

Gastro-intestinal Parasites in Goat (*Capra hircus*) of Puranchaur VDC, Pokhara

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Abstract: The present study was conducted to assess the prevalence of gastrointestinal parasites of goat. A total of 220 fecal samples were collected of which 110 in summer and 110 in winter from Puranchaur VDC of Pokhara and examined by direct smear and flotation technique. The samples were collected in the month of January/February and June/July. A questionnaire survey was conducted among 100 farmers randomly regarding goat diseases and use of anthelmintics. Prevalence of protozoan and helminth were found to be 100% in goat. Altogether 13 genera of gastrointestinal parasites were found in the present study among the porotozoan, sporozoan (89.54%) showed higher prevalence followed by sarcodina (31.81%). Among helminth parasites, two were trematodes *Fasciola* sp. (8.18%) and *Paramphistomum* sp. (4.09%), 2 were cestodes *Taenia* sp. (4.09%) and *Moniezia* sp. (18.18%) and seven were nematode in which *Toxocara* sp. (68.18%) showed the highest prevalence followed by *Bunostomum* sp. (35%), *Oxyuris* sp. (30.45%), *Trichuris* sp. (12.27%), *Strongyloides* sp. (7.27%), *Trichostrongyloid* sp. (5.45%), *Nematodirus* sp. (4.54%). During the study different type of parasitic infections were encountered in goats. Multiple infection was observed in 202 (91.81%) samples and single infection in 18 (8.18%) samples. Statistically there was no significant difference in the seasonal prevalence of gastrointestinal parasites during two seasons in goats. Most of the farmers were not aware of the gastrointestinal parasitic diseases. There should be awareness programme for farmers to enhance the goat farming and increase productivity.

Keywords: Goat; intestinal parasites; *Bunostomum*; Nepal; season

1. INTRODUCTION

The domestic goat is among the earliest animals domesticated by humans. They are distributed worldwide with higher concentrations in tropical areas and in dry zones (Di Cerboet *et al.*, 2010). Goats are primarily reared for meat and manure and regarded as the second important animal species (first being buffalo) for generating their cash income by farmers (Gatenby *et al.*, 1990). As such the diseases of these animals are of great economic importance to humans.

Gastrointestinal parasitism is one of the most important diseases of goats, especially nematode infections which are among the major health problems limiting its productivity (Dimander *et al.*, 2000 and Johannes *et al.*, 2009). However, trematode (flake) and cestode (tapeworm) parasites may also contribute to detrimental worm burdens in animals (Rahmann and Seip 2006). Protozoan diseases like amoebiasis, giardiasis, coccidiosis has been reported from different countries like Thailand, Costa Rica, India (Jittapalpong *et al.*, 2011, Jimenez *et al.*, 2007, Kaur and Kaur 2008) etc. Some of the common diseases of goats are viral diseases eg. foot and mouth diseases (Gibbens *et al.*, 2001), blue tongue diseases (Conraths *et al.*, 2009) and goat pox (Kitching 2003) etc. The goats also suffers through various bacterial diseases e.g. pleuropneumonia (Thiaucourt and Bolske 1996) etc. funguses eg. facial ezyma (Phua *et al.*, 2001) etc. Nutritional problems are the largest single cause of poor performance, particularly mineral and protein deficiencies (Akerejola *et al.*, 1979).

The prevalence of gastrointestinal helminths is related to the agro-climatic conditions like quantity and quality of pasture, temperature, humidity and grazing behavior of the host (Pal and Qayyum 1993). Seasonal prevalence of gastrointestinal parasites is higher during the warm-rainy season than in the dry-cold season. This might be related to the availability of browse and a longer browsing time

in the warm-rainy season by the host (Pathak and Pal 2008) and sufficient moisture and temperature, which create favorable conditions allowing for the larval development, oocyst sporulation and survival of the infective stage larva (Faizal and Rajapakse, 2001). Furthermore, the increased browsing time increases the chance of contact between the host and parasites (Ouattara and Dorchies 2001). Higher infection during rainy season may also be attributed to suitable molarity of salt present in soil, an important factor for ecdysis (Soulsby 1966). Low prevalence in winter season may be due to reduced grazing hours of the animals, which helps in reducing the chances of contact between host and parasites (Katoch, et.al.2000).

Economic losses are caused by gastrointestinal parasites in a variety of ways: they cause losses through lowered fertility, reduced work capacity, involuntary culling, a reduction in food intake and lower weight gains, lower milk production, treatment costs, and mortality in heavily parasitized animals (Lebbie 1994).

2. MATERIALS AND METHODS

The present study was carried out in goats of Puranchaur VDC of Pokhara. A total of 220 stool samples were collected of which 110 in summer and 110 in winter and preserved in 2.5% Potassium dichromate and the samples were transported to parasitology laboratory of Central Department of Zoology, Kirtipur, Kathmandu and examined by floatation and sedimentation method for detection of gastrointestinal parasites of goats.

Flotation method is used widely for detecting eggs of nematodes and cestodes. As their eggs are lighter and small, they can float in the flotation liquid. Approximately 3 gm of faecal sample was taken in a beaker and added 15 ml of water then the sample was grinded lightly with the help of motor and pistle and filter the solution by tea strainer. The filtrate solution was poured into a centrifuge tube of 15 ml and centrifuged at 1000 rpm for 5 minutes. The tube's water was replaced with saturated sodium chloride solution and again centrifuged. After centrifuge more saturated sodium chloride solution was added to develop convex surface at the top of the tube and one drop of methylene blue (to stain) where a cover slip can be placed for a few minutes and then cover slip was removed and placed on a slide and examined at 10X and 40X. Photographs of cyst, eggs and parasites were taken and identified based on egg's color, shape, and size.

Sedimentation method is used for detecting trematodes eggs as they are but heavier than the other eggs. Saturated salt solution was removed gently from the test tube after examined the flotation portion and pour the sediment content into the watch glass and stirred the content gently to mixed it. One drop from the mixture was taken to prepare a second slide. The specimen was stained with iodine wetmounts solution.

In this way two slides were prepared from one sample (one from flotation and one from sedimentation) were examined under 10X and 40X of microscope to detect eggs of helminthes and trophozoites or cyst of gastrointestinal protozoans. While identified by the size and shape of the cyst, egg and larva of the parasites along with published literature.

3. RESULT

Out of 220 stool samples examined 220(100%) were found to be infected with one or many types of gastrointestinal parasites.

Seasonal prevalence of protozoan parasites

Among 110 samples examined each during winter and summer revealed maximum 78(70.90%) infection with *Eimeria* sp. without micropile compared to winter 65(59.09%) but difference is not statistically significant ($\chi^2=3.37$, $p=.066$, $d.f=1$). In case of *Eimeria* sp. with micropile, maximum 55(50%) infection was revealed during summer than in winter with 48(43.63%). The difference in the prevalence was found to be insignificant ($\chi^2=.89$, $p=.344$, $d.f=1$) (Figure 1).

Only one genera of Sarcodina i.e. *Entamoeba* sp. was observed during the study and the prevalence was found to be 70(31.81%) out of 220 samples (Fig 1). The difference in the seasonal prevalence was found to be statically insignificant ($\chi^2=.08$, $p=.772$, $d.f=1$).

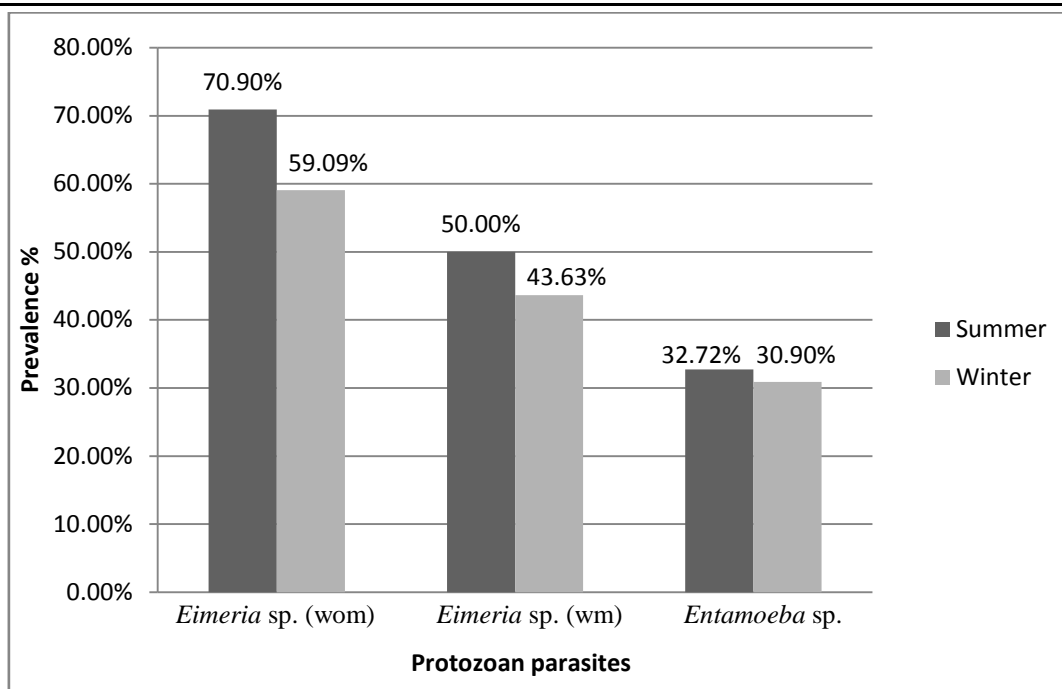


Figure 1. Seasonal Prevalence of Protozoan Parasites

Maximum (91.82%) samples were found positive for nematode parasites followed by trematode (12.27%) and cestode (22.7%). Among them *Toxocara* sp. (68.18%) showed the highest prevalence and lowest by *Taenia* sp. and *Paramphistomum* sp. i.e. (4.09%). The seasonal prevalence of helminth parasite was higher in summer (95.45%) than winter (88.18%). (Figure 2).

Trematodes parasites

Two different genera of trematode parasites were observed infecting goats among 12.27% positive samples. *Fasciola* sp. (8.18%) showed higher prevalence than *Paramphistomum* sp. (4.09%). Difference in the seasonal prevalence of trematode parasites ($\chi^2=3.65$, $p=0.56$, $d.f=1$), and *Paramphistomum* sp. ($\chi^2=.00$, $p=1.0$, $d.f=1$) was found statistically insignificant, whereas the difference was statistically significant for *Fasciola* sp. ($\chi^2=4.6$, $p=.031$, $d.f=1$), in between two seasons. (Figure3).

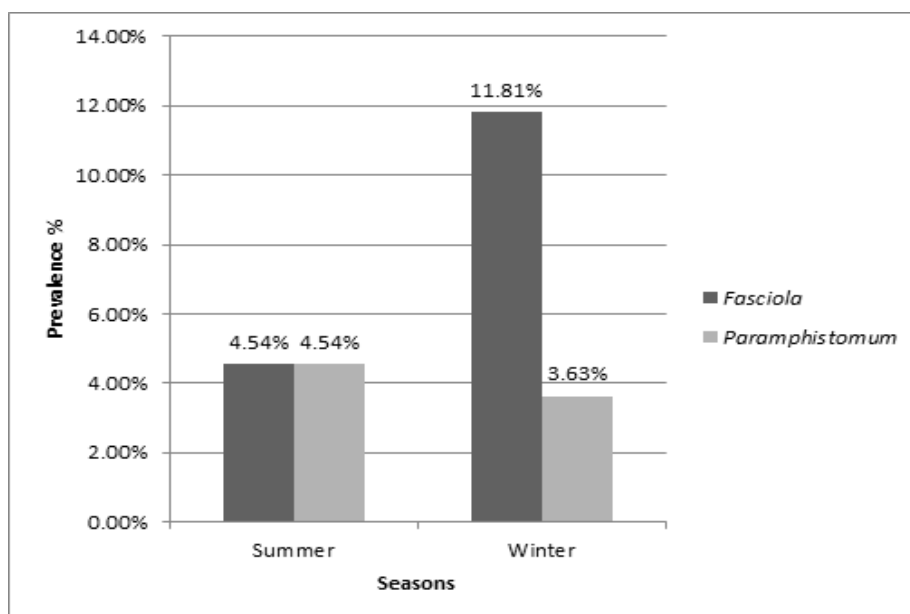


Figure 2. Seasonal prevalence of Trematode genera in goats

Cestodes parasites

Out of 220 samples examined, the goats were found to be infected with two species of cestodes parasites (*Moniezia* sp. and *Taenia* sp.). The study showed a higher prevalence of *Moniezia* sp. (18.18%) as compared to *Taenia* sp. (4.09%). Statistically there was no significant difference in the seasonal prevalence of cestode parasites ($\chi^2=0.93, p \leq 0.334, d.f=1$), *Moniezia* sp. ($\chi^2=0.47, p \leq 0.493, d.f=1$) and *Taenia* sp. ($\chi^2=0.41, p \leq 0.517, d.f=1$) respectively. (Figure 5)

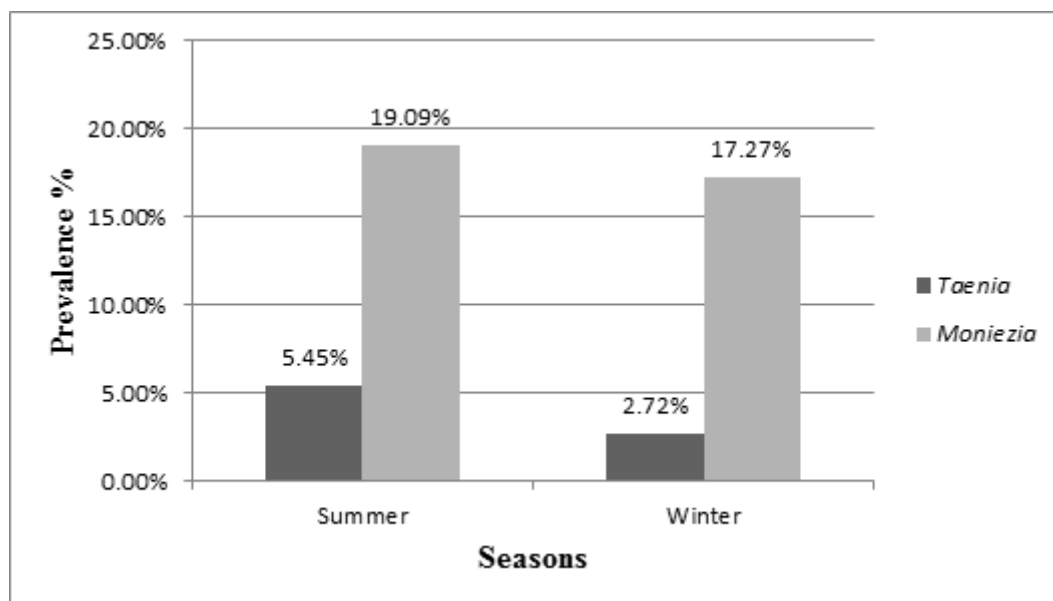


Figure 3. Seasonal prevalence of cestode genera in goats

Nematode parasites

A total of seven different nematode parasites were observed in 91.82% positive samples. Among them *Toxocara* sp. (68.18%) was the most prevalent nematode in goats followed by *Bunostomum* sp. (35%), *Oxyuris* sp. (30.45%), *Trichuris* sp. (12.27%), *Strongyloides* sp. (7.27%), *Trichostrongyloid* sp. (5.45%), *Nematodirus* sp. (4.54%). Difference in seasonal prevalence of nematode parasite was statistically significant ($\chi^2=6.37, p=0.012, d.f=1$). Parasitic association between summer and winter revealed insignificant for *Bunostomum* sp. *Nematodirus* sp. *Oxyuris* sp. *Trichostrongyloid* sp. and *Strongyloides* sp. While there was significant association for *Trichuris* sp. and *Toxocara* sp.

Table 1. Seasonal prevalence of Nematode genera

S/N	Name of genera	Summer N=110	Winter N=110	p value
1	<i>Bunostomum</i> sp.	34(30.09%)	43(39.09%)	$p \leq 0.867$
2	<i>Nematodirus</i> sp.	6(5.45%)	4(3.63%)	$p \leq 0.517$
3	<i>Oxyuris</i> sp.	35(31.81%)	32(29.09%)	$p \leq 0.884$
4	<i>Trichostrongylus</i> sp.	4(3.63%)	8(7.27%)	$p \leq 0.235$
5	<i>Strongyloides</i> sp.	8(7.27%)	8(7.27%)	$p \leq 0.604$
6	<i>Trichuris</i> sp.	7(6.36%)	20(18.18%)	$p \geq 0.012$
7	<i>Toxocara</i> sp.	91(82.72%)	59(53.63%)	$p \geq 0.000$

During the study different type of parasitic infections were encountered in goats. Multiple infection 202 (91.81%) was found to be higher than single infection 18 (8.18%).

4. DISCUSSION

The present study was carried out to determine the seasonal prevalence of intestinal helminthes parasites of goats. It can be said that the prevalence of gastro intestinal parasites is considerably influenced by the climatic conditions and geographical factors. Generally the warm and humid conditions, Continuous high rainfall throughout the year which prevail in much of South-East Asia, provide good conditions for many gastro intestinal parasites to flourish that means there is no season during which the parasites are not a problem. (Tiyo *et al.*, 2008). In the present study all the goats of Puranchaur V.D.C. were found to be infected with one or more species of gastro-intestinal parasites, 94.09% samples were found to be infected with protozoan parasites where as 91.82% of the goats were found to be infected with helminth parasites. In present study, since oocyst were not cultured,

species couldn't be identified hence *Eimeria* sp. has been broadly differentiated into two types (*Eimeria* with micropile and without micropile) on the basis of morphological structure.

Goats of Pokhara were found to be infected with 197 (89.54%) of coccidian parasites which is higher in comparison to 27.1%, 50%, 57.5% and 22.4% revealed by Gupta and Chabra (1990) and Kaur and Kaur (2008), Rehman *et al.*, (2011) and Gebeyehu *et al.*, (2013) but lower than 93.7% Jimenez *et al.*, (2007) in goat and sheep of Costa Rica respectively. Infection with sarcoda parasites revealed 70(31.81%) positivity for *Entamoeba* sp. which is comparatively similar to 33.04% observed by (Jittapalapong *et al.*, 2011) from Thailand, but higher than 1.84% and 3.2% recovered by (Radavelli *et al.*, 2014) from Brazil and Tanzania (Mhoma *et al.*, 2011). The trematodes observed in the goats of study area were *Fasciola* sp. and *Paramphistomum* sp. Fasciolopsis and paramphistomosis are two important parasitic diseases in farmed livestock all over the world where they causes huge losses to production (Wamae *et al.*, 1998 and Mage *et al.*, 2002).

Overall prevalence rate of cestodes in the current study was found to be 49(22.27%). Among Cestodes, *Moniezia* sp. was observed in ruminants by Silvestre *et al.*, (2000) in France, Waruiru *et al.*, (2005) from Kenya, and Gebeyehu *et al.*, (2013) from Korea. The prevalence of *Taenia* sp. in goats of Pokhara was found to be (4.09%) and this parasite has been reported in domestic animals by different researchers like Bashir (2009) in goats, Fakae (1990) in small ruminants, Edosomwan and Shoyemi (2012) in cattles and goats etc.

The overall prevalence of nematodes parasites in the goats at puranchaur V.D.C showed an infection rate of 91.82%. This may be attributed to the temperature and climatic condition of the area, which are suitable for the development of endoparasites. The nematode parasites observed in the study were *Bunostomum* sp., *Nematodirus* sp., *Oxyuris* sp., *Strongyloides* sp., *Trichostrongyloid* sp., *Trichuris* sp. and *Toxocara* sp. The highest prevalence was shown by *Toxocara* sp.

5. CONCLUSION

Goat farming is going popular in Nepal but lack of the commercial farming techniques still it is being practiced by using traditional and conventional methods from centuries. It could be the major cause of heavy economic losses among farmers. The overall prevalence of gastrointestinal parasites was found to be 100%. From the present study it has been concluded that the gastrointestinal parasites in goats are highly prevalent in Puranchaur. Thirteen different genera of parasites were observed in the present study which are as follows protozoans; *Eimeria* sp. (89.54%) and *Entamoeba* sp. (31.81%) among trematodes ; *Fasciola* sp. (8.18%) and *Paramphistomum* sp. (4.09%) among cestodes; *Taenia* sp. (4.09%) and *Moniezia* sp. (18.18%) amongs nematodes; *Bunostomum* sp.(35%), *Nematodirus* sp. (4.54%), *Oxyuris* sp. (30.45%), *Trichostrongyloid* sp. (5.45%), *Strongyloides* sp.(7.27%), *Trichuris* sp.(12.27%)and *Toxocara* sp. (68.18%) amongs nematodes. Among 13 genera *Eimeria* sp. showed the highest prevalence followed by *Toxocara* sp., *Bunostomum* sp., *Entamoeba* sp., *Oxyuris* sp. etc.

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