

Original Article

Detection of Gastrointestinal Parasites in Goats (*Capra hircus*) in Barili, Cebu, Philippines

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ABSTRACT

Gastrointestinal (GIT) parasites are known to affect the health of goats. In the Philippines, data on caprine GIT parasites are limited. The present study aimed to provide information on the presence of GIT parasites in goats in Cebu, Philippines. A total of 205 goats were sampled from three different areas in Barili, Cebu, Philippines. Fresh fecal samples were evaluated using the direct fecal smear method. From those found positive, selected samples were processed for larval culture for a more specific identification. Results revealed that 66.3% (136) were positive with GIT parasites, including *Eimeria*, *Strongyloides*, and *Trichuris* spp. Examination of the cultured larvae also revealed the presence of *Bunostomum*, *Teladorsagia*, *Haemonchus* and *Cooperia* spp. The present study revealed that majority of the goat samples were positive for GIT parasites, which calls for the implementation of a deworming program.

Keywords: Gastrointestinal parasites, goats, Cebu, Philippines

1 INTRODUCTION

Most goat farming in the Philippines are at the backyard level and from the marginalized sector. Goat production is preferred by the marginalized sector and has been shown to be a source of income of the farmers (De Vries, 2008). However, it is affected by several factors. Among its constraints include the presence of gastrointestinal (GIT) parasites (Gadahi *et al.*, 2009; Rinaldi *et al.*, 2007). These parasites have known economic impacts (McLeod, 2004).

The probability of exposure of goats to GIT parasites is high in most backyard farming due to the grazing practices, where goats may ingest parasite eggs during feeding. GIT parasites can cause weight loss, diarrhea, depression, weakness, anemia, fever, and bottle jaw (Villaruel, 2013). It can even cause death in goats, especially when cachexia, tissue pallor, poorly

formed feces and mesenteric lymphadenomegaly are seen (Valentine *et al.*, 2007).

Central Visayas region, where Cebu is located, accounts for 13% of the total goat population in the Philippines (Esplana, 2009). The only published study related to goats in this area dealt with body weight estimation technique using body measurements (Perez *et al.*, 2016). Reports on the prevalence of GIT parasites have been limited in the area and the Philippines as a whole (Tongson *et al.*, 1981; Ducusin and Faylon, 1996; Rupa and Portugaliza, 2016). Knowledge about the common parasites present can be important in designing control programs (Sani *et al.*, 2004). Hence, the present study aimed to identify common GIT parasites present among backyard and commercial raised goats from the different areas in Barili, Cebu.

2 MATERIALS AND METHODS

Animals and study site

A total of 205 goats regardless of age, sex and breed were selected by convenience sampling. Body condition of the animals was recorded. Age was estimated using dentition (Stevens and Houston, 1989). The study was conducted at Brgy. Cagay, Brgy. Cabcanan and Brgy. Nasipit, Barili, Cebu from November 2016 to February 2017. Barili is located 61 km (38 miles) southwest of Cebu City, the capital of Cebu.

Collection of Fecal Samples

Fresh fecal samples (approximately 10 g) were collected in small plastic cups with cover directly from the rectum of each animal, labeled appropriately and transported in a cool container. Fecal analysis by direct fecal smear method was performed in triplicates at the CTU-Barili Campus Veterinary Teaching Hospital laboratory within one hour after collection of samples. Selected positive samples were subjected to larval culture for further parasite larvae detection and identification (Soulsby, 1986).

Data Processing and Analysis

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Animal profile and fecalysis results were manually recorded on a tally sheet. Gathered data were encoded in Microsoft Excel and imported to a statistical software. Descriptive statistics was employed. To determine the statistical association between profile and fecalysis results, Kruskal Wallis and logistic regression tests were used with significance level set at 5%.

Ethical Considerations

The procedures performed in this study were guided by the principles of animal welfare, Animal Welfare Act of the Philippines (RA 8485) and Administrative Order No. 45 of the Bureau of the Animal Industry of the Philippines.

3 RESULTS AND DISCUSSION

Majority of the sampled goats were female (84%), between one to two years old (72%), and not all had the ideal body condition score (44%). Results imply that most farmers keep their goats for one to two years before selling, and they may prefer to keep females because of their potential reproductive capacity. Also, a better production management may be required because not all goats were found to have the ideal body condition. This may be due to the GIT parasites (Copeman, 2006), which may impact its performance especially if the animals are used for dairy production (Koyuncu and Altınçekiç, 2013).

Fecalysis revealed that 66% of the goat (136) were positive with at least one GIT parasite. The most common GIT parasites were *Eimeria* and *Strongyloides* spp. (Table 1). Most of those infected were between one to two years old. Rupa and Portugaliza (2016) found that Strongyle species were also among the most common GIT parasites in goats in Leyte, Philippines. On the other hand, larval culture revealed the presence of four species including *Bunostomum* (Figure 5), *Teladorsagia* (Figure 5), *Haemonchus* (Figure 6) and *Cooperia* spp. (Figure 7). These species were identified based on measurements and morphological features. *Bunostomum* sp. was identified by its head as rounded, and its sheath tail filamentous, and has approximately 16 gut cells. *Teladorsagia* sp. was identified by its head and tail conformation, with its square head and a tail that forms like a short cone, and approximately 16 gut cells. *Haemonchus* sp. was identified by its narrow-rounded head and a tail ending in a fine point. *Cooperiasp.* was identified by its square headed larvae with a medium tapering tail (Soulsby, 1986).

Results revealed that age was not significantly associated with the over-all parasite detection, which is similar to the results of Biu *et al.* (2009), but contrary to that of Tariq *et al.* (2009). Rupa and Portugaliza (2016) also revealed that the odds of goats acquiring strongyle infection were increasing as its age increases. On the other hand, sex was found to be significantly associated with over-all parasite detection ($p=0.019$). Similar results were found with the detection of *Eimeria* ($p=0.021$) with sex. However, Biu *et al.* (2009) showed a different result as sex was not a significant

factor for parasitic infection and egg output in their studied ruminants.

Body condition score was also found not associated with the presence or degree of GIT parasitism. Thus, goats may harbor GIT parasites even if they have normal body conditions. However, it is recommended that intervention like deworming must be implemented in addition to supplemental feeding and pasture rotation (Villaquiran *et al.*, 2005) especially if the body condition score of the animal is seen to decrease.

In this study, the direct fecal smear method was mainly used although there are other available methods which can be more sensitive (Sato *et al.*, 1995; Dryden *et al.*, 2005). Hence, it is highly probable that there were still other species that were not detected, and that there might be a higher number of positive goats in the study.

The present study only used morphology as the basis for identifying the parasite. While this method is important (Soulsby, 1986), it is only effective when the concentration of parasites is high and when the examiner is trained in parasite identification (Kauffman, 2013). Molecular methods like PCR might be necessary to validate species and determine the genetic diversity of the GIT parasitic species. PCR is suitable for species identification and studying parasite resistance to anthelmintics (Silvestre and Humbert, 2000).

GIT parasitism in small ruminants may have seasonal trends (Fritsche *et al.*, 1993), which may also affect its body condition (Ndlovu *et al.*, 2009). It can be interesting to validate if there are also seasonal variations of GIT parasites in small ruminants in the country.

The detection of GIT parasites in most of the sampled goats despite the low sensitivity of the method calls for the treatment of these animals. A prevention program, including routine deworming, must be incorporated in the current animal health program of the sampled areas.



Figure 1. *Eimeriaspp.* egg from a goat in Barili, Cebu

Table 1. Prevalence of gastrointestinal parasites in goats in Barili, Cebu, Philippines (n=205)

Parasite	Age (years)					Total	Parasite-Specific Prevalence Rate
	1	2	3	4	5		
<i>Eimeria</i> sp.	37	26	14	8	4	89	43
<i>Strongyloides</i> sp.	24	11	8	4	1	48	23
<i>Trichuris</i> sp.	3	2	0	0	2	7	3
<i>Protostrongylus</i> sp. larvae	18	13	6	2	0	39	19

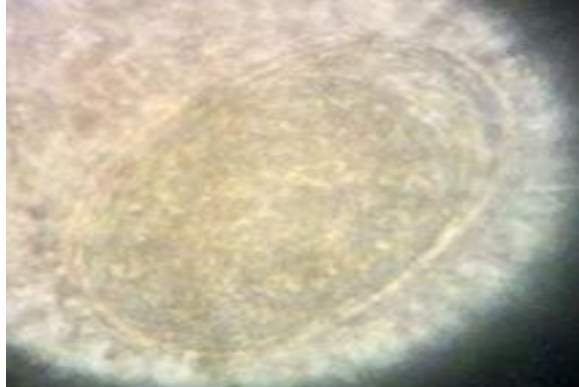


Figure 2. *Strongyle* sp. egg from a goat in Barili, Cebu



Figure 3. *Strongyloides* sp. egg from a goat in Barili, Cebu



Figure 4. *Trichuris* sp. egg from a goat in Barili, Cebu

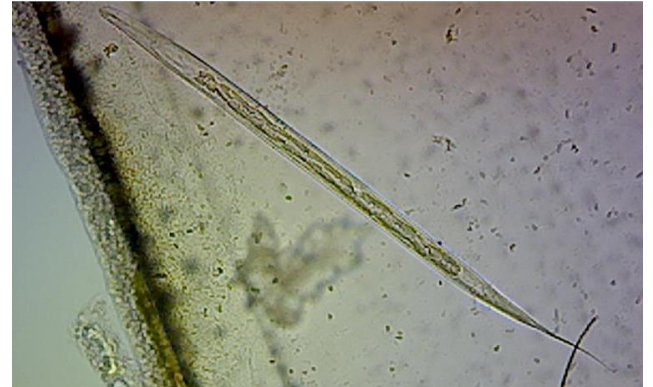


Figure 5. *Bunostomum* (above) and *Teladorsagia* spp. (below) from a goat in Barili, Cebu



Figure 6. *Haemonchus* spp. larvae from a goat in Barili, Cebu



Figure 7. *Cooperia* sp. larvae from a goat in Barili, Cebu

4 CONCLUSION

Majority of the sampled goats (66.83%) were positive for GIT parasites. The most common parasites detected were *Eimeria*, *Strongyloides*, *Protostrongylus* and *Trichuris* spp.. Larval culture also revealed four

species, including *Bunostomum*, *Teladorsagia*, *Haemonchus* and *Cooperia* spp.. The present study recommends treatment for the infected animals and the implementation of a sound deworming program.

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