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A survey of parasitic infection on small ruminant farms in Kinta and Hilir Perak districts, Perak, Malaysia

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Abstract. This paper reports the occurrence of helminth and protozoan infections on small ruminants from eight farms situated in Kinta and Perak Tengah district, Perak. The results of this survey indicate that helminthiasis and coccidiosis is rampant in sheep and goat farms. Several anthelmintics have been used for the control of helminths. The smallholders depended on health and extention services from the State Veterinary Department. This survey is part of an ongoing programme by the Department of Veterinary Services to upgrade services and report the current status of parasitic diseases in the state.

INTRODUCTION

The 2006 figures from the Department of Veterinary Services, Malaysia recorded the total number of sheep and goat populations as 116,697 and 333,962 respectively with a total of 8 271 sheep farmers and 12 755 goat farmers nationwide (Department of Veterinary Services, http://agrolink.moa.my/jph). The increase in population of animals will aid in the strategies of The 9th Malaysian Plan to revitalise the agriculture sector to emerge as the third pillar of economic growth (Ministry of Information, http://ww.epu.jpm.my). This in turn will help develop Malaysia into a global centre for halal products (Ministry of Agriculture, http://moa.gov.my).

The main threat for the livestock industry is infectious diseases such as helminthiasis and pneumonia. It was reported that helminth infection by trichostrongyle nematodes such as *Haemonchus contortus*, *Oesophagostomum* spp., *Cooperia* spp. and *Trichostrongylus* spp. causes severe losses to the livestock industry (Waller, 2006). These infections have been identified as one of the most prominent causes of mortality and morbidity in Malaysia (Fatimah *et al.*, 1985; Sani & Rajamanickam, 1990; Sani *et al.*, 2004).

The parasite that causes significant losses to the small ruminant industry is the bloodsucker nematode; *H. contortus*, better known as 'barber's pole' worm. It is the most pathogenic parasite for small ruminants (Soulsby, 1982). This parasite occurs worldwide; in the tropics as well in temperate countries such as Sweden (Waller & Chandrawathani, 2005). Helminth infections are rampant due to the grazing activities of the livestock on pastures contaminated with third stage infective larvae of parasitic nematodes.

The humid climate throughout the year in Malaysia is very favourable for the development of free living stages of trichostrongyle nematodes and infective larvae are available on the pasture for grazing animals all the year round (Ikeme *et al.*, 1987). Coccidiosis in small ruminants is mainly caused by the *Eimeri*a species (Soulsby, 1982). Heavy infections will result in severe diarrhoea which sometimes

contains blood and diagnosis can be done through faecal examination for oocyst identification (Urquhart *et al.*, 1996). Nine species of Eimeria was identified from goats in 10 smallholder farms in Selangor. The species were *Eimeria arloingi*, *Eimeria ninakohlyakimovae*, *Eimeria christenseni*, *Eimeria alijevi*, *Eimeria hirci*, *Eimeria jolchijevi*, *Eimeria caprovina*, *Eimeria caprina* and *Eimeria pallida* (Jalila *et al.*, 1998).

Packed Cell Volume (PCV) is an important diagnostic tool to establish anaemia and can be used to infer helminth or protozoan diseases. It is a fast and reliable method for the quick diagnosis of anaemia and is widely used by all levels of farm personnel.

Theileriosis is an infection caused by several species of a tick-borne blood parasite, and commonly occurs in Africa, Asia and the Middle East which can be a serious constraint on livestock development (Urquhart *et al.*, 1996). *Theileria hirci* and *Theileria ovis* were the two species of Theileria described in sheep and goats (Soulsby, 1982).

Thus the objective of the study is to report on the occurrence of worm infections, blood parasites as well as the packed cell volume values on small ruminants in selected farms situated in Perak.

MATERIALS AND METHODS

Eight small ruminant farms situated in Kinta and Perak Tengah district, Perak were examined for gastrointestinal parasites and blood parasite infections, as well as the packed cell volume.

Rectal faecal samples and jugular venous blood samples were taken from approximately 10% of each farm population.

Faecal samples collected were subjected to modified McMaster method (Ministry of Agriculture, Fisheries and Food, 1986) examination of all parasites in the faeces. The blood samples collected were subjected to thin blood smear examination (Ministry of Agriculture, Fisheries and Food, 1986) for blood parasites and PCV (Jain *et al.*, 1986). PCV values obtained were compared with the normal PCV values of goats, i.e. 22% - 38% (Schalm *et al.*, 1975). Hence, goats with PCV values below 22% were recorded as anaemic while values more than 38% were recorded as dehydrate.

Personal interviews with the farmers were conducted during the farm visits to obtain information on the farm management and health history.

RESULTS

Information obtained from the interview was recorded in Table 1. It was found that 6 farms had only goats while 2 farms had sheep together with the goats, and the breed of animals were recorded.

Two farms (Farm 1, 3) were reported to use Benzimidazole anthelmintic, which is the most economical anthelmintic locally available. Farm 2 was found out to use Ivermectin, while on 2 farms (Farm 4, 6), the animals were not treated with any anthelmintic. On 3 of the farms (5, 7, 8), the status of anthelmintic use was unknown as no records were kept. Based on the information obtained, the drugs used in the farms were Benzimidazole oral drenches, Ivermectin injectible and Cydectin pour- on formula. The deworming frequencies on each farm were unknown as records were not maintained. However Farm 2 dewormed the animals 4 times a year while Farm 3 dewormed less than 6 times a year.

Based on Table 2, it was found that only one farm (Farm 4) had all animals with faecal egg counts lower than 500 eggs per gram (e.p.g.). All farms recorded coccidia infection in the animals while only two farms (Farm 5 and 6) had *Moniezia* sp. infections and only one farm (Farm 5) had *Strongyloides* sp. infection. Farm 6 recorded the highest percentage of animals with egg counts greater than 1000 e.p.g., i.e. 61%. The highest percentage of cocccidia infection was recorded in Farm 3 on goats (86%).

Packed Cell Volume values and *Theileria* sp. infection for the animals in the eight farms was summarised in Table 3. It was found that the highest percentage of

Table 1. Information on the animals, brees and anthelmintics used on the 8 farms

Farm	Type of animals	Breed of animals	Anthelmintics that had been used	Deworming frequency
1	Goat	Saanen, Boer, Jamnapari, Katjang	Benzimidazole, Ivermectin	Unknown
2	Goat	Katjang, Boer, Jamnapari, Anglo Nubian	Benzimidazole, Ivermectin	4 times/year
3	Goat	Jamnapari cross, Boer, Saanen	Benzimidazole, Cydectin pour on	Less than 6 times/year
	Sheep	Santa ines, Garut	–	–
4	Goat	Boer, Saanen, Jamnapari	Unknown	Unknown
5	Goat	Saanen-Jamnapari cross, Jamnapari	Ivermectin	Unknown
6	Goat	Boer, Katjang	Unknown	Unknown
7	Goat	Jamnapari cross, katjang cross	Ivermectin, Benzimidazole	Unknown
	Sheep	Siamese Longtail		
8	Goat	Boer, Boer cross, Saanen, Jamnapari, Katjang		

Table 2. Results for faecal egg count, *Eimeria* sp. oocyst, and other parasite found during faecal examination on the 8 farms

Farm	Location / District	Animal	No. of samples	Faecal sample				
				Number of positive cases (%)				
				Faecal Egg Count (e.p.g.)			Oocyst Eimeria	Others
				0–400	500–1000	>1000		
1	Batu Gajah / Kinta	Goat	26	25 (96)	0	1 (4)	20 (80)	None
2	Ipoh / Kinta	Goat	29	7 (24)	9 (31)	12 (41)	16 (55)	None
3	Ipoh / Kinta	Goat	22	17 (77)	2 (9)	3 (14)	19 (86)	None
		Sheep	9	4 (44)	1 (11)	4 (44)	7 (78)	None
4	Gopeng / Kinta	Goat	20	20 (100)	0	0	4 (2)	None
5	Gopeng / Kinta	Goat	24	7 (29)	9 (38)	8 (33)	10 (42)	Moniezia - 4
6	Bota Kiri / Perak Tengah	Goat	23	9 (39)	0	14 (61)	3 (13)	Strongyloides - 7 Moniezia - 6
7	Bota Kanan / Perak Tengah	Goat	33	15 (45)	8 (24)	10 (30)	27 (82)	None
		Sheep	9	1 (11)	4 (44)	4 (44)	5 (56)	None
8	Bota Kanan / Perak Tengah	Goat	26	7 (27)	6 (23)	13 (50)	0	None

Table 3. Results for Packed Cell Volume and blood parasite on the 8 farms

Farm	Location / District	Animal	Blood sample			
			Number of positive cases (%)			
			Number of samples	PCV Value > 38% Dehydrated	PCV Value < 22% Anaemic	Blood parasite (*Theileria* sp.)
1	Batu Gajah / Kinta	Goat	30	7 (23)	4 (13)	8 (27)
2	Ipoh / Kinta	Goat	20	0	14 (70)	4 (20)
3	Ipoh / Kinta	Goat	24	2 (8)	2 (8)	1 (4)
		Sheep	7	2 (29)	2 (29)	1 (14)
4	Gopeng / Kinta	Goat	22	17 (77)	0	3 (14)
5	Gopeng / Kinta	Goat	31	9 (29)	0	*not recorded
6	Bota Kiri /Perak Tengah	Goat	21	1 (5)	12 (57)	*not recorded
7	Bota Kanan / Perak Tengah	Goat	35	7 (20)	13 (37)	*not recorded
		Sheep	10	3 (30)	0	*not recorded
8	Bota Kanan / Perak Tengah	Goat	26	0	8 (31)	*not recorded

dehydrated animals was recorded in Farm 4, with 77%, while Farm 2 and Farm 8 did not record any dehydrate animals. However, Farm 2 recorded the highest percentage of anaemic animals, with 70%. Farm 4, 5 and 7 did not record any anaemic animals. *Theileria* sp was recorded the highest percentage in Farm 1, with 27% while in Farm 4 *Theileria* sp. was found on 14% of the animals. *Theileria* sp. in four farms was not recorded.

DISCUSSION

It was reported that parasitic gastroenteritis was the main cause of mortality in weaner Dorset Horn sheep, whereas in adult sheep, pneumonia, bacterial enteritis, trauma and septicaemia are also common (Fatimah *et al.*, 1985). Sani *et al.* (2004) reported that from 72 goats necropsied in Universiti Putra Malaysia, *H. contortus* was the major helminth found (67%), followed by *Moniezia expansa* (51%), *Oesophagostomum columbianum* (42%) and *Trichostrongylus colubriformis* (38%). Work done by Dorny *et al.* (1995) on sheep and goats from the three farms in peninsular Malaysia showed that *H. contortus* and *Trichostrongylus* spp. were the most important strongyles in sheep and goats.

Based on the findings from these papers, it was found that helminthiasis occurs in the farms and the anaemic status of the animals may be caused by the helminth infection. This was illustrated in Table 3, where the farm with the lowest egg counts in Table 2 (Farm 4) had good PCV values. However, it was found that all 8 farms recorded PCV values out of the normal range (higher or lower). High PCV values were recorded in 6 farms (Farm 1, 3, 4, 5, 6 and 7), indicating dehydration which may occur as a result of loss of fluids with diarrhoea in coccidiosis infection. Low PCV value were recorded in 6 farms (Farm 1, 2, 3, 6, 7 and 8), indicating anaemia due to helminth infections.

Theileria sp. was found in four farms (Farm 1, 2, 3, and 4) but the infections were not heavy (<5% of the red blood cells are infected). As theileriosis is a benign infection in sheep, no clinical signs of jaundice were seen.

The survey on 8 farms shows the importance of helminth infections such as *H. contortus* and protozoans such as coccidia in small ruminants in Malaysia. Further work needs to be carried out to establish control methods using

environmentally friendly solutions so that drugs such as anthelmintics may be reduced. Extension services must be available to farmers at all levels to aid in identifying and treating infectious diseases as well as for advisory services. If these diseases can be kept under control, small ruminant industry can be a lucrative venture.

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REFERENCES

Department of Veterinary Services, Malaysia http://agrolink.moa.my/jph

Dorny, P., Symoens, C., Jalila, A., Vercruysse, J. & Sani, R. (1995). Strongyle infections in sheep and goats under the tradition husbandry system in Peninsular Malaysia. *Veterinary Parasitology* **56:** 121-136.

Fatimah, I., Ranjit, K.D. & Jainudeen, M.R. (1985). Causes of mortality of Dorset Horn Sheep in Malaysia. *Kajian Veterinar* **17**(1): 62-67.

Ikeme, M.M., Fatimah, I. & Lee, C.C. (1987). Seasonal changes in the prevalence of *Haemonchus* and *Trichostrongylus* hypobiotic larvae in tracer goats in Malaysia. *Tropical Animal Health and Production* **19**: 184-190.

Jain, N.C. (1986). *Schalm's Veterinary Haematology* 4th Edition. Lea and Febiger, Philadelphia.

Jalila, A., Dorny, P., Sani, R., Salim, N.B. & Vercruysse, J. (1998). Coccidial infections of goats in Selangor, Peninsular Malaysia. *Veterinary Parasitology* **74**: 165-172.

Ministry of Agriculture, Fisheries and Food. (1986). *Manual of Veterinary Parasitological Laboratory Techniques*. Her Majesty's Stationery Office, London. P.160.

Ministry of Agriculture, Malaysia http://moa.gov.my

Ministry of Information, Malaysia http://ww.epu.jpm.my

Sani, R.A. & Rajamanickam, C. (1990). Gastrointestinal parasitism in small ruminants in Malaysia. In: Le Jambre and Knox. ACIAR Proceedings No. 74. Bogor, Indonesia. Pp. 98 – 100.

Sani, R.A., Adnan, M., Cheah, T.S. & Chandrawathani, P. (2004). Worm control for small ruminants in goats in Serdang, West Malaysia. *Kajian Veterinar*. **17:** 127-131.

Schalm, O.W., Jain, N.C. & Carroll, E.J. (1975). *Veterinary Haematology*, 3rd Edition, Lea and Febiger, Philadelphia.

Soulsby, E.J.L. (1982). *Helminths, Arthropods and Protozoa of Domesticated Animals*: Bailliere Tindall, London. P 231.

Urquhart, G.M., Armour, J., Duncan, J.L., Dunn, A.M. & Jennings, F.M. (1996). *Veterinary Parasitology*. Second Edition. Blackwell Science, United Kingdom. Pp. 10, 19 - 57.

Waller, P.J. (2006). From discovery to development: Current industry perspectives for the development of novel method of helminth control in livestock. *Veterinary Parasitology* **139:** 1 – 14.

Waller, P.J. & Chandrawathani, P. (2005). *Haemonchus contortus*: Parasite problem No. 1 from tropics – Polar Circle. Problems and prospects for control based on epidemiology. *Tropical Biomedicine* **22**(2): 131-137.