



### Internal and External Parasites of Cats in Kuwait

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#### ABSTRACT

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This study was conducted in Animal House veterinary Hospital Salyimia region, Kuwait state. The study focuses on the domestic cats because it is very important in public health . The majority of families in Kuwait have domestic cats and other pets in their homes. Fecal samples were collected monthly at random from domestic cats in different age, sex and breed that visited the Hospital at the rate of 10 to 15 faecal samples per month. A questionnaire was prepared and completed by the owners of cats included in this study .Direct centrifugal flotation technique was used for the detection of internal parasites, their larval stages and eggs .External parasites were examined by comb counting examination of fur and ear smears .The study extended over a year from November 2014 up to November 2015. Among 150 cats surveyed, 27 cats (18%) had *Otodectes cynotis*; 33 cats had *Ancylostoma tubaeforme* (22%) and 11 cats (7.3%) were infected with *Isospora felis*. Routine examination and regular deworming were suggested for protection of cats breeds in Kuwait.

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#### INTRODUCTION

In Europe, cats can be invaded by an extensive variety of internal and external parasites. The infection of the parasite may bring changing clinical signs in cats, from gastro-intestinal scatters and

inability to flourish, to iron deficiency or anorexia in the more serious cases, especially in little cats with substantial parasitic weights (Traversa, 2012). Likewise, a few parasites of felines have a zoonotic potential (Raether and Hänel,

2003, [Petavy et al., 2008](#)). This is the situation for a few nematodes, for example, *Toxocara cati* and *Ancylostoma tubaeformae*, which are in charge of human instinctive/visual and cutaneous larva migrans, separately ([Fisher, 2003](#), [Robertson and Thompson, 2002](#)). People may likewise get to be infected with zoonotic cestodes from felines, for example, *Dipylidium caninum* or *Echinococcus multilocularis* ([Deplazes et al., 2011](#), [Petavy et al., 2008](#)). Among protozoans, *Toxoplasma gondii* is of real significance ([Lopes et al., 2008](#), [Schares et al., 2008](#)). Ectoparasites can bring direct harm, for example, uneasiness, pruritus and hypersensitive responses, however they have likewise a potential vectorial part: bugs are for example required in the transmission of zoonotic pathogens, particularly *Bartonella henselae*, the causative specialist of feline scratch malady ([Beugnet and Marié 2009](#), [Boulouis et al., 2005](#)). Different systems and courses of transmission of parasites from domestic carnivores to individuals are known. These consolidate transmission by food (*Toxoplasma gondii* and *Toxocara* spp.), through water (*Giardia duodenalis* and *Cryptosporidium parvum*), by direct contact (e.g. *Sarcoptes scabiei*) or percutaneously (e.g. *Ancylostoma* spp.), and furthermore through vectors no less than one vector arthropods (e.g. *Leishmania* spp. likewise, *Dirofilaria* spp.). Considering that canines and cats in Europe are as frequently as could reasonably be expected spoiled/infested with a broad assortment of endo-and ectoparasites, including some vector-borne parasites ([Otranto et al., 2013.](#), [Beugnet et al., 2014](#), [Baneth et al., 2015.](#)), the European Scientific Counsel

Companion Animal Parasites (ESCCAP; <http://www.esccap.org/>) has explained rules for the treatment and control of companion animal parasites, with the purpose of guaranteeing the prosperity of pets and in addition the quality of the overall public by decreasing the threat of zoonotic parasite transmission. Nevertheless, nature with these tenets or conceivably the perspective of the zoonotic capacity of a couple of parasites by pet proprietors and also by veterinarians is all in all compelled/poor ([Bourdeau et al., 2014](#)). In Kuwait there is no information about the number of cats, yet owning the pets felines are making in families all through Kuwait and no information accessible about their afflictions and parasites and the level of danger they may position to general. The greater bit of studies concentrates on the stray felines in Kuwait ([Abdul-Salam and Baker, 1990](#)). The present study was conducted to identify the endo- and external parasites of felines and the degree of the hazard to public health in Kuwait.

## MATERIALS AND METHODS

**Study area:** Kuwait is a small country located in the desert; vegetation is extremely sparse. The climate is continental characterized by long dry hot season (April up to November) and mild cold wet season (December up to March). Dust storms often occur during long hot season and temperature sometimes reaches 50°C. Because of the harsh climate and limited vegetation cover the majority of domestic cats are kept inside the houses or in pet shops as well as in cats adoption centers where cats are overcrowded thus increasing the risk of diseases or parasites transmission to human.

**External parasites examination:** Ten to 15 cats examined monthly in total of 150 samples. did not receive any anthelmintic treatment for last two months before complaining of any health problems. The animals were apparently in good health related to parasitic diseases .the fur of all cats examined and combed for 10 minutes all external parasites collected stored in individual vials containing 70% ethanol for identification of species. Samples suspected of skin mites infestation assessed by skin scraping and examined under microscope. The ear canal examined for ear mites the ear swabs from all cats placed in mineral oil and placed on glass slide and covered by cover slip and examined under microscope (10 x magnifications) to detect the ear mites.

**Internal parasites examination**

**Parasitological procedures:** Faecal samples collected from all cats at time of consultation .Both macroscopic examination to identify the (adult parasites and cestode proglottids ) and microscopic examination to identify the (parasites oocysts, cysts, eggs , larvae). Direct centrifugation flotation technique (Cringoli *et al.*, 2010) was used as follow: 5 gram of faeces, and mix with 10ml of flotation solution(sodium nitrate), pour mixture through a tea strainer into faecal cup and then pour strained solution into a 15 ml centrifuge tube and fill the tube by flotation solution, then put the tube in the centrifuge at 1200 rpm for 5 minutes then remove the tube from centrifuge

and put the cover slip on the top of the tube and let it stand for 10 minutes then remove the cover slip and placed on a glass slide and examine the entire area under the cover slip at (10x magnification) and confirm diagnosis by magnification the parasite using x 40 objective lens .

**Questionnaire:** Details of each cats included in this study including information about, age, locality, sex of the animal, household accommodation, hunting behaviour, demographic, and previous parasiticide treatment is recorded in owner questionnaire.

**Data collecting and analysis:** Prevalence rates were recorded .The 95% confidence intervals was computed with SPSS software. Association between parasitism and risk factors was first screened by univariate analysis and then by multivariate analysis.

**RESULTS**

All samples (150 cats) included in this study were negative for ticks ,lice ,fleas as well as skin mites but 27 cats were infected by ear mites *Otodectes cynotis* the prevalence rate of *O. cynotis* from the total number of cats examined was 18% . Eighteen males and 9 females from the total number of males (82) and total number of females (68) the prevalence rate of *O. cynotis* among males and females was 21.95% and 13.23%, respectively. The prevalence rate of *O. cynotis* among males and females differed significantly (P <0.05) Table 1.

**Table 1:** Prevalence rate of *O.cynotis* among male and female

Item	Male	Female	Significance
No examined	82	68	
No Positive	18 (21.9%)	9 (13.2%)	*

Thirty three cats were infected with *Ancylostoma tubaeforme* ( worm larval stages in fecal samples ) the prevalence rate of *A .tubaeforme* from the number of total cats examined was 22%. Seventeen males and 16 female from total males (82) and total female (68) the

prevalence rate *A. tubaeforme* among male and female was 20.7% and 23.5% respectively .there is no statistical difference between the prevalence rate among male and females ( $P>0.05$  chi<sup>2</sup>-test: Table 2).

**Table 2:** Prevalence rate of *A. tubaeforme* among male and female

Item	Male	Female	Significance
No examined	82	68	
No Positive	17 (20.7%)	16 (23.5%)	*

One cat was infected by *A. tubaeforme* (worm larval stages in fecal samples) contact with stray cats. The prevalence rate was 3.03% and there was no statistical difference between the prevalence rate among contact with stray and worm larval stages in faecal samples ( $P>0.05$ ). Eleven cats infected with cysts of *Isospora felis* from total cats

examined the prevalence rate was 7.3% .Seven male and 4 female from total number of male (82) and female (68) the prevalence rate of *Isospora felis* among male and female was 8.5% and 5.8%, respectively .The prevalence rate of *Isospora felis* among males and females differed significantly ( $P<0.05$  ) Table 3.

**Table 3:** Prevalence rate of *Isospora felis* among male and female

Item	Male	Female	Significance
No examined	82	68	
No Positive	7 (8.5%)	4 (5.8%)	*

The prevalence rate of *O. cynotis* (ear mites) at different age groups was (29.17%) in group (1) less than 3 months, and (27.08%) in group (2) less than 6 month, and (9.23%) in group 3

less than 1 year, and (7.69%) in group 4 over one year so the majority of infected cats by *O. cynotis* were kitten less than 6 months ( $P>0.05$ ) Table 4.

**Table 4:** The prevalence rate of *O. cynotis* (ear mites) at different age groups

Age group	Prevalence rate
< 3month	29.17%
>3<6 month	27.08%
>6 month< one year	9.23%

The prevalence rate of *A. tubaeforme* at different age groups was 0% in group 1 less than 3 months, and 22.92% in group 2 less than 6 months, and 29.23% in

group 3 less than 1 year, and 23.08% in group 4 over 1 year .so the majority of infected cats with *A. tubaeforme* were cats over 3months ( $P<0.05$  ) Table 5.

**Table 5:** The prevalence rate of *A. tubaeforme* (ear mites) at different age groups

Age group	prevalence rate
< 3month	0%
>3<6 month	29.23%
>6 month< one year	23.08%
> one year	22.92%

The prevalence rate of *I. felis* at different age groups was 37.5% in group 1 less than 3 months, and 2.08% in group 2 less than 6 months, and 0% in group 3

less than 1 year, and 7.69% in group 4 over 1 year .so the majority of infected cats with *I. felis* were kitten under 6 months (P>0.05) Table 6.

**Table 6:** The prevalence rate of *I. felis* (ear mites) at different age groups

Age group	Prevalence rate
< 3month	37.5%
>3<6 month	2.08%
>6 month< one year	7.69%

The prevalence rate of *I. felis* at different localities was 7.9% from Hawally locality, and 12.5% from ALasema locality and 0% from the rest localities

(Alferwania, Alahmady, Algahra, Mobark alkaber). So all cats infected with *I. felis* came from Hawally and Alasema localities (P>0.05 ) Table 7 .

**Table 7:** The prevalence rate of *I. felis* at different localities

Locality	Prevalence rate
Hawally	7.9%
ALasema	12.5%
Other (Alferwania,Alahmady ,Algahra, Mobark alkaber )	0.00%

The prevalence rate of *O. cynotis* at different localities was 19.69% from Hawally locality, and 50% from Alahmady locality ,and 20% from

Alferwania locality and 0% from the rest localities .So the high prevalence rate of *O. cynotis* was in Alahmady locality(P>0.05 chi<sup>2</sup>-test : Table 8.

**Table 8:** The prevalence rate of *O. cynotis* at different localities

Locality	Prevalence rate
Hawally	19.69%
Alahmady	50%
Alferwania	20%
Other (ALasema,Algahra,Mobark alkaber )	0.00%

The prevalence rate of *A. tubaeforme* at different localities was 22.83% from Hawally locality and 6.25% from Alasema and 60% from Alferwania and

0% from the rest localities. So the high prevalence rate was in Alferwania locality (P>0.05 ) Table 9.

**Table 9:** The prevalence rate of *A. tubaeforme* at different localities

Locality	Prevalence rate
Hawally	22.83%
ALasema	6.25%
Alferwania	60%
Other (Alahmady ,Algahra, Mobark alkaber )	0.00%

The prevalence rate of *A. tubaeforme* at different sources of cats was 0% from house breeding source, 24.53%from pet shops, and 17.39% from another breeder,

and 20% from the street, and 25% from the adoption societies. so the high prevalence rate was from the adoption societies source Table 10.

**Table 10:** the prevalence rate of *A. tubaeforme* at different sources of cats

Source	Prevalence rate
House breeding	0.00%

Pet shops	24.53%
Other breeder	17.39%
Street	20%
Adoption societies	25

The prevalence rate of *I. felis* at different sources of cats was 0% from house breeding source, and 2.83% from pet shops, and 30.43% from another breeder, and 20% from the street, and 0% from the adoption societies. So the high prevalence rate of *I. felis* was from the another breeder source Table 11.

**Table 11:** The prevalence rate of *I. felis* at different sources of cats

Source	Prevalence rate
House breeding	0.00%
Pet shops	2.83%
Other breeder	30.43%
Street	20%
Adoption societies	0.00%

The prevalence rate of *O. cynotis* at different sources of cats was 12.5% from house breeding, and 17.92% from pet shops, and 17.39% from another breeder, 40% from the street, and 12.5 from the adoption societies. So the high prevalence rate of *O. cynotis* was from street source Table 12.

**Table 12:** The prevalence rate of *O. cynotis* at different sources of cats

Source	Prevalence rate
House breeding	12.50%
Pet shops	17.92%
Other breeder	17.39%
Street	40%
Adoption societies	12.50%

## DISCUSSION

In this study the prevalence rate of *A. tubaeforme* was High 22%, the life cycle of this hookworm is direct all the cats included in this study were domestic indoor cats and this offered suitable temperature and humidity to the larvae compare to the previous studies of the stray cats in Kuwait reported as low prevalence rate 1.3% (Abdul-salam and Baker, 1990) due to ambient temperature and humidity on the street (Osama et al., 2016). The previous hookworm recorded in Kuwait was *A. caninum* in dogs (Matthews, 1985) and cats (Abdul-salam, 1986) with low prevalence rate 2.9% and 0.48%, respectively. Regarding internal parasites, a study in Spain found a significantly higher prevalence in stray cats (32.9%) than in

household cats (16.5%) (Miró et al., 2004). Previous surveys conducted in Germany, Italy and Hungary found endo-parasites in 22.8%, 35% and 39.6% of owned cats respectively, were similar to our results, i.e. 35.1% (Capári et al., 2013, Riggio et al., 2013). In this study the prevalence rate of ear mites (*O. cynotis*) was high 18%, the ear mites is transmitted by direct contact the majority of infected cats came from pet shop 26 (24.53%) overcrowding increased the chances of infection by direct contact. kittens less than 3 months 7 (29.17%) and less than 6 months 13 (27.08%) were infected more than adult cats over 6 months. This was probably due to weak immunity against ear mites in kittens less than 6 months. In this study the prevalence rate of cysts of *I.*

*felis* was 7.3%. This internal parasite is transmitted by direct contact with faeces from infected cats especially the ones bred from infected dams. Kittens the majority of infected cats in this study were kitten less than 3 months 9 (37.5%) and kittens less than 6 months 1(2.08%). Overcrowding and poor management play a big role in the transmission of this parasite. In several studies, young cats are estimated to be much more frequently infested with digestive parasites especially with ascarids and protozoans (coccidians, *Cystoisospora* spp. and *Giardia*). Meanwhile infestations of hookworms, lungworms, whipworms and taeniid cestodes seem to be mainly prevalent in older cats (Riggio *et al.*, 2013, Mircean *et al.*, 2010).

#### CONCLUSION AND RECOMMENDATIONS

This study reveals in general that domestic indoor cats can act as reservoir hosts for zoonotic parasite *A. tubaeforme* the causative agent of *cutaneous larva migrans (creeping eruption)*. Given the zoonotic consideration and the clinical importance, it is strongly recommended to implement effective and regular parasite control in cats, by regular treatment for both internal and external parasites.

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