

Prevalence of *Toxocara canis*, *Toxascaris leonina* and *Dirofilaria immitis* in dogs in Chuncheon, Korea (2004)

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Abstract: The intestines and hearts of dogs were examined for *Toxocara canis*, *Toxascaris leonina*, and *Dirofilaria immitis*, after necropsy between June 26 and September 29, 2004 in Chuncheon, Korea. Of the 662 dogs examined, 6 were infected with *T. canis* (0.9%), 86 with *T. leonina* (13.0%). Fifty dogs were infected with *D. immitis* among 500 dogs examined (10.0%). Five were co-infected with *T. canis* and *T. leonina*, and three were co-infected with *T. leonina* and *D. immitis*. The cumulative positive infection rate for three species was 134/662(20.2%). Considering previously reported seropositive rates of *T. canis* excretory-secretory antigen, i.e., 5% in the adult population in Korea, the possibility of toxocariasis caused by *T. leonina* should be reevaluated.

Key words: toxocariasis, *Toxocara canis*, *Toxascaris leonina*, *Dirofilaria immitis*, prevalence, dogs, Korea

We undertook the survey to determine the prevalences of *Toxocara canis*, *Toxascaris leonina*, and *Dirofilaria immitis* in dogs, since dogs act as natural hosts of these parasites. From June 26, 2004 to September 29, 2004, the intestines and hearts of 662 dogs were examined by naked eye after sacrifice in an abattoir in Chuncheon, Korea. The collected *Toxocara* spp. worms and *Toxascaris leonina* were identified in the laboratory after observing cephalic alae and egg morphology under a microscope (Fig. 1). Cephalic alae allowed *T. canis* and *T. leonina* to be differentiated from *Toxocara cati*.

T. canis was identified in 6 dogs (0.9%), and *T. leonina* in 86 dogs (13.0%). Cardiac ventricles and atria of dogs were observed in 500 of the 662 dogs. *D. immitis*

was found in 50 dogs (10.0%), 5 dogs (0.7%) were co-infected with *T. canis* and *T. leonina*, and 3 dogs were co-infected with *T. leonina* and *D. immitis*; no other intestinal helminthes were found. The cumulative positive rate was 20.2% (134/662).

A Korean survey of 245 feces of dog from 1992 to 1995 showed that the infection rates of *T. canis* and *T. leonina* were 8.2% and 2.0% respectively (Youn et al., 1995). In a report issued more than 20 years ago from July 10 to August 1, 1977 in Eunjungbu City, Kyunggi-Do, 102 dogs were examined, and 72 were found to be infected with helminthes at autopsy: *Dipylidium caninum* (47%), *Ancylostoma caninum* (26%), *T. leonina* (16%), *T. canis* (13%), *Taenia pisiformis* (9%), *Echinostoma hortense* (4%), *E. cinetorchis* (2%) and *Spirometra mansoni* (2%) (Cho et al., 1981). And, a study conducted from July 1980 to August 1981 in 16 cities on dog stools using the formalin-ether concentration method, reported the following infection frequencies; *T. canis* 14.4%, *Trichuris vulpis* 9.5%, *A. caninum* 8.0%, *T. leoni-*

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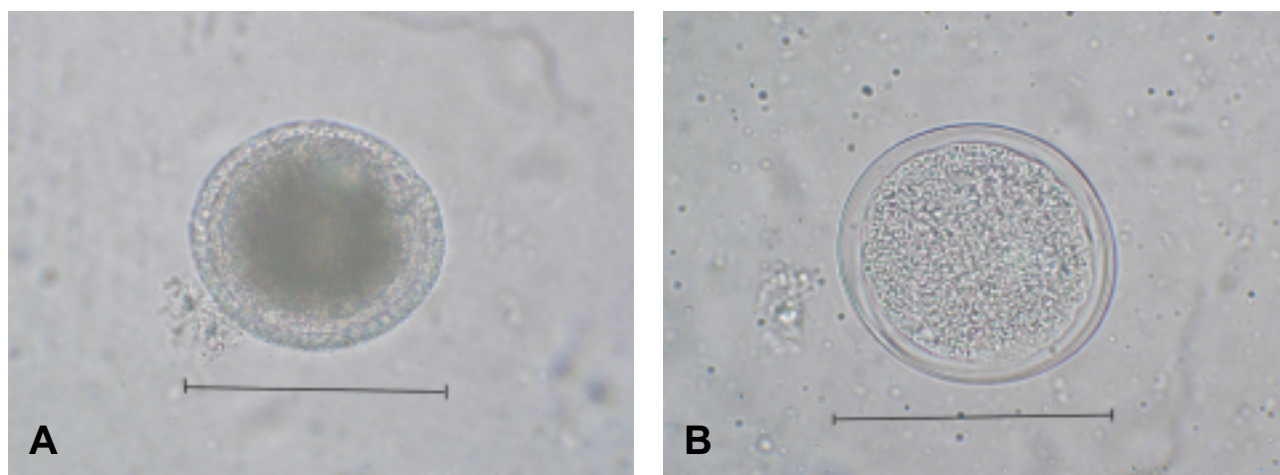


Fig. 1. Eggs of *Toxocara canis* and *Toxascaris leonina*. A. *T. canis*, bar = 80 μ m. B. *T. leonina*, bar = 87.5 μ m. The two species can be differentiated by egg shell morphology: egg shell of *T. canis* is granular and that of *T. leonina* is lamellated.

na 4.0%, *Clonorchis sinensis* 2.4%, *Metagonimus yokogawai* 1.3%, *Paragonimus westermani* 0.8% and *Spirometra* sp. 0.9% (Min, 1981). These results demonstrate that the prevalence of *T. canis* infection in dogs has reduced, but that *T. leonina* infection has persisted. The absence of other helminthes such as intestinal trematodes and cestodes may be due to the fact that most of the dogs sacrificed were reared on artificial feed. *Toxocara* spp. can be transmitted through an egg-contaminated environment and *D. immitis* can be transmitted by mosquitoes. However, other trematodes or cestodes are transmitted via contaminated feed. Seropositivity to *T. canis* excretory-secretory antigen was reported to be as high as 5% in apparently healthy residents in Gangwon-do (Park et al., 2002), and clinical reports have been issued on toxocarasis in the eye, lung, and brain (Park et al., 2000; Kim et al., 2002b, 2003). The causative role of *T. leonina* as an agent of visceral larva migrans has been suggested by previous reports of larva migrans by *T. leonina* to lungs in 96% of 168 infected mice (Prokopic and Figalova, 1982), and cross reactions between *T. canis* excretory-secretory antigen and sera of rabbits infected with *T. leonina* (Smith, 1982). Therefore, the possibility of toxocarasis caused by *T. leonina* should be considered and reevaluated in Korea, although it is very difficult to detect the larvae of *Toxocara* spp. in a lesion.

Recent data on the prevalence of dirofilariasis in Korean dogs showed an infection rate of 10.2% (13/127) among 127 dogs by the microfilarial test, but 28.3% (36/127) by the antigen test from October 1994 to August 1995 (Lee et al., 1996). Also, 339 (40.0%) of 848 dog serum samples taken during 2001 and 2002 produced a positive reaction for *D. immitis* antigen (Song et al., 2003). Recent human dirofilariasis have been reported. For example, a 39-year-old man without any evidence of systemic symptoms was found incidentally to have a hepatic nodule during a routine physical check-up (Kim et al., 2002a). Also, a 47 year-old man, who complained of chest pain for 1 month in 1998, was diagnosed as pulmonary dirofilariasis (Lee et al., 2002). Even though human dirofilariasis is rare, it should be ruled out during the differential diagnosis of a nodule in organs. Moreover, dogs should be screened and treated for *T. canis*, *T. leonina* and *D. immitis* infections.

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