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Comparative Analysis of Gastro-Intestinal Helminth Parasites of Goat and Buffalo Syangja, Nepal

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Abstract: Parasitic diseases are one of the important causes of morbidity and mortality of domestic animals. This research study was conducted to identify the various gastrointestinal helminth parasites for the comparative analysis of gastrointestinal parasites among goats and buffaloes. The total of 100 fecal samples were collected by random sampling method, 50 from goats and 50 from buffaloes in May/June, 2017. Parasitological procedures including direct and indirect methods (sedimentation and floatation) were used for the identification of gastrointestinal helminths parasites. Appropriate and suitable statistical tool was used for data analysis. The overall prevalence of helminthiasis was 80% in goat and 84% in buffalo. The *Strongyloides* sp. (42%) showed the higher prevalence in goat and *Toxocara* sp. 66% in buffaloes. The *Strongyloides*, *Ascaris* and *Oesophagostomum* sp. were similar helminth parasites found both goats and buffaloes. The result shows that the prevalence of *Strongyloides*, *Trichuris* and *Toxocara* sp. is significantly higher ($p<0.05$). Whereas there is no significant difference in the prevalence of *Ascaris* and *Oesophagostomum* sp. between goats and buffaloes ($p>0.05$). In conclusion, nematode is dominant both in goats and buffaloes. In goat highest infection is caused by S*trongyloides* sp. and lowest infection is caused by *Oesophagostomum*, *Trichuris* and *Moniezia* sp. are only found in goat but not in buffaloes.

INTRODUCTION

In Nepal livestock is one of the most potential sub-sectors of agriculture which plays an indispensable role in promoting human health and national economy of the country. The nutritional requirement of animals is not satisfactory in developing country like Nepal where helminth infection is proliferating haphazardly. Furthermore, no satisfactory facilities of veterinary care have enhancing the gastrointestinal helminth parasites growth and transmission[1]. The production and productivity of animals are greatly influenced by different diseases along with gastrointestinal parasitic infections. Gastrointestinal parasitism in different domestic animals is a world-wide problem[2]. The losses caused by parasitic infections are in the form of lowered general health

condition, retarded growth rate, diminishing the working efficiency, decrease milk and meat production, abortion, cost related with preventive measures and decreases the disease resistance capability which may ultimately lead to higher death rate[3, 4]. Different groups of gastrointestinal parasitic infections including; Fascioliasis, Haemonchosis, Trichostrongylosis, Oesophagostomiasis and Monieziosis impaired the growth and productivity of goats. Small ruminants such as goats and others are essential components of the mixed farming systems in the hilly area of Nepal and are found in many parts of country. They are mainly kept for meat, fibre and manure. In the present subsistence farming processes of the hilly areas, farmers have little surplus agricultural produce to sell and so depend upon the sale of livestock and their products as a source of income. Major parasites of goats are *Dicrocoelium, Fasiola, Trichuris, Trichostrongylus, Oesophagostomum, Toxocara* sp. *Haemonchus, Ostergia, Capillaria, Chabertia,* etc.[5]. The helminth parasitism is one of the major health problems for dairy buffaloes[6]. Some helminthes of buffaloes are also transmissible directly or indirectly to humans where they can cause significant clinical diseases such as Schistosomiasis, Hydatidosis, Echinococcosis and Fasioliasis in a number of countries including Bangladesh[7]. Varieties groups of parasitic gastroenteritis has been noted as vital constraints to ruminant's productivity in terms of pathology and economic importance[8]. Despite notable losses by different gastrointestinal parasitism, the major problems are often neglected and overlooked a majority of the infected animals show a number of little obvious clinical signs throughout their productive life and their effects are gradual and chronic[9]. Nevertheless, among the gastrointestinal parasitic diseases, haemonchosis caused by *Haemonchus* spp which is a predominantly a highly pathogenic and economically important disease of goats[10]. Prevalence of gastrointestinal parasites is considerably influenced by the climatic conditions and as far as possible the evidence for the distribution and prevalence of the diseases is presented by geographical area, roughly corresponding to climatic conditions.

MATERIALS AND METHODS

The study area: The present study was carried out in Birgha VDC of Syangja and is one of the small village of that district (Fig. 1).

Sample collection and processing: About 100 samples were collected, 50 from goats and 50 from buffaloes from their individual shed of the peoples with the help of local people during February 2017 in Birgha VDC, Syangja, Nepal. About 20-25 g fecal matter was placed in 2.5% potassium dichromate to cover the fecal sample completely in 20 mL vial. Then, vial was air tight closed and put in cool box. The collected fecal samples were transported to lab at Central Department of Zoology, Tribhuvan University, Kritipur, Kathmandu for further processing. Fecal samples were processed for microscopic examination. Ovum/larvae were identified according to the morphology and quantitative estimation by using concentration method (flotation and sedimentation) technique. In this way, two slides were prepared from one sample and examined under 10 and 40× magnification of microscope to detect eggs of helminthes and trophozoites or cyst of gastrointestinal protozoan[11].

Statistical analysis: Data analysis of data was done by R (software). The p-value was obtained by using χ^2-test to know the level of significance.

Fig. 1: Map of Nepal showing Syangja, district

Table 1: Comparison of helminths parasites in goats and bufalloes

Class	Genera of helminthes	Buffaloes (%)	Goats (%)	Chi-square values	p-values
Nematode	*Strongyloides*	10	42	19.692	9.097×10^{-6}
	Ascaris	26	18	1.4545	0.2278
	Trichuris	-	18	18	2.209×10^{-5}
	Oesophagostomum	10	4	2.5714	0.1088
	Toxocara	66	-	66	4.509×10^{-16}
Cestode	*Moniezia*	-	14	14	0.0001825
Trematode	*Fasciola*	8	-	8	0.004678
	Paramphistomum	4	-	4	0.0455
	Dicrocoelium	2	-	2	0.1573

RESULTS AND DISCUSSION

Among 100 samples (50 goats and 50 buffaloes) the overall prevalence of helminths was the highest in buffaloes 42(84%) and followed by goats 40 (80%) (Fig. 2). The distribution of different classes of helminths included nematodes (82%), followed by cestodes (18%) in goats and nematodes (84%), followed by trematodes (16%) in buffaloes.

Five parasites of various genera were encountered in the goats samples examined. These include; *Strongyloides*, *Trichuris*, *Ascaris*, *Oesophagostomum* and *Moniezia* sp. (Fig. 3). Among 50 feacal samples of goats, *Strongyloides* sp. was the most prevalent (42%) intestinal parasite encountered followed by *Trichuris* sp. (18%), *Ascaris* sp. (18%), *Moniezia* sp. (14%) while *Oesophagostomum* sp. (4%) were the least prevalent parasites encountered. Similarly, seven parasites of various genera were encountered in the buffaloes samples examined. These include: *Toxocara*, *Ascaris*, *Oesophagostomum*, *Strongyloides*, *Fasciola*, *Paramphistomum* and *Dicrocoelium* sp. (Fig. 4). In bufalloes, *Toxocara* sp. had the highest prevalence (66%) gastrointestinal parasites followed by *Ascaris* sp. (26%), *Oesophagostomum* sp. (10%), *Strongyloides* sp. (10%), *Fasciola* sp. (8%) while *Paramphistomum* sp. (4%) and *Dicrocoelium* sp. (2%) were the least prevalent encountered intestinal parasites. The *Strongyloides* sp. *Ascaris* and *Oesophagostomum* sp. were similar helminth parasites found both goats and buffaloes.

Similarly, in comparison with different helminths parasites in goats and bufalloes showed that the prevalence of *Strongyloides*, *Trichuris* and *Toxocara* sp. is significantly higher ($p<0.05$). Whereas there is no significant difference in the prevalence of *Ascaris* and *Oesophagostomum* sp. between goats and buffaloes ($p>0.05$). The only cestode *Moniezia* sp. was found in goat and *Fasciola*, *Paramphistomum* and *Dicrocoelium* sp. were only found in buffaloes (Table 1).

The agro-ecological and climatic conditions of Nepal are highly favorable for growth, development and multiplication of helminths parasites. Ecto-parasites and gastrointestinal parasitism are claimed to be one of the main hindrances for profitable local goat and buffalo rearing in Nepal. The present study showed that the highest prevalence of helminths was recorded in buffaloes followed by goats. The higher prevalence of gastrointestinal helminths parasites in buffaloes correlates with a higher proportion of time spent on grazing in compare with goats which are grazed proportionately less

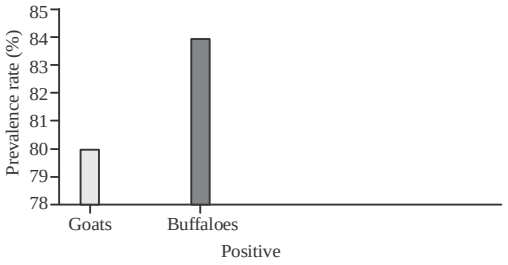

Fig. 2: General prevalence of helminths parasites

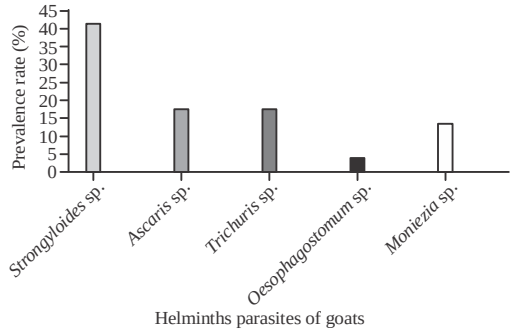

Fig. 3: Gastrointestinal helminths parasites of goats

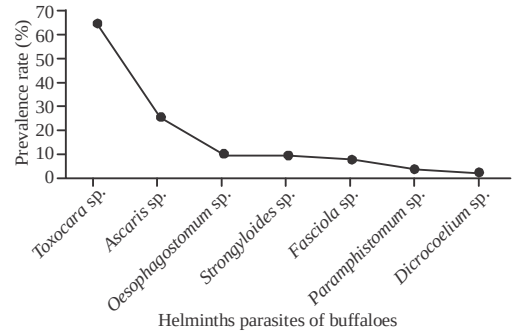

Fig. 4: Gastrointestinal helminths parasites of buffaloes

and kept mainly in stalls for feeding. Similarly, a variety of factors such as host age, sex and breeding status, grazing habits, the level of education and economic capacity of farmers, the standard of management and anthelmintic used can influence the prevalence of helminths[12]. The high prevalence of infection observed in the study agree with the results of Marsoke *et al*.[13], Chavhan *et al*.[3] and Bashir[14] who reported 73.33, 75, 76.15, 87.50, 85.92, 90.3 and 90.1% from Jabalpur India, Toba Tek Pakisthan, Khyber Pakhtunkhwa, District of Chhattisgarh, Rasuwa Nepal, Kalanki Kathmandu Nepal and Owerri South east Nigeria. This could be due to favorable environmental condition for the existence of the parasites[15]. Present study recorded higher prevalence in goat and buffalo compared with the study carried by Tripathi and Subedi[5] who recorded 67.92% and 68% helminthiasis from Shivraj Municipality, Nepal and Khilijee Arghakhanchi Nepal, respectively. This difference might be attributed to the difference in animal species and environmental condition for the parasitic stage of larvae growth. The increase in the prevalence in the present study compared with other studies could support prolonged survival and development of the infective larval stage of most nematodes.

The analysis of fecal samples of goats and buffaloes revealed that different helminths parasites were encountered among them five genera from goats and seven from buffaloes. These include; *Strongyloides, Trichuris, Ascaris, Oesophagostomum* and *Moniezia* sp. in goats followed by *Toxocara*, *Ascaris*, *Oesophagostomum*, *Strongyloides*, *Fasciola*, *Paramphistomum* and *Dicrocoelium* sp. in buffaloes. The group of helminths parasites recorded in the study area have also been reported previously in other areas of Pakistan[16, 17] and elsewhere in the world[18, 19]. However, these workers have also encountered the occurrence of other gastrointestinal helminths parasites and this regional variation may be attributed to different geographical distributions, host factors and climatic conditions required for the development of free-living stages of the nematodes.

Among helminths parasites of buffaloes *Toxocara, Ascaris* and *Oesophagostomum* sp. showed the higher prevalence. Similar type of prevalence found in the study conducted by Raza *et al*.[9] and Karki *et al*.[20]. The highest prevalence in the study area may be due tobreeding status, grazing habits and treatment with anthelmintic drugs and also, attributed to non-adoption of recommended buffalo management related practices and careless attitude of the farmers in buffalo raising. Chavhan *et al*.[3] who recorded 13.14%, 37.50% *Toxocara* sp. infection that is less than the present study. Among helminths parasites of buffaloes *Dicrocoelium* sp. showed the least prevalence where cattle *Dicrocoelium* sp. has been reported about12.32% from Anarmani VDC of Jhapa[21], 6% by Karki *et al*.[20] from Kalanki, Kathmandu, Nepal. Devi[22] recorded 12.94% infection from Pokharathok VDC Arghakhanchi, Nepal and 20.61% infection was recorded by Mukhia. The infection of *Dicrocoelium* sp. is higher than present study, i.e., 2%. This may be due to different geographic condition and climatic condition of the different areas. Likewise, Condoleo *et al*.[23] reported 2.4% *Dicrocoelium dendriticum* from buffalo farms of central, Italy. This is almost similar to the present study.

Five types of parasites were recorded from goats out of which *Strongyloides* sp. showed the higher prevalence followed by *Trichuris, Ascaris, Oesophagostomum* and *Moniezia* sp. 12.24% of *Strongyloides* sp. has been reported from Mhow, Indore[24]. Condoleo *et al*.[23] obtained 3.1% infection from central Italy. This is less than present study this could be due to climatic conditions and geographical factors between countries. About 54.6% *Strongyloides* sp. infection has been reported from goat which higher than present study. Highest infection of *Strongyloides* sp. may be due to unhygienic, dark, congested and also when fed with contaminated food and water. Likewise, high infection of *Strongyloides* sp. is 88% recorded by Kushwaha. This is very higher than present study.

Moniezia sp. encountered as the least prevalence in goats and similarly, *Moniezia* sp. has been reported 2.4% and 5.77% by Condoleo *et al*.[23] and Bansal *et al*.[24] from central Italy and Mhow Indore. This is very less than the present study. Karki *et al*.[20] recorded 16% Monieziasis from Kalanki, Kathmandu, Nepal which is little bit similar to the present study that is 14%. This could be due to same type of climatic condition. Likewise, *Moniezia* has been reported from gastrointestinal parasite in goats at the IAAS livestock farm at Manglapur VDC-2 Chitwan. Similarly, Ghimire and Achhami also recorded *Moniezia* sp. from Nepal. The *Moniezia* sp. infection was 14% in goat in the presentstudy due to presence of suitable temperature and moisture serve best for breeding of helminthparasites.

CONCLUSION

In conclusion, nematode is dominant both in goats and buffaloes. In goat highest infection is caused by S*trongyloides* sp. and lowest infection is caused by *Oesophagostomum, Trichuris* and *Moniezia* sp. are only found in goat but not in buffaloes. In buffalo the highest infection is caused by nematode *Toxocara* sp. which is very high infection observed in buffalo and low infection caused by *Dicrocoelium, Fasciola, Paramphistomum* and *Dicrocoelium* sp. was the trematode only observed in buffaloes of the present study. Mixed infection was caused by *Strongyloides, Ascaris* and *Oesophagostomum* sp. These are the common Nematode present in buffalo and goat.

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