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## Dog parasites presence and public health concern, data from Western Macedonia

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### Abstract:

**Introduction:** Dogs are a reservoir for a very huge number of endo and ectoparasites. These parasites not only affect the dogs health and wellbeing but are important zoonotic agents.

**Aim:** To know the situation of the most common parasites present in Tetova region and the public health concern from them.

**Material and Methods:** During 2017 a total of 264 dogs are tested for the presence of endoparasites with the centrifugation-flotation technique and for the presence of ectoparasites by a complete examination of the skin.

**Results:** In our study we observed that the potential zoonotic genera of parasites found in dogs and their percentage were: *Ancylostoma caninum* (26,8%), *Trichuris vulpis* (17,1%), *Toxocara canis* (8,5%). The most common ectoparasites found were ticks *Rhipicephalus sanguineus* on 60 dogs (34,2%) followed by *Ixodes ricinus* in 23 dogs (13,1%). The endoparasite *Angiostrongylus vasorum* was found only in 1 case.

**Conclusion:** The present study determines the most common parasites found in dogs of Tetova region, Macedonia. While some dog parasites are highly host-specific, several dog parasites as *Ancylostoma caninum* or *Toxocara canis* are important from the veterinary and human perspective. This article presents the situation of some parasites of the region studied and some important information regarding public health concerns and a better management of some zoonotic parasites.

**Keywords:** dogs, ecto - endo parasites, zoonosis.

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### Introduction

The number of pets and stray dogs in Western Macedonia is increasing. There is a known fact that a number of infectious diseases can be transmitted to humans by the dogs and their infected feces or by ecto parasites. Osler was the first to report human diseases caused by helminths of dogs in 1877. [1]. There are reported cases that prove the role of dogs as a reservoir of parasitic infections, and the encouragement of the people in the control of the source of environmental pollution. [2]. A parasite is an organism that takes benefit from their host without giving something back and usually causing some damage to it. They are divided as endoparasites and ectoparasites according to their location in the host body. Ectoparasites may also be classified as permanent (e.g., lice and mites) or non-permanent (e.g., ticks and mosquitoes), depending on the relationship with their host [3]. Dogs are very close to humans as pets or in some parts of Balkans countries as free living in the cities areas. All dogs, also the ones who live in families may harbor many parasites; some of them are zoonotic agents that present a health risk for some categories of people [4]. For example *Ancylostoma spp*, and *Toxocara spp* are common parasites of dogs present in different countries and present also in the region under the study, this fact emphasizes the need for a One Health approach towards their management and control. In Tetova, Western Macedonia, dogs may serve as hosts for a large number of endo and ectoparasites. The impact of parasitic diseases is higher in developing countries such as the region in this study because the living conditions of the populations often favor the exposure to certain parasites; also in some regions the transmission may be associated with poor sanitary

conditions. It is very important to control ectoparasites in dogs because their presence may cause irritation, changes in blood formulae, skin lesions that potentially lead to the occurrence of secondary bacterial infections. Also some ectoparasites such as ticks may also transmit pathogens to dogs including bacteria, protozoa, and helminthes [5].

### Materials and methods

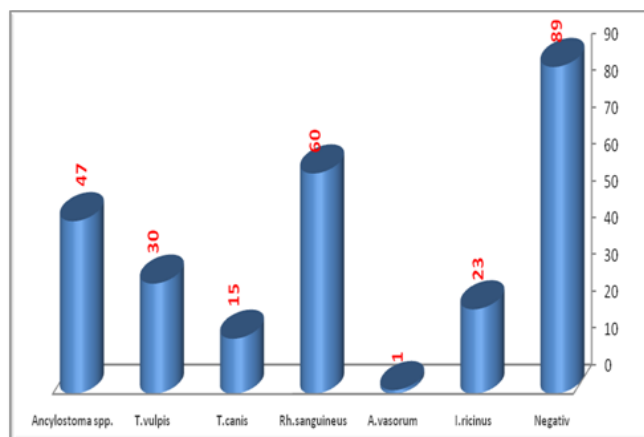
During 2017 are tested 264 dogs from Tetova region for the presence of different ecto and endoparasites. Faecal samples are tested with the centrifugation-flotation technique. A minimum of 2-6 g of faeces were collected from each animal. The faeces samples were mixed thoroughly with 15 mL pre-made zinc sulphate solution (ZnSO<sub>4</sub>, specific gravity 1.18) and transferred to a 15 mL conical tube. Additional ZnSO<sub>4</sub> was added to bring the volume up to 15 mL if required, and the solution was centrifuged for 5 minutes. Following centrifugation, ZnSO<sub>4</sub> was added to form a positive meniscus, onto which a cover slip was placed and left for 5 to 10 minutes. The entire cover slip area was examined using a 10× and 40× objective. The dogs were also examined for ectoparasites presence by a complete examination of the skin. The skins of all dogs were visually inspected thoroughly for the presence of ticks. All ticks were manually removed carefully to ensure that the mouthparts remained intact and collected together with any fleas and lice in the comb. The ticks removed from the animals were stored in 70% ethanol.

### Results

A total of 264 dogs from Tetova region, Western Macedonia are analyzed for the presence of ecto and endoparasites. The potential zoonotic genera of parasites found in dogs and their percentage were: *Ancylostoma caninum* (26,8%), *Trichuris vulpis* (17,1%), *Toxocara canis* (8,5%). The most common ectoparasites found were ticks *Rhipicephalus sanguineus* on 60 dogs (34,2%) followed by *Ixodes ricinus* in 23 dogs (13,1%). The endoparasite *Angiostrongylus vasorum* was found only in 1 case.

**Table 1.** Ecto and endoparasites found in the positive cases

Parasites found	No. of positive cases/175
<i>Ancylostoma spp.</i>	47
<i>Trichuris vulpis</i>	30
<i>Toxocara canis</i>	15
<i>Rhipicephalus sanguineus</i>	60
<i>Ixodes ricinus</i>	23



Among the recovered parasites species *A. caninum* and *T.vulpis* which are accounted most frequently are considered with public health significance as important zoonose agents. In some cases was observed the presence of two or more parasite species in one sample. The study reported that hookworms as *Ancylostoma spp.* were more prevalent in the summer-autumn period, ascarids - *T. canis* almost all the year, whereas whipworms - *T. vulpis* peaked in winter, spring and summer. According to ectoparasites ticks as *R. sanguineus* and *I.ricinus* were the most prevalent species present in infected dogs. Younger dogs >1 year appeared to be most susceptible to ectoparasites because of their weak immunity.

## Discussion

This study indicates a high presence of endoparasites in dogs of Tetova region. These parasites are a permanent source of endoparasites to pet animals and a major zoonotic hazard for humans, through the contamination of public areas. Puppies have a much higher incidence of toxocariasis than adult dogs, and many veterinary researches believe that almost all untreated young puppies carry this parasite. The suckling period is the most important time of disseminators of *Toxocara ova* [6],[7]. The primary mode of transmission of *T. canis* in dogs is that of in utero infection. [8]. Adult dogs, may also be infected by eating feaces containing *T. canis* eggs. Humans acquire the infection by ingesting feacally contaminated food or as is more common in children, by eating dirt or soil that has been contaminated by dog feaces. The major clinical features are persistent eosinophilia, fever, hepatomegaly and pulmonary lesions. Visceral larva migrans becomes especially troublesome when the larvae migrate to vital organs such as the eye or brain. [9],[10],[11]. Causal relations have also been reported between helminthic infections and central nervous system diseases. About the parasites presence in tested animals we can conclude that dog sex did not showed any significant differences. Summer and autumn was the period when the most infected dogs were found this is understandable knowing that this period offers the most appropriate temperature and humidity. As we mentioned before some dog ectoparasites are strictly associated to the dogs but some of them are zoonotic agents. There are known cases of human infction by dogs infected with ticks *R. sanguineus* [12], [13] or from endoparasites as *Toxocara spp.* and *Ancylostoma spp.* found commonly in the feaces analyzed in the studied region. Because of the presence of a significant number of the stray dogs in this area it is expected a contamination of public gardens soil.

Also the lack of information and preventive measures taken from some pet owners facilitates the spread of infection in the pet dogs. According the parasites control it is important to use different available tools from the veterinary practitioners. It is important to specify that is not only important their use but also their properly use. Against the common endoparasites of dogs found during in our study as *A. caninum* and *T. canis* is useful the routine administration of anthelmintics. Against ticks infection exist a huge list of products available as spot-on pipettes, collars, shampoos, and sprays [14].

## Conclusion

This work was conducted to determine the presence of different ecto and endoparasites on dogs of Tetova region, Western Macedonia. Dogs examined were found to be infested with ticks and different endoparasites of public health concern. The information may help in understanding the impact of dogs infections in public health. The parasites found are harmful for the animal but also represent potential hazard for humans that are in close contact with dogs. It is important to follow the programs for prevention and control of these parasites and accompanying diseases. Also it is fundamental to maintain dogs in good health and protected from zoonotic pathogens. The level of awareness of pet owners should be very high about the use of these antiparasitic products because to prevent is better than to cure. Pet owners should be informed about the risk of not using of the preventive measures as regular veterinary care and anthelmintic treatment.

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