GASTROINTESTINAL PARASITES OF SHEPERD DOGS FROM TETOVO REGION MACEDONIA

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Abstract
A total of 78 faecal samples from owned shepherd dogs were collected in Tetovo, Macedonia and were examined for the presence of intestinal parasites by centrifugation - flotation method that is more sensitive. The overall prevalence of parasitism in the tested samples was 0,71%. The species found and the infective percentage were: *Ancylostoma caninum* 41%, *Trichuris vulpis* 39.2% and *Toxocara canis* 17,8. The parasite *Angiostrongylus vasorum* was found in only 1 sample. There was not observed any significant difference in prevalence between dogs genders according the species of parasite found. Young animals were found to more frequently shed nematode eggs in faeces than adult animals. The presence of zoonotic species of parasites in dogs in the studied region, associated with the elevated degree of misinformation of the owners, indicates that the risk of zoonotic infection by canine intestinal parasite may be high.

Keywords: Dogs, intestinal parasites, flotation methods, prevalence.

Introduction

Intestinal parasites of dogs are diffused worldwide and intestinal parasitic infections in dogs are commonly recognized as a cause of gastrointestinal disorders with a high prevalence in developing countries (David ÉB, 2015). The veterinarian concern for these parasites is still a living matter due to their zoonotic potential. Among intestinal helminthes of dogs, *Toxocara canis* represents the major concern as it can cause severe infection in humans (Nijsse R, 2015). Other zoonotic helminthes like *Ancylostoma caninum* are primary causes of cutaneous, visceral, and ocular larva migrants and eosinophilic enteritis (McKenzie E, 2010). Environmental faecal contamination by infected dogs represents a source of infection for humans. In fact, parasitic elements, like eggs, larvae, cysts, and oocysts excreted via canine faecal route can survive over a long time and be infective in the environment at different condition. For that reason is necessary to make epidemiological studies to obtain data from dogs which can undoubtedly contribute to preventing direct zoonotic transmission from dogs to humans via the control of infectious animals (Lee AC, 2010). Most intestinal parasites do not show symptoms until the infestation has become severe. This is why preventative care and regular faecal exams are important to catch the infection in its early stages this is performed by collecting stool samples and check frequently for any parasites. Hookworms will attach to the wall of the stomach and puncture blood vessels to feed on the blood also they are transmitted to humans. Roundworms are the most common intestinal parasites in dogs almost all dogs will have an infestation of roundworms at some point in their lifetime and they can be also transmitted to humans also tapeworms can be transmitted to humans. Major aim of this survey was to determine the prevalence of intestinal parasites in shepherd dogs in Tetovo region, Macedonia from May to June 2017. Samples are taken from shepherd dogs of various ages and sex and parasite prevalence was calculated. Influence on prevalence of individual pet features (age, gender, size, and presence/absence of clinical signs) were also considered. Due to regional variations in parasite prevalence, such information is often of limited value outside the specific areas evaluated.

Material and methods

The survey was carried out in Tetovo region, located in the northwestern part of Macedonia. During May to June 2017 a total of 78 fresh faecal samples were collected from shepherd dogs. Data about age, sex, and presence/absence of clinical signs of animals were recorded. The group of tested animals consisted in 48 dogs ≤12 months and 30 dogs >12 months, from them 43 males and 35 females. A minimum of 2 g of faeces was collected from each animal, immediately placed into a plastic container, labelled and stored at 4°C until they were examined within 48 hours. Faeces (2 to 3 g) were mixed thoroughly with 15 mL zinc sulphate solution (ZnSO4, specific gravity 1.18) and transferred to a 15-mL conical tube. The faeces solution was centrifuged in maximal speed for 5 min. Additional ZnSO4 was added to bring the volume up to 15 mL to form a positive meniscus, onto which a cover slip was placed and left for 5 – 10 min. The cover slip was removed, placed on a glass slide and examined by light microscopy. The entire cover slip area was examined using a 10× and 40× objective.

Results and discussion

A total of 78 fecal samples were collected from dogs of Tetovo region of Macedonia. The dogs taken in study didn't show any visible clinical signs. After performing the flotation-centrifugation method in all feces resulted that 56 of them (71%) were positive. Precisely the parasite *A.caninum* was found in 41% of positive samples; *T.vulpis* in 39,2%; *T.canis* in 17,8% and the parasite *A. vasorum* was found in only 1 sample (1,7%).

Table 1. Parasites found, percentage and Confidence Interval of the samples

Variable	Infectedn (%)	95% CL
Ancylostoma caninum	23 (41%)	0,411
Trichuris vulpis	22 (39,2%)	0,293
Toxocara canis	10 (17,8%)	0,179
Angiostrongylus vasorum	1 (1,7%)	0,18
Total Examined (78)	56 (71%)	0,718

The Confidence Interval – Likelihood ratio was used to capture the magnitude of abnormality of test results. A likelihood ratio is defined as the probability of a given level of a test result in those with disease divided by the probability of that same result in those without the disease (Fletcher RH,1996). From the dog taken in survey 43 of them were male and 35 female. The results showed that the sex didn't play any significant role in parasite infection. The male dogs infected were 29 (51,7%) and the infected females 27 (48,2%).

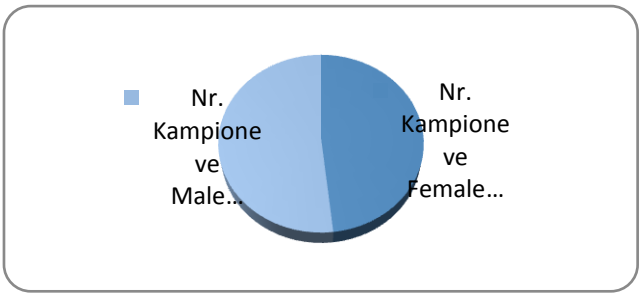


Figure 1 The infection differences between male and females dogs

Risk factors reported to be associated with endoparasitism in dogs include age, sex, reproductive status, median household income, breed size, population, and geographic location (Little SE, 2009). Considering the analysis of the results obtained in dogs, age was the strongest predictor of intestinal parasite infection, being younger than 12 months is a risk factor for infection. Our study showed that

from 48 dogs ≤12 months and 30 dogs >12 months the most infected dogs belonged to the first group, exactly 33 dogs were ≤12 months and 23 >12 months year old.

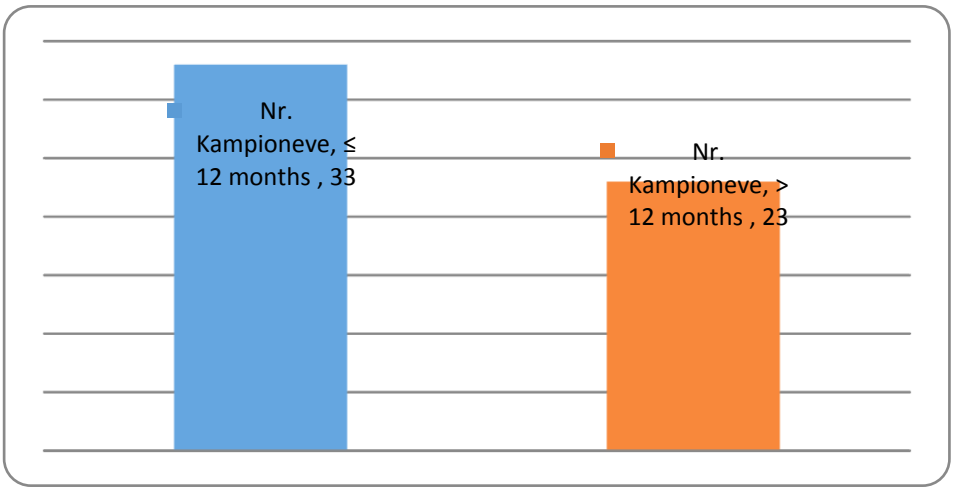


Figure 2. The infection differences between dog ages.

It is a known fact that dog domestication has played an active role for the spreading of different zoonotic parasites, especially in developing countries (Salb AL, 2008). The dogs taken in study live near people so they represent a risk for spreading zoonotic diseases. Among the recovered parasites species *A. caninum* which accounted the most frequent, in 41% of the infected dogs is considered with public health significance as important zoonose (C.N.L. Macpherson,2013). Other parasite diffusing zoonose of minor importance such as *T. vulpis* was found in 39,2% of positive samples. The concurrent infection with two or more parasite species was very common in some samples investigated during this study. The coinfection was seen between *A.caninum* and *T.vulpis* in 8 samples. Ascarid as *Toxocara spp*., was one of the most prevalent parasite. The presence of multiple infected pets brings the environmental contamination with infective stages of these taxa. With very interest was the finding of the metastrongyloid nematode *Angiostrongylus vasorum* in one the tested samples. This is a parasite of the heart and pulmonary circulation of dogs and foxes. Infection can cause a wide range of disease outcomes, which are most often characterized by respiratory dysfunction, but can also manifest as bleeding, neurological, cardiovascular or gastrointestinal disorders, with or without respiratory involvement (E. Morgan, 2010).

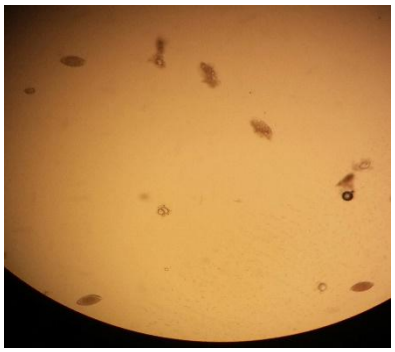


Figure. 3 Trichuris vulpis (40X)

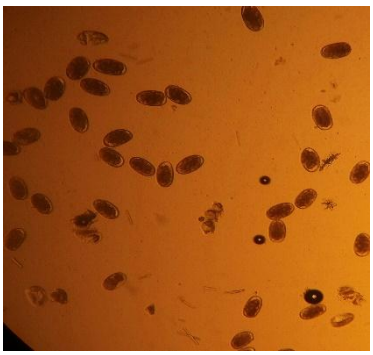


Figure 4. Ancylostoma caninum (40X)



Figure 5. Coinfection *Trichuris vulpis* and *Ancylostoma caninum (40X)*

In conclusion, this study showed a high overall prevalence of intestinal parasites, precisely 0,71% of the dogs resulted positive. The high percentage of infection is probably due the movements of the sheepherd dogs that are always on their walks and not regularly treatment with anthelmetic medication. Another risk factor for infection is the colonies of stray dogs that exist in this area that serve as source of infection. According the literature the cohabitation with other dogs is one of the most important risk factors associated to endoparasitism (S. Katagiri, 2008). The presence of important zoonotic endoparasites should raise the attention of taking preventive and therapeutic measures routinely all year round for the sheepherd dogs.

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