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IDENTIFICATION OF ENDOPARASITES IN JAVAN BANTENG (*Bos javanicus javanicus*) IN UJUNG KULON NATIONAL PARK (UKNP)

IDENTIFIKASI ENDOPARASIT PADA BANTENG JAWA (*Bos javanicus javanicus*) DI TAMAN NASIONAL UJUNG KULON (TNUK)

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Abstract

Research on parasitic infections in the Javan rhinoceros (*Rhinoceros sondaicus*) and banteng (*Bos javanicus javanicus*) in Ujung Kulon National Park has been reported before. This study not only identifies the types of endoparasites but also measures the infection levels using eggs per gram of feces (EPG) and oocysts per gram of feces (OPG). This research aims to determine the impact of endoparasite infection on the health of the banteng (*Bos javanicus javanicus*) in its natural habitat at Ujung Kulon National Park (UKNP), through identifying the types of endoparasites that infect, prevalence analysis, and the level of infection. The sample identification was carried out at the Protozoology Laboratory of the Faculty of Veterinary Medicine and Biomedical Sciences of Institut Pertanian Bogor (IPB) University. Identification process using the flotation method, sedimentation method, native method, and the McMaster.The results of this research found five types of parasite eggs: Ascarid, *Strongyloides*, strongyloid, *Paramphistomum*, and *Eimeria*. The infection levels of each parasite, based on the calculation of eggs per gram of feces (EPG) and oocysts per gram (OPG), are as follows: ascarid at 1,050 EPG, *Strongyloides* at 1,600 EPG, Strongloides at 1,600 EPG, *Paramphistomum* at 50 EPG, and *Eimeria* at 550 OPG.

Keywords: *Bos javanicus javanicus*; Endoparasite; Infection; Ujung Kulon National Park

Abstrak

Penelitian mengenai infeksi parasit pada badak jawa (Rhinoceros sondaicus) dan banteng (Bos javanicus) di Taman Nasional Ujung Kulon sebelumnya telah dilaporkan. Namun, penelitian tersebut hanya mengidentifikasi jenis-jenis parasit yang ditemukan tanpa melakukan pengukuran tingkat infeksi. Penelitian ini tidak hanya mengidentifikasi jenis endoparasit, tetapi juga mengukur tingkat infeksi menggunakan parameter telur per gram feses (eggs per gram/EPG) dan ookista per gram feses (oocysts per gram/OPG). Penelitian ini bertujuan untuk mengidentifikasi jenis endoparasit, menentukan prevalensi, serta mengukur tingkat infeksi endoparasit pada banteng (Bos javanicus javanicus) di Taman Nasional Ujung Kulon. Identifikasi sampel dilakukan di Laboratorium Protozoologi, Fakultas Kedokteran Hewan dan Ilmu Biomedis, IPB. Identifikasi parasit dilakukan menggunakan metode flotasi, sedimentasi, natif, dan McMaster. Hasil penelitian menunjukkan terdapat lima jenis endoparasit, yaitu Ascaris Strongyloides, Strongylid, Paramphistomum, dan Eimeria. Tingkat infeksi masing-masing parasit berdasarkan perhitungan EPG dan OPG adalah ascarid sebesar 1.050 EPG, Strongyloides sebesar 1.600 EPG, strongylid sebesar 1.600 EPG, Paramphistomum sebesar 50 EPG, dan Eimeria sebesar 550 OPG.

***Kata Kunci**: Bos javanicus javanicus; Endoparasit; Infeksi; Taman Nasional Ujung Kulon (TNUK)*

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INTRODUCTION

Ujung Kulon National Park (UKNP) is a crucial conservation area in Indonesia, and as a natural habitat for various endemic species and a refuge for some rare species that are threatened with extinction (Siswoyo et al., 2024). One of them is the banteng (*Bos javanicus javanicus*), which is classified as Endangered according to the IUCN Red List (Timmins et al., 2015). The banteng, known as a large herbivore, has a very important function in ecological balance (Chaiyarat et al., 2023; Watwiengkam et al., 2024). Many herbivores have been known as ecosystem engineers by shaping the structure along the trophic cascade and the function of landscapes. Through their size, feeding choice, metabolic requirements, social behavior, and movement patterns. The large herbivores have direct and indirect effects on nutrient cycling, seed dispersal, and the food chain for predators and scavengers (Chaiyarat et al., 2023).

The population of banteng continues to pressure from various factors, loss of natural habitat due to land conversion for agriculture, and land fragmentation that leads to the isolation of population groups, and biological aspects such as increased parasitic infections affecting the health and reproduction of banteng and the risk of zoonotic diseases that can be transmitted from wildlife to humans or vice versa further worsen the condition of this species population (Thornback, 2012; Watwiengkam et al., 2024). According to Hoogerwerf (1970), in the context of ecology and wildlife management, competition between domestic species such as buffalo (*Bubalus bubalis*) and wildlife is also related to the risk of disease and parasite transmission. *B. bubalis*, as a domestic animal that inhabits the same habitat as wildlife, can be a vector or carrier of various pathogens that are dangerous to wildlife.

The investigation of this animal disease was conducted because in 1937, 16 carcasses of cattle were found in Ujung Kulon, which was considered something extraordinary and needed to be researched. Based on the findings, several cattle were found to be positive for *Fasciola hepatica* and *Fasciola gigantica* as well as *Paramphistomum cervi* and *Paramphistomum explanatum*. Cattle infected by these parasites will become weak, have low nutritional content, be thin, have low milk yield, low fertility, and may also die. These weak cattle are easily preyed upon by predators (tigers, wild dogs, etc.). Therefore, this parasitic infection is very dangerous for the survival of cattle and is considered a significant cause of the decline in the banteng population.

According to Maharjan et al. (2025). This study identified parasitic infections in wildlife and zoonotic risks in six large wild mammals in Chitwan National Park, Nepal, using concentration methods and direct wet examinations, and analyzing 63 fecal samples from Bengal tigers, Asian elephants, one-horned rhinoceroses, bears, slow lorises, spotted deer, and Rhesus monkeys. The results show that gastrointestinal parasites pose a significant threat to wildlife health and biodiversity, impacting reproductive activity, behavior, survival, and population dynamics. Meanwhile, a study conducted by Watwiengkam et al. (2024). The prevalence of gastrointestinal parasites in bantengs and domestic cattle in the same area between wildlife and livestock in Thailand. The study found that bantengs have a higher overall prevalence, and this data will equip management with the capacity to implement proactive strategies and arrangements to mitigate the impact of parasitic diseases that may pose a threat to banteng populations. Then there was a study conducted by Mursyid et al. (2020). The study used 61 samples, the floating and sedimentation methods were used to detect the presence of parasite eggs. The types of endoparasites infecting buffalo in Praya Barat district are from the families *Toxocaridae*, *Trichostrongylidae*, *Cooperidae*, *Anoplocephalidae*, *Strongylidae*, *Strongyloididae*, *Chabertidae*, *Fasciolidae*, and *Eimeriidae*.

Research has been conducted by Candra et al. (2016). This research identified the presence of worms in fecal samples from wildlife (tigers, rhinos, and elephants) and domestic livestock (cattle, buffalo, and goats) using native methods, sedimentation, and flotation. The research found that the gastrointestinal worms with potential zoonotic threats are *Fasciola* spp., *Strongyloides* spp., *Oesophagostomum* spp., *Haemonchus* spp., *Trichostrongylus* spp., and *Trichuris* spp. Subsequently, a study was conducted by Tiuria et al. (2008) regarding trematode infestation in Javan rhinoceros and Javan banteng in Ujung Kulon National Park. By filtering fecal samples, they identified the types of worms present, noting that the Javan banteng in Ujung Kulon National Park were infected with

Fasciola spp. at a rate of 17.39% and *Paramphistomum* spp. at 56.52%. The examination revealed that the Javan rhinoceros in Ujung Kulon National Park was infected with *Fasciola* spp. at a rate of 44% and *Schistosoma* spp. at 12%. The results of this research indicate that helminthiasis appears to play an important role in the health status of the Javan rhinoceros and banteng, thus requiring monitoring and treatment. Although several previous studies have been conducted regarding endoparasites in Banteng, the available reviews are still very limited, especially in Ujung Kulon National Park (UKNP).

The latest relevant research conducted by Tiuria et al. (2008) has not been followed by any comprehensive update on the types, prevalence, and impact of endoparasitic infections on the population of bulls in the region. Along with the dynamics of environmental changes, interactions between wildlife and humans, as well as domestic animals, there is a significant possibility of the emergence of new parasitic species or an increase in the intensity of infections. Therefore, this research is important as it will not only update data on the types of gastrointestinal endoparasites infecting bulls and their prevalence, but it is also expected to discover new or different types of endoparasites than those reported in previous studies, as well as the impact of parasitic infections on the health aspects of bulls, especially in Ujung Kulon National Park (UKNP).

The main contribution of this research is to provide up-to-date epidemiological data that can be used as a basis for long-term conservation planning, including the development of parasite control strategies, wildlife health monitoring, and mitigation of zoonotic risks in and around conservation areas. Additionally, the results of this research are also important for stakeholders in biodiversity management, particularly in the conservation of the banteng population as a protected wildlife species.

This study aims to determine the impact of endoparasite infections on the health of bantengs (*Bos javanicus javanicus*) in Ujung Kulon National Park (TNUK) through species identification of infecting endoparasites, prevalence analysis, and assessment of infection levels. Endoparasite infections can affect health status, physiological condition, and the survival of wildlife populations, especially in endangered species such as bantengs. However, information regarding the diversity, prevalence, and intensity of endoparasite infections in wild banteng populations is still limited. Therefore, this study provides essential baseline data on parasite infections in the banteng population in TNUK. The findings are expected to contribute to wildlife health monitoring programs and support evidence-based conservation and management strategies for this endangered species.

MATERIALS AND METHODS

The research was conducted in July to August 2025. This research was carried out in two stages: a total of 76 fecal samples were collected for the collection of fecal samples. The collection of feces samples from Banteng in Ujung Kulon National Park (UKNP) (Figure 1), while the sample identification was carried out at the Protozoology Laboratory of the Faculty of Veterinary Medicine and Biomedical Sciences, Institut Pertanian Bogor (IPB) University.

Fecal samples were collected non-invasively from the activity areas of the bulls, namely the savanna. The collected samples were placed into sterile containers, labeled, and then stored in cold conditions during transport to the laboratory to prevent changes in the morphology of parasite eggs and oocysts. Endoparasite examination was carried out using native, sedimentation, flotation, and McMaster methods. The sedimentation method was used to detect worm eggs with a high specific gravity, while the flotation method was used to identify worm eggs and protozoan oocysts based on differences in specific gravity with the flotation solution. The infection rate was calculated using the McMaster method and expressed as eggs per gram (EPG) for helminth eggs and oocysts per gram (OPG) for protozoa. Endoparasite identification was carried out based on microscopic observation of parasite eggs and oocysts using a microscope with a 100× magnification for egg and oocyst counting, and 400× was used for morphological identification and measurement of endoparasite eggs. Parasite identification was performed only up to the genus level.

The sampling locations in the TNUK area were divided into six observation blocks, namely Blocks A to F. Each block has specific geographic coordinates defined by south latitude (S) and east longitude (E). All observation sites are characterized by savanna vegetation. The number of samples collected varied among blocks, with 15 samples in Block A, 20 in Block B, 24 in Block C, 11 samples each in Blocks D and F, and 19 samples in Block E. These differences in sample numbers indicate variations in site conditions or the extent of the observation area within each block of the study location (Table 1).

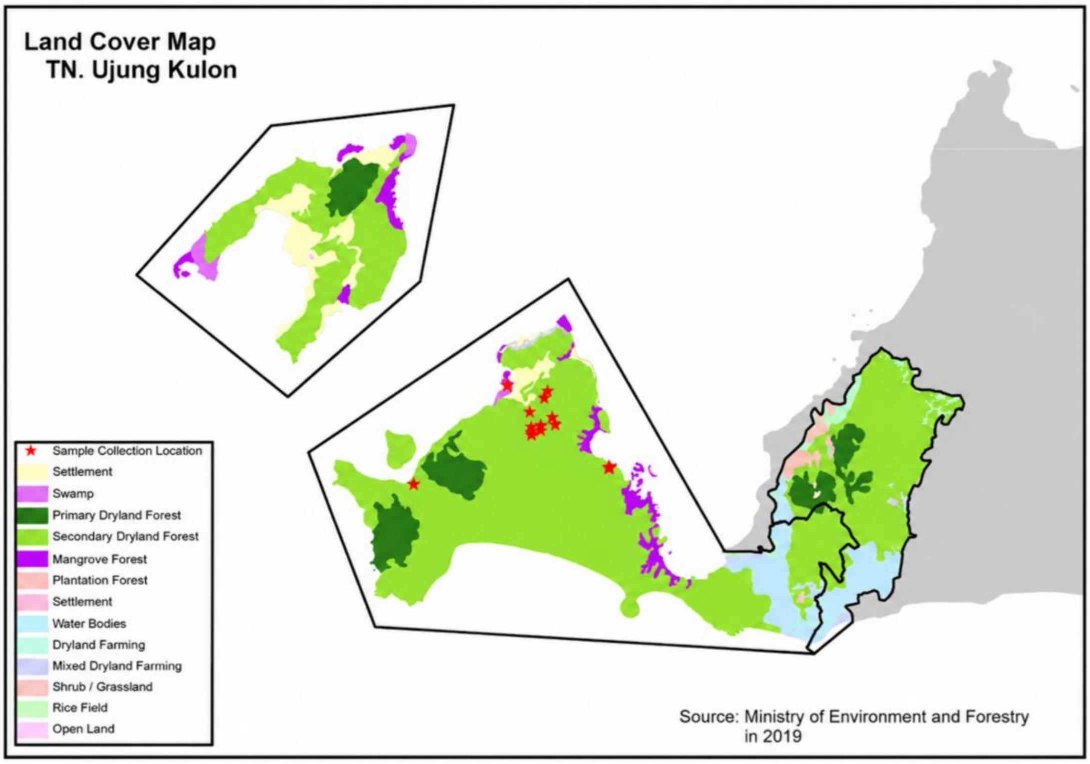

Figure 1. Map of sampling location

Table 1. Sample collection

Location	Site location	Coordinate	Vegetation	Sample/n
Ujung Kulon National Park	Block A	S 06.76303° E105.26600°	Savana	15
	Block B	S 06.76213° E105.26761°	Savana	20
	Block C	S 06.76136° E 105.26673°	Savana	24
	Block D	S 06.76155° E 105.26621°	Savana	11
	Block E	S 06.76114° E 105.26521°	Savana	19
	Block F	S 06.76132° E 105.26654°	Savana	11

The collection of *Bos javanicus javanicus* feces is carried out between 08:00 and 16:00 aseptically using gloves and wooden spoons. Feces are collected in amounts of approximately 10–15 g and placed into a 50 mL tube, then 10% formalin is added. Each material of feces collected is documented, related to the condition and area of the feces discovery, and this data is stored in a worksheet as information. The samples are then taken to the laboratory for identification.

Sample Identification

Feces samples collected from the field are then analyzed in the laboratory to detect and identify the types of endoparasites. The identification process is carried out using several examination techniques, namely the flotation method, sedimentation method, and native method, as well as calculating the number of worm eggs in feces using the McMaster method. A total of 2 g of feces is taken and added to 30 mL of saturated salt solution, then mixed until a homogeneous mixture is formed. The well-mixed mixture is then filtered, and the filtrate is placed into a centrifuge tube until it reaches a volume of 15 mL. The tube is then centrifuged at a speed of 1,500 rpm for 5 minutes. After centrifugation, saturated salt solution is added again until the surface of the liquid slightly protrudes over the edge of the tube. A cover glass is placed on top of the tube and left for 5 minutes.

Furthermore, the cover glass is taken and moved onto the object glass, then observed under the microscope to examine the morphology of the eggs more clearly. Quantitative examination is performed by counting the number of worm eggs and oocysts in the feces using the McMaster method (Chandrawathani et al., 2015). Then, it was calculated using the egg per gram (EPG) calculation and then documented (Bondarevskyi et al., 2024). The sediment is treated with methylene blue and hatched on the glass slide and covered with a cover slip, then the sediment is observed under the microscope to identify the morphology of the eggs and worms from the identified parasites, based on characteristics of size, shape, and wall structure (Kahby et al., 2024a). Infection levels based on the number of eggs per gram of feces can be categorized into several levels (Table 2).

Table 2. Infection levels based on the number of eggs per gram of feces (Thienpont & Vanparijs, 2003)

The number of eggs (per gram of feces)	Infection levels
1–499	Low infection high infection
500–5000	Moderate infection
>5000	High infection

RESULTS AND DISCUSSION

Ujung Kulon National Park is located in the lowland area of West Java and is an ecosystem of tropical rainforest. This area has temperatures ranging from 25–30 °C and a relatively high humidity, between 80% and 90%. The humid and warm environment creates ideal conditions for the growth and development of various types of parasitic worms. These parasites include protozoa, nematodes, cestodes, and trematodes that infect the host's gut through the ingestion of infective cysts, oocysts, eggs, and larvae, leading to malnutrition and increased disease susceptibility (Gimah et al., 2025). The laboratory analysis of 100 fecal samples from banteng (*Bos javanicus javanicus*) found the presence of five.

Types of endoparasites. Taxonomically, the identified worms consisted of genera of *Nematoda*, namely ascarid, *Strongyloides*, and strongyloid, as well as the genus *Trematoda*, which is *Paramphistomum*. Additionally, one type of protozoa from the genus *Eimeria* was found. This study did not find any species from the *Cestoda* group in the examined samples. The complete identification results can be seen in Table 3.

Table 3. Morphology of egg and oocyst types in the feces of banteng (*Bos javanicus javanicus*)

Group	Length (µm)	Width (µm)	Infection level
Ascarid	95	75	1,050 EPG
Strongyloides	54	41	1,600 EPG
Strongyloid	65	45	1,600 EPG
Paramphistomum	115	90	50 EPG
Eimeria	48	24	550 OPG

Note: EPG= egg per gram; OPG= oocyst per gram

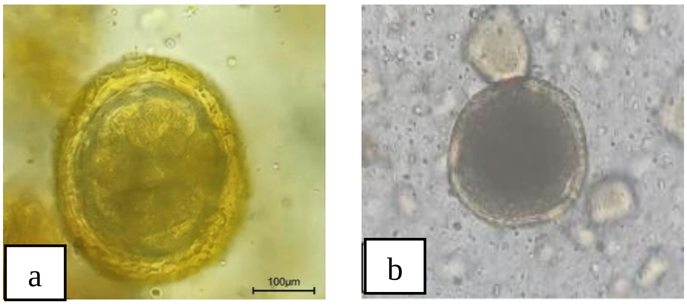

Figure 2. Ascarid egg research (a) and ascarid egg tiger (b) from the literature (Amarilis et al., 2023)

Based on the results of the research, the morphological parts of ascarid eggs are clearly distinguishable, observed in the thick brown outer wall and the egg wall consisting of three layers (albumin layer, glycogen, and lipid layer), and there is a thick serrated albuminoid layer, usually containing 1–4 cells. The *Ascaris* worm eggs found in the feces of banteng have characteristics of oval or round shapes with lengths of 94 μm and widths of 75 μm (Table 1). The results of oocyst and helminth egg counts in BX cattle at the Bayur Slaughterhouse, Tangerang City, showed that cattle aged 2.5 to 3 years were infected with *Eimeria* sp., with oocyst sizes ranging from 80–120 µm, whereas strongyle type eggs measured 40–80 µm (Aminah et al., 2022).

According to Asaolu (2018), it is stated that *Ascaris lumbricoides* is classified in the Kingdom: *Animalia*, Phylum: *Nematoda*, Class: *Secernentea*, Order: *Ascaridida*, Family: *Ascarididae*, Genus: *Ascaris*, Species: *Ascaris lumbricoides*. Ascarid nematodes are the most common and harmful nematode parasites in animals (Chen et al., 2022). Infection levels based on the number of eggs per gram of feces show that ascarid eggs amount to 1,050 EPG and 50 EPG (Table 3). This indicates that it can be categorized into several levels: moderate infection, in accordance with the standards (Thienpont & Vanparijs, 2003). At the moderate infection level, there is a need for action to be taken, which is to continue monitoring because there are mild symptoms. *Ascaris* (Figure 2) can infect the digestive tract, shown by symptoms such as colic (abdominal pain) and malnutrition. Animals infected with these worms often experience weight loss due to disrupted nutrient absorption, which affects their physical health. In large numbers, they can cause intestinal blockage or lead to various bodily reactions due to toxins produced by these worms. Infection from these worms hinders growth and reduces the body's resistance to disease (Chen et al., 2022). The clinical signs of animals infected with worms are weight loss, dull fur, lack of appetite, diarrhea, especially during the rainy season, and acute death in young animals (Kahby et al., 2024b). This type of ascarid egg in cattle can lead to *Toxocara vitulorum*, which is a type of nematode that commonly infects ruminants. *Toxocara vitulorum* is an ascarid nematode that infects the small intestine of buffalo and cattle, particularly neonatal calves, with the postnatal route through milk being the main source of infection (Dewair & Bessat, 2020; Harlia et al., 2023). Temperature is one of the important physical factors for the survival of worm eggs, including *Ascaris* eggs, in the environment. The appropriate temperature for eggs to develop into infectious larvae is around 25 °C.

The results of the endoparasite identification also found positive results for the presence of *Strongyloides* type eggs and *Strongyloides*. The *Strongyloides* genus of nematodes is a common parasite of terrestrial vertebrates, and they have fascinating biology (Viney, 2017). The morphology of the *Strongyloides* worm eggs found in the examination is oval (elongated), contains larvae, the egg shell is clearly visible, with a length of 54 and a width of 41, while the strongyloid egg type measures 65 in length and 45 in width (Figure 3).

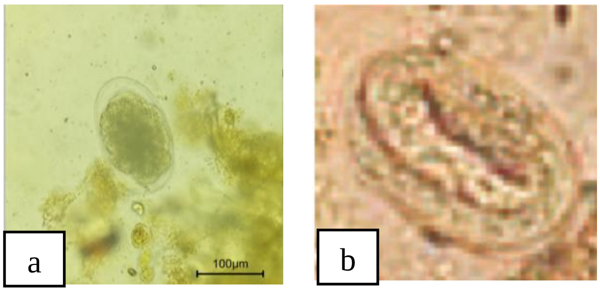

Figure 3. *Strongyloides* egg research (a) and from the literature in tiger (b) (Tiuria et al., 2017)

These characteristics resemble those of *Strongyloides* sp. eggs mentioned in several previous studies. The morphology of *Strongyloides* eggs has a thin wall, is elliptical, and is embryonated. The characteristics of *Strongyloides* sp. worm eggs are small in size, oval in shape, contain larvae, and have a thin egg wall. The characteristics of the *Strongyloides*, strongylid type worm eggs were found with characteristics of elongated/elliptical-shaped eggs, thin-shelled on the sides like barrels, and containing blastomers in varying amounts. *Strongyloides* eggs, which have a thin wall, are oval-shaped and have embryos. *Strongyloididae* contains three genera: *Strongyloides*, *Parastrongyloides*, and *Leipernema*. The free-living generation in all small rhabditoid nematodes, while the parasitic generation is a small, slender stage. Therefore, the taxonomic arrangement of *Caenorhabditis* and *Strongyloides* is not consistent with the reconstructed phylogeny. Note the difference between the taxonomic order *Strongyloida* and the family *Strongyloidea* (order *Rhabditida*), which contains

Strongyloides spp., a potential source of great confusion (Speare, 1986; Viney, 2017; Gugosyan et al., 2019). In Table 1, infection levels based on the number of eggs per gram of feces show that the number of type and *Strongyloides* eggs is 1,600 epg. This indicates that it can be categorized into several levels: a moderate infection, which is in accordance with the regulations (Thienpont & Vanparijs, 2003). At a moderate level of infection, action should be taken specifically, and continued monitoring is due to the presence of mild symptoms.

According to Viney and Lok (2007), there is a classification of *Strongyloides* sp.: Kingdom: *Animalia*, Phylum: *Nematoda*, Order: *Rhabditida*, Family: *Strongyloididae*, Genus: *Strongyloides*, Species: *Strongyloides* sp. Many factors contribute to the high infection rates of *Strongyloides* sp. This type of worm can live freely and reproduce in nature and can also reproduce as a parasite within the bodies of animals, with a prepatent period of about 5–7 days (Mendez et al., 2022). Infective larvae develop in nature, then penetrate the skin and follow the bloodstream to enter the alveoli, rise to the epiglottis, and are swallowed into the upper part of the digestive tract (intestine) to develop into adults, and then the adult worms lay their eggs in the duodenum. Borrás et al. (2023) stated that *Strongyloides* sp. can infect animals through direct ingestion and by penetrating the skin.

This research also found a type of endoparasite in the form of *Paramphistomum* worm eggs. *Paramphistomum* is a common genus of *Trematoda* typically found in ruminants worldwide. *Paramphistomum* sp. is similar to *Fasciola* sp. and *Eurythrema* sp. This worm has a sucking disc on its ventral side called an acetabulum, and there is a small oral sucker at the mouth. The characteristics of *Paramphistomum* sp. eggs obtained in this study have a length of 115 µm and a width of 90 µm, as shown in Figure 4. *Paramphistomum* sp. has a transparent shape, clear embryonic cells, and an operculum, with a clear (transparent) wall, often having small protrusions at the posterior end. The size of *Paramphistomum* sp. eggs is 113–175 µm in length and 73–100 µm in width, and is slightly pale yellow and transparent (Hambal et al., 2020). The adult worm measures about 5–13 mm in length and 2–5 mm in width (Berata et al., 2024). Indicating that the number of *Paramphistomum* type eggs is 50 EPG (Table 3). This shows that it can be categorized into several levels. At the light infection level, there are no symptoms, and the impact/effects are low; however, this type is very dangerous because the genus of *Trematoda*, typically found in ruminants, is of the *Fasciola* sp. type. Therefore, actions need to be taken, which include continued monitoring due to the presence of light symptoms.

Table 4. Infection levels based on the number of eggs per gram of feces (Thienpont & Vanparijs, 2003)

The number of eggs (per gram of feces)	Infection levels
1–499	Low infection high infection
500–5,000	Moderate infection
>5,000	High infection

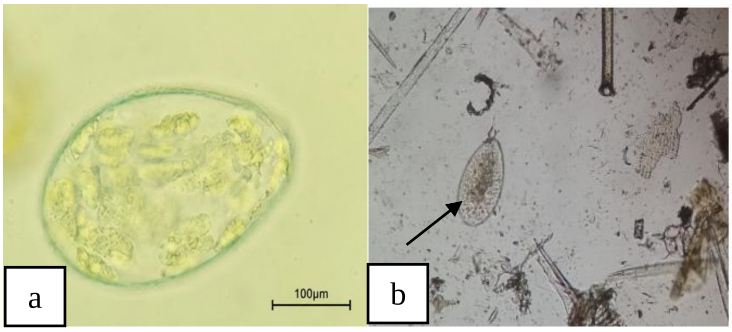

Figure 4. *Paramphistomum* egg research (a) and *Paramphistomum* in buffalo (b) (Saukhan et al., 2023)

Co-infection of this type of worm has been reported in the Javanese bull in Ujung Kulon National Park, being infected with *Fasciola* spp. at 17.39% and *Paramphistomum* spp. at 56.52% (Tiuria et al., 2008). Furthermore, research on Sumatran rhinos in TNWKS found *Paramphistomum* spp. (0.20%; 0.27) and in wild elephants, *Paramphistomum* spp. (0.23%; 1.0) (Candra et al., 2016). Based on research that has been conducted, Paudel et al. (2022) found that the prevalence of gastrointestinal parasites in Indian rhinos (Greater One-Horned Rhino) in Chitwan National Park, Nepal, using 100 fecal samples from the samples examined, showed that there were *Paramphistomum* (31%). *Fasciola*, *Paramphistomum*, and Schistosoma belong to the class of Trematoda. Infected animals would not show clinical symptoms. Nevertheless, prolonged infection leads to reduced reproduction capability and even death (Materu et al., 2024). The distribution and life cycle of Trematoda are correlated with definitive and intermediate hosts. Snails are mostly known as intermediate hosts of trematodes (Megersa et al., 2024). Apparently, infections in wildlife and domesticated animals are due to the consumption of food contaminated by cercaria previously developed in intermediate hosts (Mukhlisi et al., 2020). Banteng that are infected with diseases caused by parasites will become weak, have low nutritional content, be thin, have low milk yields, low fertility, and may even die. These weak banteng will be easy prey for predators (tigers, wild dogs).

Based on the results of the research that has been conducted, gastrointestinal protozoa, specifically *Eimeria* spp., were found to have characteristics of ookyst that are 48 in length and 24 in width, with an infection level of 550 OPG (Table 3). *Eimeria* infections are commonly found in a variety of mammalian hosts. In addition to livestock, wildlife and domestic animals can also be infected with *Eimeria*, resulting in clinical or subclinical coccidiosis. The health of wildlife herds is crucial for conservation efforts, and *Eimeria* species are common pathogens of a wide range of mammalian wildlife species.

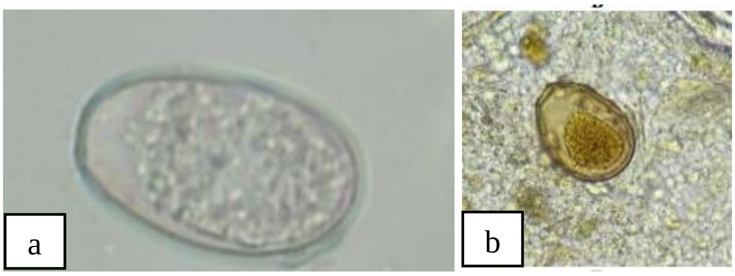

Figure 5. *Eimeria* in cattle in Cikareo (a) (Ul et al., 2024) and *Eimeria* beef cattle (b) (Bangoura et al., 2022)

Eimeria spp. (Figure 5) are gastrointestinal protozoans that affect animal productivity, thereby causing symptoms that range from bloody diarrhea to death. These symptoms cause economic losses to farmers. The distribution of *Eimeria* spp. in cattle has, therefore, been reported to have spread widely, especially in the tropics and subtropics. Indonesia is a tropical country at high risk of *Eimeria* infections (Bangoura et al., 2022).

Wildlife herd health is crucial to conservation efforts, and *Eimeria* species are a prevalent pathogen in multiple mammalian wildlife species. In a study by Gao et al. (2021), with a fecal sample of 674 fresh feces from forest musk deer (*Moschus berezovskii* Flerov) in Sichuan and Shaanxi Provinces, China, it was found that 65% were infected with *Eimeria* spp. Gastrointestinal parasitism by microbes, protists, and helminths is common in these musk deer and may lead to >30% mortality rates in captive musk deer. Based on research Paudel et al. (2022) The prevalence of gastrointestinal parasites in the Indian rhino (greater one-horned rhino) in Chitwan National Park, Nepal, using 100 fecal samples, showed that there were protozoa *Eimeria* sp. (9%).

CONCLUSION

Based on the research results, five types of parasites have been identified in the feces of banteng (*Bos javanicus javanicus*), namely ascarid, *Strongyloides*, strongyloid, *Paramphistomum*, and *Eimeria*. The detection of five gastrointestinal parasites with mild to moderate infection levels indicates ongoing parasite transmission within the banteng population. Continuous surveillance is therefore essential to evaluate potential health risks and support effective conservation management of this endangered species. Although the infection level has not reached the severe category, the presence of these parasites still requires special attention. Chronic infections, even at moderate levels, can lead to health disruptions.

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