Research Paper Veterinary

# *Toxocara Canis* in Stray Dogs of Tirana and Related Public Health Risks


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**ABSTRACT**

*Toxocara canis* is a nematode parasite widely distributed in Tirana. Tirana is expanding with conditions that favor the growth of the number of stray dogs. The current number of strays in Tirana is about 2300 (± 250). This number includes only dogs within the urban city without considering the suburban areas. Infestation burden with *T. canis* in strays resulted 59.6%, with significant variations between various age groups. Puppies up to 6 months resulted 100% infested by *T. canis.* Parasitic burden for this age-group resulted with the higher at an average of 1,879 e/ g / feces. Dogs aged 6 ÷12 months old resulted infected with 58.1% by *T. canis* with high parasitic burden at an average of 800 e/ g / feces. Dogs over 12 months of age resulted in a less infestion rate by *T. canis* (22.1%) at an average of 697 e / g / feces.

**KEYWORDS** Stray dogs, T. canis, parasite eggs, parasitic burden.

## Introduction

*T.canis* is the ubiquitous nematode parasiting mainly in the intestines of the canine species. Female toxocara produce eggs which are excreted out with the feces of dogs. The source of infestation of parasitic hosts are the L2 that are hatched within the invasive egg in the outer environment. The risk of exposure to toxocara in humans living in Tirana is very high. The phenomenon of migrant larvae is common in children aged between one and three years old. Stray dogs are usually found around the garbage bins, walking freely in public parks, streets, close to houses and apartments and other public spaces as a result of their need to be fed. This way they contaminate with feces dirty with these environments shedding and spreading out a huge number of embryonated eggs. Small dogs that are the most infested are at the same time the more malnourished ones. Lack of food is the major cause of bringing them closer to people's environments especially children, garbage bins, parks and public places, increasing the likelihood for the humans to get infested. Young children are at an age where everything is touched and tasted, including contaminated items facing the phenomenon of larvae migrans. Larvae migrant phenomenon in humans is followed by fatigue, anorexia, weight loss, pneumonia, fever, cough, bronchospasms, muscular cramps, headaches and neurologic symptoms. Severe cases can lead to infarction or stop breathing.

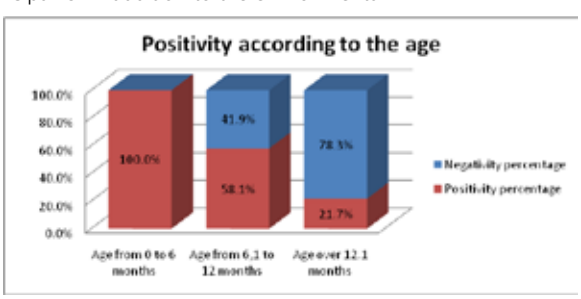
## Materials and methods

Faecal samples were evaluated for the presence of eggs and calculated with respect to parasitic burden of *T.canis.* The database was set up for the period of the year 2012 to 2013 and included information from egg count and identification examinations of 198 stray dogs. The samples were examined at the parasitologic laboratory of Faculty of Veterinary Medicine, Tirana and Petlife Hospital, Tirana, Albania. A total of 198 faecal samples comprising male and female dogs (n = 91male and n = 107 female) were examined. The database of the year 2013 included information feces of 67 puppies from 1 to 6 months old, where the age of 62 dogs varied from 6 to 12 months and for the remaining 69 were over 12 months old. Samples are taken individually. Dogs included in the study were provided by the humane societies operating in Albania and small animal practices in Tirana as well as by a joint project between Faculty of Veterinary Medicine, Tirana and the City Hall of Tirana. Feces of dogs aged over 6 months were taken individually. For dogs younger than 6 months old (especially those 0÷1 months old) samples were often conceived as litter samples. Often it was observed and examined feces of groups of 3-4 puppies. Each faecal sample weighted 5-10 g. A brief history on the age and other information on where dogs were fed the way they lived was recorded. Collecting data were followed by clinical examination of the animal at the time of sampling. Determination of the age of the dog to

the clinic was conducted on the basis of examination of the teeth according to the criteria described by merck manuals and ruralareavet.org. [12]. Faecal samples were individually packaged in disposable plastic cups with proper individual identification along with the date of sampling and animal code. Faecal examinations were carried out by McMaster method [9].

**Results and discussion**

Of the 198 samples tested, 118 (59.6%) resulted positive positive by coprologic examination. All dogs aged from 0 to 6 month old resulted positive (67 of 67) for Toxocara canis. Parasitic burden for that age-group was high. By counting the eggs on the microscope the values varied with min÷max 200÷20000 with an average of 1,879 / g / f. Lognormal distribution of parasitic burden values for this age group resulted with min÷max 2.301÷4.301 e / g / f with an average of 3,274 / g / f. [2]. Results of screening for this age group showed that most of the stray dogs were born infested or they were infested in the first week after birth [5, 7]. Puppies are the main source of infestation of children and the leading cause of environmental contamination with Toxocara canis eggs [1, 3, 8]. Puppies as a result of the lack of more food got closer to human settlements, garbage bins and shared facilities in public parks. In addition to the environmental




contamination with a large number of parasite eggs, they can establish direct contact with people (children 3÷12 years old) and this way they constitute a direct public health threat [8]. Very often, it is common to watch children of different residential blocks that hold the stray puppies and play with them for hours, often even receiving them in their apartments. All those kids who may play with such an uncontrolled puppy are very likely to get infested by askarides and after 20 days will begin to complain of abdominal pain, throwing up and having cough or fever due to bronchopneumonia, might show skin rash or worse may show neurological complications in forms of epileptical episodes and eye involvement as well [1, 8]. For puppies of 0 to 6 months old resulted that Toxocara canes , the 95% confidence interval of the mean was (3.1455 ÷ 3.4017) [1, 2, 9].

Graphic no.1 The results of coprological examination according to the age.

In the group of dogs aged between 6÷12 months, out of 62 dogs tested, 36 (58.1%) resulted infested. For the same group of animals, the parasite burden, according to the eggs counted under the microscope, was with min÷max 200 to 6000 with an average of 800 eggs per gram of feces. Lognormal distribution parasite burden values of this age-group varied from 2.301 to 3.778 of gram per feces, with the average 2.903 per gram of feces [4,6]. The values were lower as compared to parasitic burden value of puppies from 0 to 6 months old, although they remain still high. For puppies from 6 to 12 months old that resulted Toxocara positive, the 95% confidence interval of the mean was (2.7695 ÷ 3.0374) [2,4,6].In the age-group of dogs older than 12 months, out of 69 dogs tested, only 15 (21%) of them resulted positive. The parasite burden values according to the eggs counted under the microscope varied within the respective values of min÷max 200÷2400 with an average of 697 eggs per gram of feces. Lognormal distribution of parasitic burden values for this group ranged from 2.301 to 3.380 of gram per feces with the average of 2.843 e /g/ f. Again, it resulted a high parasitic burden but with a lower impact compared to the age-related prevalence of dogs involved in the study. For dogs over 12 months that resulted Toxocara canes positive, the 95% confidence interval of the mean was (2.6436 ÷ 3.0422) [2,4,6]. The faecal examination of stray dogs showed a high prevalence of infestation which directly was depended on the age of the animal. As shown in the Graphic 1 the age of dogs played an important role regarding the number of eggs shed per gram of feces. The Graphic 1 also shows that the shedding of eggs was the highest as per puppies belonging to the age-group from 0 to 6 months and then the shedding decreased in the age-group of young puppies from 6 to 12 months and further drastically decreased to dogs over 12 months of age. The ascaride live in dog's organism in about a year [9, 11]. This is why we revealed positive results every season, year round. Characteristics of the biological cycle of the ascaride make it difficult to note the seasonal impact on the level of infestation of dogs [7]. The study highlighted that the gender of dogs did not play any role in the level of infestation and parasitic burden indicators. To assess the impact of sex on the level of infestation by Toxocara canes the laboratory examination data were re organized in table no.1.

**Tab. 1. Coprologic data depending on sex.**

| | Age 0÷6 months | Age 6.1÷12 months | Age over 12 months |
|---|---|---|---|
| Positivity percentage male | 100.0% | 62.1% | 12.9% |
| Positivity percentage Female | 100.0% | 54.5% | 28.9% |

It seemed clear that for dogs aged 0÷6 months the infection rate was not affected by sex.

For age group from 6 to 12 months old and for the dogs over 12 months old some suspicion arose that perhaps the infection was influenced by sex.

The test Mann-Whitney U test [4,6] was carried out to verify the hypothesis that sex could have any significance for dogs infected with *Toxocara canes*. This procedure was used to test whether two independent samples were drew from the same population or, equivalently, from two different populations having the same mean. The results and the conclusion are shown in the table no. 2.

**Table 2 Statistical values for coprologic examination depending on sex**

| | U Statistics | U Mean | U Standart deviation | U standartizied value | Normal standartizied value p=0.95 | Conclusion |
|---|---|---|---|---|---|---|
| Male & Female aged 6-12 months | 172 | 162 | 31.607 | 0.3164 | 1.96 | Reject the hypothesis that sex has influence in the infection with Canes canes |
| Male & Female aged over 12 months | 22 | 22 | 7.659 | 0 | 1.96 | Reject the hypothesis that sex has influence in the infection with Canes canes |

The Table 2 shows clearly that the gender of dogs did not play any role in the level of infestation and parasitic burden indicators. Puppies got infested by ascarides by their mothers, either in utero or by suckling or milk [5]. The fact that 100% of puppies that we tested proved to be infested, it shows indirectly that their mothers were 100% infested by ascarides [11].

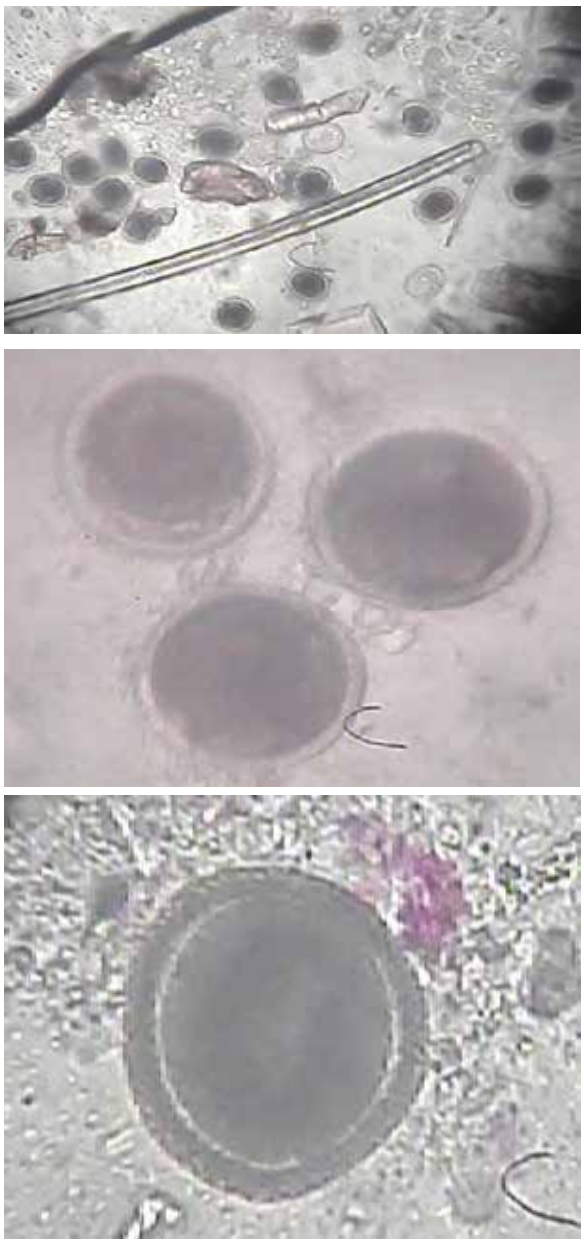


**Fig. no.1. *T.canis* eggs during counting with Mc Master method (original photo).**

The high prevalence and the very high parasitic burden of *Toxocara canes* in stray dogs of Tirana clearly indicate the risk of infestation with the parasite for owned dogs and children as well [8]. Therefore, it is necessary to take measures to properly control the population of strays. In addition, the parasitic burden of the ground and soil where stray puppies do live has to be monitored periodically. It is extremely important that communities be informed of the danger of getting infested by *Toxocara canes* which might lead to life threatening situations especially in children and, at the same time to not neglect the other zoonotic diseases that can be transmitted from dogs to humans [1,8]. .

**Conclusions**

The level of infestation of stray dogs in the city of Tirana results 59.6%. This prevalence is high and it is a clear evidence of the risk that *Toxocara canes* poses to public health and owned dogs. Parasitic burden resulted high with distinct variations between different age-groups of dogs involved in the study. Particularly high resulted the parasitic burden in the age-group of puppies from 0 to 6 months. Parasitic burden tends to decrease in inverse proportion to the age of the animal and this is attributed mainly to the growth and formation of immunity. Seen on the statistical point of view the impact of sex on the level of infestation did not affect the level of Toxocara canes infestation in dogs. High rate of parasite infestation and parasitic burden found in stray dog show of Tirana attracts the attention on the risk to the public health, especially to children. In the suburban areas of Tirana where the population of strays are larger, it is expected that the rate of infestation of strays be also higher, posing this way a serious public health concern. Without any doubt the control of stray dogs is an emergency. For the time being, we suggest for the people in a sort of contact with strays good hygiene practices and routine deworming of pet dogs and cats.

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