Bulgarian Journal of Veterinary Medicine (2006), **9**, No 2, 141–147

STUDY ON THE PREVALENCE OF TRICHUROSIS IN DIFFERENT CATEGORIES OF DOGS AND WILD CARNIVORES

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Summary

Kirkova, Z., D. Georgieva & E. Raychev, 2006. Study on the prevalence of trichurosis in different categories of dogs and wild carnivores. *Bulg. J. Vet. Med.*, **9**, No 2, 141–147.

In the period between 2003 and 2005, the prevalence of trichurosis in various categories of dogs and wild carnivores was studied. To this end, 508 coprological samples from dogs aged from 6 months to 14 years from different populated areas in North-east, Central, and South Bulgaria were studied using the flotation method of Fuleborn. Partial helminthological autopsies of the large intestine were performed in 113 foxes and 56 jackals.

Trichuris vulpis infection was found in all studied categories of dogs. The highest extensity of infection was observed in hunting dogs (30%), followed by dogs used as guards of village yards (21.8%), dogs bred in kennels (9%), and home pets (6%).

In the studied wild carnivores, *T. vulpis* infestation was found in 30.7% of the jackals, and in 12.2% of the foxes.

The results showed that trichurosis is one of the commonest intestinal helminithoses in dogs and jackals.

Key words: dog, fox, jackal, *Trichuris vulpis*, trichurosis

INTRODUCTION

Trichuris vulpis Froelich, 1789 is a nematode from the Trichuridae family, which abides in the large intestine of dogs and wild canids (jackals, wolves, and foxes).

Previous studies in a number of European countries show that trichurosis is among the commonest intestinal helminithoses in dogs, affecting from 0.2% to 60% of the populations in different countries, depending on the category and age of the animals (Matov, 1958; Tassi & Widenhorn, 1977; Turner & Pegg, 1977; Haralabidis *et al.*, 1988; Vazquez Valdez *et al.*, 1989; Gothe & Reichler, 1990; Prunaux & Guignard, 1991; Vanparijs *et al.*, 1991; Epe *et al.*, 1993; Franc *et al.*, 1997; Overgaauw & Boersema, 1998; Georgieva *et al.*, 1999; Fok *et al.*, 2001; Barutzki & Schaper, 2003; Epe *et al.*, 2004; Le Nobel *et al.*, 2004).

Differences in the results are due to the fact that the studied dogs belonged to different categories and age groups.

The *T. vulpis* species was found in wild canids in Bulgaria (Georgieva & Kamenov, 1993), Great Britain (Richards *et al.*, 1995; Smith *et al.*, 2003), Italy (Poglayen *et al.*, 1985), Spain (Gortazar *et al.*, 1998; Segovia *et al.*, 2001), and France (Petavy *et al.*, 1990).

Even though trichurosis in humans is caused by *Trichuris trichiura*, so far, more

than 60 cases of *T. vulpis* infection in people between the ages of 4 and 80 have been described (Hall & Sonnenberg, 1956; De Carneri *et al.*, 1971; Kenney & Eveland, 1978; Kenney & Yermakov, 1980; Kagei *et al.*, 1986). In some people, a combined infection with *T. trichiura* and *T. vulpis* was found (Singh *et al.*, 1993). It has been reported that *T. vulpis* participates in the etiology of the Larva migrans syndrome in people (Sakano *et al.*, 1980; Coulter *et al.*, 1981; Masuda *et al.*, 1987).

Due to lack of sufficient information for our country, we aimed at determining the prevalence of trichurosis in dogs and wild canids, as well as their role in contaminating the environment and infection of humans.

MATERIALS AND METHODS

In the period of 2003–2005, coprological samples from a total of 508 dogs (319 male and 189 female) at ages varying from 6 months to 14 years, originating from various regions of the country, were studied through the flotation method of Fuleborn. The animals were bred in different conditions – as home pets in apartments, as guards or hunting dogs in village yards, and in breeding places. In the last month before the tests, the animals were not treated with any antiparasitic medications.

We determined the extensity of infection (EI), using the following equation:

$$EI = \frac{\text{Number of infected animals}}{\text{Total number of tested animals}}, \%$$

The intensity of infection in dogs was quantified by the number of eggs in a gramme of faeces, using the Mc Master method, while in foxes and jackals – by counting of the trichurids found in the large intestine.

Partial helminthological autopsies of large intestines and examination of rectal contents using the method of Fuleborn were carried out in 113 foxes and 56 jackals from the area of the Sredna Gora Mountain.

The presence of other intestinal helminthes and protozoa found during the coprological studies was also taken into consideration.

RESULTS

During the performed coproovoscopic study, we found that 48% of all dogs were infected with 1 or more of intestinal parasitic species. Of all tested dogs, 32% were infected with only one species, 13% with two, and 2.6% with 3 parasite species.

The extensity of *Ancylostomidae* infection, was the highest, followed by *T. vulpis* and *T. canis* (Table 1). Combined infection with *Ancylostomidae* and *T. vulpis* was found in 5.6% of the tested subjects, of *T. vulpis* and *T. canis* – in 1%, of *T. vulpis* and other parasites – in 2.1%, while single infection with *T. vulpis* was found in 5.6% of the dogs.

The percentage of infected dogs was the highest in hunting dogs – 30%, followed by village dogs – 21.8%. In dogs bred in breeding places and apartments, the percentages of infection were 9.4% and 6%, respectively (Table 2). Only three (4.2%) of *T. vulpis*-infected dogs were within the age range of 6 to 12 months. The youngest affected dog was 6 months old. In affected dogs, the intensity of infection varied from 100 to 5600 epg – being 1033 on the average.

We discovered *T. vulpis* infection in 113 foxes and 56 jackals. Partial helminthological autopsy of large intestine showed infection with *T. vulpis* in 12.2% of foxes and 30.7% of jackals (Table 3).

Table 1. Extensity of infection with intestinal helminths and protozoa in the tested dogs (n=508)

Species	EI (%)
Ancylostomidae	33.0
Trichuris vulpis	14.2
Toxocara canis	7.7
Isospora spp.	4.1
Toxascaris leonina	3.1
Capillaria spp.	2.0
Taenia spp.	0.8
Dipylidium caninum	0.8
Sarcocystis spp.	0.5

Table 2. Extensity of infection with *T. vulpis* in different categories of dogs

Category	Number of tested dogs	Number of infected dogs	EI (%)
Hunting dogs	40	12	30.0
Village dogs	151	33	21.8
Breeding kennels	234	22	9.4
Home pets	83	5	6.0
Total	508	72	14.2

Table 3. Extensity of infection with helminths and protozoa in foxes (n=113) and jackals (n=56)

Species	EI (%)	
	Foxes	Jackals
Ancylostomidae	55.1	84.6
Trichuris vulpis	12.2	30.7
Toxocara canis	21.4	7.7
Toxascaris leonina	6.1	5.8
Sarcocystis sp.	2.0	1.9
Isospora sp.	4.1	5.8
Taenia sp.	1.3	2.3
Dipylidium caninum	1.0	3.8

The intensity of infection in foxes exhibited an average value of 7.6 (1–27 specimens), while in jackals it was 12.8 (1–156 specimens).

DISCUSSION

Our results showed that the eggs of *T. vulpis* could be found in faecal samples of all categories of dogs. The average extensity of *T. vulpis* infection in Bulgaria was

Table 4. Extensity of infection with *Trichuris vulpis* in dogs throughout Europe

Country	Categories of dogs	EI (%)	References
Spain	Various	8.2	Vazquez Valdez *et al.*, 1989
France	Home pets	22.2	Prunaux & Guignard, 1991
	Home pets	28.0	Franc *et al.*, 1997
Italy	Home pets	10.0	Tassi & Widenhorn, 1977
Greece	Home pets	2.6	Haralabidis *et al.*, 1988
Germany	Breeding kennels	6.0	Gothe & Reichler, 1990
	Various	4.0	Barutzki & Schaper, 2003
	Various	0.2	Epe *et al.*, 2004
	Various	2.5	Epe *et al*., 1993
Netherlands	Breeding kennels		Overgaauw & Boersema, 1998
	– adults	29.0	
	– young	0	
	Breeding kennels	4.9	Le Nobel *et al.*, 2004
Belgium	Stray dogs	7.0	Vanparijs *et al.*, 1991
	Breeding kennels	25.0	Vanparijs *et al.*, 1991
Britain	Home pets	3.0	Turner & Pegg, 1977
Hungary	Stray dogs	20.4–23.3	Fok *et al.*, 2001
Bulgaria	Stray dogs (V. Tarnovo)	56.0	Matov, 1958
	Stray dogs (Sofia)	28.8	Matov, 1958
	Stray dogs	60.0	Georgieva *et al.*, 1999

among the highest in Europe (Table 4.)

The highest percentage of infection was observed in dogs categories with more frequent contacts with the outside environment. That is explainable with regard to the fact, that the subject of this study is a geohelminthosis.

The high resistance of *T. vulpis* eggs allows them to persist in the soil or the rooms where the dogs are kept. Home pets, through their walks outside can also come in contact with the eggs, which is proved by the discovery of infection in this specific dog category. A high extensity of *T. vulpis* infection (22.2%) was found in home pets in France (Prunaux & Guignard, 1991). According to the authors, the reason for that is the resistance of *T. vulpis* towards a large part of anthelminthic drugs.

Trichurosis is a problematic disease even for dogs in breeding kennels, where strict preventive antiparasitic treatments are performed, and cells are cleaned on a daily basis. In dogs bred in conditions of high sanitation, *T. vulpis* infection was found in 4.9% of the animals (Le Nobel *et al.*, 2004). In the Netherlands, a study on 286 adult and 159 young dogs from 32 kennels determined a *Trichuris* infection in 29% and 0% respectively of the test subjects (Overgaauw & Boersema, 1998). Due to the long prepatent period (3.5–4 months), *Trichuris* eggs are found primarily in the faeces of adult dogs. In a study in France, *T. vulpis* infection was found in

28% of the dogs, with 4.7% of them under the age of one year, and 23.3% were above that age (Franc *et al.*, 1997).

In Poland, eggs of *T. vulpis* were found in 6% of studied soil samples, with a higher number of positive tests from rural areas, in comparison with samples from urban sites (Mizgajska, 1997). During a research on the levels of contamination with zooparasites of sand pits in kindergartens in the town of Stara Zagora, Georgieva *et al.* (2005) discovered *T. vulpis* eggs in 16.7% of the tested samples of sand. Those results showed that a risk for *T. vulpis* infection exists, especially for children, due to lack of proper hygienic habits.

We share the position of Kirkpatrik (1988), that the actual extensity of the infection in dogs is probably higher than those determined in coproovoscopy tests, due to the presence of prepatent infections or intermittent laying of eggs.

The discovery of a *T. vulpis* infection in wild carnivores showed that they are also part from the epizootological chain of this particular nematodosis. Because of their free movement, wild animals are a significant source of *T. vulpis* eggs contamination of the environment. That is a probable cause for the higher extensity of the infestation in sporting dogs, in comparison with the other categories. While studying the helminthic fauna of wild canids in Bulgaria, within the Sredna Gora Mountain region, a *T. vulpis* infection in 6 (13.9%) of the studied 43 foxes and in 6 (18.8%) of the studied 32 wolves was discovered (Georgieva & Kamenov, 1993). Infection with *T. vulpis* in Italy was found in 2.9% of the foxes (Poglayen *et al.*, 1985), in France - in 8% (Petavy *et al.*, 1990), in Britain - in 0.5% (Richards *et al.*, 1995), and in Spain - in 38.8% (Criado-Fornelio *et al.*, 2000). The fox population in the region of Sredna Gora Mountain is stable, while that of jackals has significantly increased over the last 20 years (Raychev, 2002). The observed expansion of jackals underlines their greater role in contaminating the environment with *T. vulpis* eggs.

Infections with *T. vulpis* in people are resulting of continuous contacts with infected dogs (Kenney & Yermakov, 1980; Kagei *et al.*, 1986; Singh *et al.*, 1993). Therefore, together with the sharp increase in the number of dogs and their presence in human home, as guards, hunting dogs, and pets, the risk of infecting people with *T. vulpis* significantly increases as well.

CONCLUSION

In dogs above the age of six months, trichurosis is among the commonest helminthoses. From the studied categories of dogs, the extensity of infection was the highest in hunting dogs. A high extensity of infection was also found in dogs bred in very good sanitary conditions – as home pets, or in special breeding kennels. The attempts to control the spread of the helminthosis could be impeded by the high level of infestation among wild canids. Infected dogs and wild canids are a source of environmental contamination with eggs of *T. vulpis,* that is a potential health hazard.

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* Author's translation

Paper received 19.10.2005; accepted for publication 20.04.2006

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