Fasciola AND *Paramphistomum* INFECTIONS IN SMALL RUMINANTS (SHEEP AND GOAT) IN TERENGGANU

MURSYIDAH A.K.[1], KHADIJAH S.[1]* AND RITA N.[1]

School of Food Science and Technology, Universiti Malaysia Terengganu, 21300, Kuala Terengganu, Terengganu, Malaysia.

* Corresponding author: dijah@umt.edu.my

ABSTRACT. A study was conducted to identify the current status of *Fasciola* and *Paramphistomum* infections in small ruminants in Terengganu. A total of 267 faecal samples from small ruminants were collected and subjected to sedimentation technique. Serum samples were diagnosed for detection of IgG antibody for *Fasciola* infection using sELISA method. Results showed that there were 4% of the goats positive with *Paramphistomum* eggs whereas *Fasciola* egg was not observed in any of the faecal samples. However, it was found that 89% of the serum samples from goats were positive with IgG antibody for *Fasciola* infection. Small ruminants in Terengganu were not infected with severe *Fasciola* and *Paramphistomum* infections yet the results obtained from this study will update the current status of the infections. This information will help the farmers and the Department of Veterinary Services to plan on management to maintain the animals' health.

Keywords: *Fasciola* and *Paramphistomum* infections, sedimentation technique, IgG antibody, *Paramphistomum* egg

INTRODUCTION

About 70% of small ruminants farming in Malaysia were reared in small farms, usually in small groups of 20-50 animals (Alimon, 1990). Trematode infections are the main threat to the production of sheep and goats in both small-scale and large-scale farms (Copeman, 1980; Sani and Rajamanickam, 1990; Koinari *et al*., 2013). These infections were caused by two different species, *Fasciola* sp. and *Paramphistomum* sp. Both species are categorised as a food- or water-borne trematodiasis where *Fasciola* infection is considered as one of the most significant parasitic disease for domestic ruminants (Saleha, 1991; Hopkins, 1992). These flukes cause high mortality in small ruminants, which depend on the occurrence of the flukes and stage of the infections (Sripa *et al*., 2010).

The increase of *Fasciola* infection had occurred as an outcome of uncontrolled movements of infected animals from one region to another region, where *Fasciola* sp. had been endemic for several years (Faull, 1987; Saleha, 1991). Besides that, optimal temperature which is above 10 °C and moisture condition are the essential aspects for the growth of larvae (miracidia), the reproduction of the snails (the intermediate host) and larval development within the

snails (Soulsby, 1982; Mengesha, 1991; Saleha, 1991).

It was reported that in certain states in Peninsular Malaysia, which were Kedah, Melaka, Perak, Selangor, Negeri Sembilan and Johor, there was about 34.4% of *Fasciola* infection in goats (Saleha, 1991). The latest data recorded on the infection in live animals (goats) was by Lee and Sheikh-Omar (1986) at Faculty of Veterinary Medicine and Animal Science, UPM (Selangor). *Paramphistomum* infection was not reported in any of these studies. Thus, there is a need to know the current status of *Fasciola* and *Paramphistomum* infection in small ruminants in order to successfully manage and control the infection.

MATERIALS AND METHODS

Sampling locations and time

The study was conducted at 16 farms, with at least two farms from each district in Terengganu, Peninsular Malaysia. Those districts include Besut, Setiu, Kuala Terengganu, Hulu Terengganu, Marang, Dungun and Kemaman. All the farms were visited in different months starting from March 2015 to December 2015. The sampling was organised by the Department of Veterinary Services with the guidance from veterinary assistants from each district in Terengganu, Peninsular Malaysia.

Animal selections and sample collections

In this study, 267 rectal faecal samples were collected from animals that include 41 males and 226 females, in the range of age 6 months to 4 years old. A total of 20 animals were chosen for the rectal faecal sample collections from each of the farms. However, if the farm has less than 20 animals, all the animals were included in the sampling. All the faecal samples were placed in separate containers and stored at 4 °C chiller in the laboratory until examination. Blood samples from sheep and goats were collected from the jugular veins. Then, samples were centrifuged at 2000 rpm for 10 minutes. The serum samples were obtained and transferred into centrifuge tubes and stored at -20 °C until processed.

Parasitological examination

Faecal samples were subjected for sedimentation technique to observe the *Fasciola* and *Paramphistomum* egg (Ministry of Agriculture, Fisheries and Food, 1986). Serum samples were subjected for IgG antibody detection using sELISA and the method was conducted according to the instructions that were attached in the kit from the manufacturer (Koma Biotech Inc., Seoul, Korea).

RESULTS

Prevalence of *Fasciola* eggs from faecal samples

Fasciola egg was not detected in any of the faecal samples (n=267) for all the farms (n=16).

Prevalence of *Paramphistomum* eggs from faecal samples

It was found that 100% of the animals (n=10) from one of the farm in Kuala Terengganu (5.39368°, 103.09563°) had *Paramphistomum* infection. Therefore, from the total of the faecal samples diagnosed (n=267), 4% of the samples were positive with *Paramphistomum* eggs. Figure 1 shows the egg of *Paramphistomum* in faecal samples.

IgG antibody detection for *Fasciola* infections in goats

Serum samples were randomly selected (n=86) for IgG antibody detection using serological test sELISA for *Fasciola* infection. These samples were found to be negative for *Fasciola* eggs during sedimentation technique. It was found that 89% of the samples (n=76) were positive for IgG antibody for *Fasciola* infection in goats.

DISCUSSION

This study reported the current status of *Fasciola* and *Paramphistomum* infections in small ruminants in Terengganu. From the results, it can be concluded that *Fasciola* and *Paramphistomum* infections are not severe in small ruminants in Terengganu. However, farmers should be aware so that the animals' health is maintained, especially when the sELISA results showed that the animals were once exposed to *Fasciola* infection.

In this study, *Fasciola* egg was not detected in any of the faecal samples when processed using sedimentation method. However, the results of IgG antibody detection using sELISA revealed that 89% of the serum samples were positive, indicating

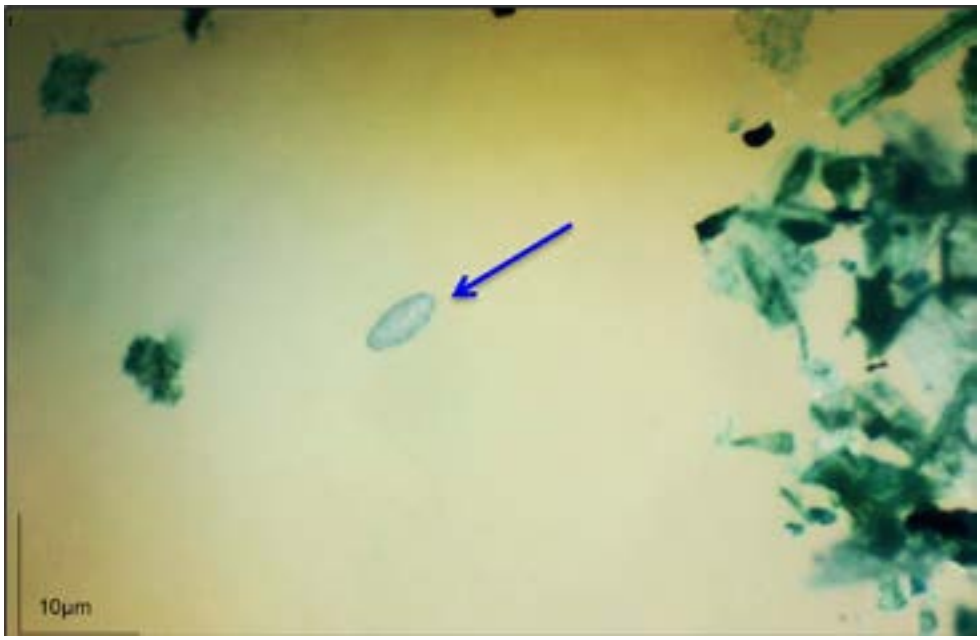

Figure 1. The egg of *Paramphistomum* indicated by the arrow.

exposure to *Fasciola* infection. Sedimentation technique is less accurate for detection of *Fasciola* eggs (Happich and Boray, 1969) due to undetected eggs from the faeces. During the migration stage, the immature flukes do not lay eggs and with low worm burdens the output is small. In addition to that, eggs laid may be irregular and pass unobserved (Dorchies, 2007). Flukes are not prolific egg layers so the number of eggs is always very low (10 to 100 eggs in ruminants). Report showed that if there are less than 20 flukes in bile ducts, the sensitivity of e.p.g. counting methods is too low to show the appearance of the eggs in the faecal sample (Dorchies, 2007). Therefore, a more subtle method was introduced to detect the rate of the *Fasciola* infection in animals. Most of the methods were related to the Enzyme Linked Immunosorbent Assay (ELISA) test where the majority of tests are applied to the detection of blood antibodies. The occurrence of positive result for the antibody detection could be due to previous and present infection (Espino *et al.*, 1998).

About 4% of the total animals had *Paramphistomum* infection in Terengganu. Other studies that had reported the occurrence of *Fasciola* infection did not report the results for *Paramphistomum* infection in Malaysia (Sani *et al.*, 1985; Lee and Sheikh-Omar, 1986; Rajamanickam *et al.*, 1996). In this study, it was observe that the *Paramphistomum* egg count in the faecal samples were below 100 e.p.g. Light infection does not cause severe damages to the animals, but huge number of immature *Paramphistomum* can migrate through intestinal tract causing acute gastroenteritis with high morbidity and mortality rates particularly in young animals (Horak, 1971; Malek, 1980; Noble and Noble, 1982; Hanna *et al.*, 1988; Melaku and Addis, 2012). Adults *Paramphistomum* can cause severe illness by submerging themselves into the sub mucosa of the duodenum that results in anorexia, diarrhoea, drop in plasma protein concentration and anaemia, which eventually deteriorate the host (Dube and Aisien, 2010). Thus, farmers should be aware of the spread of the infections among the animals even though they are having light infection.

CONCLUSION

From the results of sELISA, it can be concluded that small ruminants in Terengganu were exposed to *Fasciola* infection. Sedimentation results were negative, indicating either very low worm burden or previous exposure towards *Fasciola* infection. Serological test gives a better and accurate result on *Fasciola* infection in small ruminants compared to sedimentation method. Thus, it is recommended for future studies to include serological tests for the diagnosis of *Fasciola* infection in small ruminants. Results from this study also reported the occurrence of *Paramphistomum* infection in goats, and further study should be conducted to determine the prevalence and the severity of the infection in other farms in Malaysia.

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