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Epidemiological Study of *Otodectes cynotis* Infestation in Pet Cats in Urban Areas (Case Study in Mataram City)

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Abstract

Keywords:
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Cats
Prevalence
Ear mite
Mataram City

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Otodectes cynotis is a parasitic mite frequently identified in the external ear canal of cats, where it causes otitis externa and severe pruritus. Environmental conditions, hygiene standards, and animal management practices influence the prevalence of this mite. The present study aimed to assess the detection rate and prevalence of *O. cynotis* infestation in cats presented to veterinary clinics in Mataram City, West Nusa Tenggara. A total of 63 cats from three clinics (A, B, and C) were examined between November and December 2024. Earwax samples were processed using the native method with a 10% KOH solution at the Parasitology and Microbiology Laboratory, Faculty of Veterinary Medicine, Mandalika University of Education. Microscopic examinations at 10× and 40× magnifications were conducted to identify *O. cynotis* based on morphological

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characteristics. Among the 63 cats examined, 22 (34.92%) were infested. The prevalence rates were 40.74%, 29.17%, and 33.33% at Clinics A, B, and C, respectively. These results demonstrate a moderate-to-high prevalence of *O. cynotis* among cats in Mataram City. Routine ear examinations, enhanced hygiene practices, and regular antiparasitic treatments are recommended to reduce infestation rates and improve feline ear health.

PENDAHULUAN

Otodectes cynotis (O. Cynotis) is a mite that prefers to live in the external ear canal of cats. This mite causes cats to scratch their ears, tilt their ears, and can cause a hematoma (Jannnah and Siagian, 2021). The most common clinical symptoms in cats infected with *O. Cynotis* mites include ear canal itching, excessive production of blackish-brown earwax, and otitis (ear inflammation) (Hidayah et al., 2021). *O. Cynotis* mite infestation causes itching and otitis externa, manifested by an erythematous ear canal and dark brown, ceruminous exudate (Ahaduzzaman, 2014).

One of the most common diseases in cats is parasitic and bacterial infections, which cause inflammation of the ear canal (otitis externa). This is characterised by sores on the skin of the outer ear, along the tympanic membrane. Meanwhile, if the infection occurs in the middle ear canal, it is classified as otitis media. If not treated promptly, this condition can progress to inflammation of the inner ear, including a ruptured eardrum, accompanied by infection of the inner ear canal (otitis interna) (Foster and Smith, 2009).

Otitis externa is often exacerbated by secondary bacterial or fungal infections. Staphylococcus intermedius, a common coccus, is frequently identified in cases of otitis externa, while Pseudomonas species are prevalent bacilli. The presence of purulent fluid in the ear canal typically indicates bacterial infection (Acar and Yipel, 2016; Kartini et al., 2017; Silva, 2020; Taenzler, 2018). In epidemiological research, prevalence is defined as the proportion of individuals within a population who exhibit a specific disease, disorder, or condition at a given time. The prevalence of *Otodectes cynotis* mites is the proportion of the population exhibiting characteristics and risk factors associated with these mites (Bengi, 2017). *Otodectes cynotis* mites are ectoparasites that inhabit the external ear canal of cats, but they can also infect dogs and other carnivores such as foxes and ferrets (Sweatman, 1958). Clinical symptoms may arise when the population of *Otodectes cynotis* increases in the host or when the host's health and immune system are compromised (Dhingra, 2008). This study aims to determine and evaluate the prevalence of *Otodectes cynotis* infestation in cats at various veterinary clinics in Mataram.

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METHODOLOGY

Research Time and Location

The research will be conducted over two months, from September to October 2024. Sampling will take place at several veterinary clinics in Mataram City. Cat earwax samples will be analysed at the Parasitology and Microbiology Laboratory in the Faculty of Veterinary Medicine, Mandalika University of Education.

Population and Sample Size

Samples in this study consisted of *Otodectes cynotis* mites collected from cat patients at various veterinary clinics in Mataram City. A random sampling method was used. The sample size was calculated using the formula provided by Daniel and Cross (2013). The following formula was applied:

$$n = \frac{Z^2 P (1 - P)}{d^2}$$

The sample size calculation was performed using the Daniel & Cross (2013) formula with a 95% confidence level (Z = 1.96), an expected prevalence of 40%, and a total cat population of 400. Based on the calculation results, it was found that for a precision level (d) of ±11%, a sample size of 63 cats was required. This number is considered representative to describe the condition of the population being studied with an adequate level of confidence.

Materials Used in the Study
Instruments and Reagents

The instruments utilised in this study include a microscope, masks, glass slides, cover slips, gloves, tissue, cotton swabs, and plastic

sample clips. The primary reagents are cat earwax and a 10% potassium hydroxide (KOH) solution.

Research Procedures

Sampling Procedure

According to Hadi and Soviana (2010), the initial steps before sampling include patient history-taking and a clinical examination to support the diagnosis. The history taking and clinical examination will be conducted by a veterinarian. Afterward, sampling can be performed with permission from the veterinarian treating the patient. Before sampling, observe the area around the patient's ear for clinical signs of ear canal itching and excessive blackish-brown earwax production. Observe the patient's ear exudate. Sampling is performed by scraping directly from the cat's ear using a cotton swab. After sampling is complete, all samples taken from the cat are placed in a labeled plastic bag. These samples are then examined in the Parasitology and Microbiology Laboratory of the Faculty of Veterinary Medicine, Mandalika University. Routine sampling and examinations are carried out until the specified sample size is reached within one month.

Sample Examination Procedure

Examination of ear scraping samples using the native examination method. The native examination procedure involves placing earwax on a glass slide and adding one to two drops of 10% KOH solution, then covering it with a cover glass. The slide is then observed under a microscope at 40x or 100x magnification (Hadi and Soviana 2010).

Identification of *Otodectes cynotis*

Otodectes Cynotis is characterized by its oval body and four pairs of relatively long legs. The findings in this study will be based on the book Veterinary Parasitology by Taylor et al., 2015.

RESULTS AND DISCUSSION

Results

A total of 63 cats were examined at three veterinary clinics in Mataram City between November and December 2024. Random sampling was performed from a population of 400 cats. Earwax (cerumen) samples were collected and analyzed in the Parasitology and Microbiology Laboratory at the Faculty of Veterinary Medicine, Mandalika University of Education. A native test method with 10% KOH solution was used to facilitate microscopic identification of *Otodectes cynotis* mites. Of the 63 samples, 22 (34.92%) tested positive for *O. cynotis* infestation. Clinic A exhibited the highest prevalence at 40%, followed by Clinic C at 33% and Clinic B at 29%. *O. cynotis* mites were clearly observed at 40× magnification under the microscope. The observed morphology includes an oval body, four pairs of legs, and a distinctive capitulum and posterior anus structure in males and females. Factors suspected of contributing to infestation include cat ear hygiene, the environment, and the owner's grooming behavior. Cats with infrequent ear cleaning or frequent interaction with other outdoor animals are more prone to mite infestation. Most cases are found in domestic and mixed-breed cats (mixdom) compared to Persian or Angora cats.

The prevalence of 34.92% indicates that *O. cynotis* infestation is considered high compared to previous research reports in other areas, such as Bogor Regency (9.5%) and Batusangkar (40%). This indicates that ear mite infestation in cats in Mataram City is still quite common, especially in cats that do not receive routine ear care. Clinical manifestations observed in positive cats include itching (pruritus), frequent ear scratching, blackish-brown earwax, and signs of otitis externa. If not treated promptly, the infestation can develop into chronic inflammation, fibrosis, and even ear canal stenosis.

Figure 1. Morphological Features and Body Parts of *Otodectes cynotis* (Cat Ear Mite).

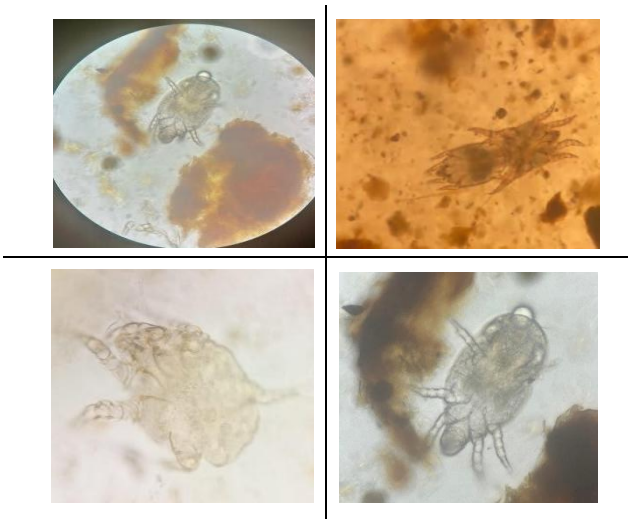
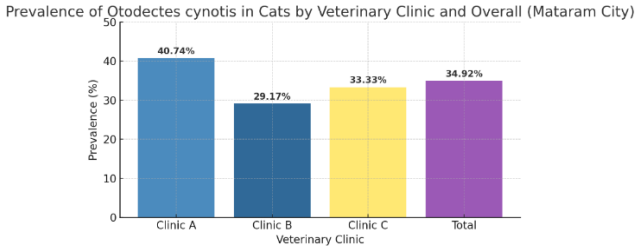


Table 1. "Prevalence of *Otodectes cynotis* Infestation in Cats Examined at Three Veterinary Clinics in Mataram City"

Clinic	Total Cats Examined	Positive Cases	Negative Cases	Prevalence (%)
A	27	11	16	**40.74**
B	24	7	17	**29.17**
C	12	4	8	**33.33**
Total	**63**	**22**	**41**	**34.92**



Here is the bar chart showing the prevalence of *Otodectes cynotis* across Clinic A, Clinic B, Clinic C, and the overall total prevalence for cats in Mataram City: The visualisation clearly shows that Clinic A recorded the highest prevalence**.** In contrast**,** Clinic B showed the lowest rate. The total prevalence (34.92%) indicates that about one-third of the cats examined were infested with *O. cynotis*.

DISCUSSION

This study found a prevalence of *Otodectes cynotis* infestation of 34.92% (22/63) in a population of 63 cats at three veterinary clinics in Mataram City (microscopic native method). This result is relatively high compared to several other studies, but still within the range reported globally. This figure indicates that ear mite infestation remains high in urban areas with relatively dense populations of pet cats. These results align with research by Jannah and Siagian (2021) at the World Animal Clinic in Batusangkar, which reported a prevalence of around 40%, but higher than the report by Iriyanti (2023) at a traditional market in Mataram City, which reported a lower infestation rate in stray cats. The prevalence of *O. cynotis* varies greatly across locations and populations. Several international studies have reported results similar to those of this study, including those by Beugnet et al. (2018) in France (30%), Nardoni et al. (2014) in Italy (33%), and Silva et al. (2020) in Brazil (52.6%). Meanwhile, a study in Turkey by Farkas et al. (2007) showed a lower figure of 27.7%. This variation is influenced by climatic conditions, environmental hygiene, diagnostic methods, and cat husbandry patterns in each region. The high prevalence in Mataram City is likely due to the humid tropical climate, which strongly supports the development of ectoparasites. According to Taylor et al. (2015), *O. cynotis* mites thrive optimally at a relative humidity of 70-80% and a temperature of 25-30°C, conditions consistent with the weather in Mataram.

Several studies have shown wide variations in prevalence. For example, a survey in Murcia, Spain, found a prevalence of approximately 30% (95% CI 25–35%) in 296 cats in urban and peri-urban areas (Fanelli et al, 2020). Another study in Italy reported infestation as the leading cause of otitis externa in approximately 53.3% of feral/free-ranging cats (Perego et al, 2014). Meanwhile, a study in Brazil

reported a prevalence of 52.6% in cats in a semi-arid region (Vilela et al, 2020). In Turkey, a study of 105 cats found a prevalence of 27.7% (Acar and Yipel, 2016). Compared with the literature, the results of this study (34.9%) fall between the highest and lowest values , higher than some studies (e.g., Turkey) but slightly lower than the very high values (e.g., Brazil). This shows that *O. cynotis* infestation in the environment of 3 veterinary clinics in Mataram City is a significant problem and deserves attention.

Several factors contribute to high infestation rates, including Ear hygiene and environmental conditions. Cats whose ears are not cleaned regularly have a higher risk of infestation (Waly and Khalaf, 2013). Field observations showed that most cats in the research clinic had a buildup of wax and blackish-brown feces. A study in Spain showed that cats in peri-urban areas have a higher risk of infestation than cats living entirely indoors (Fanelli et al., 2020). Although this study did not collect specific data on outdoor access, environmental factors may be a contributing factor. Interactions between animals: Transmission of *O. cynotis* can occur through direct contact between cats or between infested cats and dogs (Sotiraki et al., 2001). Many of the cats examined were known to live with other animals without routine parasite control. Regarding environmental conditions and breed, according to Napitupulu (2011) and Lefkaditis et al. (2009), domestic cats are more susceptible than Persians or Angoras due to less intensive care.

Age and immunity: Kittens (<6 months) are more susceptible to infection due to their immature immune systems (Farkas et al., 2007). In this study, positive cases were primarily found in young and semi-domestic cats. Some studies suggest that young cats (<6 months) have a higher prevalence due to close contact with their mothers and immature immunity. For example, a Greek study of kittens (<6 months) showed a prevalence of 17.6% compared to 11.4% in kittens <3 months (Lefkaditis et al, 2009). However, this study showed a higher overall rate (34.9%), so your population may have more adult cats, or other factors may be contributing to the infestation, such as environmental hygiene and parasite control. Ear hygiene, routine examinations, veterinary care, and antiparasite policies can significantly influence prevalence rates. A guideline article from the Companion Animal Parasite Council states that *O. cynotis* is frequently encountered in cats without adequate parasite control (Companion Animal Parasite Council, 2019). Diagnostic methods: Variations in method (otoscopy vs. scraping vs. microscopy) influence reported prevalence. Studies using full ear canal scrapings tend to yield higher rates than simple otoscopic examinations (Fanelli et al, 2020). Ensure that native microscopic methods are used in your study to ensure adequate sensitivity.

Pathogenesis and Clinical Symptoms

Infestation with *O. cynotis* results in chronic irritation of the external ear canal, known as otitis externa. Adult mites penetrate the epithelial lining, producing micro-injuries and stimulating excessive cerumen secretion. The combination of cerumen and dried blood forms a characteristic dark brown crust. Clinical manifestations include intense pruritus, frequent scratching, head shaking, and the development of aural hematomas. Without intervention, the condition may progress to otitis media or interna (Foster and Smith, 2009). Microscopic examination reveals adult mites and nymphs exhibiting distinctive features: an oval body, four pairs of legs, and an anterior capitulum. Female mites measure approximately 97–104 µm, whereas males are smaller, measuring around 91 µm. These findings are consistent with the morphological descriptions provided by Harwood and James (1969) and Hidayah et al. (2021). According to the Companion Animal Parasite Council (2023) guidelines, effective treatment for *O. cynotis* can be achieved with topical agents such as selamectin, moxidectin, or ivermectin (topical/ear drops). Treatment should

be repeated 2–3 times at 7–10-day intervals to interrupt the mite's life cycle. Prevention involves maintaining ear hygiene, isolating infested animals, and administering monthly antiparasitic prophylaxis.

Epidemiological Interpretation and Clinical Implications

The prevalence of 34.9% indicates that *O. cynotis* is a significant animal health problem in urban Mataram. This figure indicates that approximately 1 in 3 cats admitted to clinics are potentially infested. If left untreated, this parasite can cause discomfort and reduced productivity and may even become a potential source of zoonosis through allergic reactions or dermatitis in humans (Wiwanitkit, 2011). Therefore, routine ear screening is important, especially for pet cats with outdoor access.

Practical Implications

The findings of this study demonstrate that *O. cynotis* infestation represents a significant concern in Mataram City, with a prevalence of approximately 34.9%. This suggests that nearly one in three cats in the local clinic population may be affected. Several practical implications arise from these results. Routine ear screening programs for client cats should be enhanced, particularly for those with outdoor access or frequent contact with other animals. Pet owners should be educated regarding the importance of regular ear cleaning and examinations, as well as the appropriate use of acaricides or topical antiparasitics when indicated. Veterinary clinics in the region are advised to incorporate ear mite screening into standard protocols for otitis externa or ear pruritus, even in cases lacking pronounced symptoms. From a research perspective, conducting local risk-factor analyses, such as evaluating outdoor access, animal density, multiple-cat ownership, and vaccination or antiparasitic status, is essential to enable more targeted interventions.

CONCLUSION

Based on a study of 63 cats at three veterinary clinics in Mataram City, it can be concluded that: *Otodectes cynotis* was successfully detected in a proportion of cat patients, with a total prevalence of 34.92%. The clinic with the highest prevalence was Clinic A (40%), followed by Clinic C (33%), and Clinic B (29%). The main factors influencing the high infestation rate were ear hygiene, the cat's care environment, and the owner's lack of attention to routine ear care.

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