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AN ABATTOIR STUDY OF GASTROINTESTINAL PARASITES OF ADULT INDIGENOUS GOATS

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SUMMARY. The species and numbers of helminths found in the gastrointestinal tract of 66 freshly slaughtered clinically healthy adult indigenous goats were studied over period of one year. Sixteen species of worms were recorded from the animals, *Haemonchus contortus*, *Trichostrongylus axei*, *Trichostrongylus colubriformis*, *Oesophagostomum spp.* and *Strongyloides papillosus* being the most common. The animals harboured substantial numbers of the worms with the exception of *Oesophagostomum spp.* The rumen fluke *Paramphistomum spp.*, the pancreatic fluke, *Eurytrema pancreaticum* and *Cooperia curticei* were the next most common. Other species of parasites occured in insignificant numbers and in only a few animals. The pathogenic significance of the worm burdens in relation to the management system was discussed.

Key Words: helminth species; indigenous adult goats; Malaysia

INTRODUCTION

Parasitism is perhaps the most important cause of lowered productivity in goats and sheep anywhere in the world. Besides ectoparasitic problems (ticks, mites and lice), the most common and important cause of lost production is parasitism of the gastrointestinal tract. Despite the importance of these parasites in Malaysia, relatively little research work has been conducted on this topic. Parasite species occurring in local goats and sheep have been listed (Lancaster, 1957; Mustaffa-Babjee, 1980; Shanta, 1982). In a five - year analysis of cause of death in goats at the Research Institute in Kluang, Johor, helminthiasis and coccidiosis were responsible for only 2.3 percent of the death toll while 46 percent were undiagnosed (Mohna, 1976). The low incidence of helminthiasis and coccidiosis could be due to the frequent use of anthelmintics and coccidiostats at the government farm. In an analysis of 68 carcasses of sheep and goats studied at Universiti Pertanian Malaysia, pediculosis, mange, haemonchosis and coccidiosis were among the most common diseases diagnosed (Sheikh-Omar and Chulan, 1980). The most common helminths recovered from the post mortem examination of sheep and goats in more recent studies were *Haemonchus contortus, Oesophagostomum columbianum, Trichostrongylus colubriformis* and *Moniezia expansa* (Sani et al., 1985;1986).

The present study was designed to quantify the number and species of the gastrointestinal nematodes harboured by apparently healthy indigenous adult goats that had been grazing on natural forages.

MATERIALS AND METHODS

Gastrointestinal tracts from 66 freshly slaughtered indigenous goats were obtained from the Shah Alam abattoir. The goats were above three years old, apparently healthy and of good body condition, and had come from Sabak Bernam, Selangor and Telok Intan, Perak. These animals had been grazing freely on the natural pasture available in coconut plantations and areas around paddy-fields and kept at night in raised sheds with slatted floors. Anthelmintic treatment was given occasionally when the animals appeared unthrifty.

The study was conducted from January to December 1988. Four to 10 gastrointestinal tracts were available each month.

The gastrointestinal tracts were separated into rumen, abomasum, small and large intestines. Each section was opened, placed in separate containers, thoroughly washed and the mucosa surface gently scraped to facilitate worm recovery. The abomasum and the large intestine were digested separately in 0.8% acid pepsin saline at 37°c for at least four hours in the waterbath to recover immature stages (MAFF, 1986).

Rectal faecal samples were examined for parasite eggs and oocysts using the Modified McMasters technique.

RESULTS

Eimeria oocysts and worm egg count

The prevalence of coccidial and helminth infection and the level of oocyst and egg outputs are shown in Table 1. Coccidial occysts were found in animals in each month examined with the largest numbers being passed by certain individuals in December and January.Strongyle eggs were recovered in every month except August while Strongyloides eggs were produced throughout the year except for May.

Helminths found in the gastrointestinal tracts

Details of the helminths recovered are given in Table 2. *Haemonchus contortus, Trichostrongylus spp. (T. colubriformis* and *T. axei), Strongyloides papillosus, Oesophagostomum spp. (O. columbianum* and *O. venulosum)* were numerically the most important species. *Cooperia curticei, Paramphistomum spp.* and *Eurytrema pancreaticum* were also quite common. Worms of other species occured less frequently and in smaller numbers.

Details of parasities recovered each month are given in Table 3. *Haemonchus contortus, Trichostronglylus spp. S. papillosus, Oesophagostomum spp.* and the amphistomes occured in almost all of the months studied. *Haemonchus contortus* occurred in moderate numbers throughout the year except for August when the numbers increased, ranging from 2640 to 7860 worms. By comparison the *Trichostrongylus spp.* were found in moderately heavy numbers in most months with the exception of August and December. The recovery of *Cooperia* and *Oesophagostumum spp.* was considered light throughout.

DISCUSSION

This study indicates that adult goats may harbour a wide range of parasites subclinically. The mean level of excretion of eggs and oocysts in faeces for many of the parasites (Table 1) was moderately heavy and if poor husbandry and malnutrition prevailed, young goats might end up suffering from a severe clinical disease.

Some animals were found to excrete as many as 15,000 strongyle eggs and 40,000 oocysts per gm. of faeces while some others produced only 100-200 eggs or oocysts. However,

TABLE 1
Worm egg and coccidian oocyst counts in the faeces from 66 goats

	%Parasite	Animals with patent infections	Range
Eimeria oocysts	97	100-39,800	3848
Strongyles	82	100-15,200	2454
Strongyloides	47	100-11,600	1793
Moniezia	3	200	200

TABLE 2
Gastrointestinal parasites in 66 goats

Parasite	% animals infected +	Worm burden+ (Range)
NEMATODES		
Haemonchus contortus	97	73 2 (15-7,860)
Trichostrongylus axei	67	1,326 (25-6,152)
T. colubriformis	83	1,246 (20-9,525)
Cooperia curticei	29	381 (10-1,575)
Paracooperia nodulosa *	1.5	10
Gaigeria pachyscelis	4.5	25 (10-35)
Strongyloides papillosus	71	323 (10-2,450)
*Capillaria spp.***	9.1	33 (10-75)
Capillaria longipes	6.1	31 (15-75)
C. brevepis	1.5	15
*Trichuris spp.***	6.1	23 (20-33)
T.ovis	3.0	30 (20-40)
*Oesophagostomum sp.****	33	43 (1-200)
O. columbianum	29	53 (15-120)
O.venulosum	20	22 (20-40)
TREMATODES		
Amphistomes ++ *(Paramphistomum spp.)*	23	+++
Eurytrema pancreaticum	24	+++
Schistosoma spp. ++	1.5	60 (60)
CESTODES		
Moniezia expansa	3.0	20 (20)
Cysticercus Cysticercus	1.5	1 (1)

* new host record in Malaysia and described elsewhere (Lee *et al* 1989)
** not identified to species, females only.
*** not identified to species, L_4 nematodes only
\+ rounded up figures
++ not identified
+++ not enumerated

TABLE 3
Average no+. of helminths recovered each month from 66 goats

Parasite	Month (No. of Animals)									
	Jan (8)	Feb (8)	Mac (10)	April (8)	May (4)	June (0)	July (8)	Aug (4)	Sept (4)	Oct (8)
Haemonchus contortus	474	349	553	693	511	-	721	4455	143	180
Trichostrongylus axei	2000	655	1155	355	1563	-	205	-	519	1300
T. colubriformis	1029	738	2652	933	986	-	1307	353	775	279
Cooperia curticei	3	13	47	349	-	-	206	-	-	262
*Paracooperia nodulosa**	-	1	-	-	-	-	-	-	-	-
Gaigeria pachysceli	60	6	-	-	-	-	-	-	-	-
Strongyloides paplillosus	253	94	133	86	150	-	644	-	147	403
*Capillaria spp.***	5	3	-	-	2	-	-	-	31	8
*Trichuris spp.***	5	4	2	-	-	-	-	-	-	-
T. ovis	-	-	-	3	-	-	-	-	-	5
*Oesophagostomum spp.****	8	39	6	15	30	-	-	40	-	10
O. columbianum	28	14	18	4	5	-	25	-	-	30
O. venulosum	13	-	6	-	10	-	-	-	5	8
Amphistomes	+++	+++	+++	+++	+++	-	-	+++	+++	+++
Eurytrema pancreaticum	-	+++	-	+++	+++	-	-	+++	-	+++
Schistosoma sp.++	-	-	-	-	-	-	-	-	-	8
Monieza expansa	-	-	-	-	-	-	-	5	3	-
Cysticercus tenuicollis	-	1	-	-	-	-	-	-	-	-

* new host record in Malaysia and described elsewhere (Lee *et al* 1989)
** not identified to species, females only.
*** not identified to species, L_4 nematodes only
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animals producing low number of eggs and oocysts can be high producers at other times (S.M. Amin-Babjee, personal observation). It is therefore clear that the diagnosis of parasitism using faecal examination should be based on presence of typical clinical signs.

From the list of helminths recovered (Table 2), *H. contortus, Trichostrongylus spp, C. curticei, Oesophagostomum spp., S. papillous*, the rumen and pancreatic flukes are relatively common. The first five nematodes are potentially dangerous to goats if their infective larvae have the oppertunity to accumulate to large numbers on pasture. Previous studies based on post mortem cases also showed their high prevalence in the local goats and sheep (Sani et al., 1985,1986).

Although *Ostertagia spp. (O. ostertagi* and *O. circumcincta)* have been listed as parasites of domestic sheep and goats in Malaysia (Shanta, 1982), the results of the present study could not demonstrate the presence of this helminths. The larval stages of these nematodes are known to survive well in cool climate but not in the hot, humid tropical climate such as in Malaysia. Hence, *Ostertagia spp.* may be an unlikely parasite in the tropics. It is possible that the parasites recorded previously were from imported rather than locally bred goats. However, further studies may elucidate this point.

Haemonchus contortus and *Trichostrongylus spp.* were found in moderate numbers throughout the year (Table 3). The hot humid climate allows rapid and continuous development of the free living stages of these nematodes. The work of Ikeme *et al.* (1986) has indicated that the larval stages of these worms could survive on the pasture throughout the year. It has also been shown that these two species of nematodes develop rapidly to become adults in goats as early as 11 days after experimental infection (Rahman and Collins, 1990a, 1990b). The short life cycle of these nematodes and their ability to develop continuously in our climate, necessitate the frequent use of anthelmintics especially for large numbers of goats grazing on grown pasture. Conversely, the survival of the preparasitic stages of the gastrointestinal nematodes in our local climate may be much shorter compared to that in temperate countries because the larva will be more active and likely to deplete its energy reserve more rapidly. A study on the survival of the infective third stage larvae of important nematodes in Malaysia is badly needed. If these larvae were found to be shortlived, rotational grazing could be considered for the control of these worms.

The monthly mean number of *H. contortus* and *Trichostrongylus spp.* throughout the year range from 143-4455 and 148-2652 respectively. In August the number of *H. contortus* were relatively high, ranging from 2640 to 7860. Whether this number of worms affects productivity of adult goats kept under the free grazing practice is not known. In adult sheep, 10,000 *H. contortus* or more than 12,000 *Trichostrongylus spp.* are regarded as clinically significant (Soulsby, 1965). In a study in New Zealand on the causes of death in goats, the mean *Trichostrongylus spp.* worm count was 88,500 and in some animals the numbers exceeded 100,000 (Buddle *et al.*, 1988). In Malaysia, especially the inland regions, natural forage is plentiful throughout the year and goats, being selective feeders, take only the nutritious and easily digestible part of the herb-age. Assuming that these free grazing goats are well nourished, it is likely that the worm burdens found in the present study would have little adverse effects in adult animals. Work conducted in Kenya and India showed that younger goats treated regularly with anthelmintics, had a significantly better liveweight gains than undrenched animals kept under intensive conditions (Muenstermann and Tome, 1989; Rajangam and Balachandran, 1989). However, work in Indonesia (Hardayani *et al.*, 1986) showed that four to five-month-old kids did not show any improvement in liveweight gains following anthelmintic treatment. This difference may be due to the different management systems of the experimental animals.

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RINGKASAN

SATU KAJIAN ABATTOIR PARASIT GASTROUSUS KAMBING DEWASA TEMPATAN

Species cacing dan bilangannya terdapat dalam gastrousus 66 ekor kambing dewasa tempatan yang sihat telah dikaji dalam jangkamasa satu tahun. Sejumlah 16 speices cacing didapati daripada binatang-binatang itu. Cacing-cacing yang selalu dijumpai ialah Haemonchus contortus, Trichosstrongylus axei, T. colubriformis, species Oesophagostomum dan Strongyloides papillosus. Ada kambing individu yang mengandungi agar banyak cacing-cacing tersebut melainkan species Oesophagostomum. Fluk rumen species Paramphistomum, fluk pankreas Eurytrema pancreaticum dan Cooperi curticei adalah cacing-cacing kedua yang sering didapati. Speices-species lain dijumpai dengan bilangan yang kecil dan tidak bermakna. Potensi kepentingan dari segi kepatogenan yang berkaitan dengan populasi cacing dan sistem pengurusan adalah dibincang.