (7)	0.361	8.70 (4)	1.000
	Female	54	5.56(3)		9.26 (5)		7.41(4)	

N= No of animals, % = Percentage, Significant (P< 0.05).

Haemoprotozoan diseases remain a major threat to livestock industry in tropical and sub-tropical countries especially in small ruminant (Ademola and Onyiche, 2013). In the present study (25%) goats were found to be infected with various hemoprotozoan diseases. Among them the prevalence of Babesiosis was 5%, Anaplasmosis was 12% and mixed infection was 08% (Table 1). Lower percentage of the infection may be due to the technique used in this study. Whereas other study reported that prevalence of Babesiosis was 2.18% in goat at Babugonj upazilla, Barishal, Bangladesh (Amin, 2015). The overall prevalence of hemoprotozoan disease in this investigation partially consistent with the earlier report where it was recorded slightly lower prevalence (23.88%) in southern Punjab (Iqbal et al., 2011). Findings of the present study also consistent with an earlier report of infection rate of hemoprotozoan diseases (27.0%) on a retrospective study in goats (Useh et al., 2007). In the Northern Kerala of South India, the prevalence of Babesiosis and Anaplasmosis was 25% (Nair et al., 2013) and in south western Uganda prevalence was 28% (Ssenyonga et al., 1992). In a study of haemoprotozoan diseases of West African goat in Ibadan, there was severe anaemia associated with mixed infections involving Anaplasmosis and Babesiosis in which more 50% of the animals evaluated had haemoprotozoan disease either as single or mixed infections (Adejinmi et al., 2004) which is significantly higher than the present study. Variation of this prevalence of haemoprotozoan diseases might be due to geo-climatic conditions of the sampling area along with sampling procedure.

In this study it was observed that there was no significant relationship of haemoprotozoan diseases in relation to sex (Table 2). In case of Babesiosis prevalence was slightly higher in female (5.56%) than male (4.35%) whereas in case of Anaplasmosis, highest prevalence was observed in male (15.22%) than female (9.26%). In mixed infection, the prevalence was also higher in male (8.70%) than female (7.41%). As a whole, highest prevalence was observed in male 28.27% than female 22.23% among all animals in these three types of infection.

It was observed that the overall prevalence haemoprotozoan diseases in male goat was (28.27%) and in female goat was (22.23%) (Table 2). There was no statistically significant difference among sex of examined animals. This result partially consistent with the previous study where it was reported that highest prevalence (61.2%) in male than female (46.7%) in Lahore Pakistan (Shah et al., 2017). Findings of the present study also consistent with previous study where it was reported that higher prevalence was observed in male (23.77%) than female (19.62%) in Nigeria (Anyanwu et al., 2016) and disagree to previous findings where higher prevalence was observed in female (26.31%) than male (23.38%) (Abenga et al., 2008). Females are generally believed to be more prone to haemo-parasitaemia due to their extended breeding for economic reasons (calving and milk production) as well as the stress of breeding, milking and cyclical hormonal changes associated with gestation, parturition and calving processes (Ukwueze, 2015).The variation may be due to geographical location, climatic condition, reproduction of tick and tick population.

In case of age group, higher prevalence was found (8.11%) in >2 years of age followed by (4.17%) in 1-2 years and no prevalence was found in < 1 years in Babesiosis (Table 3). The prevalence of Anaplasmosis was found (13.33%) in <1 years of age, (12.50%) in 1-2 years and (10.81%) in >2 years. In case of mixed infection the prevalence was found (12.50%) in 1-2 years of age, (5.41%) in >2 years and no prevalence was found in <1 year. This result almost agrees to the previous findings Sitotaw et al., (2014) who reported that adult (>2 year) 14% and young (1-2 year) 4.4% were infected with haemoprotozoan diseases.

Table- 3: Age related prevalence of haemoprotozoan diseases in goat at Sylhet District

Variable	Category	N	Babesiosis		Anaplasmosis		Mixed infection	
	Year		%	P-value	%	P-value	%	P-value
Age	<1	15	0.00(00)	0.507	13.33(2)	1.000	0.00(00)	0.405
	1-2	48	4.17(2)		12.50(6)		12.50(6)	
	>2	37	8.11(3)		10.81(4)		5.41(2)	

N= No of animals, % = Percentage**,** Significant (P< 0.05)

Table 4: Seasonal prevalence of haemoprotozoan diseases in goat at Sylhet District

Variable	Category	N	Babesiosis		Anaplasmosis		Mixed infection	
			%	P-value	%	P-value	%	P-value
Season	Rainy	40	7.50 (3)	0.730	15.00 (6)	0.682	12.50 (5)	0.165
	Summer	31	3.23 (1)		12.90 (4)		9.68 (3)	
	winter	29	3.45 (1)		6.90 (2)		0.00 (00)	

N= No of animals, % = Percentage, Significant (P< 0.05)

In this study it was detected that there was no significant relationship of haemoprotozoan diseases in goat in case of seasonal variation. The prevalence of Babesiosis was observed 7.50% in rainy, 3.45% winter and 3.23% summer season. The prevalence of Anaplasmosis was observed 15.00% in rainy season, 12.90% in summer and 6.90% in winter season. Prevalence mixed infection was observed in 12.50% rainy season and 9.68% summer season. This result disagrees to the previous finding in case of Babesiosis (Amin, 2015) who reported highest prevalence in summer season (3.81%) followed by winter (1.78%) and rainy (1.40%) in goat at Babugonj upazilla, Barishal, Bangladesh. On the other hand, present study consistent with the earlier study, previous study also reported that the seasonal prevalence of blood protozoa in livestock was highest in rainy season (45.45%) in comparison to summer (27.87%) and winter (16.55%) in the hilly areas of Bangladesh (Mohanta et al., 2011). It was recorded that rainy season is the most important factor in the prevalence of Anaplasmosis and Babesiosis (Mattioli et al., 1997). It is assumed that, due to the availability of green grasses in the rainy season, the animals maintains a good health and remain carrier state in endemic areas. Higher incidence of haemoprotozoan diseases were found soon after peck of tick population depending on temperature, humidity, rainfall etc. Lower temperature and humidity of winter months were less favourable for the growth and multiplication of tick vectors which might contribute to lower frequency of such diseases in the study population (Zahid et al., 2005 and Muhammad et al., 1999)

4. CONCLUSIONS

The result of this research clearly shows that the prevalence of haemoprotozoan diseases in goat is more common regardless of age, sex and season of the year in both sexes. The sub clinical presence of haemoprotozoan diseases could have a negative effect on meat and milk production. So, there is a need for strengthening extension work to ensure a continuous flow of information to overcome these sorts of social obstacle in goat rearing.

ACKNOWLEDGEMENT

The authors are highly thankful to the Department of Medicine, Faculty of Veterinary, Animal and Biomedical Sciences, Sylhet Agricultural University, Sylhet for providing the research facilities.

5. REFERENCES

Abenga, J.N., Fajinmi, A., Idowu, T., Kalgo, A., Lawani, F., Samdi, S. 2008. Seasonal variation of trypanosomosis rates in small ruminants at Kaduna abattoir, Nigeria. African. J. Biomed. Res. 11:229-232.

Ademola, I.O., Onyiche, T.E. 2013. Haemoparasites and Haematological parameters of slaughtered Ruminants and pigs at Bodija Abattoir, Ibadan, Nigeria. African J. Biomed. Res. Vol. 16, 101-105.

Adejinmi, J.O., Sadiq, N.A., Fashanu, S.O., Lasisi, O.T., Ekundayo, S. 2004. Study on the blood parasite of sheep in Ibadan, Nigeria. African J. Biomed. Res. 7 pp. 42-43.

Amin, M.R. 2015. Prevalence of common parasitic and infectious diseases of goat at Babugonj upazilla, Barisal, Bangladesh. Asian J. Med. Biol. Res. 2015, 1:449-456.

Anyanwu, N.C.J., Iheanacho, C.N., Adogo, L.Y. 2016. Parasitological Screening of Haemo-Parasites of Small Ruminants in Karu Local Government Area of Nasarawa State, Nigeria. 11: 1-8.

DLS, 2002. Annual Report of Directorate of Livestock Services (2001-2002), Bangladesh.

Dewan, M.L., Hossain, M.I., Baki, M.A. 1979.Pathological investigation on the mortality of buffalo calves of Bangladesh. Bangladesh. Vet. J. 13: 1-7.

Hussein, N.M., Mohammed, E.S., Hassan, A.A., El-Dakhly, K.M. 2017. Distribution Pattern of Babesia and Theileria Species in Sheep in Qena Province, Upper Egypt. Arch Parasitol 1: 102.

Hamedani, A., Khaki, M., Rahbari, Z.,Kazemi, S.B.,Bandehpour, M. 2009. Molecular identification of anaplasmosis in goats using a new PCR-RFLP method.Vol. 10, No. 4, Ser. No. 29.

Hossain, M.J., Amin, M., Mostofa, M., Sharif, M., Khalid, S.M.A. 2004. Efficacy of levanid against natural gastrointestinal nematodiasis and paramphistomiasis in sheep. Bangladesh Veteterinarian. 21: 70-73.

Iqbal,F., Fatima, M., Ali,M. 2011. A study on the determination of risk factors associated with Babesiosis and prevalence of Babesia spp. Parasitol. 18(3): 229-234.

Levine,N.D. 1985. Apicomplexa: the piroplasms.Veterinary Protozoology. Iowa State University Press, Ames, pp. 291–328.

McCosker, P.J. 1979. Global aspects of the management and control of ticks of veterinary importance. Recent Advances in Acarology.11: 45-53.

Mattioli, R.C., Janneh, L., Corr, N., Faye, j.A., Pandey, V.S., Verhulst, A. 1997. Seasonal prevalence of tick and tick transmitted haemoparasites in traditionally managed N´Dama cattle with reference to strategic tick control in the Gambia. Medical and Vet. Entomol. 11: 342-348.

Mohanta, U.K., Anisuzzaman, Mondal, M.M.H. 2011.Tick- and tick-borne protozoan diseases of livestock in the selected hilly areas of Bangladesh. Res. Innov. & Tech. 1: 60-63.

Muhammad, G.M., Saqib, M., Athar, M.Z. and Khan, M.N. 1999. Clinic epidemiological and therapeutic aspects of bovine theileriosis, Pakistan. Vet. J.19: 64-69.

Nair, A.S., Ravindran, R., Lakshmanan, B.,Sreekumar, C. 2013. Bovine carriers of Anaplasmamarginale and Anaplasmabovis in South India. Tropical Biomedicine 30: 105–112.

Nooruddin, M., Baki, A., Das, J.G. 1987. Clinico-pathological studies of an ich outbreak of Tr in cow calves. Indian. J. Vet. Med. 7: 116-119.

Sitotaw, T., Regassa, F., ZeruFand,Kahsay, G. 2014. Epidemiological significance of major hemoparasites of ruminants in and around Debre-Zeit, Central Ethiopia. J. Parasitol. and Vector Biol. 6: Pp: 16-22.

Shahiduzzaman, M., Talukder, M.H., Rahman, M.H. 1999. Ecology of preparasitic stages of ruminants in Bangladesh. Bangladesh Vet. J. 33: 93-97.

Soulsby, E.Y.L. 1986. The Helminths, Arthoropods and Protozoa of Domestic Animal. Bailliere & Tindall, London, pp: 809.

Shah, S.S.A., Khan, M.I., Rahman, H.U. 2017. Epidemiological and hematological investigations of tick-borne diseases in small ruminants in Peshawar and Khyber Agency, Pakistan. J. Adv. Parasitol. 4: 15-22.

Shompole, S., Waghela, S.D., Rurangirwa, F.R., McGuire, T.C. 1989. Cloned DNA probes identify Anaplasmaovisin goats and reveal a high prevalence of infection. J. Clin. Microbiol. vol-27, pp: 2730-2735.

Ssenyonga, G.S.Z., Kakoma, I., Nyeko, J.P., Buga, R., Hansen, R. 1992.Anaplasmosis in Uganda. Ill. Parasitological and serological evidence of Anaplasma infection in Ugandan goats. Onderstepoort. J. Vet. Res. 59:161–162.

Ukwueze, C.S., Kalu, E.J. 2015. Prevalence of haemoparasites in red sokoto goats slaughtered at Ahiaeke Market, Umuahia, Abia State, Nigeria. J. Vet. Adv. 5: 826-830.

Useh, N.M., Ajanusi, O.J., Lawal, I., Adamu, S., Agbede, R.I.S., Esievo, KAN. 2007. Hemoparasites of goatsreared on free range in Zaria, Nigeria. Nig. J. of Parasitol. 27: 54-57.

Zahid, I.A., Latif, M., Baloch, K.B. 2005. Incidence and Treatment of Theileriasis and Babesiasis. Pakistan Vet. J. 25: 137-139.