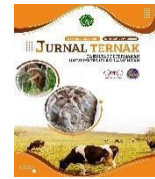




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Prevalence of Protozoa Infections in Domestic Cats

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ABSTRACT

This study aims to determine the prevalence of helminthiasis infection in domestic cats that live freely in the IPB Gunung Gede campus. This study used 15 samples of stray cat feces that live in the IPB Gunung Gede Campus. The collected fecal samples were then examined qualitatively by native and flotation methods. The results showed that 4 out of 15 feral cats were positively infected with protozoa with a prevalence of 26.6% on flotation examination, whereas on native examination, the results were negative. The positive result was indicated by the discovery of oocysts during flotation examination. The positive feral cat was found with watery diarrhea condition and his hair looks dull. Protozoal infections are more common in feral cats than in domestic cats. Protozoal infections can cause disturbances in the digestive tract in the form of diarrhea and are zoonotic.

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1. Introduction

Domestic cats can be found in the environment where humans live, one of which is on the Gunung Gede Campus of IPB. It is located in Bogor City. The population of domestic cats there is quite a lot because domestic cats have high reproductive abilities and breed quickly [1]. The stray cat population can certainly be at risk for spreading disease infections quickly both between cats and to humans (zoonosis), one of which is Protozoal infection [2]. Protozoal infections in feral cats show specific symptoms in the form of diarrhea and generally attack the digestive tract [3]. Protozoa that infect cats and cause digestive tract problems are *Giardia sp*, *Cryptosporidium sp*, and *Toxoplasma gondii*. These protozoa are zoonotic [4].

The prevalence of protozoan infections in feral cats was reported by Purnama *et al.* (2019) on cats kept in Shelters in the City of Surabaya. In addition, the prevalence of protozoan infections was also reported in cats in Lumajang City. Data on the prevalence of protozoal infections in Bogor City is still limited and it is necessary to conduct research on the prevalence of protozoan infections in cats living in Bogor City. Addressing the gap, this study aimed to determine the prevalence of protozoan infections in domestic cats that live freely in the IPB Gunung Gede campus in the Bogor City area.

2. Research Methods

Sample Collection

This study used 15 domestic cats that live freely in the IPB Gunung Gede Campus, Bogor City. The cat consisted of 6 males and 9 females with an age range of 7-24 months. The study was conducted for 2 days starting from 11th until 12th March 2022. The research sample was in the form of fresh cat feces taken when the animals defecated. The collected samples were put into medicinal plastics and labeled as identities.

Protozoa Examination

The collected fecal samples were then examined. The examination was carried out at the Veterinary Clinic of the IPB University Vocational School which is located on the IPB Gunung Gede Campus. The tools used in this research were microscope, object glass, cover glass, tube and test tube rack, dropper, glove, measuring cup, mica glass, toothpick, stirring rod, and distilled water. The materials used were salt sugar flotation solution and stool samples. The stool samples were examined qualitatively to determine the presence of oocysts [10]. The methods used in this qualitative examination were native and flotation methods [11].

Stool examination with the native method is often used because it is easy and fast to do with a relatively low level of infection findings. The procedure for the native method is that a small sample of feces is placed on an object glass and given 1-2 drops of distilled water and then homogenized evenly using a toothpick and covered with a cover glass. Flotation method procedure is conducted to validate the results of the native method examination. This method uses a flotation solution in the form of saturated salt sugar with BJ 1.2. As much as 4 grams of feces was mixed with 56 ml of saturated solution and homogenized. The homogeneous sample was then filtered and poured into a test tube until the surface was convex. The cover glass was placed on the convex surface and allowed to stand for 10-15 minutes. The flotation method used was in accordance with that of Siagian and Tiuria [12]. The lower density of oocysts compared to the flotation solution would cause the oocysts to float and stick to the surface of the cover glass [13]. The cover glass was placed on the object glass and examined under a microscope using 40x and 100x magnification.

Data analysis

The results of the examination were recorded and analyzed descriptively to describe the prevalence of protozoa infection in feral cats at the IPB Gunung Gede Campus. The examination was carried out 2-3 hours after the collection of fresh fecal samples with research findings in the form of oocysts. Prevalence is calculated using the following formula [14]:

$$\text{Prevalence (\%)} = \frac{\text{Number of sick individuals at a certain time}}{\text{Population at risk at any given time}} \times 100$$

3. Results and Discussion

The results showed that 4 out of 15 samples of feral cat feces found oocysts (Figure 1) on flotation examination, while on native examination, no oocysts were found. This means that 4 of the 15 feral cats that were positively infected with protozoa in the IPB Gunung Gede Campus with a prevalence of 26.6% (Table 1). This figure is relatively smaller than the prevalence of protozoa that occur in the city of Surabaya in cats kept in shelters of 43.9% of the 82 samples observed [15]. This figure is also lower when compared to domestic cats in the Lumajang area, which is 88.33%. Protozoal infection was higher when compared to cats kept at home based on the results of research in Lumajang. House cats are only infected with protozoa with a prevalence of 48.33% [16]. Geographical factors, health,

population density, and the level of welfare of cats greatly affect the risk of being infected with protozoa [17].

Table 1. Protozoa examination results in domestic cats in the IPB Gunung Gede Campus

Cat Number Identify	Gender	Native Check	Flotation Check
1	Female	-	-
2	Male	-	-
3	Male	-	-
4	Female	-	+
5	Female	-	-
6	Female	-	-
7	Female	-	+
8	Male	-	-
9	Male	-	-
10	Female	-	-
11	Female	-	+
12	Female	-	-
13	Female	-	-
14	Male	-	-
15	Male	-	+

The type of protozoan digestive tract of domestic cats based on the results of this study is an oocyst from the phylum Apicomplexa. The oocysts found were oval in shape with thin walls and contained 2 sporocysts. Protozoa phylum Apicomplexa that infects domestic cats at the Campus of IPB Gunung Gede are probably the genus *Isospora*, *Toxoplasma* and *Sarcocystis* [18].



Figure 1. Result of observation infestation oocyst in domestic cat

Domestic cats at the IPB Gunung Gede Campus get their food from an environment contaminated with oocysts from the Apicomplexa phylum, so that protozoan infections can occur quickly. The findings of these oocysts came from fecal samples of domestic cats that were actively roaming the place [19]. Another factor that influences protozoal infection is gender. Female cats have a higher risk of infection than male cats because female cats are more active in looking for food to support their reproductive status, such as being pregnant for the continuation of the fetus [20]. Age affects the incidence of infection at the level of protozoa. The incidence of protozoan infection in young cats is higher than in old cats [9]. Cats that have been infected usually show clinical symptoms of acute and chronic diarrhea, this is due to the activity of protozoa in the digestive tract to live and reproduce [21].

Cats are one of the definitive hosts for zoonotic protozoa such as *Toxoplasma gondii* [22]. The following is an overview of the life cycle of one type of zoonotic protozoan from the Phylum Apicomplexa, namely *Toxoplasma gondii* (Figures 2 and 3). The life cycle is a protozoan that infects domestic cats within a certain time, it will reproduce in the digestive tract by producing oocysts as its infective agent [5]. Oocysts will usually be expelled together with adaptive feces to survive in the environment for one year to become infective sporocysts to infect humans and other domestic cats

through food or drink [6]. The sporocysts will be carried to the digestive tract to develop into sporozoites and reproduce by endodyogeny [7]. This replicative ability causes the risk of infection in cats to occur around 35-73% [8].

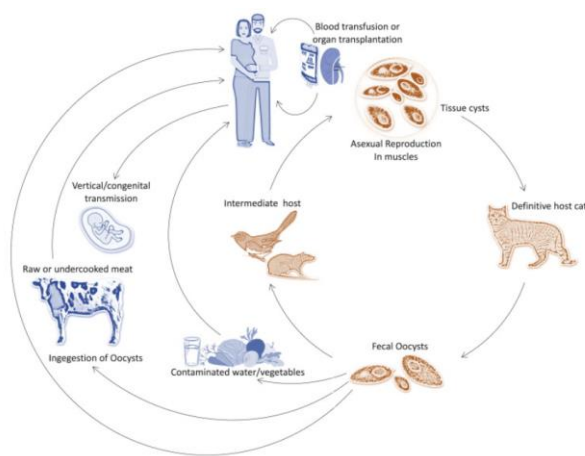


Figure 2. Life Cycle Transmission of Protozoa [22]

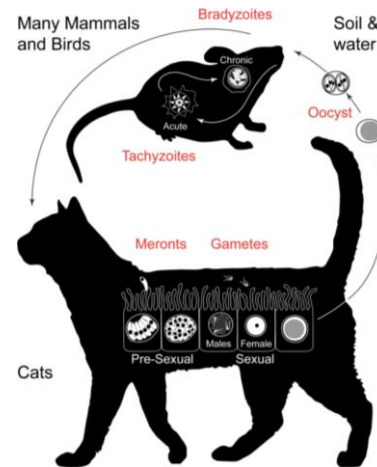


Figure 3. Specific Life Cycle of Protozoa [23]

These protozoan infections can be minimized by implementing the four pillars of animal health in the form of promotive, preventive, curative and rehabilitative measures [24]. This action can be carried out by veterinarians and animal health workers by giving antiprotozoal drugs in the form of Clindamycin, Tylosin, Metronidazole, Ronidazole, Sulfadimethoxine, and Ponazuril intravenously (IV) [25, 26, 27]. This action should be done regularly to cats to reduce the prevalence of the risk of being infected with protozoa.

4. Conclusions

Based on the results of the examination of 15 domestic cats living in the area of the IPB Gunung Gede campus, 4 domestic cats were found positive for the presence of oocysts based on the results of the flotation examination and negative for the native examination. The prevalence of the domestic cat protozoan infection was 26.6%. The type of protozoan digestive tract of domestic cats based on the results of this study is an oocyst from the phylum Apicomplexa. Protozoa phylum Apicomplexa that infects domestic cats at the Campus of IPB Gunung Gede are probably the genus *Isospora*, *Toxoplasma* and *Sarcocystis*.

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