A SURVEY OF GASTROINTESTINAL PARASITIC INFECTION ON SMALL RUMINANT FARMS IN SEBERANG PERAI SELATAN DISTRICT, PENANG, MALAYSIA

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ABSTRACT. In Malaysia, helminthiasis due to strongyles such as *Haemonchus contortus* and coccidiosis caused by *Eimeria* sp. have been reported to cause severe economic losses in small ruminants livestock industry. This paper reports the occurrence of gastrointestinal parasite infections on small ruminants situated in Seberang Perai Selatan district, Penang. Faecal samples were obtained from a total of 193 animals, randomly selected from 14 ruminant farms. The results of this survey indicates that helminthiasis and coccidiosis is rampant in sheep and goat farms. The most common infections diagnosed were helminthiasis (77.72%) and coccidiosis (60.10%) followed by *Moniezia* sp. (5.18%). From this study, it shows that parasitic diseases can be managed by good animal husbandry in farms since high parasitic infections were observed in farms that were poorly managed based on nutrition, hygiene and basic animal husbandry practices. The smallholders depended on health and extension services from the State Veterinary Department. A continuous monitoring of small ruminant farms by the Department of Veterinary Services will provide important information for assisting farmers with managing the spread of parasitic infections and maintaining the productivity of animals.

Keywords: gastrointestinal parasite, coccidiosis, management

INTRODUCTION

The population of goats and sheep recorded in Malaysia was 378,155 and 141,188 (Perangkaan Ternakan 2015/2016, Kementerian Pertanian Dan Industri Asas Tani Malaysia). Goat and sheep production has been an important part of Malaysia's agriculture for many years. It was reported that helminth infection was one of the most important factors for mortality and morbidity in small ruminants in Malaysia (Fatimah *et al.,* 1985; Sani and Rajamanickam, 1990; Sani *et al.,* 2004a; Nor-Azlina *et al*., 2011; Chandrawathani and Nurul Aini, 2012; Premaalatha B. *et al*., 2014).

In 1982, Soulsby reported that the endoparasite that causes significant losses to the small ruminant industry is the bloodsucker nematode, *Haemonchus contortus* in the abomasum, which may lead to blood loss, dehydration and anaemia. Sani *et al*. (1990) also reported that worm infections have been the second most important factor for mortality in goats,

after pneumatic pasteurellosis. Futhermore, helminth infection by trichostrongyle nematodes such as *Haemonchus contortus*, *Oesophagostomum* sp., *Cooperia* sp. and *Trichostrongylus* sp., followed by *Moniezia expansa*, cause severe losses to the livestock industry (Sani *et al.*, 2004a; Sani *et al.*, 2004b; Waller, 2006).

Coccidiosis in small ruminants is mainly caused by the *Eimeria* species. It was reported (Soulsby, 1982; Zamri, 1987) that after worm infection, coccidiosis was reported to be one of the important infection related to intestine, in a 10-year observation of parasite infection on 1,063 necropsied goats in Serdang, Selangor.

The main constraint hindering the productivity of small ruminants are infectious diseases. Others are poor nutrition, poor breeding policies and poor management. In Malaysia, several studies conducted over the last 20 years has shed light on the various methods of helminth control including rapid rotational grazing of pastures, herbal remedies for worm control, biological control using *Duddingtonia flagrans* as well as zero grazing or cut-and-carry method (Chandrawathani *et al.*, 1999 and 2002).

The unknown status of gastrointestinal parasite infection in goats and sheep in Penang could lead to prolonged and increased infection which eventually leads to lower production and in severe cases will lead to mortality. Thus, the aim of this study was to report the occurrence of gastrointestinal parasite infection on small ruminants situated in Seberang Perai Selatan district, Penang.

MATERIALS AND METHODS

Study Design and Sampling Site

The sampling size was calculated base on population of 3,973 (DVS Pulau Pinang, 2014), margin of error 5%, confidence level of 95% and 86% from past survey (Fazly *et al.,* 2015). The samples were examined for their gastrointestinal parasitic infestation status using faecal examinations. All samples were processed and diagnosed at the Parasitology Section, Regional Veterinary Laboratory Bukit Tengah.

Animal and information

A total of 193 faecal samples from adult goat and sheep were randomly collected from 14 small ruminant farms in Seberang Perai Selatan districts in Penang. On the sampling day, an information sheet was given to the farmers to obtain information about grazing management and deworming history.

Faecal Examination

Rectal faecal samples collected from animals were subjected to McMaster Technique (Christopher *et al.*, 1992) for the quantitative assessment of helminth eggs. All results were recorded as the number of eggs per gram (e.p.g.). The presence of coccidia oocysts for McMaster and sedimentation positive examination was recorded as a positive examination. The degrees of infection (e.p.g.) were separated into three groups as mentioned in the Handbook for the Control of Internal Parasites of Sheep and Goats (2012). <500 e.p.g. was indicated as low

infection, 500 to 1,000 e.p.g. was indicated as moderate infection, whereas >1,000 e.p.g. showed the severe burden of helminth infection.

Data Analysis

All statistical analysis was conducted using SPSS Version 20 (IBM Corporation) at confidence level of 95%. All data are expressed as the mean±SD.

RESULT

General information

In this study, a total of 13 farms practised semi-intensive farming and one sheep

Table 1.

Farms	Deworming programme				
	Coccidiosis medication	Helminthiasis medication	Type of medication given	Regularly	Medication resource
A	NIL	NIL	NIL	NIL	NIL
B	NIL	NIL	NIL	NIL	NIL
C	NIL	Yes	Vitastress (Poutry)	Randomly	Commercial Veterinary product shop
D	NIL	Yes	Helmidazule (Oral)	Twice yearly	Commercial Veterinary product shop
E	NIL	Yes	Not sure (Oral)	First time	Commercial Veterinary product shop
F	NIL	Yes	Not sure (Suntikan)	Twice yearly	Given from other farmer
G	NIL	Yes	Not sure (Oral)	Once a year	DVS given
H	NIL	Yes	Not sure (Suntikan)	Twice yearly	Commercial Veterinary product shop
I	NIL	Yes	Ivermectin (suntikan)	Randomly	Commercial Veterinary product shop
J	NIL	Yes	Ivermectin (suntikan)	Randomly	Commercial Veterinary product shop
K	NIL	Yes	Ivermectin (oral)	Every month	Commercial Veterinary product shop
L	NIL	Yes	Ivermectin (suntikan)	Randomly	Commercial Veterinary product shop
M	NIL	Yes	Albendazole (oral)	Quaterly	Commercial Veterinary product shop
N	NIL	Yes	Capro (suntikan)	Twice yearly	Commercial Veterinary product shop

farm practised intensive farming. In a semi-intensive management, the goats and sheep were allowed to free graze at a nearby palm oil estate during the day but kept in housed wooden sheds during the night. Both goat and sheep farms were given daily chopped palm oil leaves and cut-and-carry grass as additional or main food source upon returning from free grazing.

Based on the farm profile information, it was found that seven farms (Farms D, F, G, H, K, M and N) kept deworming records. The deworming medication was given every 6 months without any faecal egg count test. Seven farms (Farms A, B, C, E, I, J and L) had not kept proper deworming records for controlling helminthiasis. The small ruminants in these farms were also never treated for coccidiosis.

These farmers bought the deworming drugs from commercial enterprises without consulting a veterinarian. The type of drugs, dosage, and weight of each animal was not recorded before introducing the drug to the animal.

Gastrointestinal parasite

A total of 193 faecal samples from 144 goats and 49 sheep of various breeds were successfully examined for helminth ova. Results for McMaster was recored as e.p.g., the present of gastrointestinal parasite were strongyle, *Moniezia* sp., and strongyloides. The present of gastrointestinal parasite for sedimentation were *Trichuris* sp., *Paramphistomum* sp. and *Fasciola* sp.

The results are shown in detail in Table 2. The analysis of the faecal samples showed that 77.72% (n=150) (1,453.37±4,149.385) of the samples were positive for strongyle ova. The faecal examination showed low faecal egg counts in three farms (Farms B, E and G had faecal egg counts of below 500 e.p.g.). A total of eight farms (Farms D, F, H, I, J, K, L and N had faecal egg counts of more than 1,000 e.p.g.). Thus, it was observed that an average of 31.61% of the faecal samples had low faecal egg counts, followed by 27.46% of the faecal samples having severe faecal egg counts necessitating treatment (Handbook for the Control of Internal Parasites of Sheep & Goats, 2012).

An average of 1.55% (2.07±17.555) and 5.18% (45.08±272.315) of the faecal samples tested showed the presence of strongyloides and *Moniezia* sp. tapeworm, whereas all fourteen farms showed evidence of coccidiosis 60.10% (6.94±23.667) due to *Eimeria* sp. with three farms showing all samples testing positive; that is Farms E, F and N. In this study, there was only one sample positive with *Trichuris* sp., two samples positive with *Paramphistomum* sp. and one sample positive with *Fasciola* sp. (Table 2).

DISCUSSION

In this study, a total of 193 faecal samples were examined for parasites. The egg counts in this study were lower than previous reports of studies conducted in Perak, Malaysia (Fazly *et al.*, 2015). The results indicate that the most common infections diagnosed were helminthiasis (77.72%) and coccidiosis (60.10%) followed by *Moniezia* sp. (5.18%). Base on the results obtained, six farms were showed an average below 400 e.p.g. and seven farms showed an average

Table 2. Number of positive samples and percentage infected with various worm egg counts

Farm	No. of faecal samples examined	Positive Strongyle Feacal Egg Count (e.p.g.)					Positive Strongy-loides	Positive Moniezia spp.	Positive Oocyst Eimeria	Tric-huris spp.	Paramphistomum spp.	Fasciola spp.
		0	100-400	500-900	> 1000	Total Positive Samples						
A	8	3	3	2	0	5	0	2	6	0	0	0
B	8	8	0	0	0	0	0	0	3	0	1	0
C	9	2	6	1	0	7	1	0	5	0	0	0
D	10	1	5	1	3	9	0	1	5	0	0	0
E	5	5	0	0	0	0	0	0	5	0	0	0
F	5	0	2	2	1	5	0	0	5	0	0	0
G	7	6	1	0	0	1	0	0	1	0	0	0
H	4	0	0	1	3	4	0	1	3	0	0	0
I	30	4	15	8	3	26	1	0	20	1	1	1
J	10	0	3	3	4	10	0	0	3	0	0	0
K	30	3	13	6	8	27	1	4	20	0	0	0
L	39	4	7	8	20	35	0	1	17	0	0	0
M	15	7	6	2	0	8	0	0	10	0	0	0
N	13	0	0	2	11	13	0	1	13	0	0	0
Number of positive samples		43	61	36	53	150	3	10	116	1	2	1
Percentage (%)		22. 28	31. 61	18.65	27.46	77.72	1.55	5.18	60.10	0.52	1.04	0.52

at least 700 e.p.g., which shall require treatment.

Based on the deworming record information gained from the farmers, the improper deworming programme might have caused the helminthiasis problem and it might have also caused anthelminthic resistance. Anthelmintic resistance is an issue to be addressed in farms with animals that are treated with anthelmintics and still exhibit helminthiasis problems (Chandrawathani *et al.*, 2013). A proper record on weight gain, laboratory faecal test, type of drug and dosages used for each animal is important for future purposes.

Each farm was positive with coccidiosis. Due to the impact of coccidiosis infection, it might be the cause poor nutrition in animals and indirectly reduce production. Therefore, coccidiosis should be well controlled. According to Jalila *et al.* (1998) and Khadijah *et al.* (2014), the intensity of coccidiosis

infestation was found to be related to the cleanliness level. Based on the observations, there were three farms classified as good in cleanliness, as the farm washed and cleaned up the faeces every day. Five farms were classified as poor in cleanliness because it only washed and cleaned up the faeces once a month. As suggested by Jalila *et al.* (1998), when faeces are not often cleared under the shed, it may serve as a source of coccidia and nematode infection when animals graze around the contaminated areas.

From this study, a total of thirteen farms practised semi-intensive farming and one sheep farm was intensive farming. Parasitic infection can be spread by either intensive grazing or cutting feed from infected areas and hand feeding. Therefore, control requires treatment programmes and improved management of stock and pasture. According to Sani *et al.* (1996), rotational grazing may not be applicable to certain types of management, for example communal grazing or limited land.

CONCLUSION

Based on the results of this study, gastrointestinal parasite infection cause by strongyle, strongyloids, *Moniezia* sp., *Trichuris* sp., *Paramphistomum* sp., *Fasciola* sp. and coccidiosis were found to be common in small ruminant farms in Penang, Malaysia. Concerted efforts need to be taken to improve productivity and to safeguard food quality as drugs may be used rampantly to control these infections in high-density, overcrowded pens that encourage these diseases. The proper information of usage of anthelmintics and coccidiostats on farms will help in controlling parasitic infestations. A continuous monitoring of small ruminant farms by the state Department of Veterinary Services will provide important information for assisting farmers with managing the spread of parasitic infections and maintaining the productivity of animals.

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