Al-Hayat: Journal of Biology and Applied Biology
Volume 8, No 1 (2025): 49-58
DOI. 10.21580/ah.v8i1.26885.

Identification and Prevalence of Gastrointestinal Parasites in the Feces of Sapera Goats at Jawara Farm

Hafaz Arif[1]*, Riski Andrian Jasmi[1], Dimas Kukuh Nur Rachim[2]

[1]Department of Biology, Faculty of Science and Technology, Universitas Islam Negeri Sultan Maulana Hasanuddin, Banten, Indonesia

[2]Department of Mathematics, Faculty of Science and Technology, Universitas Islam Negeri Sultan Maulana Hasanuddin, Banten, Indonesia

Abstract

Livestock health is a critical factor affecting the success of animal husbandry. One major determinant of livestock health is the presence of parasites. The present study identified the types of gastrointestinal parasites and determined their prevalence in Sapera goats at Jawara Farm. The research employed three diagnostic methods: native, sedimentation, and flotation. A total of 23 fecal samples were collected and analyzed in the laboratory. The results identified five types of gastrointestinal parasites: *Haemonchus contortus*, *Trichuris* spp., *Eimeria hirci*, *Eimeria christenseni*, and *Eimeria aspheronica*. The parasite with the highest prevalence was *H. contortus* (69%), followed by *Trichuris* spp. (39%), *E. aspheronica* (26%), *E. hirci* (17%), and *E. christenseni* (13%). The highest average Egg Per Gram (EPG) value was recorded for *Trichuris* spp. (379.17), indicating a moderate level of infection. Environmental factors such as temperature, humidity, and pen hygiene were strongly suspected to affect both the prevalence and severity of parasitic infections. These findings are expected to serve as a foundation for developing strategies to control and prevent parasitic infections on farms.

Keywords: EPG, gastrointestinal parasites, Jawara Farm, prevalence, Sapera goat

Introduction

Goats, as ruminant livestock, serve as an important source of income for farmers in many regions, particularly in Indonesia, where the demand for livestock products remains high. These animals have the potential to generate stable income for farmers when raised under healthy and productive conditions (Saputra & Putra, 2019). Moreover, according to recent data from the Indonesian Central Bureau of Statistics (2023), goat production in Banten Province reached 2,349,480.

Sapera goats are the result of crossbreeding male Saanen goats with female Etawah crossbred (PE) goats. Developed primarily as a dairy breed, Sapera

*Corresponding author: Hafaz Arif, email: 211710053.hafaz@uinbanten.ac.id, UIN Sultan Maulana Hasanuddin Banten, Jl. Syech Nawawi Al Bantani, Kp. Andamu'i, Kel. Sukawana, Kec. Curug, Kota Serang, 42171, Banten. Telp. (0254) 200 323.

goats produce relatively high volumes of milk, averaging 1.5–2 liters per day. Their production potential can be further enhanced by improving breeding quality, particularly through the identification of qualitative and quantitative traits. Qualitative traits, such as physical characteristics, are important for selecting superior breeds, while quantitative traits, such as body size, are closely linked to production levels and serve as valuable references for breeding selection (Kaleka & Haryadi, 2013).

Animal health is a critical factor affecting the success of livestock farming. Healthy animals typically exhibit greater meat and milk production, thereby supporting market demands (Ermawati et al., 2022). According to Sukhairi (2023), livestock health is strongly affected by farm management practices, including pen hygiene, the provision of nutritionally adequate feed, and regular disease monitoring. One of the key threats to livestock health is parasitic infection. Endoparasites, which inhabit the host's body, particularly the digestive tract, pose significant health risks to livestock, including goats.

Interview data from Jawara Farm revealed a considerable decline in goat body weight and an increase in feed leftovers. Several goats experienced an average weight loss of 3–5 kg within one month. Between September and December, leftover feed ranged from 35 kg to 100 kg, with the highest amount recorded in the first week of October. These findings suggest a strong likelihood of parasitic infections in the digestive tract, particularly involving worms and protozoa.

Research by Pujaningsih et al. (2021) supports the notion that weight loss in goats is often indicative of gastrointestinal parasitic infections, which can severely affect overall animal health. The main effects of such infections include loss of appetite, nutrient malabsorption, and intestinal tissue damage. These conditions ultimately lead to significant weight loss and decreased productivity in terms of milk or meat yield.

According to a study conducted by Purwaningsih et al. (2017), fecal samples were collected from 32 Ettawa crossbred Kacang goats raised under semi-intensive management in Amban Village, West Manokwari District, West Papua Province. Parasitological examinations were performed using the sedimentation technique. The findings revealed a 100% prevalence of gastrointestinal nematode infestation. The identified helminth species included Strongyle sp., Strongyloides sp., Haemonchus spp., Bunostomum spp., Trichostrongylus spp., and Cooperia spp.

No studies have been conducted on gastrointestinal parasites in goats at Jawara Farm. Therefore, this research aimed to identify the types and prevalence of gastrointestinal parasites found in goat feces at the farm. The findings are expected to provide valuable insights for farm owners and the broader community regarding parasite-related health issues in livestock at Jawara Farm.

Research Methods

Time and Place

This research was conducted from February to April 2025. Fecal samples from Sapera goats were collected at Jawara Farm, while sample observations were carried out at the Laboratory of the Faculty of Science, Universitas Islam Negeri (UIN) Sultan Maulana Hasanuddin Banten.

Equipment and Materials

The equipment utilized in this study included a Digital Trinocular Microscope (Primostar 3 Zeiss), Centrifuge 5430 R (Eppendorf), cool box, beaker glass, microscope slides, cover glasses, dropper pipettes, plastic bags, Electronic Analytical Balance (JA-303 Faithful), petri dishes, label paper, test tubes, gloves, sieves, stirrers or spoons, camera, and stationery. Meanwhile, the materials used included fresh goat feces, saturated NaCl solution, water, 10% formalin solution, cooling gel, and methylene blue.

Procedure

a. Native Method

First, the fecal sample was collected using a stick and placed on a microscope slide. A small amount of water was added, and the sample was then covered with a cover glass. Two drops of iodine solution were subsequently added. The slide was then examined under a microscope (Soedarto, 2011).

b. Sedimentation Method

This method consisted of several steps. First, 2 grams of goat feces were weighed and mixed with a small amount of water, then stirred until homogeneous. The mixture was filtered using a tea strainer, and the filtrate was transferred into a centrifuge tube. The tubes were balanced and centrifuged at 2000 rpm for five minutes. After centrifugation, the supernatant was discarded, and the scum at the bottom was ignored. The sediment was collected using a pipette, placed on a microscope slide, and mixed with one drop of methylene blue solution. After evenly mixing, the sample was covered with a cover glass and observed under a microscope (Jasnia et al., 2022).

c. Flotation Method

This method used a saturated NaCl solution as the flotation medium. First, 2 grams of goat feces were mixed with 50 ml of water and homogenized. The mixture was filtered using two layers of gauze and transferred to a centrifuge tube. The sample was centrifuged at 2000 rpm for five minutes. After centrifugation, the supernatant was discarded, and the sediment was mixed with saturated NaCl solution and stirred until homogeneous. The sample was centrifuged again at 2000 rpm for five minutes. A more saturated NaCl solution was then added until the liquid reached the top of the tube. A cover glass was carefully placed over the tube and left for five minutes. Afterward, the cover glass was removed and placed on a microscope slide for observation (Nurdin et al., 2024).

Data Analysis

This study employed descriptive analysis to identify the types of parasitic worms. Additionally, two formulas were used in the analysis: one for calculating prevalence and another for determining the Egg Per Gram (EPG) value.

$$\boldsymbol{Prevalence} = \frac{\boldsymbol{F}}{\boldsymbol{N}} \times \mathbf{100}\%$$

Notes:

Prevalence: The percentage of samples found positive for parasite eggs.

F: The number of positive samples.

N: The total number of samples observed. (Yufa *et al.* 2018)

$$EPG = n \times 50$$

Note:

N: The number of parasite eggs observed on the slide. (Jupri & Jannah, 2021)

Research Results and Discussion

Identification of Gastrointestinal Parasite Species in Sapera Goats at Jawara Farm

Based on observations conducted during the study, polyparasitic infections were identified in Sapera goats at Jawara Farm. A total of 23 fecal samples were examined, and five gastrointestinal parasite species were successfully identified: *Haemonchus contortus*, *Trichuris* spp., *Eimeria hirci*, *Eimeria christenseni*, and *Eimeria aspheronica*. The identification results are presented in **Table 1**.

Table 1. *Gastrointestinal Parasites Identified in the Feces of Sapera Goats at Jawara Farm*

No	Parasite species	Total
1	*Haemonchus contortus*	16
2	*Trichuris spp.*	9
3	*Eimeria hirci*	4
4	*Eimeria aspheronica*	6
5	*Eimeria christenseni*	3

a. *Haemonchus contortus* (Rudolphi, 1803) Cobb, 1898

H. contortus was the most commonly found gastrointestinal parasite in Sapera goats, detected through all three examination methods: native, flotation, and sedimentation. It was identified in 16 out of 23 samples, confirming its status as one of the most prevalent nematodes infecting Sapera goats. The findings are illustrated in **Figure 1**.

Figure 1. Oocysts of *H. contortus*: (a) blastomere, (b) operculum. *(Source: Personal Documentation)*

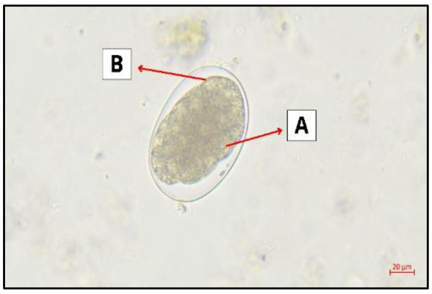


Figure 1 shows nematode eggs with an oval shape, thin walls, and a homogeneous embryonic mass that had not yet undergone segmentation. The eggs measured between 47–48.7 µm in width and 77.2–78.5 µm in length. This morphology corresponds to the typical characteristics of *H. contortus* eggs, thin-walled, approximately 70–85 µm long and 40–50 µm wide, and classified as strongyle-type eggs. This identification is supported by Baker (2007), who provides a detailed description of *H. contortus* eggs in goats.

According to Shapiro (2010), Haemonchus contortus, commonly known as the Barber's pole worm, is a gastrointestinal nematode that requires a host to survive. It resides in the digestive tract, particularly in the abomasum, and is hematophagous (blood-feeding). Its parasitic activity damages the gastric mucosa and leads to a reduction in protein levels and blood volume in the host animal.

b. *Trichuris* spp. (Roederer, 1761)

Based on the observations, *Trichuris* spp. was the second most commonly found gastrointestinal parasite in Sapera goats at Jawara Farm. This parasite was detected using all three examination methods: native, flotation, and sedimentation. It was found in 9 out of 23 samples, confirming its role as a common parasitic worm infecting Sapera goats after *H. contortus*. The findings are presented in **Figure 2**.

Figure 2. Oocysts of *Trichuris* spp.: (a) blastomere, (b) operculum. *(Source: Personal Documentation)*

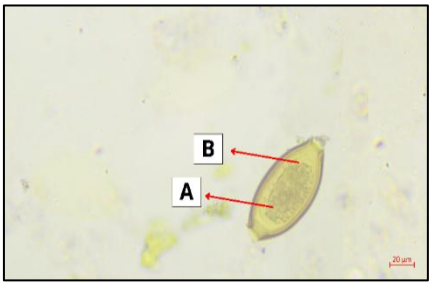


Figure 2 shows nematode eggs with a distinctive morphology, characterized by an elongated oval shape with polar plugs at both ends, resembling caps or opercula. The egg walls were thick and yellowish-brown, enclosing a dense embryonic mass. The eggs measured 35.2–39 µm in width and 70.3–75 µm in length. This identification aligns with the description by Baker (2007), who notes that *Trichuris* eggs are oval, have polar plugs, thick walls, and measure 70–80 µm long and 30–40 µm wide.

According to Cattleya et al. (2019), Trichuris spp. are parasitic worms that inhabit the gastrointestinal tract of animals, particularly the cecum and large intestine. These species are obligate parasites, relying on their hosts for nutrition and survival. Trichuris spp. have a whip-like body shape and are capable of penetrating the intestinal mucosa to feed on blood, causing irritation and damage to the gastrointestinal lining.

c. *Eimeria hirci* (Chevalier, 1966)

E. hirci was one of the protozoan parasites responsible for coccidiosis in Sapera goats. It was detected through flotation and sedimentation methods, but not by the native method. The parasite was found in 4 out of 23 samples. The findings are illustrated in **Figure 3**.

Figure 3. Oocysts of *E. hirci*: (a) sporozoite, (b) microfil. *(Source: Personal Documentation)*

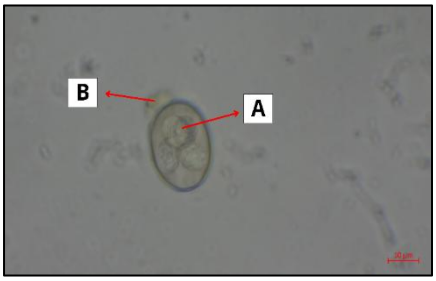


Figure 3 shows oocysts from the genus *Eimeria*, identified as *E. hirci*. These oocysts appeared oval-shaped with smooth, transparent walls and contained several sporoblasts, indicating the early stage of sporulation. Three sporozoites were visible inside the oocysts. Based on microscopic measurements, the oocysts were 17.3–20 µm wide and 20.2–26.4 µm long. These morphological characteristics match the description in Taylor et al. (2016), which states that *E. hirci* oocysts in goats typically measure 20–26 µm long and 17–20 µm wide.

d. *Eimeria aspheronica* (Levine, 1982)

E. aspheronica was another *Eimeria* species infecting Sapera goats, with a higher detection rate than *E. hirci*. It was identified through flotation and sedimentation methods, but not via the native method. It was found in 6 out of 23 samples. The findings are presented in **Figure 4**.

Figure 4. Oocysts of *E. aspheronica*: (a) sporozoite, (b) microfil. *(Source: Personal Documentation)*

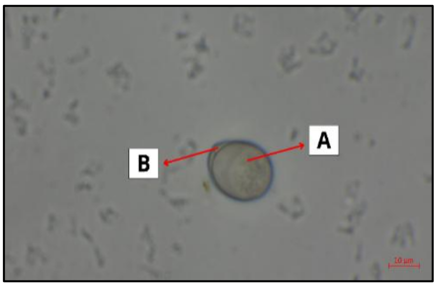


Figure 4 shows oocysts of *E. aspheronica*, with an oval shape that tended to be asymmetrical, with smooth, thin walls. Inside, a granular mass was visible, indicating an unsporulated stage. One sporozoite could be observed near the bottom of the oocyst. The oocysts measured 13.2–15.8 µm in width and 18.2–22.7 µm in length. These morphological features align with the description in Taylor et al. (2016), which states that *E. aspheronica* oocysts are small, oval-egg shaped, and distinct from other *Eimeria* species infecting goats.

e. *Eimeria christenseni* (Levine, Ivens, & Fritz, 1962)

E. christenseni was another species of *Eimeria* detected in Sapera goats, albeit with a relatively low prevalence. It was identified only through the flotation method and was not found in the native or sedimentation methods. The parasite was found in 3 out of 23 samples. The findings are shown in **Figure 5**.

Figure 5. Oocysts of *E. christenseni*: (a) sporozoite, (b) microfil. *(Source: Personal Documentation)*

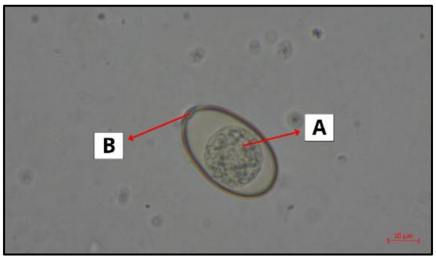
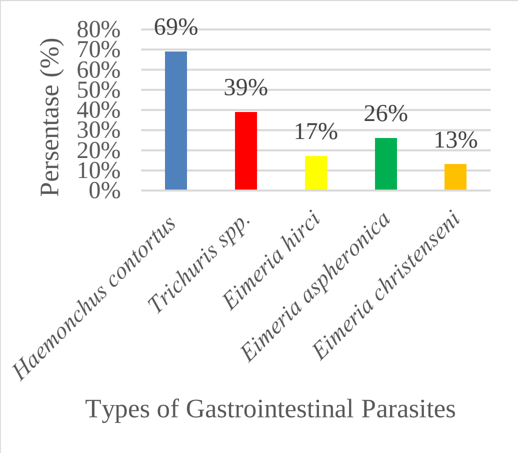


Figure 5 shows an oocyst of *E. christenseni* with an elongated oval shape and distinct, clear walls. Inside, a granular mass was visible in the unsporulated stage, along with one sporozoite located in the center. Microscopic measurements showed the oocyst to be 14.3–17.6 µm in width and 30.8–32.2 µm in length. These features match the description in Taylor et al. (2016), noting that *E. christenseni* oocysts are typically longer than 30 µm and 15–18 µm wide, with a characteristic elongated oval shape.

Prevalence of Gastrointestinal Parasites in Sapera Goats at Jawara Farm

Prevalence is a measure indicating the proportion or percentage of individuals in a population affected by a particular disease. At Jawara Farm, the prevalence of gastrointestinal parasites in Sapera goats was dominated by *H. contortus* (69%), followed by *Trichuris* spp. (39%), *E. aspheronica* (26%), *E. hirci* (17%), and *E. christenseni* (13%). The prevalence data are illustrated in **Figure 6**.

Figure 6. Prevalence of Gastrointestinal Parasites in Sapera Goats at Jawara Farm



The high prevalence of *H. contortus* in Sapera goats was likely affected by several factors, primarily environmental conditions. Jawara Farm experienced warm and humid conditions, with temperatures ranging between 28°C and 32°C. This environment was conducive to the parasite's life cycle and larval development, as supported by Mariyam et al. (2018), who stated that such conditions promote parasite proliferation around livestock enclosures.

The relatively high prevalence of *Trichuris* spp. could be attributed to poor sanitation in the feeding areas. At Jawara Farm, the feeding troughs were made of plastic and were rarely cleaned, increasing the likelihood of parasite contamination. This observation aligns with Datta et al. (2019), who reported that *Trichuris* spp. infections often result from the ingestion of eggs present in contaminated feed or drinking water, particularly in unclean feeding areas.

The prevalence of *Eimeria* spp. was also affected by environmental conditions, including temperature and humidity within the barn. The temperature range of 28–32°C at Jawara Farm created optimal conditions for the development and sporulation of oocysts. Pertiwi et al. (2023) emphasized that warm and humid conditions not only favor the survival of *Eimeria* oocysts but also accelerate their sporulation, thereby increasing the likelihood of transmission among livestock.

Another contributing factor was the high animal density in each pen at Jawara Farm, with 10–20 goats housed per pen. This crowding facilitates faster transmission of parasites. This finding is supported by Sukhairi (2023), who noted that high stocking density significantly increases the risk of parasitic infection.

Egg Per Gram (EPG) Infection Value in Sapera Goats at Jawara Farm

To assess the severity of parasite infections, the EPG value was used to indicate infection intensity. The EPG value represented the number of parasite eggs per gram of feces and was calculated by multiplying the number of eggs found on a slide (*n*) by a dilution factor of 50.

The analysis included data on parasite species, average EPG values, and the infection categories associated with each parasite. The highest EPG value was recorded for *Trichuris* spp., with an average of 379.17, followed closely by *E. hirci* (378.57) and *E. christenseni* (316.67). In contrast, *H. contortus* and *E. aspheronica* had lower average EPG values of 178.13 and 175, respectively.

These high EPG values suggest that *Trichuris* spp., *E. hirci*, and *E. christenseni* were the most intensely infecting parasites in the samples. Their high prevalence and infection intensity might be attributed to several factors. These parasites have rapid life cycles and reproduce efficiently in moist, unhygienic farm environments. Moreover, their eggs or oocysts are resilient and can withstand extreme environmental conditions, leading to persistent reinfection (Pamungkas et al., 2021).

Another important factor is the immune status of the animals. Young goats, in particular, are more susceptible to parasitic infections (Ermawati et al., 2022). Moreover, a combination of poor sanitation and weak host immunity contributes to the accumulation of parasite eggs, resulting in elevated EPG values.

Conclusion

Based on the research results, the following conclusions can be drawn:

1. The gastrointestinal parasites identified in Sapera goats at Jawara Farm included *H. contortus*, *Trichuris* spp., *E. hirci*, *E. christenseni*, and *E. aspheronica*.
2. The prevalence rates of gastrointestinal parasites in Sapera goats at Jawara Farm were as follows: *H. contortus* (69%), *Trichuris* spp. (39%), *E. aspheronica* (26%), *E. hirci* (17%), and *E. christenseni* (13%).
3. Based on the average EPG values, the degree of infection was categorized as follows: 1) *H. contortus* (178.13) – mild; 2) *Trichuris* spp. (379.17) – moderate; 3) *E. aspheronica* (175) – mild; 4) *E. hirci* (378.57) – moderate; and 5) *E. christenseni* (316.67) – moderate.

Acknowledgment

The authors extend sincere gratitude to the Jawara Farm and its staff for their invaluable support, assistance, and guidance throughout this research.

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