ISSN (Online): 2091-2609
DOI Prefix: 10.3126/ijasbt
International Journal of Applied Sciences and Biotechnology (IJASBT)

Research Article

Prevalence of *Haemonchus contortus* in Goats of Western Chitwan of Nepal

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Abstract

The research was done in cross sectional design to study about the prevalence of Haemonchus contortus in goats of Western Chitwan of Nepal. A total of 252 fecal samples were collected through purposive sampling. Fecal samples were examined through sedimentation and floatation method. Egg per gram (EPG) was calculated through Mac Master Counting Technique of positive samples. Total prevalence was found to be 13.89%. Infection of parasite was more prevalent in males (15.18%) than in female (12.86%) but was statistically non-significant (P>0.05). In non-dewormed goats (40.32%), the prevalence was significantly (P<0.05) higher than in dewormed goats (5.26%). The results regarding the relationship between different age groups of goats and H. contortus showed that highest prevalence (14.54%) of parasite was observed in age group of below 1 year and the lowest (12.96%) in age group of above 2 year, statistically non-significant (P>0.05). Maximum goats were found with medium level of infestation through EPG. This study shows higher prevalence of Haemonchus in non-dewormed than in dewormed goats which is statistically significant at (P<0.05). Thus, effective deworming programme and management must be maintained in order to upgrade the health status and maximize the benefits from the animal.

Keywords: Haemonchus; Chitwan; Goats; EPG

Introduction

Agriculture is the main source of livelihood in Nepal and more than 65% people are engaged in agriculture. Livestock contributes about 17% of gross domestic product (DDP) and 25.68% of agriculture GDP (ABPSD, 2014). Livestock farming has great potentialities in Nepal and it is becoming popular among farmers due to fast returns of investment and wide market potentiality. They are reared almost in all parts of country. Haemonchosis is regarded as the major parasitic infection in goats of Nepal. Parasitic diseases of goats are burden for farmers and this view has been further supported by studies showing higher prevalence of parasitic infestation in goat (Karki *et. al., 2012*). The inadequate studies on parasitic infection and lack of appropriate control strategies are the main factors behind large number of goat population harboring parasitic infestation. The loss due to

Article may be cited as:

K. Adhikari *et al.* (2017) Int. J. Appl. Sci. Biotechnol. Vol 5(3): 321-325. DOI: http://dx.doi.org/10.3126/ijasbt.v5i3.18268

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Peer reviewed under authority of IJASBT

death of animal and decrease in population is high in Nepalese context and the problem is overwhelming in small ruminants.

The goat population in Chitwan is around 1.8 million in 2010 as per the report of District Livestock Services Office, Chitwan. They are important component of mixed farming. However, trends have been changed and farmers have opted commercialization. So, the numbers of new and small scale entrepreneurs are increasing in goat farming. Goat farming is undoubtedly a profitable business and means of living for rural people but the problem of gastrointestinal parasite (GI) is always a major constraint. Parasitic nematodes (roundworms) of small ruminants and other livestock have major economic impacts worldwide (Roeber *et al*., 2013). The major parasites of concern differ by the prevailing host animal species and climatic conditions in a particular geographic location and no farm animal species in general is free from GI parasitism.

Helminths parasite in livestock is responsible for impeding productivity in small ruminants in tropics and subtropics. The nutritional requirement of animals is not satisfactory in developing country where nematode infection is proliferating haphazardly. Furthermore, no satisfactory facilities of veterinary care and the favorable environment of tropics have enhanced the nematode growth transmission. Nematode infection is a serious veterinary health concern in Nepal. Nematode infection is mainly characterized by low feed intake and weight gain, compromised immunity, milk reduction and death in complicated infections. However, determination of the degree of nematode infestations depends mainly upon the age of the host, the breed, the parasite species involved, and the epidemiological patterns which include husbandry practices and physiological status of the animals (Tembely *et al.*, 1997). More importantly, environmental conditions such as temperature, rainfall and humidity are conducive to the development of nematode eggs (Menkir *et al.*, 2007) and free-living stages (Tembely *et al.*, 1997).

Farmer suffers huge losses directly due to decreased production and death of goats. The increased cost of control strategies to prevent infestation is also indirect losses. A huge amount of money is invested annually worldwide to combat helminth parasites in livestock (Jabbar *et al.*, 2007). The greatest losses associated with nematode parasitic infestations are subclinical, and economic assessments show that financial costs of internal parasitism are enormous. About 24% of deaths in goats were reported to be due to internal parasites and total economic losses due to GI nematodes in goats were reported to be about 25% (Lohani and Rasaili, 1995).

The prediction of Haemonchosis outbreak is extremely difficult which varies from one year to the next. Barbers pole worm can survive where pasture remains green over summer. Typical situations include perennial pastures and areas of moisture along creeks and around troughs and seepage points. Irrigated pastures pose high risk. Kids, especially of 2-3 months with a low or impaired immunity to worms are highly susceptible to Haemonchosis.

Methodology

The study was carried out from August 2016 to February 2017 at different households of farmers. Observational and a cross sectional study was carried out for assessment where fecal egg count was an ante-mortem means of diagnosing parasite of goats. Questionnaire was prepared about age, sex, deworming status from the collected data; knowledge of the goat owners was analyzed. Purposive sampling was done by taking fresh 252 samples. Samples were collected and kept in clean zip-lock (plastic) bag containing 10% formalin. The bags containing sample were transported to parasitology laboratory of Institute of Agriculture and Animal Science (IAAS) and examined. The qualitative fecal examination was carried out by different methods (sedimentation, differential floatation and quantitative examination) as per Soulsby (1982).

Sedimentation Method

About 3 gram of ground fecal sample was placed in 100 ml beaker and water was added. The mixture was poured through a tea strainer and the material left in the strainer was discarded. After 25 minutes supernatant was discarded and refilled with fresh water until the supernatant was cleared. Then sediment left in bottom was examined under microscope.

Differential Flotation Method

About 3 gram of ground fecal sample was placed in 100 ml beaker and water was added. The mixture was poured into a beaker containing clean water through a tea strainer and the material left in the strainer was discarded. After 25 minutes supernatant was discarded and refilled with fresh water 2-3 times until the supernatant being cleared. Then, the sediment content was mixed with 10-20 times (42ml) of its volume of saturated common salt solution (380 gram of NaCl/ L of water having specific gravity of 1.2). It was allowed to stand in a specimen tube for 30 minute. The surface was touched with cover slip and transferred to a grease free slide and examined under microscope.

Quantitative Examination

Macmaster's counting technique was used for determining egg per gram feces. 3 gram feces were weighed and homogenized adding 42 ml of water using mortar and pestle. Suspension was poured in 3 centrifuge tubes (14 ml each) and centrifuged 2000 rpm for 2 min. Water was removed and sodium salt solution was added prior to straining. Then 0.15 ml mixture (salt and fecal material) was taken with pipette and placed on MacMaster slide, covered with cover slip. Number of eggs counted was multiplied by 100 which represented the EPG of sample.

Statistical Analysis

Data analysis was done by using Statistical Package for Social Science (SPSS). Chi-squared ($\chi 2$) test was used for determining association or non-association of variables. Differences between parameters were tested for significance at probability levels of 0.05. Bar graphs and pie chart were made using MS-Excel 2013.

Result and Discussion

Overall Prevalence

In this study 252 goat samples were collected. Out of these 35 samples were positive for *Haemonchus contortus*. Both sex and age groups were affected. One striking feature was the abundance of Coccidia in the majority of the samples. Prevalence of *Haemonchus contortus* in goat was found to be 13.89%. It is closely equal to 14.5% (Karki *et al.*, 2012) in Kalanki, Kathmandu. The result is more than 3.43% (Tripathi and Subedi, 2015) in Shivraj Municipality 13, Kapilvastu, 9.43% (Pal and Qayyum, 1993) in Swat, Pakistan. The prevalence is less than 20.89% (KC, 2012) in Chitwan, 25.26% (Lashari *et. al.*, 2015) in D.G Khan, Pakistan, 58% in Bangladesh (Nuruzzaman *et al.*, 2012), 44% in Iran (Garedaghi and Bahavarnia, 2013), 60% in Eastern Ethiopia (Sissay *et al.*, 2007) and 77.7% in Multan (Tasawar *et al.*, 2010). The differences in prevalence reported by these studies could be accounted on the basis of differential management practices (Lindqvist *et al.*, 2001; Barger 1999; Mandonnet *et al.*, 2003), natural resistance (Pal and Qayyum, 1992; Soulsby 2005), drug treatment (Ali *et al.*, 1997; Barnes *et al.*, 2001), and local geo-climatic factors (Gupta *et al.*, 1987; Pal and Qayyum, 1993; Chaudhary *et al.*, 2007) and nutrition (Preston and Allonby, 1987; Data *et al.*, 1999). Eggs of Haemonchus contortus in sample observed under 100X microscope is shown in Fig. 1.

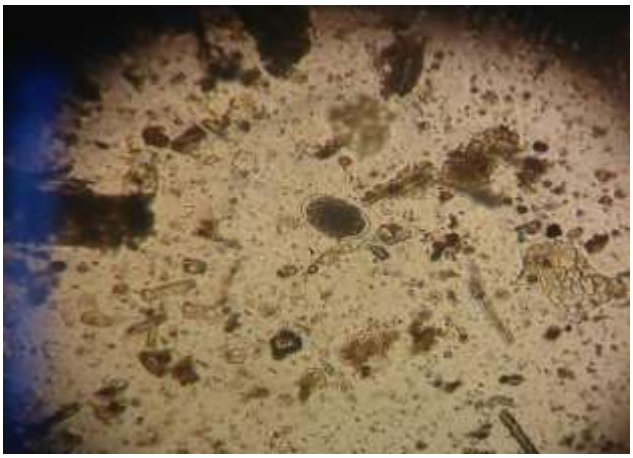

Fig 1: Eggs of *Haemonchus contortus* in sample observed under 100X microscope

Prevalence by Sex

There was no statistical significant difference in the prevalence of *Haemonchus* infection between males and females (P=0.596, P>0.05). Prevalence more in males was might be due to stimulatory effects of estrogen and inhibitory effect of androgens on immune responses. The same factor could be responsible **(**Lashari *et al.*, 2015) (Table 1).

Table 1: Prevalence of *Haemonchus* according to sex

Sex	Total sample	Positive	Negative	Prevalence (%)
Male	112	17	95	15.18
Female	140	18	122	12.86
Total	252	35	217	13.89

Table 2: Prevalence of *Haemonchus* in goats of various age groups

Age (year)	Total sample	Total Positive	Total Negative	Prevalence (%)
Below 1	110	16	94	14.54
1-2	88	12	76	13.64
Above 2	54	7	47	12.96
Total	252	35	217	13.89

Table 3: Prevalence of *Haemonchus* in deworming and non-deworming goats

Deworming status	Total	Positive	Negative	Prevalence (%)
Dewormed	190	10	180	5.26
Non-dewormed	62	25	38	40.32

Prevalence by Age

The prevalence of *Haemonchus* infection in this study did not show any statistical significance trend related to the age of the goats (P=0.959, P>0.05) supported by Tasawar *et al*., 2010. The reason of these results may be due to no strict confinement of young goats and increased chance of infection through grazing (Table 2).

Deworming Wise Prevalence

Prevalence was found to be more in non-dewormed goats than that of dewormed, the study was statistically significant (P=0.000, P<0.05) which was due to the effective deworming (Table 3).

Level of Infestation

Higher percentages of goats were infected with moderate level of infestation, found on EPG. Out of 35 total positive results; 10, 18 and 7 goats were infected with light, medium and high level of infestation respectively (Fig. 2).

Conclusion

Overall prevalence was 13.89%. Deworming was found to be significant in controlling *Haemonchus* infection. The results may not reflect true prevalence as sampling was purposive. However, the study clearly indicates that *Haemonchus* persists in goats of Western Chitwan. Further researches are mandatory. Fecal examination must be done periodically to assess the effect of anthelminthic used. Veterinarians should be consulted before using any anthelmintic for correct dosing to prevent anthelmintic resistance. Farmers should be given awareness generation programs. Replication of such study in large scale and in other areas is to be carried out.

Acknowledgements

The authors are greatly indebted to Office of the Dean of Institute of Agriculture and Animal Science, Rampur, Chitwan for providing financial assistance to carry out this research and we are equally thankful to all the staffs of Department of Microbiology and Parasitology, IAAS, TU for their direct and indirect help. Thanks are also due to Dr. Shyam Bahadur Raut and Mr. Lekhnath Adhikari for necessary help.

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