

SEVERE *TOXOCARA CATI* INFECTION IN A DOMESTIC CAT: A CASE STUDY WITH PATHOLOGICAL AND HISTOPATHOLOGICAL FINDINGS IN SAYAN VILLAGE, UBUD

Infeksi *Toxocara cati* Parah pada Kucing Domestik: Studi Kasus dengan Temuan Patologis dan Histopatologis di Desa Sayan, Ubud

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How to cite: Elviana D, Suratma INA, Berata IK, Suarjana IK, Suardana IBK. 2026. Severe *Toxocara cati* infection in a domestic cat: A case study with pathological and histopathological findings in Sayan Village, Ubud. *Bul. Vet. Udayana* 18(1): 295-302. DOI: <https://doi.org/10.24843/bulvet.2026.v18.i01.p28>

Abstract

Toxocariasis is a disease caused by worms of the genus *Toxocara*. In chronic cases, toxocariasis can lead to mortality due to damage to vital organs, including the lungs, liver, and intestines. The objective of this case study is a 2-month-old cat from Sayan Village, Ubud Subdistrict, Gianyar Regency, Bali, Indonesia. This case study aims to establish a diagnosis based on anamnesis, clinical signs, epidemiological data, anatomical pathology, histopathology, and laboratory examination results. Clinical symptoms observed in the case cat included emaciation, an enlarged abdomen, eye discharge, pale gums, rough fur, and liquid, foamy feces. Anatomical pathology examination revealed the presence of *Toxocara cati* worms, with a total count of 43 worms distributed throughout the small intestine, stomach, esophagus, trachea, and lungs. Fecal examination using qualitative methods detected *Toxocara cati* worm eggs. Histopathological observations indicated eosinophilic inflammatory cell infiltration in the small intestine and trachea. It was concluded that the case cat was diagnosed with toxocariasis. It was concluded that the cat was diagnosed with toxocariasis, which contributed to the severity

of clinical symptoms and potentially mortality, emphasizing the need for effective preventive and biosecurity measures.

Keywords: domestic cat, pathology, *toxocariasis*, zoonosis

Abstrak

Toxocariasis adalah penyakit yang disebabkan oleh cacing dari genus *Toxocara*. Pada kondisi kronis, toxocariasis dapat menyebabkan kematian karena kerusakan organ vital seperti paru-paru, hati, dan usus. Objek studi kasus ini adalah seekor kucing berusia 2 bulan yang berasal dari Desa Sayan, Kecamatan Ubud, Kabupaten Gianyar, Bali, Indonesia. Studi kasus ini bertujuan menegakkan diagnosis berdasarkan anamnesa, tanda klinis, data epidemiologi, patologi anatomi, histopatologi, dan hasil pemeriksaan laboratorium. Gejala klinis kucing kasus seperti kurus, perut membesar, terdapat leleran pada mata, gusi pucat, bulu kasar, feses cair dan berbusa. Hasil pemeriksaan patologi anatomi ditemukan cacing *Toxocara cati* berjumlah 43 ekor cacing yang tersebar pada usus halus, lambung, esofagus, trakea dan paru-paru. Hasil pemeriksaan feses dengan metode kualitatif ditemukan telur cacing *T. cati*. Hasil pengamatan histopatologi teramati infiltrasi sel radang eosinofil pada organ usus halus dan trakea. Sehingga disimpulkan bahwa ayam kasus didiagnosa menderita toxocariasis. Infeksi ini berkontribusi pada tingkat keparahan dari gejala klinis dan kematian, sehingga menyoroti perlunya tindakan pencegahan dan biosekuriti yang efektif.

Kata kunci: kucing lokal, patologi, *toxocariasis*, zoonosis,

INTRODUCTION

Cats are popular pets kept by humans worldwide. The increasing popularity of cats in Indonesia has correlated with a rise in the number of cat lovers over recent years. This growing interest in cat ownership has also increased the risk of zoonotic diseases affecting both cats and humans (Siagian *et al.*, 2023). Nevertheless, many cat owners remain insufficiently concerned with proper health, maintenance, and cage management practices that adhere to established standards, contributing to the incidence of feline diseases, including toxocariasis (Nealma *et al.*, 2013). Suboptimal maintenance systems can lead to feline infection with various parasitic diseases.

Toxocariasis is a disease caused by parasitic nematode worms of the genus *Toxocara* (Nealma *et al.*, 2013). The prevalence of toxocariasis in cats is high, particularly in tropical regions, with estimates ranging from 20% to 30%. *Toxocara cati* infection poses a health risk to humans due to its zoonotic. Toxocariasis frequently affects children, who often ingest infectious eggs from sand or soil containing *Toxocara cati* (Magnaval *et al.*, 2001). Cats can become infected by ingesting these eggs through food and drinking water. Infected cats may exhibit symptoms including emaciation, a dull coat, an enlarged abdomen, vomiting, and diarrhea. Larval migration in young cats can result in pneumonia. A significant worm burden can decrease food absorption, resulting in hypoalbuminemia and subsequent emaciation with an enlarged abdomen (Overgaauw & van Knapen, 2013).

Based on the foregoing background, it is important to further examine *Toxocara cati* as a parasite frequently infecting cats and exhibiting zoonotic potential. Consequently, further investigation is required to elaborate on the findings from anatomical pathology, histopathology, and additional examinations of this case.

RESEARCH METHODS

Epidemiological Data Collection on Animal Cases

The animal case involved a 2-month-old cat from Sayan Village, Ubud. The owner had 6 cats, 1 of which died. The cat had not received any prior vaccinations or deworming medication. It was housed outdoors and fed a natural diet. Clinical signs began approximately two weeks before death, including weight loss, abdominal distension, eye discharge, pale gums, rough fur, and loose, frothy stools. A necropsy was performed at the Veterinary Pathology Laboratory, Faculty of Veterinary Medicine, Udayana University, to determine and observe pathological anatomical changes in the animal and to collect samples for subsequent examination in parasitology, histopathology, bacteriology, and mycology laboratories.

Necropsy and Histopathological Examination

The cats underwent necropsy, and organs exhibiting pathological changes were removed. Tissue samples measuring 1×1×1 cm were taken and fixed in 10% neutral buffered formaldehyde. The first step was to dehydrate the organs with graded ethanol and absolute ethanol, each with a soaking time of ± 2 hours, followed by a clearing process by soaking the tissue in xylene solution and infiltrating it with liquid paraffin and embedding it in a paraffin block. The paraffin blocks were stained using Hematoxylin and Eosin (HE) staining. The prepared specimens were then observed microscopically for histopathological examination.

Parasite Laboratory Examination

Fecal samples are examined qualitatively using the native method, which includes concentration via sediment and flotation. Fecal examination using the native method involves collecting feces, adding 1-2 drops of distilled water, stirring until homogeneous, and examining under a microscope. For fecal examination using the sedimentation method, approximately 3 grams of stool are placed in a beaker, followed by the addition of approximately 30 ml of water (10% solution) to achieve homogeneity. The dissolved stool is placed in a centrifuge tube until it reaches $\frac{3}{4}$ of the tube's volume, then centrifuged at a speed of 1,500 rpm for 2-3 minutes. The mixture is then centrifuged at 1, 500 rpm for 2-3 minutes, and the supernatant is discarded to isolate the sediment at the bottom of the tube. Fecal examination using the flotation method is performed using the remaining sediment from the previous sedimentation method. The sediment is added to the flotation solution (saturated salt) until it reaches $\frac{3}{4}$ of the tube's volume. The mixture is homogenized and centrifuged at 1, 500 rpm for 2-3 minutes. Subsequently, additional flotation solution is added until the liquid surface forms a convex meniscus, and the slide is allowed to equilibrate for 1-2 minutes before gently touching the cover glass to the meniscus and affixing it to the objective lens.

Bacteriology and Mycology Laboratory Examination

The examination was conducted at the Veterinary Bacteriology and Mycology Laboratory, Faculty of Veterinary Medicine, Udayana University. Organ samples examined included the heart, lungs, and liver. Bacterial isolation and identification commenced with plating the samples on Nutrient Agar (NA) and incubating at 37 °C for 24 hours. Subcultures of bacterial colonies that grew on Nutrient Agar (NA) media were purified, then primary tests were conducted in the form of a catalase test using a 3% H₂O₂ solution and Gram staining using materials such as crystal violet solution, lugol, alcohol, and safranin. Subsequently, the bacteria were subcultured onto MacConkey Agar (MCA) media. Colonies that grew on MCA were subjected to biochemical testing, including Triple Sugar Iron Agar (TSIA), Simmons Citrate Agar (SCA), Sulfide Indole Motility (SIM), Methyl Red (MR), Voges-Proskauer (VP), and sugar testing with glucose.

RESULTS AND DISCUSSION

Results

A 2-month-old cat from Sayan Village, Ubud, presented with a clinical case. Six cats resided in the household, with four exhibiting similar symptoms, including one fatality. These cats were free-roaming and fed a standard diet. The cat initially displayed symptoms approximately two weeks prior to collection, including an enlarged abdomen, weight loss, loose and foamy stools, and ocular discharge. Upon collection, the cat was noted to be underweight, with an enlarged abdomen, pale gums, rough fur, and anorexia. Following collection, the cat's condition deteriorated and it subsequently died after 4 days. The cat had no documented history of vaccination or deworming. The recorded epidemiological data indicated a morbidity rate of 66.6%, a mortality rate of 16%, and a case fatality rate of 25%. Anatomical pathology revealed lesions in the intestines, lungs, and liver. Histopathological examination of several organs is presented in Figures 1 and 2. Qualitative fecal examination revealed the presence of *Toxocara cati* eggs. The eggs and worms are presented in Figure 3. Based on bacterial isolation results on Nutrient Agar (NA) media, the colonies exhibited a scattered growth pattern, not adhering to the culture media lines. Consequently, the cat case was determined to be negative for bacterial infection.

Discussion

Toxocariasis is a disease caused by nematode parasites of the genus *Toxocara* (Nealma *et al.*, 2013). *Toxocara cati* is a nematode worm that develops in the small intestine of cats (definitive host). This parasite is zoonotic; humans can become infected by ingesting infectious eggs from *T. cati*, and infection can also occur through consumption of raw or undercooked meat (Yakubu *et al.*, 2009). Transmission occurs via ingestion of *T. cati* eggs from cats, or through soil and sand contaminated with animal feces (Guilherme *et al.*, 2013). Cats often bury their feces in the soil, increasing the likelihood of infection through this route. Interactions between cats and other wild mammals, particularly rats which serve as intermediate hosts in the spread of toxocariasis (Overgaauw & van Knapen, 2013), elevate the risk of infection. Within cats, *T. cati* is transmitted orally via ingestion of infectious eggs and through paratenic hosts (earthworms, cockroaches, and rodents), as well as transmammmary.

Cats become infected by ingesting embryonated eggs (L2) alongside food and water. Following ingestion, the eggs hatch in the small intestine within a few hours. Larvae migrate through the circulatory system and subsequently reach the liver, where they are transported to the lungs. Within the lungs, L2 develops into L3. Ten days later, L3 penetrates the alveoli, moving towards the bronchus, trachea, and pharynx, ultimately causing irritation and triggering coughing in the cat, thereby facilitating the re-ingestion of larvae into the digestive tract. This process results in the development of L4 two weeks post-infection and the emergence of an adult worm in the small intestine approximately 3-4 weeks after initial infection. (Soulsby, 1983). Adult female worms lay eggs, which are then excreted in feces and develop in the environment for 10-14 days before becoming infectious (Levine, 1995).

Based on the results of anatomical pathology examinations, the cat in this case exhibited anatomical pathology changes in nearly all organs. Organ damage was attributed to the migration of *T. cati* larvae. Upon migration through body tissues, the cat's immune system recognized the larvae as foreign, triggering an inflammatory response. This inflammation can subsequently cause damage to surrounding tissues, such as edema or necrosis. This inflammation can subsequently cause damage to surrounding tissues, such as edema or necrosis. Forty-three *T. cati* larvae and adult worms were identified in multiple organs, including the small intestine, stomach, esophagus, trachea, and lungs. Larval migration in young cats can result in pneumonia. Furthermore, larval migration through the lungs can cause coughing,

dyspnea, accompanied by foamy exudate and, occasionally, blood. A heavy worm burden can lead to decreased food absorption, resulting in hypoalbuminemia, emaciation, and an enlarged abdomen, potentially culminating in death (Overgaauw & van Knapen, 2013).

Given the cat's age of only 2 months, transmission could have occurred via transmammary infection. During lactation, transmammary infection is common, particularly in acutely infected cats, and represents the primary route of transmission. The prepatent period for egg infection is approximately 8 weeks (Taylor *et al.*, 2016). Kittens infected through colostrum or milk are infected more rapidly than cats infected by eggs, as *Toxocara* eggs are excreted in feces within 9 days (Estuningsih, 2005). *Toxocara cati* does not transmit within the queen's uterus; however, larvae will infest kittens through milk from the second day after birth and for approximately 10 days thereafter (Beugnet *et al.*, 2018).

The qualitative fecal examination of cats revealed a positive infection with *Toxocara cati* eggs. *Toxocara cati* eggs are round or subglobular in shape, have thick and rough walls, and range in size from 61–80 x 50–70 μm . with an average diameter of 60–70 (67.30) μm , and contain one or two cells (Chen *et al.*, 2012). During post-mortem examination of the cat case, 43 * *Toxocara cati* * worms were identified. Morphology of *Toxocara cati*. *Toxocara cati* morphology revealed that male worms typically measure 3–10 cm and exhibit a posterior region that curves ventrally. Adult female worms range in size from 10 to 15 cm and have a tapered posterior region. Adult worms are cream-colored and possess three large lips surrounding the mouth, along with two cervical alae resembling fins (Luca, 2021). The dorsal lip is 119.86-193.62 μm long and 110.64-221.28 μm wide. The sub-ventral lips are 8.98-221.28 μm long and 101.42-221.28 μm wide. The cloaca extends 119.86–230.50 μm to the tip of the tail (Gallas & da Silveira, 2013). Male *Toxocara cati* worms exhibit a tail shaped like a hand with fingers (digitiform), whereas female worms have a rounded, tapered tail (Taylor *et al.*, 2015). They are very strong and can live for months or years in the soil. They become infectious within three to four weeks after being excreted in feces (Hasim, 2022).

Histopathological examination revealed changes in the small intestine, liver, and lungs. Lung damage was attributed to the migration of *Toxocara cati* larvae from the small intestine. The lungs exhibited hemorrhage, necrosis, and the presence of *Toxocara cati* larvae. Histopathological examination of the lungs demonstrated edema, congestion, thickening of the alveolar septa, and hemosiderin-laden macrophages. The thickening of the alveolar septa resulted from chronic inflammation and tissue fibrosis. A parasitic infection induces fibrosis in lung tissue secondary to a prolonged inflammatory response (Pratama *et al.*, 2021). Meanwhile, hemosiderin-laden macrophages occur due to ongoing hemorrhage in the cat's body. This process occurs because red blood cells in the body are destroyed and hemoglobin is broken down into hemosiderin.

Changes in the liver of case cats reveal white spots on the liver lobes, hemorrhages, and black discoloration. Hepatomegaly was observed in one lobe, accompanied by hemorrhages. Histopathological examination of the liver in cats infected with *Toxocara cati* revealed congestion and hemorrhage resulting from larval migration, triggering inflammation and hepatomegaly. Infective *Toxocara cati* larvae, which migrate through lung and liver tissues, can also induce edema in these organs.

Histopathological examination of the cat's small intestine revealed necrosis of intestinal villi and desquamation of the intestinal villi epithelium, reducing the surface area available for nutrient absorption and disrupting this process. This is attributed to parasite larvae migrating through the intestinal wall and causing structural damage (Wu & Bowman, 2020). A high worm burden can lead to decreased food absorption, potentially resulting in hypoalbuminemia and

subsequent emaciation accompanied by an enlarged abdomen (Overgaauw & van Knapen, 2013).

According to Beugnet *et al.* (2014), clinical signs of toxocariasis are observed in three primary areas: respiratory disorders, general failure to thrive, and intestinal disorders. Respiratory disorders encompass symptoms such as coughing, which typically precedes other clinical manifestations (this is associated with larval migration from the pulmonary artery to the alveoli and bronchi, followed by ingestion and entry into the digestive tract for adult worm development).

CONCLUSION AND SUGGESTIONS

Conclusion

Based on the patient's history, clinical signs, epidemiological data, anatomical and histopathological findings, and fecal examination results, it can be concluded that the cat in this case had toxocariasis, characterized by a severe infection caused by *Toxocara cati* worms.

Suggestions

The cat care system plays a crucial role in controlling toxocariasis; therefore, improvements to the system are expected to reduce the incidence of the disease. Special attention to the cats being kept, by providing proper nutrition and healthcare. Maintaining environmental cleanliness to prevent contamination with infectious *Toxocara cati* eggs.

ACKNOWLEDGMENTS

The author gratefully acknowledges the lecturers and staff of the Veterinary Pathology Laboratory, Veterinary Parasitology Laboratory, Veterinary Bacteriology and Mycology Laboratory, and Veterinary Virology Laboratory, Faculty of Veterinary Medicine, Udayana University, for their knowledge, the facilities they provided, and their permission to utilize them during the Laboratory Diagnostic Co-Assistance activities.

REFERENCES

- Beugnet, F., Labuschagne, M., Fourie, J., Jacques, G., Farkas, R., Cozma, V., Halos, L., Hellmann, K., Knaus, M., & Rehbein, S. (2014). Occurrence of *Dipylidium caninum* in fleas from client-owned cats and dogs in Europe using a new PCR detection assay. *Veterinary Parasitology*, 205(1–2), 300–306. <https://doi.org/10.1016/j.vetpar.2014.06.008>
- Chen, J., Zhou, D.-H., Nisbet, A. J., Xu, M.-J., Huang, S.-Y., Li, M.-W., Wang, C.-R., & Zhu, X.-Q. (2012). Advances in molecular identification, taxonomy, genetic variation and diagnosis of *Toxocara* spp. *Infection, Genetics and Evolution*, 12(7), 1344–1348. <https://doi.org/10.1016/j.meegid.2012.04.019>
- Estuningsih, S. E. (2005). Toxocariasis pada hewan dan bahayanya pada manusia. *Wartazoa*, 15(3), 136–142.
- Gallas, M., & da Silveira, E. F. (2013). *Toxocara cati* (Nematoda, Ascarididae) in different wild feline species in Brazil: new host records. *Biotemas*, 26(3), 117–125. <https://doi.org/10.5007/2175-7925.2013v26n3p117>
- Guilherme, E. V., Marchioro, A. A., Araujo, S. M., Falavigna, D. L. M., Adami, C., Falavigna-Guilherme, G., Rubinsky-Elefant, G., & Falavigna-Guilherme, A. L. (2013). Toxocariasis in Children Attending a Public Health Service Pneumology Unit in Paraná State, Brazil. *Revista Do Instituto de Medicina Tropical de São Paulo*, 55(3), 189–192. <https://doi.org/10.1590/S0036-46652013000300009>

Hasim, D. N. (2022). *Identifikasi dan Evaluasi Klinis Kejadian Infeksi Toxocara Cati Pada Kucing Domestik Di Kecamatan Turikale Kabupaten Maros*. Universitas Hasanuddin.

Levine, N. D. (1995). *Protozoologi Veteriner*. Gajah Mada University Press.

Luca, I. (2021). Morphological Characteristics of Toxocara spp. Adults Determined by Electron Microscopy. *International Journal of Medical Parasitology and Epidemiology Sciences*, 2(2), 40–42. <https://doi.org/10.34172/ijmpes.2021.13>

Magnaval, J.-F., Glickman, L. T., Dorchies, P., & Morassin, B. (2001). Highlights of Human Toxocariasis. *The Korean Journal of Parasitology*, 39(1), 1. <https://doi.org/10.3347/kjp.2001.39.1.1>

Nealma, S., Dwinata, I. M., & Oka, I. B. M. (2013). Prevalensi Infeksi Cacing Toxocara cati pada Kucing Lokal di Wilayah Denpasar . *Indonesia Medicus Veterinus* , 2(4), 428–436.

Overgaaauw, P. A. M., & van Knapen, F. (2013). Veterinary and public health aspects of Toxocara spp. *Veterinary Parasitology*, 193(4), 398–403. <https://doi.org/10.1016/j.vetpar.2012.12.035>

Pratama, D. A. O. A. , Haryo, A. , & Untari, H. (2021). *Imunopatologi Veteriner*. Universitas Brawijaya Press.

Siagian, T. B., Tjiumena, E. S., Nurul, & Siagian, G. Y. H. (2023). Gambaran Pengetahuan Pemilik Kucing Tentangcarapencegahanpenyakitpada Kucing Peliharaannya Selamapandemic Covid 19. *Jurnal Sains Terapan : Wahana Informasi Dan Alih Teknologi Pertanian*, 13(2), 59–67.

Soulsby, E. J. L. (1983). *Helminths, arthropods and protozoa of domesticated animals* (13th ed.). Bailliere Tindall, 10 Greycoat Place.

Taylor, M. A., Coop, R. L. , & Wall, R. (2015). *Veterinary Parasitology* (M. A. Taylor, R. L. Coop, & R. L. Wall, Eds.). Wiley. <https://doi.org/10.1002/9781119073680>

Wu, T., & Bowman, D. D. (2020). *Visceral larval migrans of Toxocara canis and Toxocara cati in non-canid and non-felid hosts* (pp. 63–88). <https://doi.org/10.1016/bs.apar.2020.02.001>

Yakubu R. A., Patrick, A., Iliya, S. N., & Ishaya, H. N. (2009). Seroprevalence Of Human Toxocara Canis Infection In Vom, Plateau State, Nigeria. *Nigerian J Sci Research*, 8, 11–14.

Figures

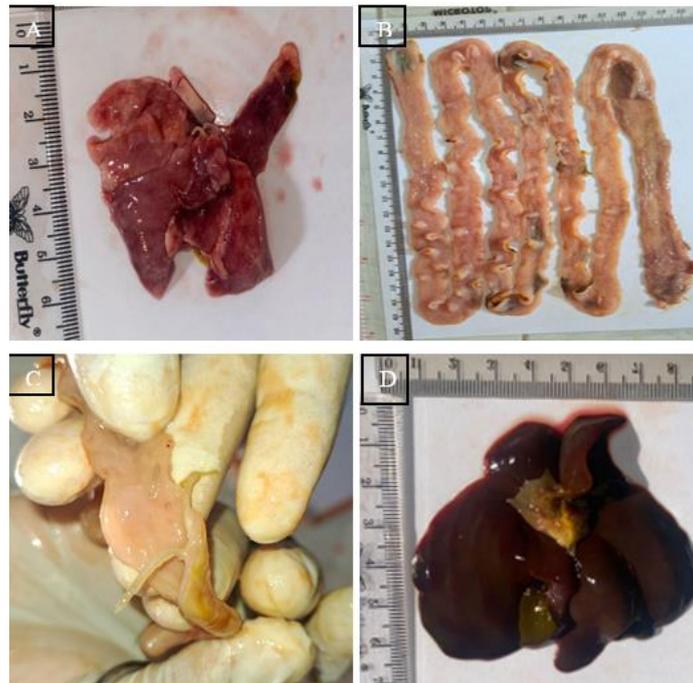


Figure 1. (A) Hemorrhage with the presence of worms in the lungs; (B, C) Multifocal petechiae, the presence of *Toxocara cati* worms, and granulomas in the intestine; and (D) White spots and hemorrhage in the intestine.

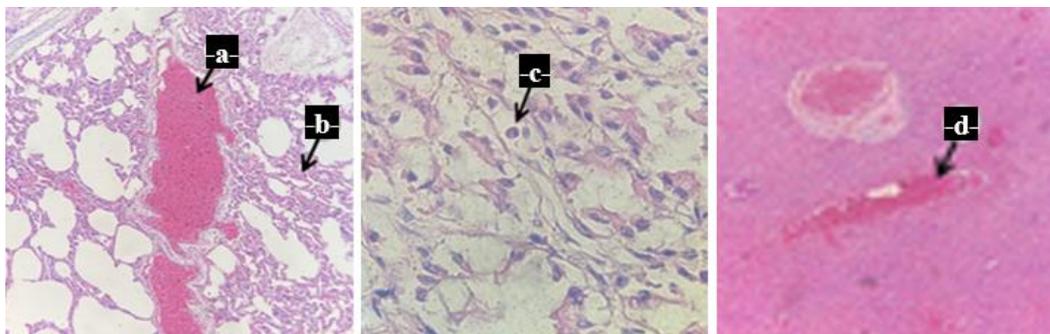


Figure 2. (A) Pulmonary congestion; (B) Thickening of the alveolar septa in the lungs; (C) Eosinophilic inflammatory cells in the intestine; and (D) Hepatic congestion.

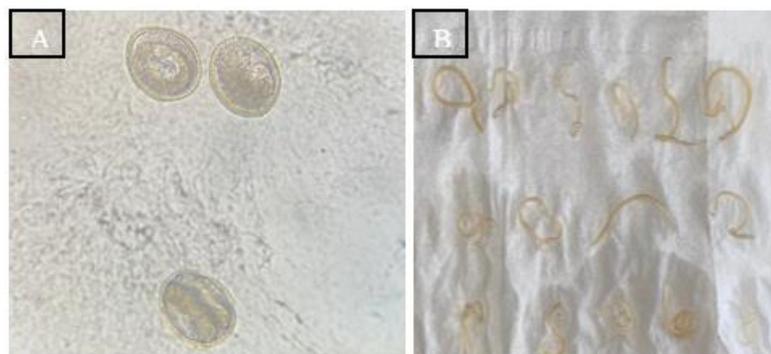


Figure 3. (A) *Toxocara cati* eggs and (B) *Toxocara cati* worms.