

A STUDY ON HELMINTH PARASITES IN CHAURIES OF MANANG, NEPAL

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ABSTRACT

Gastrointestinal helminthes parasites create the most important health problem of Chauries in Nepal for limiting their productivity and in some cases their survival. A study on gastrointestinal parasites in chauries of Manang was conducted from November to mid December 2019. Helminth parasites create the most important health problem of Chauries in Nepal for limiting their productivity and in some cases their survival. Altogether a total of 100 faecal samples were collected from Manang in zip lock bags, properly labelled, transported to the Parasitology Laboratory of Himalayan College of Agricultural Sciences and Technology. The samples were examined qualitatively by sedimentation technique and floatation technique for identification of helminths parasites (Soulsby, 1976). Out of 100 samples, 31 (31%) were found to be positive for one or other type of gastrointestinal parasites where 69(69%) samples were negative. The nematode parasites were highest: Strongyle spp 13 (13%), Trichuris spp 9(9%), while trematodes found to be lower; Fasciola spp 5 (5%) and all samples were found to be negative for cestodes. Sex wise higher number of samples were positive in females (36.50%) compared to males (21.62%). Age wise number of samples were positive at >6months of age (41.67%) compared to <6months of age (20%).

Keywords: Age-wise, chauries, helminth parasites, Manang, sex-wise, species-wise

INTRODUCTION

Agriculture plays a pivotal role in Nepalese economy. About 66 percent of the population are involved in agriculture (Pradhanang *et al.*, 2015). Among the agriculture commodities, livestock subsector plays significant role in the agriculture development and economic empowerment of the country. It contributes 24 percent in the National Agricultural GDP (Pradhanang *et al.*,

2015). The Yak is long-haired large bovine with bushy tail, flat-headed and is common in mountainous region of Nepal, Tibet, Bhutan, Northern India, China including Mongolia and Russia. The Yak was listed by Linnaeus as *Bos grunniens*, the same genus as other domestic cattle. A number of scholars had changed this by the middle of the Nineteenth century to *Poepagus grunniens* on closer examination of features distinguishing the yak from *Bos* (Weiner *et al.*, 2003). Chauries are the hybrid off-springs of yak- cattle. These are known for their ability to withstand low temperature, and have potential to survive on coarse fodder at higher altitude where no other ruminants can survive (Katiyar and Sinha, 1982). They are mostly black in color but white and other colors (fawn) are also common. They are very hardy and can thrive on harsh climatic conditions and provide milk, transport, manure and many others products such as tail and hides in low input system (Neopane and Pokhrel, 2005).

Helminth parasites are a major problem in Chauries causing economic losses, primarily through severe weight loss, poor meat, milk and wool production, and impaired reproductive performance. (Joshi, 1982) has reported the incidence of liverfluke in both yak and their cross breeds in Nepal. Similarly, *Fasciola hepatica*, *Echinococcus* cysts and nematodes were found in yaks of Nepal (Weiner *et al.*, 2003). (Shrestha and Bidari, 2013) recorded the prevalence of *Strongyle*, *Eimeria*, *Ascaris*, *Trichuris* and *Amphistomum* in the Chauries of Ramechhap district of Nepal. None of the farmer had ever vaccinated their animals. Chauri raiser are unaware of it. The common ectoparasites infestation in Chauri is tick which is more common in summer. Besides tick, leech infestation during rainy season is common problem. Most of the farmers deworm their animal every 6 months against roundworm, fluke and tapeworm. Few farmers report that they only deworm the animal after sign of loose stool and diarrhoea. However, there are no any research conducted and data found on helminthes parasites in Chauries in Manang. These data may be useful for the planning measures to control gastrointestinal parasitic diseases and to measure impact on productive performance of Yak and Chauri.

National Research Scenario

Qualitative analysis of 44 fecal samples of yaks from Lehe VDC of Manaslu Conservation Area showed the positive for parasite in 36 samples (81.82%). *Strongyle* showed the highest infection (47.23%) while the least was with *Amphistomum* (8.34%). Infection with *Trichuris*, *Ascaris*, *Eimeria* were also reported in the present study. The pattern of infection was both mixed (52.78%) and single (47.23%) (Byanju *et al.*, 2012).

Fifty-two fecal samples of Chauries from Gumdel VDC of Ramechhap district were analysed for study of gastrointestinal (GI) parasites and 47 samples were found positive representing 90.38% prevalence. The mode of infection was either mixed (57.44%) or single (42.55%). Among the gastrointestinal parasites, Strongyle (52%) showed the highest infection followed by *Eimeria* (23.07%), *Ascaris* (19.23%), *Trichuris* (11.53%), and *Amphistomum* (5.76%) (Shrestha and Bidari, 2013).

To determine the prevalence and associated risk factors of gastrointestinal and liver parasites in yak in the cold desert area of the Mustang District, Nepal, fecal samples were collected over a period of three months from 96 yaks from the high Himalayan District of Mustang, Nepal. The samples were tested for the presence of parasites by direct smear, sedimentation, and floatation techniques. Yak herders were surveyed with pre-tested questionnaires by participatory appraisals to explore their knowledge and awareness of parasitic diseases and health management. Examination of fecal samples revealed that 82 were positive for one or more parasites, giving an overall prevalence of 85.42%, in which 6.25% had single and 79.17% had multiple parasitic infections. Animals with poor body condition scores and young age were more susceptible than their counterparts (Acharya *et al.*, 2016).

International Research Scenario

To investigate seasonal prevalence of parasitic infection of yak in two yak rearing districts (West Kameng and Tawang) of Arunachal Pradesh, India showed that out of 895 sample fecal samples, 5.47% samples were positive for protozoa and helminth infections. Infection rate was the highest during spring followed by rainy, autumn and winter seasons. The highest prevalence was of *Strongyle* (51.02%) followed by *Eimeria* (34.69%), *Trichuris globulosa* (14.28%), *Strongyloides* (10.20%), *Dicrocoelium* and *Mammomonogamus laryngeus* (8.16%) *Amphistome spp* and *Toxocara vitulorum* (6.12% each) and *Fasciola gigantica* (4.08%). On necropsy unilocular cysts of *Echinococcus granulosus* and adult worms of *Fasciola gigantica* were isolated and identified. Analysis of data revealed that, infection was more in unorganized herd compared to organized herd (Bam *et al.*, 2012).

Occurrence of gastrointestinal parasites in domesticated yaks of North and East districts of Sikkim was studied during the year 2001 to 2008. Of the 4,792 animals examined, 991 (20.68%) were found positive for different gastrointestinal parasites. The overall occurrence of different parasites recorded was *Strongyles* (17.36%), *Strongyloides spp.* (4.34%), *Coccidia* (4.55%), *Toxocara spp.* (2.25%),

Trichuris spp. (2.88%), *Amphistomes* (0.52%) and *Moniezia spp.* (3.07%). The infestation was more in Sub-Alpine low humid area (29.34%) as compared to Alpine dry zone (19.0%) and Cold Desert zone (10.05%). The faecal egg counts (eggs per gram) of nematodes ranged from 100 to 2 900, with higher loads during rainy and post-rainy seasons. The infection was higher in calf (1–5 months) and the parasites mostly recorded were *Haemonchus spp.*, *Toxocara spp.* and *Eimeria spp.* The seasonal distribution of parasitism indicated a higher percentage of infestation in autumn (26.02%) and summer (21.57%) as compared with spring (20.65%) and winter (13.73%). On copro culture of positive samples, the nematode infestations in order of prevalence were *Haemonchus spp.*, *Bunostomum spp.*, *Oesophagostomum spp.* and *Nematodirus spp.* (Rahaman *et al.*, 2010).

The helminthological survey carried out on ruminants of Ladakh during (Oct.2007 - Sep.2008) revealed that out of the 19 and 14 samples of wild and domesticated yaks examined 9 (47.36%) and 6 (42.85%) were found positive for trematode infection. It was observed that the intensity of infection was higher in wild as compared to domesticated animals. The prevalence of these parasites was found to vary with respect to various factors, viz; season, age, and sex. Of these, the most important factor responsible for the prevalence of helminthes parasites in the both host species (wild and domesticated) was climate. During rainy season the prevalence was higher (47.36%) as compared to the dry season (42.85%). The study also revealed a difference in prevalence with respect to the age of the host. The animals below 3 years were more infected (50.00%) as compared to those who were above three years and below ten years (33.33%). The prevalence of infection was found again increasing 6/11 (54.54%) with respect to the increasing age. The eggs collected from the samples were identified as *Fasciola gigantica*, *Fasciola hepatica*, *Paramphistomum cervi* and *Dicrocoelium dendriticum*. Identification of eggs was done on the basis of various morphological and morphometric characters (Kuchai *et al.*, 2010).

The study (Goswami *et al.*, 2013) in Arunachal Pradesh and Sikkim showed that (26.31%) yaks were found positive in Arunachal Pradesh and (20.00%) Yaks were found positive in Sikkim for gastrointestinal parasitic infection with overall prevalence of 24.13%. The percentage of infection of *Strongyle spp.* and *Eimeria spp.* were 95 % and 10% in Arunachal Pradesh and 75% and 25% in Sikkim, respectively. Mean faecal egg counts of infected yaks in Arunachal Pradesh and Sikkim were 185 and 168 respectively. It can be concluded from this study that, although a moderate percentage of yaks were suffering from gastrointestinal parasitic infections with less faecal egg count which was responsible to contaminate the pasture and aid the spread of infections to healthy yaks.

This study was carried out to study gastrointestinal parasites of migratory Chauries in Manang district, determine sex-wise occurrence, determine age-wise occurrence of gastrointestinal parasites of migratory chauries.

MATERIALS AND METHODS

Study Site

The study was conducted in the Manang district in the western Nepal. It is located at 28°40'0N 84°1'0E with an altitude of 3,519 metres above sea level (11,545 ft). The district, with Chame as its district headquarters, covers an area of 2,246 km² (867 sq mi). Its population density is 3persons/km². This study was carried out during November to mid-December, 2019. The samples were collected from Upper Pisang, Lower Pisang, Humde, Brakha, Manang Village, and some chauri sheds situated at Upper Manang (up to 4000 meters above sea level).

Collection of Samples

Random sampling techniques were used to select the animals for collection of fecal samples in this study. Samples were collected per-rectally using surgical gloves or collected opportunistic fresh fecal samples. Collected sample were kept in labelled, individual, clean sample collecting plastic zip lock bags each sample was labeled with description of the animal which include: name, age, sex. It was preserved with an equal volume of 5%-10% buffered formalin for fixation of samples (Hendrix, 2006). Collected fecal samples were stored inside refrigerator at 4°C until the time of examination if processing was not possible to prevent the development and hatching of the egg (Kassa, et al., 2016). The plastic bags were kept in ice box and transported to parasitology lab of HICAST for laboratory examination.

Qualitative Sedimentation method

The sedimentation technique as described by Soulsby (1978) was used to detect the presence of eggs of parasites in the samples.

Procedure for sedimentation technique

About 3 grams of faeces were grinded with water in mortar and pestle and the suspension was passed through a coarse mesh sieve and the debris was discarded. The filtrate was allowed to stand for 5 min in a beaker. Then, the supernatants was discarded and sediment was re-suspended with water (till the suspension became clear), and allowed to sediment for next 5 minutes. Finally the supernatant was discarded and few drops of the sediment were placed on a grease-free glass slide

and observed under the microscope in low magnification (10X and 40X); Microscopic examination was performed for the detection of eggs of helminthes parasites as described by Soulsby (1978).

Flotation method

The floatation technique is widely used for the detection of nematode and cestode eggs. Eggs of cestodes and nematodes are relatively small and light. This techniques, ensures the eggs to float in the floatation liquid.

Procedure for flotation technique

About 3 g of faecal sample was grinded in mortar and pestle and few drops of water was added and again grinded to make uniform suspension. Then filtered through a tea strainer into beaker. It was then transfer into test tube and added 50ml of floatation fluid, saturated NaCl solution The test tube was tube was placed on test tube stand Cover slip was gently placed on top of test tube And left for 20 min and then cover slip was placed on a slide and examined at 10); Microscopic examination was performed for the detection of eggs of helminth parasites as described by Soulsby (1978).

RESULTS AND DISCUSSION

Overall occurrence of Parasites

Out of 100 faecal samples, 31 samples were found to be positive for one or more type of gastrointestinal parasites where 69 samples were found to be negative.

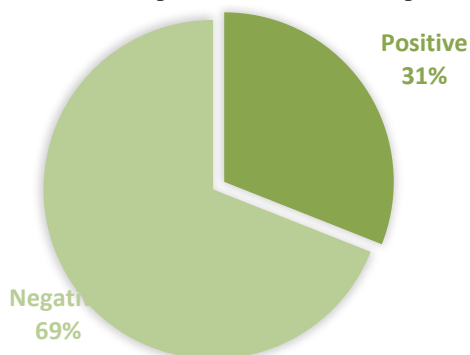


Figure 1. Prevalence of helminth parasite in sampled population

Species-wise occurrence of Parasites

Out of 100 feecal samples examined, the nematode parasites was found to be highest (22%) followed by trematodes (9%) and all samples were found to be

negative for cestodes. The most common parasites encountered were *Strongyle spp.* 13 (13%), *Trichuris spp.* 9 (9%), *Fasciola spp.* 5(5%) and *Paramphistomum spp.* 4 (4%), all samples were found to be negative in cestodes.

Table 1. Species wise occurrence of parasites in the study site

Species	Number Of Positive Samples (%)
<i>Fasciola spp</i>	5 (5%)
<i>Paramphistomum spp</i>	4 (4%)
<i>Strongyles spp</i>	13 (13%)
<i>Trichuris spp</i>	9 (9%)

Age-wise occurrence of parasites

Samples from different age group were collected and studied for gastrointestinal parasites infestation. Age-wise, the highest presence of gastrointestinal parasites were found to be in the group of >6 months 25(41.67%) and lowest in the group of <3months 0 (0%).

Table 2. Age wise occurrence of different parasites

Age (months)	Total Sample	<i>Fasciola spp</i>	<i>Paramphistomum spp</i>	<i>Strongyles spp</i>	<i>Trichuris spp</i>
0-3	10	0	0	0	0
3-6	30	3	1	1	1
>6	60	8	3	6	8

Table 3. Age wise occurrence

Age	Positive Sample (%)
0-3 months	0 (0%)
3-6 months	6 (20%)
>6 months	25 (41.67%)

Table 4. Sex-wise occurrence of parasites in the study population

Sex	Total	Positive	Percentage
Male	37	8	21.62
Female	63	23	36.50

DISCUSSION

The present study was carried out to find out the gastrointestinal parasites in the migratory chauries of Manang district of Nepal. The rate of gastrointestinal parasites is influenced by the climatic conditions, deworming practice, habit and habitat of animals, sanitary condition and feeding. In the present study, the overall occurrence of gastrointestinal parasites was found to be 31%.

Byanju *et al.*, (2012) in Manaslu conservation area found 81.82% positive cases of gastrointestinal parasite in Yaks which is higher than my study, and the higher prevalence may be due to dense stocking of the chauries and no deworming practices plus the samples collected on present study was on winter season where the larvae of the parasites may not hatch easily due to cold climatic conditions. The major reason of low prevalence in present study may be due to extremely cold climatic condition.

Shrestha and Bidari (2013) in Ramechhap found 90% prevalence of the helminthes parasite in chauries which is higher than the present study, which may be due to favorable agro climatic conditions of that place, constant exposure of infestation and availability of infective stage larvae on the grazing ground because of favourable climatic condition and lesser altitude.

Acharya *et al.*, (2016) found the prevalence 85.42% of gastrointestinal and liver parasite in yaks of lower Mustang which is higher than our finding, this may be due to the lack of treatment in the yaks of that area and also may be related to warmer climatic condition and humidity.

Rahaman *et al.*, (2010) found 20.68% prevalence of Helminthes parasites in domesticated Yaks of Sikkim which is similar to present study. But prevalence of trematode was not observed in this study, which might be due to the absence of intermediate host snail in the much cold climatic condition of Sikkim. The composition of different parasites recorded was *Strongyles*, *Strongyloides spp.*, *Coccidia*, *Toxocara spp.*, *Trichuris spp.*, *Amphistomes* and *Moniezia spp.* The infestation was more in Sub-Alpine low humid area (29.34%) as compared to Alpine dry zone ((19.0%) and Cold Desert zone (10.05%). The faecal egg counts (eggs per gram) of nematodes ranged from 100 to 2900, with higher loads during rainy and post-rainy seasons. This finding was may be due to the fact that the study was carried out from 2001 to 2008 which revealed more gastrointestinal parasites in a long duration.

Kuchai *et al.*, (2010) reported the total prevalence of 45.45% of helminths parasite in Ladakh which is higher than our study. The yak of Ladakh both wild and domestic made no exception regarding helminthes infection as is the case with other ruminants of this region. Other ruminants were also infested with the similar types of helminthes parasite. The constant exposure of the domestic ruminants with the Yaks may have spread the infestation.

Goswami *et al.*, (2013) reported the prevalence of 26.31% of helminthes parasite in Arunachal Pradesh, India which is almost similar to the present study. The similarity might be due to similar climatic condition for the parasite epidemiology.

One of the reasons for lower prevalence during this study might be sampling period, which was during the month of November and December. This period is the peak winter season, which is not the main period for helminth infection in the grazing animals in Nepal. Thus, the dry winter season limit development and survival of parasite stages in the environment and as a result, host contact and parasite transmission is also simultaneously reduced. So, this can conclude the low prevalence rate observed during the study. The lower prevalence in this study may be due to the higher altitude and location of my research area. The grazing pasture land of chauries consists of herbal medicinal plants which prevent them from suffering from helminth parasites and those plants might also have acted as a deworming agent. The chauries found in Manang are sometimes acquainted with the other ruminant animals like mountain sheep & mountain goats (*Chyangras*) but the chauries dwell on the higher altitude due to which the transmission of parasites from other animals is minimal. Also the chauries are sometimes dewormed when they severely show some gastrointestinal disorders like diarrhea and constipation so this might have played a major role in reducing the number of positive cases in my study.

CONCLUSION

A total of 31 samples showed positive cases representing 31% positive. During the study, it was found that the farmers were not familiar about helminth parasites of Chauri. However, some farmers were familiar with the deworming of Chauries. The present study indicated that sex and age are important factors which influence the occurrence of gastrointestinal helminth parasitic influence in Chauries. However, the combination of strategic use of anthelmintics with traditional veterinary medicine and good management practice could improve the control of helminth parasitic infection in Chauries.

SUGGESTIONS

This finding shall be taken into account when formulating control strategies for gastrointestinal helminths in *chauries* and other ruminants of that region as well.

It is suggested to carryout detailed study on identification and epidemiology of helminths parasites of Chauri in different areas of country. This may help in developing the strategic control program.

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