

USE OF TARGETED SELECTIVE TREATMENT IN THE CONTROL OF GOAT PARASITISM IN HUMID TROPICS

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ABSTRACT

A study was conducted to assess the efficacy of Targeted Selective Treatment (TST) based on the Five point check© in reducing faecal egg count and anthelmintic use thereby improving the health status of goats which are naturally infected with gastro intestinal strongyles under the humid tropical conditions of Kerala. Body condition score, FAMACHA©, evidence of nasal discharge, diarrhoea and sub mandibular oedema were included in the Five point check. Following implementation TST, the use of anthelmintics was reduced from 100% to 39.1 %. There was no marked difference in faecal egg count and health status of goats prior and after TST protocol.

Key words: Targeted selective treatment, Five point check, Goats, Faecal egg count, humid tropics

INTRODUCTION

Parasitism and mounting anthelmintic resistance pose severe impediments to small ruminant production (Kaplan et al., 2004; Kenyon et al., 2009; Leask et al., 2013). Refugia based treatment strategies like Targeted Selective Treatment (TST) is regarded as an ideal option for reducing the anthelmintic resistance in ruminants (Cringoli et al., 2009). TST aims at the anthelmintic treatment of only those animals having high parasitic load rather than treating the entire herd (Bath and van Wyke, 2009) thereby reducing the frequency of anthelmintic treatments in ruminants (Cringoli et al., 2009).

Implementation of TST at farmers level calls for a quick, reliable, safe and cheap

system for the identification of animals those require anthelmintic treatment (Van Wyke et al., 2006). Five point check system was developed as a practical extension of TST where five points of the animal body is looked at (Bath and van Wyke, 2009). The efficacy of TST in the parasitic treatment of small ruminants had been investigated in many countries including United states of America, South Africa, Greese and Italy (Kaplan et al., 2004; Bath and van Wyke, 2009; Gallidis et al., 2009; Cringoli et al., 2009). However, similar reports from humid tropics are scanty and mostly limited to Mediterranean region (Sotomaoir et al., 2003).

Goat production has an imperative role in providing livelihood and nutrition security of small holder farmers and socially backward communities

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of Kerala. Being a problem in humid tropical Kerala, parasitism in goats was solely controlled by the frequent drenching with anthelmintics. The indiscriminate use of anthelmintics in turn led to the development of widespread anthelmintic resistance in the helminthes population (Kenyon et al., 2009) and is not a sustainable option in good farming practice (Leaks et al., 2013).

The present study was carried out to assess the efficacy of TST based on the Five point check© in reducing faecal egg count and anthelmintic use thereby improving the health status of goats which are naturally infected with gastro intestinal strongyles under the humid tropical conditions of Kerala.

MATERIALS AND METHODS

Farm and Animals

The experiment was carried out in an ex-situ conservation unit of Attappady black goats (n=69) at Livestock research Station of Kerala Veterinary and Animal Sciences University at Thiruvazhamkunnu, Palakkad. The station is located at longitude 76°36' E and latitude of 11°03' N and at altitude of 35 m above sea level. Palakkad has a humid tropical climate with a temperature range of 23.2°C to 32.4° C.

The experimental animals were identified using ear tags. They were vaccinated against Foot and Mouth Disease, Haemorrhagic septicaemia, Peste de Petits Ruminants and Enterotoxaemia. Goats were stall-fed with 350 g concentrate having 70% TDN and 16 % DCP and ad lib roughage inclusive of tree leaves and green fodder depending upon the availability. The animals had access to ad lib clean drinking water.

Anthelmintic treatment

The study was undertaken from April to November, 2013. Parasitism is a problem in the herd from June to November, during the monsoon

season. Monthly blanket anthelmintic treatment was the norm up to July 2013 in the herd. Thereafter, Targeted selective treatment (TST) was adopted based on monthly evaluation of the Five point check©. Body condition score, FAMACHA©, evidence of nasal discharge, diarrhoea and sub mandibular oedema were included in the Five point check (Bath and van Wyke, 2009). FAMACHA© is a screening system based on the colour of conjunctiva that has been widely used to assess the anaemic status of the animals (van Wyke and Bath, 2002). The goats were grouped based on conjunctiva into five categories of white, pale pink, pink, red pink and red. The procedure described by Mary and Sherman (2009) was adopted for the condition scoring of goats. The animals were graded into condition scores ranging from 1 to 5 in which scores of 1 and 5 denotes extremely thin and overweight animals respectively. Anthelmintic was given in conditions of white or pale pink FAMACHA© scores, condition score of below 2 and nasal discharge and diarrhoea. Albendazole, Ivermectin and Pyrantal palmoate were used in rotation at a dose rate of 20, 0.4 and 25 mg/kg body weight for the TST of goats.

Monthly Faecal egg count (FEC) and Packed Cell Volume (PCV) of all animals were also investigated prior to anthelmintic treatment in the respective months.

Statistical analysis

Data were presented as mean \pm standard error (S.E), and statistical analysis was carried out using SPSS software, version 20. Level of statistical significance was set at $p \leq 0.05$.

RESULTS AND DISCUSSION

Frequency of goats underwent anthelmintic treatment

The frequency of goats that underwent anthelmintic treatment in different months is

shown in figure 1. The percentage of animals that required treatment diminished from 93% in July, 2013 (prior to TST regime) to 39.1% in November at the end of the study. Reduction of drug usage by 40 to 60% by the adoption of TST in ruminants was also revealed by the studies of van Wyke et al. (2006) and Cringoli et al. (2009). A strategy to reduce anthelmintic use, TST acts as a logical way to slow the development of anthelmintic resistance in ruminants (Bath and van Wyke, 2009).

Faecal Egg Count (FEC)

Mean FEC of goats prior to TST regime in April, July and August, and during TST schedule (September to November) are detailed in Figure 2. Though the FEC was as high as 1207.50 ± 279.43 in the month of April 2013, it was reduced to 103.85 in August even before the TST regime. This might be due to the administration of Ivermectin in July, an anthelmintic that had never been used before in the herd under study. During the TST regime (September and November), the FEC showed an initial downward trend followed by an upward trend towards the end of the study. The reduced FEC during TST protocol observed in this study was not in accordance with the earlier reports (Greer et al., 2009). TST is aimed at keeping an unexposed proportion of parasitic population in refugia which assists in slowing down the anthelmintic resistance (Cringoli et al., 2009; Greer et al., 2009). However, FEC concentration is largely influenced by temporal variations that can be attributed to the timing of anthelmintic treatment (Greer et al., 2009).

Health Status of goats

The mean percentage of non-anaemic goats with FAMACHA© score of pink red and Red during the study period are shown in figure 3. The frequency of non anaemic animals increased from 3.4% to 42.9% towards the end of the study. The reduction in the FEC and parasitic load might have contributed to better FAMACHA© scores

in the herd during the latter half of study period as FEC and FAMACHA© scores are correlated significantly (Kaplan et al., 2004; Burke et al., 2007). However, there was no significant differences in the frequency of FAMACHA© scores before and after the TST regime.

Mean Packed Cell Volume (PCV) of goats prior to TST regime in April to August, 13 and during TST schedule (November-13) is shown in figure 4. PCV exhibited no definite trend during the study period. It displayed no marked difference prior and after TST protocol.

Present study elucidates the adoption of TST in an organized herd of goats in humid tropics. Implementation of TST could reduce the anthelmintic use without much effect on the health status and FEC of goats. However, long term studies are required prior to the implementation of TST at farmers' level as a strategy to reduce anthelmintic use and slow down anthelmintic resistance while keeping parasitic population in refugia in Kerala.

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Fig. 1

Frequency of goats that required anthelmintic treatment prior to Targeted Selective Treatment (TST) regime (April to July-13) and during TST schedule (August to November-13)

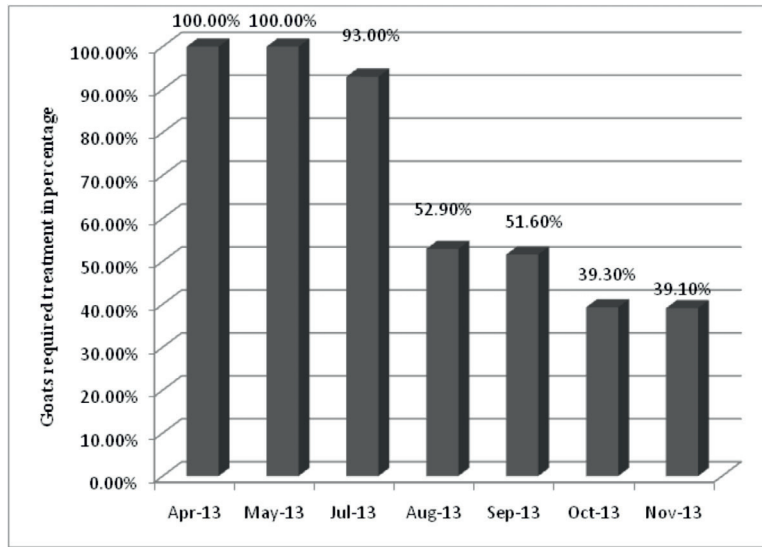


Fig.2

Mean Faecal egg count (FEC) of goats prior to Targeted Selective Treatment (TST) regime in April, July and August, 13 and during TST schedule (September to November-13)

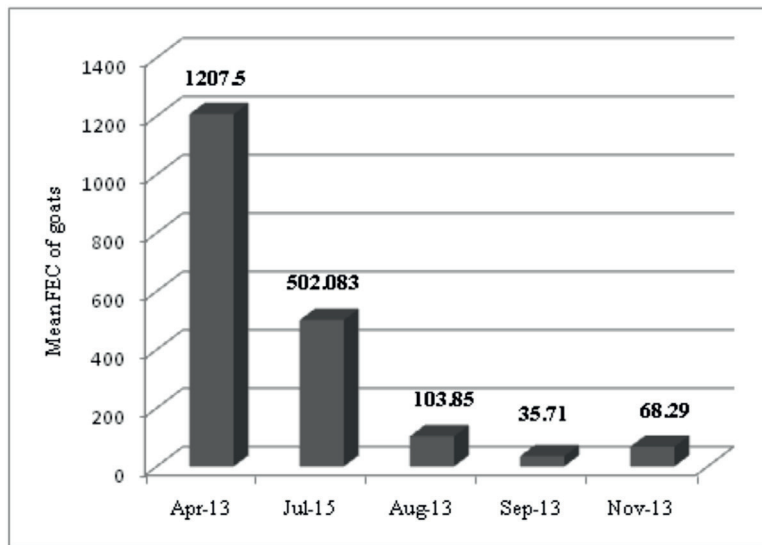


Fig. 3.

Percentage of non anaemic goats as evidenced in the FAMACHA© Score of red and red pink prior to Targeted Selective Treatment (TST) regime in April to August, 13 and during TST schedule (November-13)

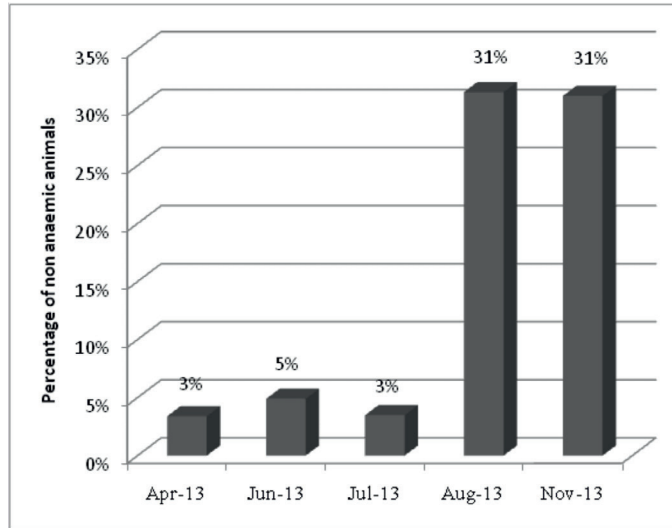


Fig.4

Mean Packed Cell Volume (PCV) of goats prior to Targeted Selective Treatment (TST) regime in April to August, 13 and during TST schedule (November-13)

