Nepalese Journal of Agricultural Sciences, January, 2025, Volume 28
eISSN 2091-0428; pISSN 2091-041X; esjindex ID = 6279

PREVALENCE OF GASTROINTESTINAL PARASITES IN GOAT (CAPRA HIRCUS) OF MALARANI RURAL MUNICIPALITY, ARGHAKHANCHI DISTRICT OF NEPAL

Naresh Kumar Sah
[1]Department of Vet Public Health, Nepal Polytechnic Institute, College of Veterinary Science, Bharatpur-10, Nepal.
***Corresponding Author's email:** nareshmph@gmail.com

ABSTRACT

Gastrointestinal parasitic infection in goat is one of the causes of low productivity, morbidity and mortality. This study was conducted to determine the prevalence, intensity of infection and farm management system. Faecal samples were collected from 200 goats from Malarani Rural Municipality, Arghakhanchi, Nepal. Samples were collected in the month of February, 2019 and subjected to direct smear, sedimentation and floatation technique for coprological examination. The study revealed that of the 200 samples examined, 132 samples (66%) were found to be positive for gastrointestinal parasites covering seven genera. The most common parasites were found to be *Eimeria sp. (59.5%), Strongyle sp. (33.5%), Trichuris sp. (23%), Haemonchus sp. (14.5%), Strongyloides sp. (13.5%), Trichostrongylus sp.* (9%) and *Fasciola sp.* (4%). Altogether one genera of protozoa and six genera of helminths parasites were found. There was no significance difference between age wise and sex wise prevalence. Single infection was recorded as the highest (54.54%) followed by double (34.09%), triple (7.57%) and multiple (3.78%). From questionnaire survey some common risk factors were recorded during the study period, which were poor farm management system, contaminated food and water, ingestion of contaminated grasses, ingestion of moist aquatic plant near the river and grazing on contaminated field. These factors help to increase the gastrointestinal infections in Goats.

Keywords: Cestodes, Gastrointestinal, Nematodes, Parasites

INTRODUCTION

Livestock is a group of domesticated animals that is reared in an agricultural setting (Azlan *et al.*, 2018). Livestock plays a crucial role in the economy of developing country like Nepal. Goat farming is an additional source of income mostly in the rural area. Goat is one of the important livestock of our country. The

importance of goat farming is that it satisfies the need as a meat product. Meat of goat is rich in protein, the body building constituent of our diet. Excreta of goat is used as manure in the agricultural fields and garden. Goat has a life span of 8-15 years. The weight of goat is approximately 20-100 kg. The gestation period is 145-155 days (Pathak,2011). A parasite is an organism that lives on or within another living organism. Parasites are classified as ectoparasite and endoparasite on the basis of them live on body cavity or inside the body.

General objective of the study was to determine the prevalence of gastrointestinal parasites in goats of Malarani Rural Municipality-1, Arghakhanchi, Nepal. This study has been focused on the gastrointestinal parasites in goats of Malarani Rural Municipality. Goat farming is major source of financial resource of villagers. The infection of gastrointestinal parasite can cause significant economic loss leading to poor health. This study will be helpful to formulate effective control strategies against gastrointestinal parasites in goats for the development of strategic deworming program. In this study an effort has been made to identify the prevalence of gastrointestinal parasites. Moreover, the present study may be helpful for the future researchers and investigators to advance their knowledge.

MATERIALS AND METHODS

Study area

Arghakhanchi district lies in province number five of Nepal with total area of 1,193 sq.km. The altitude of the district varies from 305 to 2,515 meter above the sea level. 68% of the district is in the Mountainous Mahabharat Range and the rest is Siwalik Hills. The district head quarter is Sandhikharkha. The study was conducted in Malarani Rural Municipality-1, Arghakhanchi district.

Stained smear preparation

Preparation of smear is required for many laboratory procedures. The purpose of making smear is to fix the parasitic cysts/ova/eggs onto the slide. It is useful to study the nuclear character and identification of protozoan cysts. A small portion of fecal sample was picked up with a clean bamboo toothpick and emulsified with Lugol's iodine solution on a clean glass slide and covered with a cover slip. The smear was examined under compound microscope at 10X and40X.

Concentration methods

The concentration procedures include floatation and sedimentation techniques for the detection of eggs/cysts/trophozoites/larva of parasites (Soulsby, 1982; Zajac and Conboy, 2012). In case of heavy infection, parasites can be easily seen in smears but in case of light infection it is difficult to detect the parasitic form in

smears or mounts. Hence, in the study, concentration method (Floatation and Sedimentation) were carried out.

Identification of oocysts, eggs and larvae of parasites

Oocysts, eggs and larvae were identified on the basis of morphological characters (shape and size) by using Soulsby (1982), other published and unpublished articles and also from internet sources. Calibration obtained using ocular and stage micrometer was used to measure length and breadth of eggs, oocysts.

Determination of age and sex of goats

Direct observation and questionnaire survey were carried out for identification of sex and age of goats respectively.

Determination of parasitic intensity

Intensity of gastro-intestinal parasites was calculated depending on the number of eggs/oocysts and larvae found per gram.

- Light infection= <2 eggs/oocysts/larvae per gram
- Mild infection= 2-4 eggs/oocysts/larvae per gram
- Moderate infection= 4-6 eggs/oocysts/larvae per gram
- Heavy infection= > 6 eggs/oocysts/larvae per gram

Questionnaire survey

Questioners were prepared for farmers in Malarani Rural Municipality-1, Arghakhanchi which asks them about grazing site; either forest, riverside, field or zero grazing, farm management system; either good (well-managed, clean, separate site for stool collection from loafing shed), medium (separate loafing shed from house but no separate site for stool collection) or poor (Unmanaged farming, direct association with other animals),

Data analysis

Since, the study was focused on identification of different intestinal parasites, the data were analyzed by using MS-Excel 2007 and statistical analysis was performed using "R", version 3.5.2 with chi-squared test. In all cases 95% confidence interval (CI) and $P<0.05$ was considered for statistically significant association

RESULTS AND DISCUSSION

Results

General prevalence of gastrointestinal parasites in goats

Of the 200 dropping samples of goats, 132 (66%) samples were found to be positive for gastrointestinal parasitic infection in goats of Malarani Rural

Municipality-1, Arghakhanchi, Nepal.

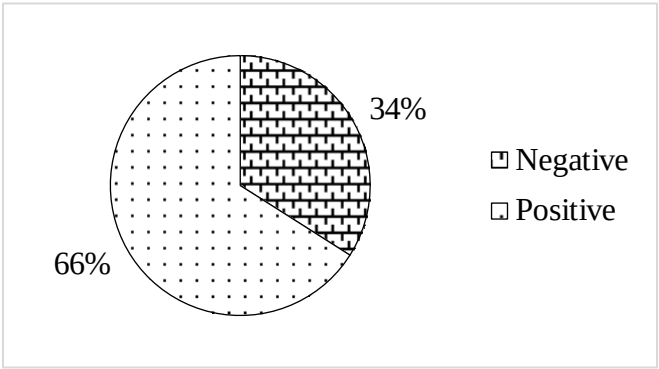

Figure 1. General prevalence of gastrointestinal parasite

Class-wise prevalence of gastrointestinal parasites

Out of the 200 samples examined, seven genera of parasites including one protozoan, one trematode and five nematodes were identified as gastrointestinal parasites. Prevalence of sporozoan was found to be 59.5%, nematode 52.50% and trematode 4%.

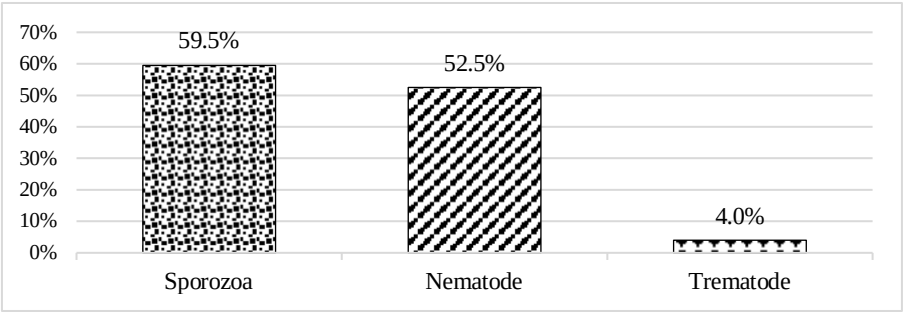

Figure 2. Protozoan and helminth wise prevalence

Genera-wise prevalence of gastrointestinal parasites

Among 200 goat dropping samples examined, 132 (66%) samples were found to be positive with one or more species of parasites. All age groups were affected. The most common parasites found were *Strongyle* sp. (33.5%), *Trichuris* sp. (23%), *Haemonchus* sp. (14.5%), *Strongyloides* sp. (13.5%), *Trichostrongylus* sp.. (9%), *Fasciola* sp. (4%) and also protozoan parasites *Eimeria* sp. (59.5%).

Age-Wise Prevalence of Gastrointestinal Parasites

Age-wise prevalence of protozoan infection

In this study 200 samples were collected, 91 from adults (>8 months), 69 from young(4-8months) and 40 from kids (2-4 months). 52 adults (57.14%), 45 young (65.21%) and kids22 (55%) were infected with one or more parasites. The prevalence of age-wise prevalence of protozoan infection is summarized in table 3 which shows that ($\chi 2$=1.481,df= 2, p-value = 0.476, i.e. p > 0.05), there is no significant difference in age wise prevalence between kids, young and adults in protozoan infection.

Table 1. Genera-wise prevalence of gastrointestinal Parasites

SN	Class	Genera	No. of infected Samples	Prevalence (%)
1	Protozoa	*Eimeria sp.*	119	59.5
2	Trematoda	*Fasciola sp.*	8	4
3	Nematoda	*Strongyle sp.*	67	33.5
		Trichuris sp.	46	23
		Haemonchus sp.	29	14.5
		Strongyloides sp.	27	13.5
		Trichostrongylus sp.	18	9

Table 2. Age-wise prevalence of protozoan infection

Age	**Total sample**	**Total positive**	**Prevalence (%)**
Kids	40	22	55
Young	69	45	65.21
Adults	91	52	57.14
Total	200	119	59.5

Age-wise prevalence of helminths infection

From the table 3, the prevalence of helminths infection in this study did not show any statistical significance ($\chi 2$ =1.727, df = 2, p-value = 0.42, i.e. p > 0.05), in relation to age of the goat's infection.

Table 3. Age-wise prevalence of helminths infection

Age	**Total sample**	**Total positive**	**Prevalence %)**
Kids	40	20	50
Young	69	43	62.32
Adults	91	50	54.94
Total	200	113	56.5

Sex-wise prevalence of protozoan

From the microscopic examination of 200 total samples, 49 males and 70 females

were found to be positive for one or more parasites. The prevalence of protozoan infection in males and females has been summarized in table 5.

Table 4. Sex-wise prevalence of protozoan

Sex	Total sample	Total positive	Prevalence (%)
Male	79	49	62.02
Female	121	70	57.85
Total	200	119	59.50

There is no significant difference in sex wise ($\chi 2 = 0.194$, df = 1, p-value = 0.659, i.e. $p > 0.05$), prevalence in protozoan infection.

Sex wise prevalence of helminths

As per the result of total samples examined, 43 males and 70 females were found infected with one or more parasites. The prevalence of helminths infection in males and females is summarized in table 6 and there is no significant difference in males and females ($\chi 2 = 0.109$, df = 1, p-value = 0.74, i.e. $p > 0.05$), prevalence in helminths infection.

Concurrent parasitic infection in goats

The results revealed that, single infection was found to be higher (n = 52) than double infection, (n = 48), triple infection, (n = 26) and multiple infection (n = 6). Single infection was found highest in *Eimeria* sp., Double infection was found highest in *Eimeria* sp. and *Strongyle* sp.

Table 5. Sex wise prevalence of helminths

Sex	Total Sample	Total positive	Prevalence (%)
Male	79	43	54.43
Female	121	70	57.85
Total	200	113	56.5

Table 6. Concurrent parasitic infection in goats

S. N.	Type of infection	Total 132 (100%)
1.	Single	52 (39.39%)
2.	Double	48 (36.36%)
3.	Triple	26 (19.69%)
4.	Multiple	6 (4.54%)

Intensity of infection

Most of the parasites of goats revealed that light infection with 94.5% while almost six species of parasites revealed mild rate of intensity i.e. 87%, Only four species of parasites were found to be positive for moderate infection i.e. 23% and

two species revealed heavy infection 1.5%.

Table 7. Intensity of infection during study period

Class	Parasites	Light (+)	Mild (++)	Moderate (+++)	Heavy (++++)
Sporozoa	*Eimeria* sp.	60 (30%)	50 (25%)	7 (3.5%)	2 (1%)
Trematode	*Fasciola* sp.	8 (4%)	_	_	_
Nematode	*Strongyle*	20 (10%)	36 (18%)	10 (5%)	1 (0.5%)
	Trichuris sp.	10 (5%)	20 (10%)	16 (8%)	_
	Haemonchus sp.	17 (8.5%)	7 (3.5%)	5 (2.5%)	_
	Strongyloides	8 (4%)	19 (9.5%)	_	_
	Trichostrongylus sp.	11 (5.5%)	7 (3.5%)	_	_

Note: Light infection = <2 eggs/oocysts/larvae per gram Mild infection = 2-4 eggs/oocysts/larvae per gram Moderate infection = 4-6 eggs/oocysts/larvae per gram Heavy infection = > 6 eggs/oocysts/larvae per gram.

Table 8. Assessment of practices and knowledge of farmers on the management of goat

SN	Questionnaires	N=50	Percentage
1.	Grazing site	Zero grazing Forest grazing Riverside grazing Field grazing	_ 50 30 20
2.	Provision of clean water	Yes Sometimes No	30 50 20
3.	Drug availability	Vet. pharmacy Open market Others	90 10
4.	Taking care of side goats	Self Vet. Hospital Traditional healer	10 80 20
5.	Types of drugs used	Allopathic Ayurvedic	80 20
6.	Knowledge about internal parasites in goats	Yes No	30 70
7.	Knowledge on harmful effect of Anthelminthic drug	Yes No	40 60
8.	Drug availability	Vet Pharmacy Open market From others	90 10
9.	Season of infection	Summer Winter All year around	70 20 10
10	Farm management	Good Medium Poor	20 30 50

Discussion

The present study was carried out to determine the prevalence of gastrointestinal parasites of goats. This study was carried out in the month of February/march. The sample was collected from Malarani Rural Municipality-1, Arghakhanchi district. From the present study out of 200 samples 132 (66%) were found positive. It is well known that the intestinal parasites are cosmopolitan in distribution and all animals whether humans, domestic animals or wild animals bear different kinds of parasites. It can be said that the prevalence of any gastrointestinal parasites is influenced by the climatic conditions and geographic factors. Generally, the warm and humid conditions, continuous rainfall throughout the year which prevail in much of South-East Asia, provide good conditions for many gastrointestinal parasites to flourish that means there is no season during which the parasites are not problem (Tiya *et al.*, 2008).

In the present study 66% of the goats from study area were found to be infected with one or more gastrointestinal parasites. One genera of Protozoa, one genera of trematode and five genera of nematode was found. Among protozoa *Eimeria* sp. was found and in trematode *Fasciola* sp. was found. Among nematodes *Strongyle*, *Trichuris*, *Haemonchus*, *Strongyloides* and *Trichostrongylus* were found. The prevalence of protozoan *Eimeria* sp. (59.5%), trematode genera found in goat was *Fasciola* sp. (4%). In the nematode *Strongyle* sp. (33.5%), *Trichuris* sp. (23%), *Haemonchu s*sp. (14.5%), *Strongyloides* (13.5%), and *Trichostrongylus* (9%) were found. The overall prevalence of helminths parasites among goats under traditional husbandry system in South East Nigeria (Opera *et al*., 2005) of which nematode infection revealed 78.4%, trematode13%. The present study was little bit similar to this study i.e. nematode infection 52.5% and trematode 4%.The presence of oocyst of *Eimeria* sp. was observed in goats of different countries (Radavelli*et al*.,2011, Jimenez *et al*., 2007, Idris *et al*.,2011), nine species (Heidari *et al*.,2014) from Iran. In present study since oocyst were not cultured, so species couldn't be identified hence *Eimeria* sp. has been broadly differentiated into two types (*Eimeria* with micropyle and *Eimeria* without micropyle) on the basis of morphological structure. Goats of Malarani were found to be infected with 59.5% out of 132 positive samples which is higher in higher in comparison to 27.1%, 50%, 57.5% and 22.4% revealed by Gupta and Chabra (1990) and Kaur and Kaur (2008), but lower than the 89.54% and 94.7% (Jimenez,2007) and Purja (2015), respectively. The result of present study sample infected with *Eimeria* sp. is 59.5% which is almost similar to 60.83% revealed .

CONCLUSION AND RECOMMENDATIONS

Seven different genera of parasites were observed in the present study which are as follows protozoans; *Eimeria* sp.(59.5%and among trematodes *Fasciola* sp. (4%) and among nematodes *Strongyle* sp. (33.5%), *Trichuris* sp. (23%), *Haemonchus* sp. (14.5%), *Strongyloides* sp. (13.5%), *Trichostrongylus sp.*. (9%).There was no significance difference between age wise and sex wise prevalence(i.e. $p>0.05$)in both protozoan and helminths parasites.

- The presence of infection in the goats was found and studied in season of February in this period temperature was moderate which was suitable for the development and survival of parasites. Some common risk factors observed during the study period were contaminated food and water, ingestion of contaminated grasses, ingestion of moist aquatic plant, contaminated vegetables, ingestion of green grasses near the river, grazing on contaminated field, contaminated soil feeding. Examination of soil and water sample from the grazing site should be carried out so as to confirm the possible risk factors of parasite transmission.
- Coccidiosis is a major problem in these goats hence mass treatment program is needed against it and must be initiated regularly.
- Knowledge on intestinal parasite of goat seems poor among farmers hence regular training of goat farming focused on disease aspect should be provided to goat farmers.

REFERENCES

Acharya, R.M. (2008) Study on GI parasite of goats and sheep of IAAS livestock farm. *Bulletin of veterinary science and animal husbandry*, 27: 35-39.

Azlan, M.M., Yusaf, M.A., and Maradhiah .M. (2018) Identification of gastrointestinal helminths infection from goats isolated in a farm Kuantan Pahang, Malaysia. *Journal Technology.*

Bandyopadhyay, S., Devi, P., Bera, A., Bandyopadhyay, S. and Bhattacharya, D. (2010) Prevalence of gastrointestinal parasite in goats in Shillong, Meghalaya, India. *Web med Central parasitology*, 1(9): wmc 00777.

Bashir, B.K. (2009) *Seasonal prevalence of intestinal helminth parasites of goat (Capra hircus) of Khasi Bajar, Kalanki, Kathmandu,* M.Sc. Thesis. Central Department of Zoology, Tribhuvan University, Kathmandu, Nepal.

Boray, J.C. (1985) Flukes of domestic animals. In Gaffar, S.M., Howord W.E., Marshre, editors. Parasites, Pests and predators. New York: Elsevier 179.

Bowman, D.D. (1999) *Georgis Parasitology for Veterinarians*, 7th Edition. W.B. Saunders. Philadelphia.

Chaubisa, S.L. and Jaroli, V.J. (2013) Gastrointestinal parasitic infection in diverse species of domestic ruminants inhabiting rural areas of Southern Rajasthan India.

Journal of Parasitic Diseases, 37(2):271-275.

Chaudhari, S.S., Gupta, S.K., Banerjee, D.P., Bhatnagar, P.K., and Ruprah, N.S. (2003) General helminthology. *Manual of Veterinary helminthology*. Internal book distribution Company, Lucknow, India, 1:10-184.

Das M, Laha R, Goswami A, Sen A. (2017) Gastrointestinal Parasitism of goats in hilly region of Meghalaya, India, *Veterinary World*, 10(1):81-85.

Devi, R. (2012) *Seasonal prevalence of helminth parasites in buffaloes of Pokharathok VDC in Arghakhanchi, Nepal*. M.Sc. Thesis. Central Department of Zoology, Tribhuvan University, Kathmandu, Nepal.

Dhakal, I. P. and Kharel. M. (1998) Common disease of livestock in Chitwan district of Nepal. *Journal of Institute of Agriculture and Animal Science*.