

## A Study on Prevalence and Pathological Effects of Intestinal Helminths in Black Bengal Goat in Chittagong

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### SUMMARY

Prevalence and pathological effects of intestinal helminths in 150 Black Bengal goats were studied by examining 150 viscera collecting from three slaughter houses of Chittagong district for a period of 6 months in the Parasitology laboratory of Chittagong Veterinary and Animal Sciences University, of which 94.67% goats were infected with intestinal helminths. A total of 3 species of helminth parasites were identified such as *Oesophagostomum columbianum* (92%), *Trichuris ovis* (56.66%), *Moniezia spp* (11.33%). Prevalence of intestinal helminth was significantly higher in winter (100%) than that in rainy (89.33%). Calculated odds ratio in between winter and rainy was 18, which indicated that Black Bengal goats were 18 times more susceptible to helminth infection in winter. Pathological lesions were observed in case of *O. columbianum*, *T. ovis* and *Moniezia spp.* infection. In *O. columbianum* infection hard, raised, slightly yellowish to greenish colored nodules were observed. Microscopically it was characterized by catarrhal inflammation associated with destruction and desquamation of epithelial cells. But moderate infection with *T. ovis* was characterized by catarrhal inflammation along with the petechial haemorrhages on the intestinal mucosa where parasites were firmly attached. The study clearly suggests that Black Bengal goats are susceptible to intestinal helminths in both winter and summer seasons and most of the parasites recovered were associated with the production of variable degree of pathological lesions. That is why proper attempts should be made to control all these parasites.

### Key Words

Prevalence, Pathological effects, Intestinal helminths, Black Bengal Goat

## Chittagong'daki Siyah Bengal Keçilerinde İntestinal Helmintlerin Prevalansı ve Patolojik Etkileri Üzerine Bir Çalışma

### ÖZET

Chittagong Veteriner ve Hayvan Bilimleri Üniversitesi Parazitoloji Laboratuvarında %94.6'sı intestinal helmintlerle enfekte bulunan 150 siyah Bengal keçisinde intestinal helmintlerin prevalans ve patolojik etkilerini ölçmek üzere Chittagong bölgesindeki 3 mezbahadan 6 aylık bir periyotta toplanan 150 viscera örneği çalışıldı. *Oesophagostomum columbianum* (%92), *Trichuris ovis* (%56.66), *Moniezia spp* (%11.33) gibi toplam 3 helmint parazit turu tespit edildi. İntestinal helmintlerin prevalansı kış mevsiminde (%100) yağmurlu (%89.33) sezona oranla belirgin bir şekilde yüksek çıkmıştır. Kış ve yağmurlu sezon arasındaki hesaplanan risk oranı 18'dir, bu da siyah Bengal keçilerinin helmint enfeksiyonuna eğilimi kış mevsiminde 18 kat daha fazladır. *O. columbianum*, *T. ovis* ve *Moniezia spp.* enfeksiyonu durumlarında patolojik lezyonlar gözlenmiştir. *O. columbianum* enfeksiyonunda sert, şişkin ve sarımsı yeşil nodüller gözlenmiştir. Mikroskobik olarak, epitel hücrelerin yıkılmanması ve dökülmesiyle ilgili olarak kataral enflamasyonla karakterizedir. Fakat orta şiddetli *T. ovis* enfeksiyonları parazitin sıkıca yapıştığı intestinal mukoza bölgesinde peteşiyal kanamalarla birlikte kataral enflamasyon ile karakterizedir. Çalışma siyah Bengal keçilerinin hem kış hem de yaz sezonlarında intestinal helmintlere duyarlı olduğu açıkça ortaya koydu. Bundan dolayı, bütün bu parazitleri kontrol etmek için uygun girişimler yapılmalıdır.

### Anahtar Kelimeler

Prevalans, Patolojik etkiler, İntestinal helmintler, Siyah Bengal Keçisi

### INTRODUCTION

In Bangladesh, there are about 34.5 millions of goats (FAO, 2003). About 97.90% of goats are distributed in rural areas and 2.10% in urban areas (BBS, 1986). In addition to its production of high quality of meat, Black Bengal goat provides world famous skin. But goat rearing is hindered by various problems, among them parasitism is an important limiting factor especially in Bangladesh as

because the climatic condition of the country favors the development and survival of various parasites. In fact, goats of Bangladesh are affected by various intestinal helminths (Qadir, 1967; Haq and Shaikh, 1968). These parasites reduce appetite with concomitant reduction of food intake, an increased passage of food through the digestive tract, indirectly may be the cause of decreased food utilization and eventually decrease the synthesis of protein in the skeletal muscle (Soulsby, 1982).

In Bangladesh, parasitic infection is the major cause of hindering the development of livestock population (Jabber and Green, 1983). The climate of Bangladesh is suitable for the parasites, which are to great extent responsible for kid mortality in this country.

The hot and humid climatic conditions in Bangladesh are highly conducive for the development and multiplication of parasites. Anorexia and reduced feed intake coupled with the direct effect of the parasites on the host contribute to reduce weight gain and lowered production (Soulsby, 1982). A number of different studies carried out in different parts of the country revealed that parasitic infections are rampant in livestock (Saifuzzaman, 1996).

So far, except some preliminary observation, very little attention has been paid to determine seasonal prevalence and to study the pathological conditions produced by intestinal helminths in Black Bengal goats in Chittagong.

Therefore, the present research work was undertaken to study prevalence, population dynamics, effects of seasons on the prevalence of intestinal helminths in Black Bengal goats in Chittagong and pathological effects produced by them.

## MATERIALS and METHODS

The investigation was carried out in Chittagong district for a period of 6 months. Animals were selected from three (3) slaughter houses located at Oxygen, Firinghi Bazar and Jhawtolaof Chittagong district. Immediately after slaughter, the intestines were collected and knot was given at the starting of the duodenum and at ending of the rectum. Then the intestines were brought to the laboratory of CVASU packing with a polythene bag as soon as possible. After shifting to the laboratory, the intestines were examined carefully from the parietal surface for detect the gross pathological changes, if any. Then the intestine was cut along the log axis with the help of scissors and the internal mucus membranes were also thoroughly examined. Parasites were collected according to the procedures by Urquhart *et al.* (1996). Collected parasites were washed several times in normal saline, and nematodes were preserved in luke-warm 70% alcohol but trematodes and cestodes were preserved in 10% formalin. Nematodes were identified by preparing temporary slides adding one drop of lactophenol (Cable, 1957) following the keys and descriptions given by Soulsby (1982). Cestodes and trematodes were identified by preparing permanent slides (Cable, 1957) by using the keys and descriptions of Soulsby (1982). After that gross pathological lesions were observed carefully and recorded.

## RESULTS

### Prevalence

From the study it was evident that prevalence of gastrointestinal helminths in Black Bengal goat was very high (94.67%) (Table 1). Similar experiments were conducted by earlier scientists in different breeds of goats in various countries. Hassan (1964) reported that 82.1% goats were positive for helminth infections whereas Patel *et al.* (2001) recorded 54.92% gastrointestinal helminth infection in goats in India. However, this variation in between the present and earlier results might be due to the differences among the geographical locations and climatic conditions of the experimental areas, method of study, sample size, breed of the animals. Bangladesh is a tropical country with hot-humid environment. Here most of the goats are reared in rural areas in scavenging or semi

scavenging system (Devendra, 1970). In this type of rearing, goats graze on the fields. Probably, this type of practice plays a vital role in the high rate of parasitic infection.

**Table 1.** Prevalence and population dynamics of intestinal helminth parasites in Black Bengal goats

Species	Number of animals infected (n: 150)	Prevalence (%)
<i>O. columbianum</i>	138	92
<i>T. ovis</i>	85	56.66
<i>Moniezia spp.</i>	17	10.66
Total	142	94.67

n: No. of animals examined.

Prevalence of *O. columbianum* (92%) was the highest but that of *Moniezia spp.* (10.66%) was the lowest (Table 1). Same type of experiment was carried out by Hassan (1964) who reported that 92.7% goats were positive to *Oesophagostomum spp.* and 10.9% to *Moniezia spp.* infection. Qadir (1967) and Haq and Shaikh (1968) also recorded the high prevalence of *O. columbianum* in goats in Mymensingh district throughout the year. The cause of higher prevalence of *O. columbianum* cannot be explained exactly but it can be assumed that bionomics of this parasite may be associated with this matter. They are abundant on the grass blades especially during the morning and in the evening (Soulsby, 1982). On the other hand, goats are habituated in the eating of grass from the top level (Devendra, 1970). Therefore, chance of gaining infection with *O. columbianum* in Black Bengal goat remains very high. Besides, in this study, viscera were collected from the slaughterhouse. So, obviously almost all goats were adult. But infection with *Moniezia spp.* usually occurs in young goats (Soulsby, 1982).

Prevalence of *T. ovis* was 56.66% in Black Bengal Goats. In case of *T. ovis*, infective stage is egg containing first stage larva (Soulsby, 1982), and goats become infected by the ingestion of infective eggs during grazing. In this case, infective eggs are not capable of active movement. So, they remain at the level of grass root (soil). So, chance of infection in browser goats with *T. ovis* remains logically relatively lower than that of the *O. columbianum*.

**Table 2.** Prevalence of helminth parasites in Black Bengal goat in rainy and winter seasons

Species	Animals infected			
	Winter(n:75)		Summer(n:75)	
	No.	%	No.	%
<i>O. columbianum</i>	75	100	63	84
<i>T. ovis</i>	54	72.05	32	42.66
<i>Moniezia spp.</i>	13	17.33	4	5.33
Total	75	100	67	89.33

Prevalence of *O. columbianum* was higher in the winter (100%) than the rainy (84%) season (Table 2). In tropical and subtropical areas, in *O. columbianum* infections, the prolonged survival of the L<sub>4</sub> within the nodules in the gut wall and the lack of an effective immunity made control difficult until the advent of effective anthelmintics (Urquhart *et al.*). Prevalence of *T. ovis* was higher in the winter (54%) than the rainy (42.6%) season (Table 2). On the other hand Prevalence of *Moniezia spp.* is also higher in

winter (17.3%) than the rainy (5.33%) season. *Moniezia spp.* infection is common in kids during their first year of life and less common in older animals. A seasonal fluctuation in the incidence of *Moniezia spp.* infection can apparently be related to active periods of the forage mite vectors during the summer in temperate areas. The cysticercoids can overwinter in the mites. (Urquhart *et al.*, 1996).

Contemporarily, prevalence of other gastrointestinal helminths identified was relatively higher in winter than that in the rainy (Table 2). Almost similar studies were conducted by Asanji and Williams (1987), who reported increased helminth infection from August, to January in Africa. They recorded the highest and lowest relative densities in October and July respectively. In Bangladesh, winter usually begins with mild cold and passes through moderate cold and temperature ranging from 18.03-23.66°C. This climatic condition is suitable for the development and survival of many geo-parasites like *Oesophagostomum spp.*, *Trichuris spp.* etc. Arthropod vectors like oribatid mites (which transmit *Moniezia spp.*), which live on the pasture, are more available in winter than summer (Urquhart *et al.*, 1996). Probably for these reasons, prevalence of such type of helminth parasites was relatively higher in winter.

### Pathological lesions in helminth infection

#### *O. columbianum*

Grossly nodule formation was commonly observed in *O. columbianum* infection. This finding conforms to the findings of Lapage (1962), Soulsby (1965) and Smith *et al.* (1992). The larvae penetrate the mucosa at any point from the pylorus to the anus in order to reach the deeper parts of the sub-mucosa where they encyst and undergo moulting. Local tissue sensitivity develops in animals due to repeated exposure to these parasites and the subsequent entry of the larvae into the submucosae which provokes an intense tissue reaction. The parasites produce some glandular secretions (Cephalic and oesophageal) which considered as responsible for the chronic inflammation in the intestinal wall (Smith *et al.*, 1992; Lapage, 1962) resulting proliferation of the fibrous tissues.

#### *T. ovis*

Most infections caused by *T. ovis* are light and asymptomatic. In some cases a large numbers of worms cause a diptheritic inflammation of the caecal mucosa. *T. ovis* penetrates the intestinal wall by their anterior parts. Probably during the process of penetration, they cause mild to moderate degree of damage in the intestinal surface, resulting petechial hemorrhages. As the parasitic infection is a long standing insult on the intestinal wall, especially in untreated cases, so they cause destruction of the lining epithelium where they predominantly inhabit. Due to this continuous irritation of the adult parasites on the intestinal wall, catarrhal inflammation occurs. That is why goblet cells were increased in numbers and size (Soulsby, 1965).

#### *Moniezia spp.*

During the present study, no considerable changes were detected in *Moniezia spp.* infection. Although generally regarded as of little pathogenic significance but heavy infections may cause unthriftiness, diarrhea and even intestinal obstruction. However, *Moniezia* infections are so obvious, both in life, because of the presence of proglottids

in the faeces, and at necropsy, that other causes of ill health may be overlooked (Urquhart *et al.*, 1996)

### CONCLUSION

Parasitic infections are a major constraint on livestock production in our country and still parasitism is one of the major health problems confronting the goat industry. The study clearly suggests that Black Bengal goats are susceptible to intestinal helminths in both winter and rainy seasons and most of the parasites recovered are associated with the production of variable degree of pathological lesions. Gastro-intestinal parasitic infection is the major cause of stunted growth of Black Bengal goat and may lead to death which in term results heavy economic loss. That is why animals should be dewormed at regular interval with an appropriate anthelmintic. Management system and overall hygiene conditions should be improved for better growth of cattle and to improve overall hygiene conditions should be improved for better growth of Black Bengal goat and to improve overall production performances.

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