ANCYLOSTOMIASIS AND HAEMATOLOGICAL PROFILES IN DOGS IN MOROGORO MUNICIPALITY, TANZANIA

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SUMMARY

Faecal and blood samples from 169 local dogs brought to the Sokoine University of Agriculture Veterinary Clinic were screened for *Ancylostoma* spp. eggs and analysed for haematological parameters i.e. total red blood cell count (TRBC), haemoglobin concentration (Hb) and packed cell volume (PCV). The overall prevalence of *Ancylostoma* spp. in the examined dogs was 51.5%. There was a significantly higher prevalence of *Ancylostoma* spp. in puppies aged less that 6 months compared to other age groups ($P < 0.001$). The mean values for haematological parameters were significantly lower in puppies with hookworm infestation than in older dogs ($P < 0.05$). Dogs with median nematode egg count per gram of faeces above 1495 had significantly lower mean values of haematological parameters than those with lower counts ($P<0.001$). The results indicate that ancylostomiasis is common in dogs in Morogoro Municipality and causes a significant depression of haematological parameters, thereby calling for deworming of dogs, and particularly puppies.

INTRODUCTION

Gastrointestinal parasitism, a common condition in dogs world-wide (Soulsby, 1982) is associated with unthriftness, poor growth, acute or chronic diarrhoea and microcytic hypochromic anaemia (Udonsi and Agunama, 1991). Various canine gastrointestinal parasites have been reported in many countries, and their distribution and prevalence vary from one area to another due to differences in ecological and sanitary factors (Soulsby, 1982; Onwuliri *et al.*, 1993). Although ancylostomiasis has been reported in dogs in Morogoro, Tanzania (Makene *et al.*, 1996), no study has been carried out to establish the association between the degree of hookworm infestation and haematological parameters in local dogs which do not receive adequate care in terms of feeding and disease control. The present study was, therefore, designed to investigate the

association between the nematode egg burdens and haematological profiles in local dogs brought to the Sokoine University of Agriculture (SUA) Veterinary Teaching Clinic.

MATERIALS AND METHODS

Faecal and blood samples were collected once from 35, 43, 37 and 54 puppies (1-6 months), weaners (7-12 months), growers (13-24 months) and adults (>24 months) respectively. Approximately five grams of faeces were collected from the rectum of each dog and kept in plastic containers at 4 °C before the determination of the nematode egg count per gram of faeces (EPG) using the McMaster technique (MAFF, 1986). Blood samples were collected from cephalic or recurrent tarsal veins into Becton-Dickinson vacutainers (Meylan Cedex, France) containing potassium ethylene diamine tetraacetic acid (K_3EDTA) as an anticoagulant. The haemoglobin concentration (Hb), total red blood cell count (TRBC) and packed cell volume (PCV) were determined using standard methods. Data was analysed using the Statistix for Windows analytical package.

RESULTS

Of the 169 faecal specimens examined, 87 (51.5%) were positive for hookworm eggs (Table 1). The prevalence of hookworm infection was significantly higher in puppies (<6 months) than in the other age groups ($P < 0.001$). Other age groups showed comparable prevalences of nematode egg counts ($P > 0.05$). The median EPG in puppies was significantly higher than in other age groups ($P < 0.01$), whereas there was no significant difference in the mean EPG values of dogs above 6 months (Table 2).

The mean values for haematological parameters decreased with age and were significantly lower in puppies than in other age groups ($P>0.05$). Significantly lower mean TRBC and PCV values were observed in dogs with a median EPG of 1495 ($P < 0.001$) than in animals with lower median EPG values (Table 3). The mean values for Hb, TRBC and PCV of animals excreting less than 100 EPG and in the range of 100-1000 EPG were comparable. However, the means of Hb and TRBC of animals excreting 1001-2000 and >2000 EPG were significantly lower ($P < 0.05$) than in animals with burdens of lower than 1000 EPG. A significantly lower mean PCV was observed in animals excreting 1000-2000 compared to other burden categories.

DISCUSSION

The results of the present study have demonstrated a 52% prevalence of *Ancylostoma* spp. in dogs in Morogoro Municipality

which is lower than that reported previously by Makene *et al.* (1996) in the same area. The difference might be attributed to the fact that some of the animals sampled in the previous study included dogs from a cool, highland climate. In addition, occasional deworming which is practised by some dog owners in Morogoro Municipality may have contributed to the low prevalence of hookworms in the animals (Harvey *et al.*,

Table 1: Occurrence of *Ancylostoma* eggs in dog faeces examined at Sokoine University of Agriculture Veterinary Clinic, Morogoro, Tanzania.

Age category (months)	No. of samples examined	No. of positive samples	% of positive samples
Puppies (0-6)	35	24	70.6
Weaners (7-12)	43	13	30.2
Growers (13-24)	37	20	54.1
Adults (>24)	54	30	55.6
Total	**169**	**87**	**51.5**

Table 2: Relationship between age groups, median nematode egg counts and haematological parameters of dogs with hookworm infection.

Age category (months)	No. infected	Median EPG	Mean Hb	Mean TRBC	Mean PCV
Puppies (0-6)	24	1342	10.3	7.1	28.4
Weaners (7-12)	13	838	12.0	9.0	33.8
Growers (13-24)	20	860	12.5	9.4	36.3
Adults (>24)	30	710	13.1	10.0	37.3

Table 3: Influence of nematode egg counts on haematological parameters of dogs with hookworm infection.

Number examined	EPG range	Median EPG	Mean Hb	Mean TRBC	Mean PCV
79	<100	0	13.5	10.5	40.0
51	100-1000	457	13.6	10.3	38.7
37	1001-2000	1495	9.8	7.0	27.4
2	>2000	2750	12.2	8.9	37.0

1991). Puppies below 6 months of age were also observed to have a higher prevalence of *Ancylostoma* spp. and median EPG values compared to the other age groups as also previously reported in the same area (Makene *et al.*, 1996) and elsewhere (Srijayanth *et al.*, 1987). The higher prevalence of *Ancylostoma* spp. in puppies has been associated with transmammary route of infection in dams and also occasionally via the transplacental route (Soulsby, 1982).

The haematological parameters (TRBC, Hb and PCV) were lower in puppies compared to older dogs and they increased with age of animals. The depression of haematological parameters in puppies could be mainly attributed to heavy hookworm infestation (Srijayanth *et al.*, 1987; Udonsi and Agunama, 1991). In addition, because most of the dogs used in this study were mongrels which were normally not well fed, the observed low red cell parameters may also be attributed to the poor nutritional status of the animals (de Gruchy, 1976).

It can be concluded from this study that ancylostomiasis causes a reduction of red cell parameters and the effects are more severe in puppies of less than 6 month of age. It is therefore recommended that, in order to reduce the infection and improve the health status of the dogs in the area, routine deworming using the recommended anthelmintics available in the market should be carried out. However, further studies are required to ascertain the appropriate deworming intervals for the various age categories of animals.

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