



## A survey for Infection Rate of *Otodectes cynotis* Parasite in Cats at Fallujah City



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### Abstract

**T**HIS investigation was done to know the infection rate of *Otodectes cynotis* in cats in Fallujah city and to know the best treatment for these cases. The Survey was conducted on domestic 140 cats with different ages, which were randomly presented in veterinary clinics for reasons unrelated to parasitic disease from a period from June 2022 to June 2023 in Fallujah city/Iraq. At their initial inspection at a private small animal clinic, the ear canals of all cats were examined using an otoscope to check for the presence of *Otodectes*. The ears of every cat that tested positive were cleaned many times with warm paraffin oil. To do this, by injected paraffin oil into the ear canal using a 5 cm<sup>3</sup> syringe and collected the resulting debris in a Petri plate. To quantify the level of parasitism, we examined this wash using a microscope. This study included treatment for these cases by 2 components as follows: G1 included 25 animals who were treated with one drop of ivermectin single dose and G2 included 25 animals who were treated with one drop of Mixture of bioline company single dose. The current study showed that from 140 animals, the infection rate by *Otodectes cynotis* was 51 (36.4%), while the age group 1-6 months was more highly infected than other groups. The current study exhibited that ivermectin with a single dose gives a significant result when compared with another treatment in G2.

**Keywords:** *Otodectes cynotis*, Fallujah, Cats, infection rate

### Introduction

The ear canal of cats and dogs is home to the parasitic mite *Otodectes cynotis* [1] of the acari family Psoroptidae. Intense pruritus caused by otodectic mange, which results from ceruminous gland hyperplasia in otitis [2], leads to scratching, self-mutilation, and shaking the head. Lohse *et al.* [3] and [4] agree that this is the most common cause of otitis externa in canines and felines. *Otodectes cynotis* has been documented in a wide variety of hosts around the globe, including a few different types of wild carnivores [5]. Otodectic mange in people is self-limiting, thus it's not a serious threat to public health. Although it is an obligate ectoparasite, *Otodectes cynotis* may, under the right conditions, live for many days away from its host [6]. Direct contact is the most common way for the disease to spread, often within the same cat colony [7]. More than half of all instances of otitis externa in cats may be attributed to otodectic mange [8]. *O. cynotis* may produce otitis media and dermatitis on the head, tail, neck, as well as trunk in severe instances [9], although in many cases cats show no symptoms at all. Shelter and feral cats have a larger chance of

contracting the parasite than domestic cats do, although all cats are susceptible to it [4].

In cats, otitis externa is caused by the psoroptid mite *O. cynotis* in about 50-80% of cases [10-12]. Direct contact with infected animals is a potent transmitter of the disease. Hosts for *O. cynotis* include dogs, ferrets, foxes, and even humans rarely [13-14]. The underlying pathophysiology of ceruminous gland tumours in foxes has been unraveled [15-16], suggesting that chronic otitis and ceruminous gland hyperplasia caused by ear mite infection are risk factors for tumour formation in dogs, cats, and foxes. *O. cynotis* has a 3-week long life cycle that takes place only in the ear canals of mammals. The mite may also infest the head, neck, and tail in rare occasions. The egg develops through four stages during ten days after hatching. It was hypothesized that the mites' infectivity off the host would last for 3-4 days, however they may live in the environment for up to 12 days. The frequency of *O. cynotis* in cats has been observed to vary from 0.5% in certain regions to 37.0% in others. The incidence rate is higher in stray cats [17] than in domesticated cats. Kittens may be more at risk of *O.*

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(Received 20/12/2023, accepted 21/01/2024)

DOI: 10.21608/EJVS.2024.257007.1737

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*cynotis* infection than adult cats, according to some studies [18-19], while others find no difference between the two age groups. Cats between the ages of 3 and 6 months were found to have a higher prevalence (17.6%) than younger cats (11.4%) in a single study. The incidence in young cats less than 1 year of age ranged from 11.4% to 31.3% [20-21]. Ear mites don't burrow, but their diet of dead skin cells may irritate the ear canal, leading to redness and sometimes pruritus. Cats may show no clinical indications at all, or they may develop otitis externa, severe otic pruritus, as well as brown discharges that look like coffee grounds [10]. Self-inflicted injuries, such as aural haematoma, miliary dermatitis, and patchy alopecia [22] are all possible in animals. *Staphylococcus spp.* as well as *Malassezia spp.* are the most often isolated microbes [23], and the mite may cause secondary bacterial and fungal infections. Some people are more likely to develop an allergy after being exposed to *Otodectes cynotis* [20]. Otoloscopic examination with live mite observation or microscopic analysis of ear canal swab samples are required for diagnosis of *O. cynotis*. In one study, researchers found that just 22.5% of ear mites could be seen using an otoscopic examination, but 37.0% could be seen with a microscopic inspection of a swab sample from the ear canals. Treatment options for feline *O. cynotis* infections include selamectin or fipronil used topically, ivermectin injected subcutaneously, and many ear medicines [24-26]. Due to the lack of data supporting *O. cynotis* transmission via the environment, no therapy has been suggested for *O. cynotis* environmental management [27]. When choosing a treatment, it's important to consider a number of factors, such as the animal age, clinical signs severity, presence of secondary infections, the animals affected number, the existence of ectopic mite infestations and when to recheck, the formulation, as well as the owner's convenience and compliance [28]. Despite the high claimed efficacy of the majority of items, there has been significant variation in the quality of study design and outcome assessment among clinical trials. This investigation done to know the infection rate of *Otodectes cynotis* in cats in Fallujah city and to know the best treatment for these cases.

### **Material and Methods**

Survey conducted on domestic 140 cats with different ages, which randomly presented in veterinary clinics for reasons unrelated to parasitic disease from a period from June 2022-june 2023 on Fallujah city/Iraq.

None of the kittens in the litter shown any signs of otitis externa when their owner brought them in for their first examination at a private small animal clinic in Fallujah, Iraq. To find out whether *Otodectes* was in the ear canal of each cat, an

otoscope examination was performed. All of the cats who tested positive had their ears washed several times with heated paraffin oil. To do this, we injected paraffin oil into the ear canal using a 5 cm<sup>3</sup> syringe and collected the resulting debris in a Petri plate. To quantify the level of parasitism, we examined this wash using a binocular microscope and counted the number of intact mites. Cosoroaba [29] offered a key for morphologically identifying mites.

**Treatment:** this study including treatment for these cases by 2 components as follows:

G1 included 25 animals were treated by one drop of ivermectin single dose (according to manufacturer).

G2 included 25 animals were treated by one drop of Mixture of bioline company single dose (according to manufacturer).

**Statistical analysis:** was done by using SPSS version 23.

### **Results and Discussion**

More than half of all instances of otitis externa are thought to be caused by the ear mite *O. cynotis* [30], making it one of the most frequent ectoparasites of cats in Europe.

The current study showed that from 140 animals, the infection rate by *Otodectes cynotis* was 51 (36.4%) (Table 1, Figure 1), while the age group 1-6 months was more highly infected than other groups (Table 1).

An author [31] reported that the frequency of *O. cynotis* in cats has been observed to vary from 0.5% in certain regions to 37.0% in others. It is more prevalent in wild cats than in domestic cats [32]. Kittens may be more at risk of *O. cynotis* infection than adult cats, according to some studies [13-15], while others find no difference between the two age groups. Cats less than a year old had a prevalence of 11.4% to 31.3% [32,33], with the highest rates seen in cats aged 3 to 6 months (17.6%) and the lowest rates found in cats younger than 3 months (11.4%).

The current study exhibited that ivermectin with a single dose gave a significant result when compared with another treatment in G2 (Table 2).

Topical spot applications of fipronil or selamectin, subcutaneous injections of ivermectin, and other ear medicines are now available for the treatment of *O. cynotis* infestation in cats [34].

Ear drops containing ivermectin were compared to spot-on selamectin and doramectin was also tested. Doramectin was only 90.0% effective (27 of 30), but selamectin spot-on was 96.7% effective (29 of 30). There were no documented adverse effects [35].

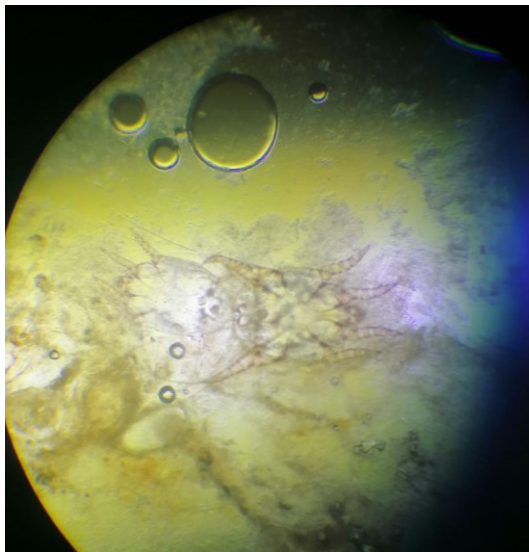
Drops of ivermectin were assessed in three open trials, with a total of 22 cats receiving treatment (out of whom 20 were cured, or 90.9%) [22, 23, 35]. The total success rate for ivermectin ear drops in four open investigations was 92.5 percent (62 of 67) [21, 22, 34]. The effectiveness of pour-on ivermectin was 95.8% (23 of 24) in a single trial [45]. Ivermectin otic solution was shown to have a rapid mite-killing effect in a study including 41 kittens; within 72 hours of therapy, 100% (6 of 6) of the ears were mite-free without the need for further follow-up [36].

### Conclusion

The *O. cynotis* was diagnosed in a significant number and ivermectin showed an excellent treatment for *O. cynotis* infestation.

**Table 1. Infection rate according to age**

Age group	No. of infected	%
1-6 mo.	23	45.1
7mo.-1year	18	35.3
More than 1 year	10	19.6
Total	51	36.4



**Fig. 1. Otodectes cynotis**

**TABLE 2. Response according to treatment**

Groups	No. of cases respond to treatment	%
G1	24	96
G2	21	84

**Acknowledgments:** We are grateful to the Private vet Clinic for support in providing tools, samples and situation for experiment.

**Funding Statements:** The authors declare that the present study has no financial issues to disclose.

**Conflict of interest:** None

**Authors contributions:** **Mohammed Ali Hussein:** Practical work, **Ahmed Emad Abood:** statistical analysis, **Mustafa Salah Hasan:** Manuscript writing and editing and, **Waleed Hamid Farhan:** Sampling.

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### معدل الإصابة بطفيلي *Otodectes cynotis* في القطط في مدينة الفلوجة

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#### الملخص:

تم إجراء هذا البحث لمعرفة نسبة الإصابة بطفيلي *Otodectes cynotis* في القطط في مدينة الفلوجة ومعرفة العلاج الأمثل لهذه الحالات. أجري المسح على 140 قطة منزلية بأعمار مختلفة احضرت عشوائياً إلى العيادات البيطرية لأسباب لا علاقة لها بالأمراض الطفيلية للفترة من حزيران 2022 إلى حزيران 2023 في مدينة الفلوجة/العراق. عند التفقيش الأولي في عيادة خاصة للحيوانات الصغيرة. تم فحص قناة الأذن لجميع القطط باستخدام منظار الأذن للتحقق من وجود *Otodectes*. تم تنظيف أذان كل قطة كانت نتيجة اختبارها إيجابية عدة مرات بزيت البارافين الدافئ، وللقيام بذلك، تم حقن زيت البارافين في قناة الأذن باستخدام حقنة بحجم 5 سم<sup>3</sup> وجمع الحطام الناتج في طبق بيترى. لقياس مستوى النطف، تم فحص هذه العينات باستخدام المجهر. تضمنت هذه الدراسة علاج هذه الحالات بمكونين على النحو التالي: المجموعة الأولى شملت 25 حيواناً عولجت بقطرة واحدة من عقار الإيفرمكتين جرعة واحدة والمجموعة الثانية شملت 25 حيواناً عولجت بقطرة واحدة من خليط شركة بيولاين جرعة واحدة. أظهرت الدراسة الحالية أنه من بين 140 حيواناً، بلغت نسبة الإصابة بجرثومة *Otodectes cynotis* (36.4%)، في حين كانت الفئة العمرية 1-6 أشهر أكثر إصابة من المجموعات الأخرى. أظهرت الدراسة الحالية أن الإيفرمكتين بجرعة واحدة يعطي نتيجة معنوية بالمقارنة مع علاج آخر في المجموعة الثانية.

الكلمات الدالة: *Otodectes cynotis*، الفلوجة، القطط، معدل الانتشار.