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# SEASONAL INFLUENCE ON THE OCCURRENCE OF *HAEMONCHUS CONTORTUS* INFECTION IN SLAUGHTERED BLACK BENGAL GOATS IN BANGLADESH

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## ABSTRACT

Seasonal influence on the occurrence of *Haemonchus contortus* parasite was studied on 672 slaughtered Black Bengal goats during one year period from July 2002 to June 2003. An overall 65.63% goats had *H. contortus* infection and significantly ( $p < 0.01$ ) higher infection rate was recorded in female ( 70.43% ) than male ( 58.61% ) goats. A positive correlation between the occurrence of *H. contortus* infection and climatic factors was recorded. Significantly ( $p < 0.01$ ) highest infection rate of *H. contortus* was recorded during rainy ( 72.57 % ) season in comparison to summer ( 66.46% ) and winter ( 51.54% ) seasons. The infection was recorded at the peak in July ( 84.42% ) and lowest in January ( 46.15% ). The load of *H. contortus* per abomasum varied significantly ( $p < 0.05$ ) in different months of the year and an average maximum number of parasites per abomasum was recorded in July ( 41.25 ) and the minimum in March ( 5.52 ). In case of sex ratio of the parasites always the female ( 60.73% ) were found to be dominated over the males ( 39.27% ) parasites.

**Key words:** Seasonal influence, *Haemonchus contortus*, Black Bengal goat, Bangladesh

## INTRODUCTION

Goat rearing is mainly confined to the small holder farming system which plays a vital role as the source of protein and a tool of poverty alleviation in Bangladesh. The goat population in Bangladesh faces a lot of hindrance in respect of their protection. Although the scarcity of feed and the recently emerging viral disease Peste des Petits Ruminants ( PPR ) appears as a havoc for the goat but parasitism is another important cause of low productivity of goats in Bangladesh. Among the parasitic diseases the gastrointestinal nematodes especially the blood sucking *Haemonchus contortus* causes serious economic losses. It causes a loss of 0.05-0.07 ml blood / parasite / day, stunted growth, weight loss, decreased meat and milk production, anemia, and finally lead to death of goats ( Soulsby, 1982; Samad, 2001 ). A good number of literatures suggest the prevalence of gastrointestinal parasites in goats in Bangladesh ( Qadir, 1967, Haq and Shaikh, 1968, Qadir, 1981, Mollah *et al.* 1996 and Samad, 2000 ). However, by the last three decades there are tremendous changes in the climatic condition, life style of people and husbandry practices of livestock in Bangladesh. Considering the facts this study was undertaken to determine the seasonal influence on the occurrence of *H. contortus* in goats.

## MATERIALS AND METHODS

A total of 672 goats abomasa were collected from the local slaughter houses of Mymensingh district during the one year period from July 2002 to June 2003. Each abomasum was opened by cutting through its lesser curvature placing on the tray and the contents were placed in a jar containing water. Scrapings of the folds and mucous membrane were taken in suspected cases. The contents and washing were examined carefully by decanting method as described by Hendrix ( 1998 ). The parasites were collected and placed in petridishes containing normal saline.

The parasites were identified on the basis of their characteristics morphological features as described by Soulsby ( 1982 ) and Urquhart *et al.* ( 1996 ). The male and female parasites were counted and placed in separate containers.

Data were subjected to One Way Analysis of Variance ( ANOVA ) for one sample 't' test to evaluate the significant differences ( Steel and Torrie, 1960 ).

## RESULTS AND DISCUSSION

Seasonal influence on the occurrence of stomach worm, *Haemonchus contortus* was studied on 672 slaughtered Black Bengal goats during one year period from July 2002 to June 2003. The month-wise infection of *H. contortus* in goats in relation to meteorological data are presented in Fig. 1. Of the 672 goats examined 65.63% had *H. contortus* infection ( Table 1 ). This finding is almost similar with the earlier report of Qadir ( 1967 ) who reported 67.35% *H. contortus* infection in slaughtered Black Bengal goats.

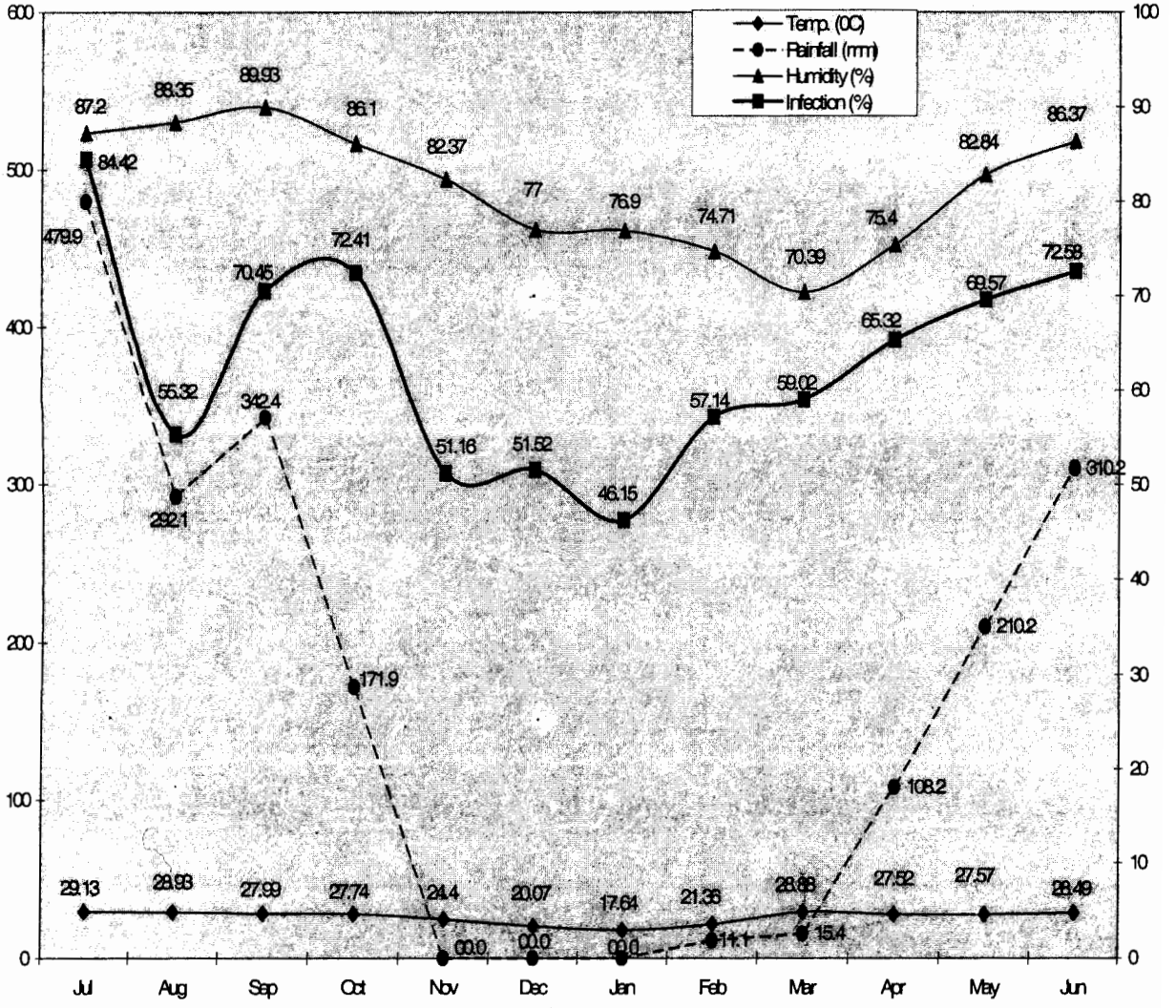


Fig. 1. Month- wise percent of infection with *Haemonchus contortus* in goats correlated with meteorological data

Haq and Shaikh ( 1968 ) recorded the ( 89% ) infection rate of *H. contortus* in his study of stomach worms in slaughtered goats in Bangladesh. This variation in the findings with the earlier report might be due to the differences in sample size, species variation and also the difference in climatic condition over the last three decades. The infection rate was significantly ( $p < 0.01$ ) higher in the female ( 70.43% ) than in the male ( 58.61 % ) goats ( Table 1 ). It may be due to the longer life span of the females than the males which expose them to get more infection. Usually the females are reared for breeding purpose as long as they retains their breeding capacity and bucks are sold earlier by the farmers and slaughtered in different festivals as they get maturity and usually between the age of 1 and 2.5 years.

Table 1. Month and season-wise occurrence of *Haemonchus contortus* in the abomasum of slaughtered goats

| Months/ Seasons | No. of abomasum examined | Infected No. (%) | Male goats No. examined | Male goats Infected No. (%) | Female goats No. examined | Female goats Infected No. (%) | Parasite Mean load per abomasums | Parasite Male & female ratio |
|---|---|---|---|---|---|---|---|---|
| July | 77 | **65 (84.42) | 32 | 26 (81.25) | 45 | 39 (86.67) | 41.25* | 0.76 |
| August | 47 | 26 (55.32) | 22 | 10 (45.45) | 25 | 16 (64.00) | 24.94 | 0.68 |
| September | 44 | 31 (70.45) | 12 | 07 (58.33) | 32 | 24 (75.00) | 33.45 | 0.72 |
| October | 58 | 42 (72.41) | 22 | 12 (54.55) | 36 | 28 (77.78) | 39.86 | 0.62 |
| **Rainy** | **226** | **164 (72.57) | **88** | **55 (62.50)** | **138** | **107 (77.54) | **34.88*** | **0.70** |
| November | 43 | 22 (51.16) | 13 | 07 (53.85) | 30 | 15 (50.00) | 05.52 | 1.05 |
| December | 33 | 17 (51.52) | 12 | 05 (41.67) | 21 | 12 (57.14) | 09.79 | 0.60 |
| January | 26 | 12 (46.15) | 14 | 06 (42.86) | 12 | 06 (50.00) | 19.48 | 0.78 |
| February | 28 | 16 (57.14) | 14 | 08 (57.14) | 14 | 08 (57.14) | 17.69 | 0.45 |
| **Winter** | **130** | **67 (51.54)** | **53** | **26 (49.06)** | **77** | **41 (53.25)** | **13.12** | **0.72** |
| March | 61 | 36 (59.02) | 25 | 13 (52.00) | 36 | 25 (69.44) | 27.81 | 0.40 |
| April | 124 | 81 (65.32) | 38 | 17 (44.74) | 86 | 64 (74.42) | 24.49 | 0.73 |
| May | 69 | 48 (69.57) | 36 | 26 (72.22) | 33 | 22 (66.67) | 07.73 | 0.45 |
| June | 62 | 45 (72.58) | 33 | 23 (69.70) | 29 | 22 (75.85) | 06.75 | 0.56 |
| **Summer** | **316** | **210 (66.46)** | **132** | **79 (59.85)*** | **184** | **133 (69.30)** | **16.70** | **0.54** |
| **Overall** | **672** | **441 (65.63)** | **273** | **160 (58.61)** | **399** | **281 (70.43)** | **21.56** | **0.65** |

*Indicates significant at ( $p < 0.05$ ), ** Indicates significant at ( $p < 0.01$ ).

Traditionally during the religious festivals especially in the two Eids of Muslims and different ceremonial occasions large number of bucks are sacrificed. In the local markets the slaughtered goats mainly constitute the culled nanny goats and few male goats. Again the females are in stress during the pregnancy and lactation which also helps for establishment of infection by the parasites ( Soulsby, 1982; Urquhart *et al.*, 1996 ). Moreover, since the females need more nutrients for the nourishment of their kids they are voracious eaters by nature, which gives them more chance of acquisition of infective larvae than the bucks. There was a marked variation in percent infection and load of *H. contortus* per abomasum in the different months of the year ( Table 1 ). Although the goats were not from experimental study rather from the local markets yet a marked seasonal trends of prevalence of infection was noticed. The rate of infection was significantly ( $p < 0.01$ ) higher in the rainy season ( 72.57% ) with the peak in the month of July ( 84.42% ) and lowest in January ( 46.15% ). In the months of June and October the infection rates were 72.58% and 72.41% respectively. Similar pattern of infection rate was reported by Qadir ( 1981 ) where the peak infection period by *H. contortus* in goats extended from June to September. The infection rate started to decline from November to February ( Winter ) and then it increased gradually from March to June ( Summer ). This trend of infection rate is substantiated by the previous report ( Al-Dulaimi *et al.*, 1985 ). There was a fluctuation in the rate of infection from July to October ( Rainy ). The lowest percentages of infection in the winter months indicates the less survival of eggs and pre-infective larvae and subsequent development to infective $L_3$ in the pasture as because of the less moisture and dry condition of the pasture. So, the goats did not get more infective stages. Moreover, the hypobiotic phenomenon of larval development in the host body because of adverse environmental influences in the winter as it happens in the temperate countries may also play an important role in Bangladesh. The infection rates were almost same in the months of July and October but there was a sharp fall in the month of August. It is very difficult to explain but in case of *H. contortus* infection in sheep there is self cure phenomenon where spontaneous expulsion of the adult parasites from the host takes place. Self cure phenomenon is a type-I hypersensitivity reaction induced by the acquisition of large number of infective larvae developed in the pasture following heavy shower of rain ( Soulsby, 1982; Urquhart *et al.*, 1996 ). This self cure phenomenon may also be true for *H. contortus* infection in goats in Bangladesh where the rain starts from the month of July and creates a conducive environmental condition for the development of large number of infective larvae on the lush grass and the goats are easily infected with huge number of infective larvae. The gradual increase of infection rates in the months of September and October is an indication of reestablishment of infection after the self-cure phenomenon.

There were seasonal differences in the parasitic load per abomasum ( Table 1 ). More parasites were recorded in the rainy ( 34.88 ) and summer ( 16.70 ) seasons with the peak in July ( 41.25 ) that was significantly ( $p < 0.05$ ) differ from other months. On an average, in the winter season the parasitic load was minimum ( 13.12 ) and lowest number of parasites were recorded in November ( 05.52 ). It is definitely the reflection of larval development in the pasture and within the host as well. In general, the active development occurs during the rainy season and grazing animals harbour a variable but significant number of worms. In areas with a distinct rainy and dry season the majority of third stage larvae ( $L_3$ ) undergo arrested development at the early winter and late summer and the parasitic load remains consistently low. The presence of less number of parasites in August again is the reflection of self-cure phenomenon.

It was recorded that the female parasites were predominant over the male parasites all the year round except in the month of November. A negative correlation was noticed in the distribution of parasitic load per abomasum and male female parasite ratio. The female parasites were more in case of lower parasitic load. Because of the paucity of the previous reports it was not possible to make a comparison. But it may be that the male pre-infective larvae are more susceptible but female larvae have some potentiality to withstand the adverse climatic condition in the winter and summer. Moreover the host defense mechanism and the female developing stages might have some inhibitory effects on the development of the male in low grade of infection in goats. Increase in the number of male parasites as the parasitic load increases in the monsoon indicates their survivability in the environment and coping with the female-male larval antagonism or inhibitory effect of body reaction of the host if any when large number of male larvae are taken by the goats.

The present investigation fairly suggests that haemonchosis caused by *H. contortus* is highly prevalent in Black Bengal goats irrespective of their sex. It is a year round problem in goats in Bangladesh and cause health problem in any way. To estimate the exact economic losses of haemonchosis in Black Bengal goats further extensive study is needed.

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