Factors associated with the prevalence of *Otodectes cynotis* in an ambulatory population of dogs

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**ABSTRACT.** Souza C.P., Ramadinha R.R., Scott F.B. & Pereira M.J.S. 2007. Factors associated with the prevalence of *Otodectes cynotis* in an ambulatory population of dogs. *Pesquisa Veterinária Brasileira* 28(8):375-378. Departamento de Parasitologia Animal, Instituto de Veterinária, Universidade Federal Rural do Rio de Janeiro, Seropédica, RJ 23890-000, Brazil. E-mail: clarissa@ufrrj.br

The objective was to evaluate the factors associated with the prevalence of *Otodectes cynotis* infestations in dogs assisted at the Dermatology Service of the Veterinary Hospital, Universidade Federal Rural do Rio de Janeiro. A total of 250 dogs were examined through direct smear of ear samples using a stereoscopic microscope, for the parasitological diagnostic. All dog owners were interviewed and data regarding the animals and their environments were individually recorded. Mite infestation was observed in 15 animals, with a prevalence of 6%. The variables were tested regarding their association with the mites, using the $\chi^2$ test and, when appropriate, the Fisher exact test. There were no evidences that age ($p = 0.20$), sex ($p = 0.31$), breed ($p = 0.50$), shape of ear ($p = 0.66$), type ($p = 0.19$) and length of hair ($p = 0.14$) and contact with other animals ($p = 0.06$) could act as potential risk factors for *O. cynotis* infestation. However, living environment ($p = 0.03$) and frequency of environmental cleaning ($p = 0.005$) may facilitate the infestation. The occurrence of pruritus was associated to the presence of mites ($p < 0.001$), suggesting to be an effect of the parasitism.

**INDEX TERMS:** Ear mange, risk factors, dogs.

INTRODUCTION

*Otodectes cynotis* mites are big, white and very active parasites. They are highly contagious and can infest
several species of animals (Scott et al. 2001). The mechanical irritation caused by the presence of the mites inside the ears may lead to a higher activity of ceruminous glands and, consequently, the establishment of a favorable environment for secondary infections by bacteria or fungi (August 1988). The infestation is named otodectic mange (Sweatman 1958) and, in general, the infested animals show discomfort, intense itch and even audition interference, depending on the level of parasitism (Gotthelf 2000).

Despite the importance of mites as causing agents of external otitis, information regarding their prevalence and the factors influencing their survival is lacking (Gram et al. 1994, Sotiraki et al. 2001).

The objective of the present study was to evaluate the factors associated with the prevalence of *O. cynotis* infestations in dogs assisted at the Dermatology Sector of the Veterinary Hospital at Universidade Federal Rural do Rio de Janeiro, Brazil.

**MATERIALS AND METHODS**

**Size and selection of samples**

The number of animals to be sampled was calculated using the formulae \( n = p \left( 1 - p \right) \times (1.96/\Delta)^2 \) (Sampaio 2002), with an estimated prevalence (\( p \)) of 50%, an error (\( \Delta \)) of 6.5% and a confidence interval of 95%. Considering the possibility of losses, an additional 10% of samples were added resulting in a total of 250 animals.

The study was carried out between October 2002 and May 2003 on the Dermatology Service of Universidade Federal Rural do Rio de Janeiro. The first 250 consecutive dogs assisted, independent of ear problems, were included in the sampling procedure after the agreement had been received from the owner.

**Anamnesis and physical examination**

All dog owners were interviewed, always by the same person and data from the present moment of the dogs were individually recorded.

The questionnaire included closed questions about the living environment, frequency of environment cleaning and contact with other animals and, the occurrence of itch in the ears and in other parts of the body. Environment cleaning includig picking up dog feces, vacuuming the carpet or sweeping off the floor for inside dogs, and hosing down the cement for outside dogs.

Opened questions were also asked about dogs’ age. The ages were divided into categories as: puppies (0 and 18 month old), adults (19 to 84 months old) and elderly (85 months or older).

Data regarding the sex, breed, anatomic format of ear and, type and length of hair were recorded during the physical examination of dogs.

Before starting the study, a pilot test was carried out during the previous two weeks.

**Laboratorial diagnosis of *Otodectes. cynotis***

Bilateral otoscopy was carried out in all dogs using a veterinary speculum. A dissection tweezers, protected with cotton, was introduced into each ear canal in order to search for *O. cynotis* mites. The obtained secretion was examined under a stereoscopic microscopy (Foley 1991). The mites found were placed on a glass slide, covered with a cover slip and the Hoyer solution was added. Identification of mites was carried out according to Flechtmann (1990).

**Analysis of data**

Data obtained from the interviews, physical examinations and laboratorial analysis were used to compose a data bank using the EPI INFO 2002 program (CDC 2003). The results from the parasitological examinations were used to calculate the prevalence of infestation (Martin et al. 1997). A descriptive analysis was carried out for the variable age of infested animals. The variables were tested regarding their association with prevalence of *O. cynotis* infestation, using the \( \chi^2 \) test and, when necessary, data were corrected through the Fisher exact test (Armitage & Berry 1995) using the EPI INFO 2002 program (CDC 2002).

**RESULTS AND DISCUSSION**

The results of the parasitological examination on this study are described in Table 1 which is similar to Tonn (1963), Larsson (1987) and Rodriguez-Vivas (2003), but is different from the ones observed by Park et al. (1996) and Souza et al. (2003). The differences on the prevalences of *Otodectes cynotis* can be partially explained by the use of different diagnostic methods, by the sampling procedures used, and by the origin of the animals.

Regarding to pruritus in the ears and body, there was an association with the presence of mites (\( p<0.001 \)) (Table 2), what is also described by Kwochka (1987), Larsson (1987), Foley (1991) and Noli (2002), in their studies.

**Table 1. Prevalence of dogs infested by *Otodectes cynotis*.**

Parasitological examination of both ears of the 250 dogs examined at the Dermatology Sector of Veterinary Hospital (Universidade Federal Rural do Rio de Janeiro), between October 2002 and May 2003

<table>
<thead>
<tr>
<th>Right ear</th>
<th>Left ear</th>
<th>Both ears</th>
<th>Total of dogs</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 (1.6%)</td>
<td>2 (0.8%)</td>
<td>9 (3.6%)</td>
<td>15 (6%)</td>
</tr>
</tbody>
</table>

**Table 2. Number of dogs examined for the diagnosis of ear mites and pruritus at the Dermatology Sector of the Veterinary Hospital (Universidade Federal Rural do Rio de Janeiro), between October 2002 and May 2003**

<table>
<thead>
<tr>
<th>Otodectes cynotis</th>
<th>Positive</th>
<th>Pruritus</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>12</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Negative</td>
<td>61</td>
<td>174</td>
<td>235</td>
</tr>
<tr>
<td>Total</td>
<td>73</td>
<td>177</td>
<td>250</td>
</tr>
</tbody>
</table>

The infested animals ages ranged from 4 to 216 months and no associations were seen with the mite infestation (Table 3). Our results disagree with Kwochka (1987) and Larsson (1989), who suggest an age predisposition of dogs, with higher occurrence of infestation in animals under one year of age. And they also mention the acquisition of immunity by the adults. Although no significant association
was observed, the modal age of infestation was 7 months what is in agreement with what has been observed in veterinary clinics, where higher frequencies of otodectic mange occur among puppies, possibly due to transmission from the bitch to puppies during breast feeding. As cited by Flechtmann (1990), Gotthelf (2000) and Marcondes (2001), this type of transmission is the most common way to acquire infestation. In spite of this, the mean age of positive animals was 3.7 years, and the median age was 3 years; what means that 50% of the infested dogs were 3 years old or younger and 50% were 3 years old or older.

With regard to the sex of infested animals no significant differences were seen between prevalence rates in males and in females (Table 3). Some authors as Park et al. (1996) and Rodriguez-Vivas et al. (2003), this last one using logistic regression, also demonstrated that there is an association between the presence of mite and the type of ear. Semi-erect and pendent were the most affected type of ears. Guimarães et al. (2001) affirm that infestation is significantly associated with semi-erect ears. However, the authors did not propose any hypothesis to explain this association.

There was an association between the living environment and O. cynotis infestation, with higher prevalence in animals living outside the house. The frequency of environment cleaning was significantly associated to the infestation. Dogs living in environments in which cleaning was carried out only once a week had higher prevalence of infestation, indicating that environment cleaning is an important factor in preventing the infestation (Table 3). The mite O. cynotis feed on organic matter and may stay viable for long periods of time in favorable environmental conditions that had been occupied by infested animals (Larkin & Gaillard 1981, Nosna & Medleau 1992, Coleman & Atwell 1999, Angus 2004). Cement and grass promote protection to mites, favoring their survival. Lower frequencies in environment cleaning also favor infestation as poor hygienic conditions lead to high accumulation of food for the mites. In addition, Souza et al. (2003) suggest that mite infestations are more common in street dogs, living under poor environmental conditions.

Among the 80% of infested dogs having contact with other animals, 75% had contact with animals living within the same house and 25% had contact with street animals. Many authors have cited the direct contact with other animals as the most frequent method of O. cynotis transmission. However, associations were not seen between infestation of O. cynotis and contact with other animals, neither for the same species nor for other species (Table 3). But the lack of association may be related to the low number of subjects in one of the categories outcomes in this variable, equalizing groups that show very different percentages (Sampaio,
2002). On the other hand, Tonn (1961) carried out a study on artificial infestation of mites on animals from the same species and on animals from different species, and concluded that _O. cynotis_ is easily transmitted from infested animals to other susceptible animals from the same species; however transmission is more difficult from a cat to a dog and vice-versa.

It has to be emphasized that for the determination of the relative contribution of each variable on _O. cynotis_ infestation, it would be recommended to develop a multivariable analysis. However, on this study, there were not enough outcomes for its execution. Katz (2006) suggests at least ten outcomes for each independent variable.

In conclusion, no evidences were provided to support that age, sex, breed, size, shape of ears, type and length of hair and contact with other dogs are potential factors of risk for _O. cynotis_ infestations. However, the living environment where the animals live, and the frequency of environmental cleaning facilitate the infestation. The occurrence of pruritus was associated with the presence of mites, suggesting being an effect of the infestation. This way, it is recommended the execution of other studies to elucidate the role of each variable.

REFERENCES


