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EFFECTS OF STRONGYLOSIS ON SOME BLOOD PARAMETERS IN GOATS

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ABSTRACT

This study was designed to find any possible relationship between strongylosis and some blood parameters. Blood and faecal samples were collected from 44 West African Dwarf (WAD) goats and 53 Red Sokoto (RS) goats of different ages and sexes. The blood parameters studied were packed cell volume (PCV), total serum protein (TSP) and serum immunoglobulin (Ig) concentrations in West African Dwarf (WAD) and Red Sokoto (RS) goats. The mean PCV of WAD and RS goats with strongylosis were significantly ($p<0.01$and $p< 0.05$, respectively) lower than that in goats without strongylosis. The mean TSP level for WAD and RS goats were not significantly ($p>0.05$) different between goats with strongylosis and those without strongyle eggs. The serum Ig concentration for WAD goats with strongylosis was significantly lower than that in goats without strongylosis. This was, however, not so for RS goats with and without strongylosis. Generally, the mean Ig levels for WAD goats were significantly higher than that for RS goats. The results indicated that PCV and serum Ig concentrations may be used as potential indicators of resistance to gastro-intestinal strongylosis.

Keywords: Strongylosis, Goats, PCV, TSP, Immunoglobulin

INTRODUCTION

Internal parasitism due to gastro-intestinal nematodes is well known to induce important economic losses in small ruminant production in tropical areas (Fabiyi, 1987; Aumont *et al*., 1997), thereby resulting in a major constraint to health and productivity in grazing livestock production system (Fox, 1997). Gastro-intestinal parasites affect production, since these parasites provoke a lower nutrition conversion, a loss of weight and or a decrease in milk production; causing great economic losses (Rangel- Ruiz *et al*., 2003). Furthermore, bleeding and diarrhoea also occur which cause general weakness and anaemia in infected animals (Tariq *et al*., 2008). This paper describes the effect of strongylosis on Packed Cell Volume, serum Immunoglobulin level and Total Serum Protein in goats in Ibadan.

MATERIALS AND METHODS

Sampling

This study was carried out in Ibadan and its environs where samples were collected from 44 West African Dwarf (WAD) goats and 53 Red Sokoto (RS) goats of different ages and sexes. 10ml of blood was collected from the jugular vein of each goat; 2ml into a sterile bijou bottle containing 100µl of 200mM

Ethylene Diamine Tetra acetic Acid as anti-coagulant for haematology and detection of haemo-protozoans and the remaining 8ml into a sterile universal bottle for serology. Serum was allowed to separate from clotted blood and centrifuged at 1000 × g for 5 minutes after which the serum for each goat was aspirated and dispensed in a labelled sterile bijou bottle and stored at -35^{0}C until used. About 10g of faeces was also collected directly from the rectum of each of the animals with the aid of transparent polythene bags.

Haematology

The packed cell volume (PCV) was determined as previously described (Jain, 1986). Briefly, anticoagulated blood was drawn by capillary action into a microhaematocrit capillary tube up to the three-quarter level in duplicate. One end of the tube was sealed with plasticine and the tubes spun at 1600 × g for 5 minutes in a microhaematocrit centrifuge. The PCV was read by the use of a haematocrit reader and expressed in percentage.

Serology

The total serum protein concentration was determined using the Biuret reaction (Toro and Ackermann, 1975) while the serum immunoglobulin concentration was determined by the zinc sulphate turbidity (ZST) technique (Otesile, 1985).

Parasitology

The determination of faecal strongyle egg counts for each animal was carried out using the McMaster method, while the detection of blood parasites was carried out using both the buffy coat examination technique and Giemsa stained thin blood smears (Urquhart *et al*., 2003).

RESULTS

Faecal Strongyle Egg Counts in Goats with Strongylosis

Of the 44 WAD goats examined, 19 (43.2%) had strongyle eggs in their faeces while 20 of 53 (37.7%) RS goats were also positive (Table 1). The mean faecal egg counts for the 19 WAD goats was 1816 ± 1931 eggs per gramme of faeces, which was not significantly ($p>0.05$) different from the corresponding value obtained for the 20 RS goats (1495 ± 2608 epg).

Packed Cell Volume of Goats with Strongylosis

The relationship between strongylosis and packed cell volume (PCV) is presented in Table 2. The mean PCV of all the 44 WAD goats was 25.57 ± 6.05%. The mean PCV of WAD goats with strongylosis (22.84 ± 5.13%) was significantly ($p<0.01$) lower than that in goats without strongyle eggs

Table 1: Faecal strongyle egg counts (mean ± SD epg) in goats

Breed	No	Mean ± SD (epg)	Range
WAD	19	1816 ± 1931	100 – 6300
RS	20	1495 ± 2608	100 – 9800

Table 2: Relationship between Strongylosis and Packed Cell Volume (mean ± SD PCV) %

Breed	Strongyle positive		Strongyle negative		Total	
	No	Mean PCV%	No	Mean PCV%	No	Mean PCV%
WAD	19	22.84±5.13	25	27.78±5.86	44	25.57±6.05
RS	20	22.53±5.96	33	26.67±4.97	53	25.10±5.68

(27.78 ± 5.86%). The mean PCV for all the 53 RS goats was 25.1± 5.68%. The mean PCV for RS goats with strongylosis (22.53± 5.96%) was significantly ($p<0.05$) lower than that in goats without strongyle eggs (26.67±4. goats was not 97%). Among goats with strongylosis, the mean PCV for WAD goats was not significantly ($p>0.05$) different from those of RS goats. Similarly among strongyle-free goats, the mean PCV for WAD goats was not significantly ($p>0.05$) different from those of RS goats.

Total Serum Protein Levels of Goats with Strongylosis

The relationship between strongylosis and total serum protein of the goats is presented in Table 3. The mean TSP level for all the 44 WAD goats was 7.76± 1.15g/dl. The mean TSP level for WAD goats with strongylosis (8.06± 1.33g/dl) was not significantly ($p>0.05$) different from that in goats without strongyle eggs (7.58± 0.96g/dl).

The mean TSP level for all the 53 RS goats was 7.92 ± 1.66g/dl. The mean TSP level for RS goats with strongylosis (7.49 ± 1.31g/dl) was not significantly ($p>0.05$) different from those in goats without strongyle eggs (8.19 ± 1.81g/dl).

Among goats with strongylosis, the mean TSP for WAD goats was not significantly ($p>0.05$) different from those of RS goats. Similarly among strongyle –free goats, the mean TSP for WAD goats was not significantly ($p>0.05$) different from those of RS goats.

Serum Immunoglobulin (Ig) levels of Goats with Strongylosis

The relationship between strongylosis and serum immunoglobulin levels is presented in Table 4. The mean serum Ig level for all the 44 WAD goats was 3.03 ± 1.05g/dl.

Table 3: Relationship between Strongylosis and Total Serum Protein Levels (mean ± SD TSP) g/dl

Breed	Strongyle positive		Strongyle negative		Total	
	No	Mean TSP (g/dl)	No	Mean TSP (g/dl)	No	Mean TSP (g/dl)
WAD	19	8.06±1.33	25	7.58±0.96	44	7.76±1.15
RS	20	7.49±1.31	33	8.19±1.81	53	7.95±1.66

The mean Ig level for WAD goats with strongylosis (2.26 ± 1.03g/dl) was significantly (p<0.001) lower than that in goats without strongyle eggs (3.61 ± 0.59g/dl). The mean Ig level for all the 53 RS goats was 2.34 ± 1.14g/dl. The mean Ig level for RS goats with strongylosis (2.40 ± 1.18g/dl) was not significantly (p>0.05) different from that in goats without strongyle eggs (2.44 ± 1.14g/dl).

Among goats with strongylosis, the mean Ig level for WAD goats was not significantly (p>0.05) different from those of RS goats. But among strongyle –free goats, the mean Ig level for WAD goats was significantly (p<0.001) higher than that in RS goats.

Table 4: Relationship between Strongylosis and Serum Immunoglobulin (mean ± SD Ig) Levels g/dl

Breed	Strongyle positive		Strongyle negative		Total	
	No	Mean Ig (g/dl)	No	Mean Ig (g/dl)	No	Mean Ig (g/dl)
WAD	19	2.26±1.03	25	3.61±0.59	44	3.03±1.05
RS	20	2.40±1.18	33	2.44±1.14	53	2.43±1.14

DISCUSSION

The mean faecal egg counts for WAD goats was not significantly (p>0.05) different from the corresponding value for the RS goats. This may mean that the two breeds are equally susceptible to strongylosis especially since the mean PCV for WAD goats was not significantly (p>0.05) different from those of RS goats.

A significant decrease in the PCV of goats with strongylosis was observed in both breeds showing that strongylosis could be one of the major causes of anaemia in the animals. This finding is in agreement with that of Radostits *et al*. (2007) who had reported reduction in the red cell values in strongylosis, which is suggestive of anaemia.

The TSP levels were not significantly (p>0.05) different between goats with strongylosis and those without strongyle-eggs. It was inferred that strongylosis has little or no effect on TSP levels.

The serum Ig concentration for WAD goats with strongylosis was significantly (p<0.001) lower than that in goats without strongylosis. This implies that strongylosis may be accompanied by reduced serum Ig concentration. However, this was not observed in RS goats with strongylosis. When the two breeds were compared there was no significant (p>0.05) difference between goats with strongylosis. However, the Ig concentration for WAD goats without strongylosis was significantly (p<0.001) higher than that of their counterpart. One could say that WAD goats have higher protective level or tolerance to parasitic infections (strongylosis) than the RS goats if the slightly higher worm burden in infected WAD goats (1816 epg) as compared to infected RS goats (1495), is taken into cognisance together with the same degree of anaemia recorded for both groups of goats. This is in agreement with the findings

of Kusiluka and Kambarage (1996) who stated that the WAD goats are resistant to gastro-intestinal nematodes.

CONCLUSION

In conclusion, it appeared that the PCV and serum Ig concentrations may be used as potential indicators of tolerance in goats to strongylosis because from this study, goats with strongylosis have lower PCV and Ig concentrations than the strongyle-free goats. It is also inferred that strongylosis has little or no effect on TSP levels in goats and that WAD goats have higher protective level against strongylosis.

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