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RESEARCH ARTICLE

Infection load of *Haemonchus contortus* in local breed of goats of Chhattishgarh and correlation with haemoglobin values

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Abstract : Goats are the small ruminants which have enormous potential to boost economy and this may be major source of income especially to marginal farmers and landless laborers. Thus the goats are called as the poor man's cow. Among the gastrointestinal parasites *Haemonchus contortus* is economically important parasites causing a great economic loss in small ruminants industry. The present study was conducted to see the seasonality status of *Haemonchus contortus* in relation to haemogobin values. In this study higher EPG (1860.57±140.20) was found during rainy season as compared to the value (175±47.70) of summer season. The highest Hb per cent (8.16±0.32) was recorded in the month of April which was followed by March (8.08±0.22), May (8.02±02), June (7.36±0.32), July (6.29±0.15), August (6.34±0.44) and lowest Hb per cent (5.99±0.15) was recorded in the month of September. While season-wise Hb per cent was compared, it was found that the value of summer season (8.09±0.13) was significantly (P<0.001) higher than rainy season (6.4±0.14).

Key words : Haemonchus contortus, Seasonality, Hb per cent, Correlation

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INTRODUCTION

Gastrointestinal (GI) parasitism is a very common and economically important condition affecting domestic livestock species worldwide (Krecek and Waller, 2006; Miller *et al.*, 1998; Bennema *et al.*, 2010). In developing countries, GI parasites are associated strongly with grazing management since pastures are usually not provided. Most pastures for animal rearing are public and are used and shared by animal owners without any regulations or guidelines. The control of cattle parasites has many beneficial effects related to productivity, including increased weight gain, feed conversion, milk production, reproductive performance, carcass quality and immune status, and may reduce morbidity and mortality. Infections with gastrointestinal nematodes (GIN) such as *Haemonchus contortus* are major causes of economic losses in small ruminant husbandry due to retarded growth, weight loss, disorder infertility, loss in milk production and mortalities (Loyacano *et al.*, 2002; Sykes, 1994; Waller, 1999; Jittapalapond *et al.*, 2011 and Charlier *et al.*, 2009). Since the parasite is voracious blood sucker, it obviously changes the value of haemoglobin which indirectly affect the production. The present work communicates the relative picture of seasonal variation of haemoglobin in relation to infection load.

RESEARCH METHODOLOGY

Determination of EPG :

Twenty goats (local non descriptive breed) of ½ to 2 years of age with either sex were monitored from March 2010 to September 2010 in the goat unit of College of Veterinary Science and Animal Husbandry, Anjora, Durg (C.G.). Faecal samples were collected directly from rectum of animals. From an individual animal an average of five gram feces was collected separately in small sized plastic bags at fortnight intervals. The samples were processed as per requirement of modified McMaster method. Two grams of feces was weighed out using electronic balance and then soaked in 30 ml of water until they were sufficiently soft and then crushed properly. 30 ml of saturated salt solution was added to feces and the mixture stirred by a stick and then further mixed by blender. After complete mixing a small amount of sample pipetted out and placed into McMaster slide chambers. After 10 minutes the chamber of McMaster slide was counted under microscope. The number of eggs within one chamber multiplied by 200 represents the number of eggs per gram of original faecal sample (Soulsby, 1982).

Coproculture :

Medium sized petridishes were taken and the back surface of that was pasted with moistened filter paper. The mixture of charcoal and feces was thickly smeared with spatula on back surface of petridish. The petridish was placed in larger petridish containing water (Fig. 2).The water level was adjusted in such way that may touch the upper margin of inner petridish. Then outer petridish was covered with another petridish of same diameter to avoid evaporation and kept for 7- 10 days. Within that period water was collected and examined at alternative day for larvae of *H. contortus.* Using compound microscope after centrifugation of collected water sample at 2,000 rpm for 5-10 minutes. Same method was applied for all faecal samples of positive cases. After coproculture, larvae of *H. contortus* were identified and the proportion was determined and this ratio was further subjected to determination of actual EPG.

Haematological protocols :

Hemoglobin level (Hellige-Sahli's haemoglobinometer tube method) :

The hemoglobin was determined by using Hellige-Sahli's haemoglobinometer tube method as described by Jain (2002). With the help of a dropper, N/10 HCl was taken in graduated haemoglobinometer tube upto its lowest mark 2 gm per cent. Anticoagulant added blood in pipette to the upto 20ml mark. After that immediately the blood was transferred from pipette into the N/10 HCl containing haemoglobinometer tube and rinsed the pipette several times by drawing the N/10 HCl used for mixing the blood but avoided foaming. The content was mixed thoroughly and left the solution to stand for 10 minutes for maximum conversion of haemoglobin in blood to acid haematin (brown colour) Acid haematin was diluted by adding distilled water in drops and it was mixed by stirrer thoroughly dilution process was continued till colour matches. Then value was noted from scale provided on the haemoglobinometer tube and expressed the hemoglobin content as gram per 100 ml of blood (Jain, 2002).

RESULTS AND DISCUSSION

Month-wise variation of egg per gram (EPG) data during the period of March 2010 to September 2010 of goats has been presented in Table 1 and season-wise EPG data has been present in Table 2. In the month of August, maximum EPG (2305±203.43) was recorded which was followed by September (2250±215.60), July (1885±224.51), June (980±196.32), May (230±60.99), April (175±58.26). The lowest EPG (120±53.01) was recorded in the month of March. Month-wise variation of Hb per cent of goats has been shown in Table 1 and Fig. 1. The highest Hb per cent (8.16±0.32) was recorded in the month of April which was followed by March (8.08±0.22), May (8.02±02), June (7.36±0.32), July (6.29±0.15), August (6.34±0.44) and lowest Hb per cent (5.99±0.15) was recorded in the month of September. In the above picture, a clear correlation is found which indicates that higher infection load results in lower Hb %.

A speculated variation of EPG data bears conformity in relation to month-wise variation. Lowest EPG (175±48.70) was recorded in summer season whereas, highest EPG (1860.57±140.20) was recorded in rainy season (May to September). EPG value of June, July, August and September month did not vary significantly (P< 0.001) whereas, individual values of different months was significantly higher as compared to individual data of March, April and May. While season-wise Hb per cent was compared, it was found that the value of summer season (8.09±0.13) was significantly (P<0.001) higher than rainy season (6.4±0.14) which has been shown in Table 2 and Fig. 2. Season-wise variation is attributed to the load of *H. contortus.* Since *H. contortus* is

Table 1 : Month-wise occurrence of Haemonchus *contortus* infection in non descriptive local breeds of goats and values of Hb per cent

Month	Mean EPG±SEM	Mean Hb %±SEM
March	120±53.01ab	8.08 ± 0.22c
April	175±58.26a	8.16 ± 0.32c
May	230±60.99ab	8.02 ± 0.32c
June	980±196.32bc	7.36 ± 0.32b
July	1885±224.51c	6.29 ± 0.15a
August	2305±203.43c	6.34 ± 0.44a
September	2250±215.60c	5.99 ± 0.15a

Mean values with different superscripts in the column represent significant difference (P < 0.001).

Table 2 : Season-wise occurrence of Haemonchus *contortus* infection in non-descript local breed of goats and values of Hb per cent

Season	Mean EPG±SEM	Mean Hb %±SEM
Summer (lean)	175±48.70 ***	8.09± 0.13***
Rainy (dominant)	1860.57±140.20***	6.4 ± 0.14***

Mean values with different superscripts in the column represent
*** indicates significance of value at P=0.001

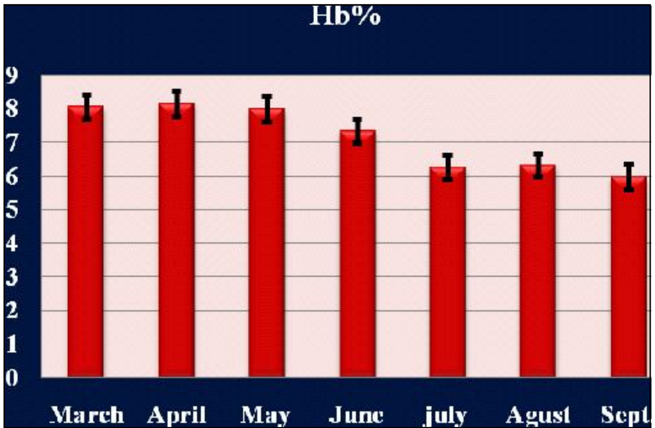

Fig. 1 : Month-wise variation of Hb per cent of non-descriptive local breed of goats

haematophagus parasites, it is presumed that high worm load would result low haematocrit value. The same picture has been reflected in the present study. Low Hb per cent value due to *Haemonchus contortus* infection has also been reported by previous workers. Arora *et al.* (2003) observed a negative correlation between EPG and Hb per cent values both in sheep and goats, showing a gradual decline in Hb per cent values with a gradual increase in EPG values *i.e.* 7.25±0.016 g/dl at

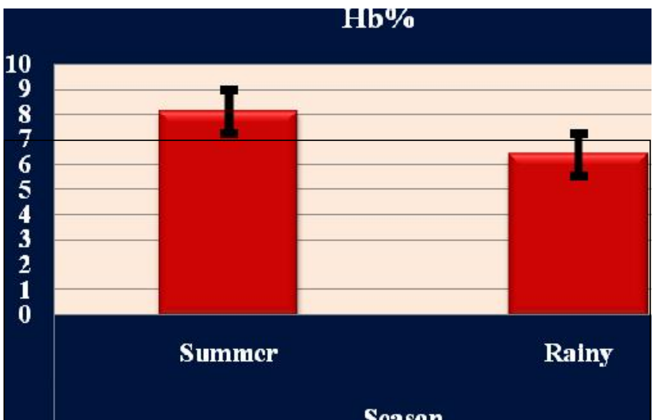

Fig. 2 : Season-wise variation of Hb per cent of non-descriptive local breed of goats

400-800 EPG and 6.71±0.05 g/dl at 2000-2400 EPG in sheep. Francisco *et al.* (2007) reported that *H. contortus* adult parasite could ingest 0.05ml of blood/helminthes/day causing blood loss with reduction of packed cell volume (PCV per cent) and haemoglobin concentration (5.3-7.7 g/dl) that was related to haematophagy nature of worms, as well as to blood losses through intestine and erythrocyte lysis caused by haemolytic factor excreted by parasites. Gastrointestinal nematode infection is generally known to cause serious impact on the major haematogical parameter like Hb concentration, PCV and TEC and result in anaemia (Jas *et al.*, 2008). Agrawal *et al.* (2010) estimated faecal egg count (FEC), packed cell volume (PCV %) and haemoglobin (Hb per cent) of Jakharana breed of goats infected with haemonchosis. Arora *et al.* (2003) and Francisco *et al.* (2007) also worked on the related topic and the results coincides with the result of the present topic.

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