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 (99.33%). 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

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

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

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).

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

<table>
<thead>
<tr>
<th>Species</th>
<th>Winter(n:75)</th>
<th>Summer(n:75)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>O.columbianum</td>
<td>75</td>
<td>100</td>
</tr>
<tr>
<td>T. ovis</td>
<td>54</td>
<td>72.05</td>
</tr>
<tr>
<td>Moniezia spp.</td>
<td>13</td>
<td>17.33</td>
</tr>
<tr>
<td>Total</td>
<td>75</td>
<td>100</td>
</tr>
</tbody>
</table>

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 L4 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. Monoiezia 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 Monoiezia spp. infection can apparently be related to active periods of the forage mite vectors during the summer in temperate areas. The cysticercois can overwinter in the mites. (Urqhurt et al., 1996).

Contemporary, 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 orbibatid mites (which transmit Monoiezia spp.), which live on the pasture, are more available in winter than summer (Urqhurt 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. colombianum

Grassly nodule formation was commonly observed in O. colombianum 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 diphtheric 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, catarhal inflammation occurs. That is why goblet cells were increased in numbers and size (Soulsby, 1965).

Monoiezia spp.

During the present study, no considerable changes were detected in Monoiezia spp. infection. Although generally regarded as of little pathogenic significance but heavy infections may cause unthriftiness, diarrhea and even intestinal obstruction. However, Monoiezia 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 (Urqhurt 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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