Parasite Infection in Two Goat Farms Located in Kuala Terengganu, Peninsular Malaysia

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ABSTRACT— ***A study was conducted to determine the parasite infection in two goat farms located in Sungai Ikan and Pantai Chendering, Kuala Terengganu, Peninsular Malaysia. Twenty goats from each farm were examined for the presence of endo- and ectoparasites. Faecal samples were subjected to worm egg counts for estimation of nematode burdens and also detection of cestodes and oocysts of coccidia. Body examination and skin scrapings were conducted to detect the presence of ticks and mites. Results showed that worm and coccidia infections were common in these two farms, with Haemonchus contortus and Trichostrongylus colubriformis as the two major worms infecting the goats. Ticks identified from this study were Boophilus sp., Dermacentor sp., Ixodes sp., Haemaphysalis sp. and Rhipicephalus sp., while the mites identified was Psoroptes sp. Parasite infection was generally higher in the farm at Sungai Ikan, when compared to the farm at Pantai Chendering.***

Keywords— Endoparasite, ectoparasite, goats, Terengganu, Peninsular Malaysia

1. INTRODUCTION

The number of goats in Malaysia for the year 2012 was recorded as 458,646 [1] with 32,685 goats recorded from Terengganu [2]. These numbers are relatively small when compared to other livestock in Malaysia. Regardless, goat production has been an important part of Malaysian agriculture for many years. One of the constraints in goats farming is parasite infection, which is responsible for morbidity, mortality and eventually economic losses. The only report on the cost-estimation of losses (deaths, treatment cost and condemnation in abattoir) due to parasitism in goats was by [3] which calculated the value at approximately MYR44,400. This value is a conservative amount as estimation on milk and milk yields were not conducted. Due to the current widespread of anthelminthic resistance in Malaysia [4, 5, 6] the current cost of treatment and losses would be higher.

Nematode infection remains one of the greatest limiting factors to successful, sustainable livestock production. The hot and humid climate throughout the year in Malaysia is favourable for the development of free-living gastrointestinal nematodes. With minimum temperatures exceeding 10°C, mean monthly temperatures exceeding 18°C and monthly rainfalls greater than 50 mm [7], Malaysia is very suitable for successful development of parasites such as nematodes, protozoa, ticks and mites.

Worm infections have been reported as the second most important factor for mortality in goats, after pneumatic pasteurellosis [8]. It was reported that in Perak, Malaysia, a total of 1239 cases of worm infection was recorded in 2008 [9]. [10] reported that from 72 goats necropsied in Universiti Putra Malaysia, *H. contortus* was the major worm found (67%), followed by *Moniezia expansa* (51%).

Coccidiosis was reported to be one of the important infections related to intestine, after worm infection in a 10-year observation of parasite infection on 1063 necropsied goats in Serdang, Selangor [11]. Coccidiosis in small ruminants is mainly caused by the Eimeria species [12]. There were nine species of Eimeria identified from goats in 10 smallholder farms in Selangor, Malaysia. The species identified were *Eimeria arloingi*, *Eimeria ninakohlyakimovae*, *Eimeria christenseni*, *Eimeria alijevi*, *Eimeria hirci*, *Eimeria jolchijevi*, *Eimeria caprovina* and *Eimeria caprina* [13].

Beside endoparasite infection, one of the major problems in livestock is ectoparasite (ticks and mites) infection, which greatly affects their productivity. [11] reported that ectoparasite infection was the major integumentary problem on goats necropsied in Serdang, Selangor, Malaysia. Common ticks found in goats were *Boophilus microplus* and *Haemaphysalis bispinosa* [14], with *Sarcoptes scabiei* was the common mite found in Malaysian goats [14, 11].

There is lack of information on the current status of endoparasite and ectoparasite infections in goats in Kuala Terengganu, Peninsular Malaysia. Unknown status of parasite infection could lead to prolonged and increased infection which eventually leads to lower production and in severe cases will lead to mortality. Thus the objective of this study is to determine the prevalence of endo- and ectoparasite infection in goats on two farms located in Sungai Ikan and Pantai Chendering, Kuala Terengganu, Peninsular Malaysia.

Information from this study will be useful to the officers from the Department of Veterinary Services Terengganu and respective farmers will know the infection status in their farms, thus making it easier to decide on treatment and to plan on suitable management to improve the health of the goats.

2. MATERIALS AND METHODS

2.1 Sampling site and sampling period

The study was conducted at two goat farms located in Sungai Ikan (Farm A) and Pantai Chendering (Farm B), Kuala Terengganu, Peninsular Malaysia (Figure 1). Sampling was conducted in the months of September and October 2013.

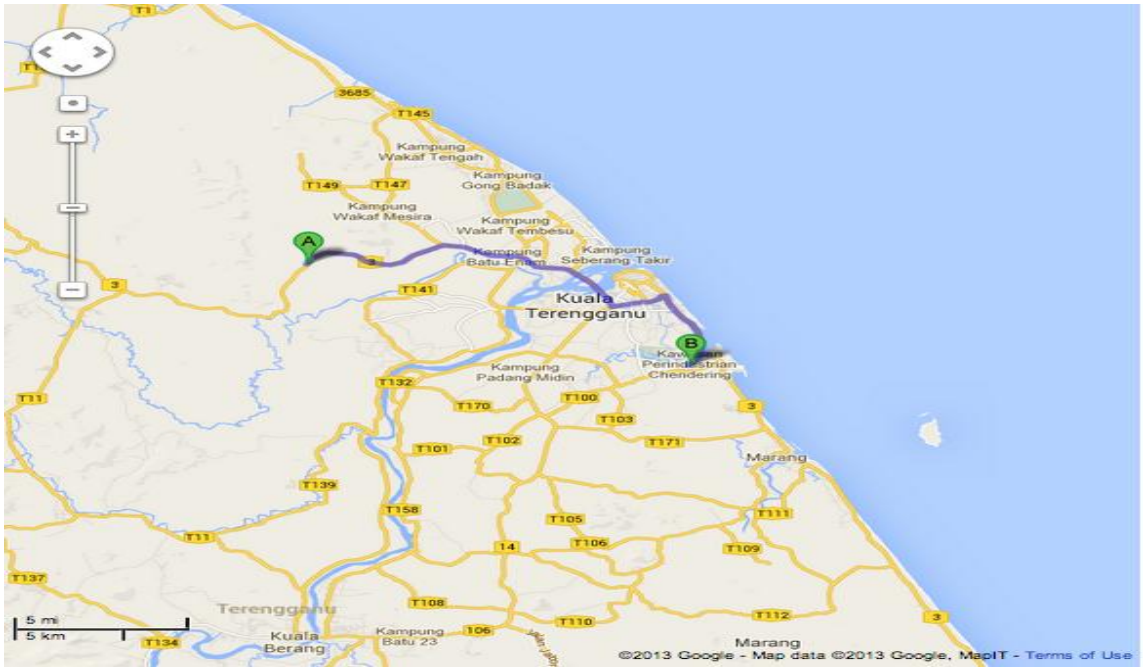

Figure 1: Location of samplings: Sungai Ikan (A) and Pantai Chendering (B) [15]

2.2 Animal and information

A total of 40 goats (20 goats from each farm) were randomly chosen for this study. On the sampling day, an information sheet was given to the farmers to obtain information such as deworming history and grazing management.

2.3Sample collection and field examination

Sampling on the farms was conducted between 0900 – 1400 h. Eighteen (18) rectal faecal samples (two animals have no faeces) were collected from goats in each farm. Samples were separately kept in plastic containers and were stored in the refrigerator until examination. The faecal samples were processed for endoparasite detection, individual worm egg count and pooled faecal larval cultures (by farm). For ectoparasite detection and skin lesions, examination of the body and skin were conducted on 20 goats. During the examination, the body parts especially head, ear, neck, shoulder, legs – back front and rear were thoroughly examined. Live ticks and skin scrapings were collected from the goats into individual plastic container and the samples were taken to the laboratory and were processed immediately.

2.4 Parasitological examination

Faecal worm egg counts were conducted to estimate the infection level of nematode and cestode worms in goats. The method was conducted according to [16] with the sensitivity of the method of 1 egg counted equivalent to 100 eggs per gram (e.p.g) of faeces. Using this method, strongyle eggs and Moniezia eggs were counted, while the existence of Coccidia oocysts was noted.

Larval culture was conducted according to [16] to obtain the third stage larvae of the nematodes for identification. Identification was conducted based on the identification keys provided in [16].

Body examination, sample collection for ticks and mites, and skin scraping were conducted according to method by [17]. Skin scrapings were processed by using the methods outlined by [16]. The observed ticks and mites were identified up to genus level, using the key by [16] and [18].

2.5 Statistical analysis

All statistical analysis was conducted using SPSS Version 20 (IBM Corporation) at confidence level of 95%. Mann-Whitney U test was used to compare the mean worm egg counts of nematodes and cestodes, between Farms A and B.

3. RESULTS

3.1 General information

Goats included in this study were aged between 2 months and 6 years. Their breeds were Jamnapari (Farm A) and Katjang (Farm B). Goats in both farms were managed in a semi-intensive management, where they were allowed to graze during the day but kept in a housed wooden sheds during the night. Animals in both farms were dewormed with benzimidazoles by the Department of Veterinary Services Kuala Terengganu. The latest treatment was in 2012 for Farm A and in 2013 (the same year of the study) for Farm B. The mortality rates were 14% and 10% for farms A and B respectively. Animals in both farms were never treated for coccidiosis.

3.2 Endoparasites

Faecal worm egg counts (WEC) for nematodes from both farms ranged from 0 - 2700 e.p.g. The lowest WEC for both farms were 0, while the highest WEC were 2700 (Farm A) and 1300 e.p.g. (Farm B). Mean WEC for Farm A was 1267 ± SE 187 e.p.g and was significantly higher ($z=0.002$, $p<0.05$) than the WEC for Farm B (Mean = 533 ± SE 82 e.p.g).

The major species infecting the goats in Farm A was *T. colubriformis* (70%), while the most dominant species infecting the goats in Farm B was *H. contortus* (64%) (Table 1).

Table 1: Percentages of third stage larvae (*Haemonchus contortus*, *Trichostrongylus colubriformis and Oesophagostomum columbianum*) in goats of Sungai Ikan farm (Farm A) and Pantai Cendering farm (Farm B).

	Percentages (%)		
	Haemonchus contortus	*Trichostrongylus colubriformis*	*Oesophagostomum columbianum*
Farm A	23	70	7
Farm B	64	32	4

In Farm A, the eggs of *Moniezia* sp. was detected in 14 samples (78%), while in Farm B *Moniezia* eggs were not detected (Table 2). Mean *Moniezia* eggs for the goats from Farm A is 133 ± SE 12 e.p.g and was significantly higher ($p<0.05$) when compared to Farm B (Mean = 0).

Table 2: Number of goats infected with *Moniezia* egg counts in goats from Sungai Ikan (Farm A) and Pantai Chendering (Farm B).

	Number of animals	*Moniezia* egg count (e.p.g.)		
		0	100-400	>400
Farm A	18	6 (33%)	11(61%)	1 (5%)
Farm B	18	0	0	0

Coccidia oocysts were detected in all samples collected from goats in both farms.

3.3 Ectoparasites

In Farm A, there were 16 goats out of 20 goats (80%) identified with ectoparasites (either ticks or mites), while there was no goat with ectoparasite in Farm B.

Table 3: Number of goats infected with either ticks, mites or both tick and mites in Farm Sungai Ikan (Farm A) and Farm Pantai Chendering (Farm B).

	Number of goats infected	**Percentage (%)**
Farm A		
Mites	2	10
Ticks	4	20
Ticks and Mites	10	50
Not infected	4	20
Total	20	100
Farm B		
Mites	0	0
Ticks	0	0
Ticks and Mites	0	0
Not infected	20	100
Total	20	100

Ticks were identified as *Boophilus* sp., *Dermacentor* sp., *Ixodes* sp. and *Haemaphysalis* sp., while mites were identified as *Psoroptes* sp.

4. DISCUSSION

The worm egg counts (WEC) in the present study are lower than previous reports of studies conducted in Malaysia. For example, [19] reported mean WEC of 3441 e.p.g. for goats in Terengganu while [20] noted that mean WEC was 3240 e.p.g. for goats in Perak. However, an egg count of 500 e.p.g is generally considered high where treatments are required to limit pasture contamination and subclinical diseases [21]. Thus, despite having lower WEC as compared to other studies, goats in Farms A and B need to be treated with anthelmintics to prevent infection from getting worse.

Results of the worm egg counts showed that there were higher burden of worms in goats of Farm A than B, however L_3 identification confirmed that the predominant species of Farm A was *T. colubriformis*, while for Farm B *H. contortus* was the dominant species. Our findings are similar to that of [22] who reported that privately owned small ruminant farms in Peninsular Malaysia have either *H. contortus* or *T. colubriformis* as the dominant species of worm population.

Moniezia eggs were only found in samples from Farm A, while no *Moniezia* eggs were found in in Farm B. The findings in Farm A were similar to that of [10], who reported that *Moniezia* (51%) was found in 72 necropsied goats in University Putra Malaysia. The absence of *Moniezia* in Farm B may be due to the fact that *Moniezia* sp. needs an intermediate host

(pasture mites) to complete the life cycle. Based on visual observation, Farm B was situated close to the sea, with sandy soil and less grass for grazing when compared to the environment in Farm A.

Coccidia oocysts were found on both farms in this study, as similarly reported by [5] where seven out of eight farms were reported to have coccidia oocysts although the number of animals infected was lower than that of the present study. The high occurrence of coccidia infection might be related to the poor sanitation level observed in both farms. As suggested by [13], 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. Based on the information gained from the farmers of both farms, the goats in both farms were never treated for coccidiosis. This may have also contributed to the high prevalence of animals infected with coccidia.

From the ticks collected from Farm A, *Boophilus* sp. was the dominant genus found and supported by the findings of [14] and [23] which reported that *Boophilus* sp. is the common tick found in goats and sheep.

From the present study, only one genus of mites was found, i.e. *Psoroptes* sp., which is different from the findings of previous studies by [14] and [11] who reported that *Sarcoptes* sp. was the common mites found on goats. However, Prosoptic and Choroptic mites were also frequently reported on goats [11].

Similarly to the findings of the cestode *Moniezia* and the lower nematode worm egg count in Farm B when compared to Farm A, the absence of ticks and mites in farms B were likely due to the location of the farms. Lack of grazing pasture and shrubs at Farm B which was located close to the sea were not suitable for the habitat of ticks and mites.

5. CONCLUSION

Generally, it was found that parasite infections in goats which are located closer to the sea (Farm B) was lower than the infections of parasite in goats located further from the sea (Farm A). This finding may suggest that the goats reared closer to the sea in Terengganu may have less parasite infections. However the results obtained from this study is insufficient to make such conclusion. Further studies need to be carried out to confirm this suggestion, and if valid, it can be used to encourage farmers in Terengganu to rear goats.

6. ACKNOWLEDGEMENT

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