

The level of family dogs infestation from intestinal parasites, indicator of biological pollution impact in public areas

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Abstract

Faeces of 240 stray dogs and 240 family dogs that frequent the same public area in Tirana City they gathered and analyzed during the two years. We used the coproscopic method to identify intestinal parasites of which could be infested. The aim of this study was to assess the impact of the environment biopollution at public areas from exogenous stage of intestinal parasites by stray dogs using two indicators: a) the prevalence of infestation and b) number of species of which are infested dogs. It showed that the prevalence of infestation of stray dogs was 77.5% and 20% of family dogs. Regardless of the season or in which environments were collected samples, in both two groups of dogs were identified the same representatives of intestinal parasites, and specifically identified: *Echinococcus granulosus*, *Dipylidium caninum*, *Taenia* spp, *Mesocostoides lineatus*, *Ancylostoma* spp, *Uncinaria* spp, *Toxocara canis*, *Toxascaris leonina*, *Trichuris* spp, *Giardia* spp and *Coccidia* spp. The high prevalence of infestation at the stray dogs is a result of their lifestyle. To ensure the food they attend household waste, territory around the slaughterhouses, etc. In these areas they take food both with the invasive stages of intestinal helminths. At the same time they fed with wreck and alive rodent, with different arthropods and annelids worms, who as we know serve as paratenic hosts for many of the representatives of invasive helminthes of dogs. Moving in search of food they come into contact with other public environments contaminated by their counterparts. Thus homogenized and increased parasite loads that they carry with which contaminate even more moving and living environments where. Family dogs infested by intestinal fauna when representatives will hike in public environments that are contaminated by stray dogs.

Between the infestation prevalence of stray dogs and the infestation prevalence of family dogs from intestinal parasitic fauna has a positive correlation ($r = 0.736$ for $p = 0.0275$), therefore can ignore the level of family dogs infestation from invasive intestinal fauna is an expression of the impact of polluted environment from stray dogs on the health conditions of family dogs.

Keywords: Stray dogs, pets, intestinal fauna, prevalence, infestation.

1. Introduction

The faeces that excretion by the dogs without dehelminthization contain the exogenous stages of helminths found in their intestines [1,6,9,16]. For this reason they are categorized as the biological causes of pollution in the environmental who lives. The term "pollution" understand "a useless change of the natural environment that causes harmful actions, or creates concern for all living beings living in that environment" [14]. When pollution is caused by living organisms such as plants, animals, viruses, bacteria, parasites, fungi, etc., which have invaded a certain environment, we are dealing with biological pollution "biopollution" [4]. The words "biological pollution" is a term that defines the negative effects of invasive species on the ecosystem attributes of a particular environment. Biopollution is synonymous to "the impact of biological invasion" [4,5,11] the level of biopollution is a quantitative assessment of the

impact of the size of biological invasion [12]. Biological pollution caused by stray dogs is a serious problem of public spaces of our cities because the contaminated sites server as a reservoir for pathogenic agents of which can become infected people and animals who frequent accompaniment. The aim of study is to assess the impact of public biological pollution caused by intestinal parasites carried by stray dogs onto the family dogs, which infested mainly in these areas. Problems arising from contamination of biological and faecal contamination by stray dogs it's a much cost with medicinal character, social and economic, therefore ongoing assessment and monitoring of its impact on human and other animals health takes a special importance.

2. Materials and methods

The study lasted 2 years (2013 and 2014) and monitoring of biopollution impact caused by stray dogs on

family dogs is performed in public areas of the Tirana city. The degree of biopollution impact of environmental from zoonotic parasites carried by stray dogs have evaluated through the level of family dogs infestation by the same zoonotic parasites they were detected in the feces of stray dogs.

The level infestation of family dog will be measured through two indicators: 1) the prevalence of their infestation by intestinal zoonotic parasites, 2) the number of intestinal parasites species who are infested (the variety of parasites). To calculate the indicator parameters of environmental impact with biopollution on the state of health of the dogs family during two years (2012 and 2013) in three public areas of Tirana (Kavaja Street, Lana River and Lake Park) were determined respectively by 5 points (terrain) in which we will take faeces samples with faeces from dogs at 200 -300 m distance from each other (a total of 15 such). At each station of sampling were collect 2 samples with faeces from family dogs and 2 samples with faeces from stray dogs once every season during two years. Thus, gathered 240 samples from family dogs and 240 samples from stray dogs. For identification of parasite nematode eggs, eggs and proglotides of Cestoda, oocysts of *Coccidia* spp and cysts of the *Giardia* spp that could be found in the faeces of dogs, we used the quality and quantity coproscopic methods in the laboratory of parasitology at Institute of Food Safety and Veterinary of Tirana, applying the technique of flotation with hypertonic solutions and macroscopic observation for the possible presence of cestods proglotides. A special technique was used to identify the eggs of *Echinococcus granulosus*[6,7,16,17].

3. Results and Discussion

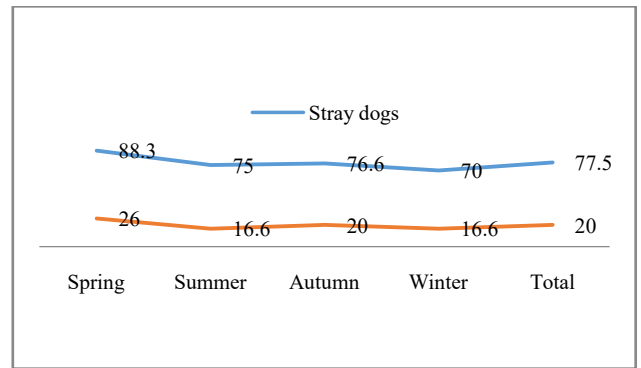


Figure 1: The level of infestation of stray dogs and family dogs from intestinal fauna in relation with seasons during 2013-2014 years in %

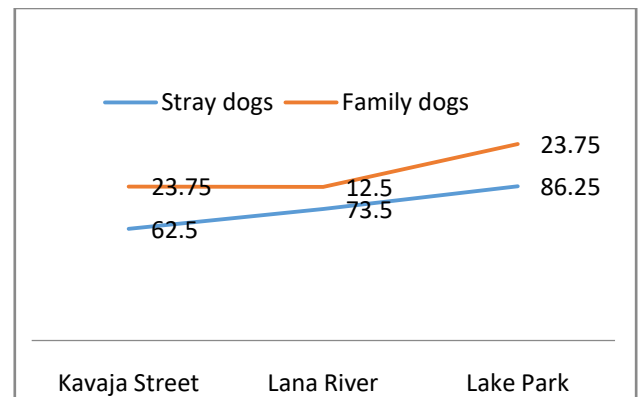


Figure 2: The level of infestation of stray dogs and family dogs in relation with frequented areas

Table 1: The prevalence of infestation of stray dogs and family dogs from zoonotic intestinal parasite in relation with frequented areas

Group of dogs	Stray dogs			Family dogs		
	Kavaja Street	Lana River	Lake Park	Kavaja Street	Lana River	Lake Park
Species of intestinal parasites identified in dog faeces	<i>E. granulosus</i>	<i>E. granulosus</i>	<i>E. granulosus</i>	<i>E. granulosus</i>	<i>E. granulosus</i>	<i>E. granulosus</i>
	Other Cestod	Other Cestod	Other Cestod	Other Cestod	Other Cestod	Other Cestod
	<i>Ancylostoma</i> spp & <i>Uncinaria</i> spp	<i>Ancylostoma</i> spp & <i>Uncinaria</i> spp	<i>Ancylostoma</i> spp & <i>Uncinaria</i> spp	<i>Ancylostoma</i> spp & <i>Uncinaria</i> spp	<i>Ancylostoma</i> spp & <i>Uncinaria</i> spp	<i>Ancylostoma</i> spp & <i>Uncinaria</i> spp
	<i>T. canis</i>	<i>T. canis</i>	<i>T. canis</i>	<i>T. canis</i>	<i>T. canis</i>	<i>T. canis</i>
	<i>T. leonina</i>	<i>T. leonina</i>	<i>T. leonina</i>	<i>T. leonina</i>	<i>T. leonina</i>	<i>T. leonina</i>
	<i>Trichuris</i> spp	<i>Trichuris</i> spp	<i>Trichuris</i> spp	<i>Trichuris</i> spp	<i>Trichuris</i> spp	<i>Trichuris</i> spp
	<i>Giardia</i> spp	<i>Giardia</i> spp	<i>Giardia</i> spp	<i>Giardia</i> spp	<i>Giardia</i> spp	<i>Giardia</i> spp
	<i>Coccidia</i> spp	<i>Coccidia</i> spp	<i>Coccidia</i> spp	<i>Coccidia</i> spp	<i>Coccidia</i> spp	<i>Coccidia</i> spp

The impact of the environment polluted by stray dogs stages exogenous of parasitic fauna on the state of health of the family dogs attending these environments will appreciate the help of two indicators: a) the prevalence of infection of family dogs from intestinal tract parasitic fauna, b) the number of intestinal fauna species have been identified in their faeces.

In Figure 1 are reflected the data of coproscopic analysis onto infestation prevalence of stray dogs and family dogs as well as species of intestinal fauna that are found in their faeces during 2 years in different seasons. The overall

prevalence of infestation (of all intestinal parasitic species) to stray dogs has resulted 77.5%, and 20% in the family dogs. Prevalence of infestation difference between the two groups of dogs is certified for $p = 0.000$ $IC=95\%$ (univariate analysis chi square test). Also between the infestation prevalence of stray dogs and the infestation prevalence of family dogs from intestinal parasitic fauna has a positive correlation with correlation coefficient $r = 0.736$ for $p = 0.0275$ (for values $r > 0.5$ and $p < 0.05$ correlation is real and statistically significant). In other words, the result of statistical analysis highlights the fact that the level of stray dog infestation from

intestinal parasites through their polluted environment affects the level of the infestation of the family dogs are those parasite.

Also in figure 1 are reflected the prevalence of infestation from parasitic fauna for both groups of dogs about the season. Appears clear similarity between two histograms representing the infestation seasonal trend for both categories of dogs. How to stray dogs and to family dogs the prevalence of infestation was higher in the spring due to the weather conditions at this season are more favourable for the development and survival of parasites exogenous stages [2,6,7,13,16,17]. Statistical analyzes have confirmed the seasonal impact on the prevalence of stray dogs infestation from zoonotic intestinal parasites (p-value = 0.0001665, IC=95%)

On the figure 2 is evidenced the prevalence of infestation is two groups of dogs in three urban environments. Prevalence of stray dogs infestation from intestinal fauna in relation to public areas that have attended over the past two years has been: at Kavaja Street 72.5%; Lana River 73.5% and 86.25% to Lake Park. Prevalence of family dog infestation in all three of these environments has been, at Kavaja Street 23.7%; to Lana River 12.5%, and in the Lake Park 23.75%.

Risc ratio (Rr) values of infestation prevalence for both categories of dogs in three public places are: Rr for Kavaja Street = $PI(\text{stray dogs}) / PI(\text{family dog}) = 3:05$; Rr for Lana River = $PI(\text{stray dogs}) / PI(\text{family dog}) = 5.8$ and Rr for Park $PI(\text{stray dogs}) / PI(\text{family dog}) = 3.6$. (PI = dogs prevalence of infestation by invasive intestinal fauna). Values of Rr in the three environments are larger than 1 (3 to 5.8), it means that the health of family dogs is seriously compromised of three environments, or in other words the level of contamination in three environments has expressed a lot of impact on the health of family dogs that attend these facilities.

In the table 1 are reflected the species of intestinal fauna that have been identified through coproscopic analysis in faeces of stray dogs and family dogs that have attended three public places in Tirana during 2013 and 2014. In both groups of dogs and in the three areas where faeces are collected they are identified the same species of intestinal parasites. Specifically, of Cestods group have identified *Echinococcus granulosus* and 3 others species of cestods which are treated as one group for reasons of lack space on the table. In this group included: *Dipylidium caninum*, *Taenia spp* and *Mesocestoides lineatus*. From nematods group we have identified: *Acylostomatides (Ancylostoma spp and Uncinaria sp treated together)*, *Toxocara canis*, *Toxascaris leonina* and *Trichuris vulpis*. From protozoa are identified *Giardia spp* and *Coccidia spp*.

Stray dogs are carriers of many zoonotic they are completely out of any kind of control and not dehelminthized. They provide food in household waste landfills, in facilities

around slaughterhouses, etc. In these environments together with the food they receive invasive stages of the intestinal parasitic fauna [3,8,18]. In cases when not find the necessary food they feed with rodents dead or alive, with different arthropods and annelids worms, who as we know serve as paratenic hosts for many of the representatives of dogs parasitic fauna [3,6,7,16,19,21]. Moving in search of food they come into contact with other public environments contaminated by their homologues. Thus homogenized and increased the parasitic loads that they carry with which contaminate even more the environments where moving and living. These are the reasons why they have a high prevalence of infestation and why in different seasons and in different territories in their faeces were identified the same types of intestinal fauna. The higher to be the prevalence of infestation of stray dogs and much more diverse to be fauna of their intestinal tract, the higher will be the level of contamination of public places where they live and the higher will be the pressure that this polluted environment will exert on family dogs who attend. Pets in general consume controlled food and they are dehelminthized, but the table 1 shown that 20% of them are infested by intestinal parasites that are identified in the faeces of stray dogs.

They have nowhere been infested from intestinal fauna representatives than in public where I derive their owners to walk. Moving on grounds of the premises, which as overview current above are very dirty, dogs family from diversity and curiosity swallow rubbish food thrown by different people, rodent, arthropod and annelids worm land that are contaminated and infested by exogenous stages of intestinal parasites scattered street dogs during defecation.

This reasoning does not apply fully to cestod because dogs not infested with cestods eggs which is contaminated environment but by cystic stages that take place in intermediate hosts tissue [3,7,9,21], who accidentally them disclose them as food. Recall that in the group of the family dogs are part and hunting dogs, whose owners give to eat the internal organs of hunting animals, which may occur cystic form of cestods. Infestation of family dogs explained with the type of immunity in parasitic disease that is not sterile immunity (premunition), which lasts as long as the last infestation [7,13,17]. After dehelminthization the family dogs undress from intestinal helminths immunity and when coming in contact with exogenous invasive parazitic stages which are public environments are contaminated by stray dogs they infested again of them.

If we compare our data with those of literature will note that there are no fundamental differences. In an article published in 2011 [20] on intestinal helminthofauna of dogs in the suburbs of Tirana reportedly been identified: *E.granulosus*, *T. hydatigena*, *D.caninum*, *Ancylostoma spp*, *Trichuris spp*, *T.canis*, *T. leonina*, *Giardiacanis* and some types from *Coccidiaspp*. Even in studies conducted in different countries [2,7,8,10,11,15,18,20] reported the same

variety of dogs intestinal fauna despite are stray dogs or family dogs.

So the level of infestation of the dog family of parasitic fauna and diversity are mainly a consequence of environment biopollution by fauna intestinal is that stray dogs eliminate in these environments during defecation. In other words the infestation prevalence of family dogs expresses the impact of public areas pollution by stray dogs on the state of health of family dogs. While the impact of the variety of stray dog intestinal fauna on the diversity of intestinal fauna of family dogs is maximal because in both groups of dogs in 4 seasons and in three areas where the study was conducted are identified the same types of intestinal parasitic fauna.

It is extremely disturbing that 20% of family dogs have resulted infested by intestinal parasites; because it shows that some owners do not care enough for dogs and do not recognize the danger of the parasitic fauna of dogs, especially for the health of their children. On the other hand, this result shows that except stray dogs and 20% of household dogs contribute to pollution of public spaces of cities.

4. Conclusion

- 1) Through coproscopic analysis proved that 20% of family dogs are infested from zoonotic intestinal parasites due biopollution caused by stray dogs in whom the prevalence of infestation was 77.5%.
- 2) Between the infestation prevalence of stray dogs and the infestation prevalence of family dogs from intestinal parasitic fauna has a positive correlation ($r = 0.736$ for $p = 0.0275$), therefore can ignore the level of family dogs infestation from invasive intestinal fauna is an expression of the impact of polluted environment from stray dogs on the health conditions of family dogs.
- 3) Due to the lifestyle of stray dogs and their movement from one urban area to another in search of food, they contaminate uniformly public areas of the Tirana city, so there are no differences in the variety of intestinal parasites identified in faeces of family dogs and stray dogs in all seasons and in three public area that included in this study.
- 4) In order to reduce the number of dogs of the road and minimize the level of biological pollution of public facilities caused by intestinal fauna that they carry, as well as its impact on the health of the family dogs, we recommend gathering in special shelters dogs stray, sterilization and dehelminthization them once in three months.
- 5) To ensure the health of family dogs and to prevent infestation of their members of the family of the dogs zoonotic intestinal fauna owners recommend that you dehelminthized them every 3 months and to endow with health cards.

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