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Short communication

Echinococcus multilocularis and *Toxocara canis* in urban red foxes (*Vulpes vulpes*) in Brussels, Belgium

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Abstract

During the last decades, European red foxes (*Vulpes vulpes*) have been implicated in the transmission of several viral or parasitic pathogenic agents to domestic animals and humans. In urban areas, risks of zoonoses transmission are likely to increase as a result of a higher rate of intra- and inter-species contacts. Foxes occur on 35% of the Brussels-Capital Region area and local densities reach up to 4 family groups per square kilometre. According to the directive 2003/99/ECC, a first survey for the presence in foxes of *Echinococcus multilocularis* and *Toxocara canis* was conducted in Brussels from 2001 to 2004. None of 160 foxes were found to be infected with *E. multilocularis* and 24 of 134 foxes were found to be infected with *T. canis*. Considering numbers of examined foxes, the sensitivity and the specificity of tests used for diagnosis, the 95% credibility intervals for the true prevalence of *E. multilocularis* and *T. canis* were estimated in a Bayesian

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framework to be 0 to 1.87% (median value of 0%) and 12.7 to 26% (median value of 18.7%), respectively. For *T. canis*, a significantly higher risk to be a carrier occurs in cubs and a significantly lower risk in adults.

Keywords: Red fox; Urban; Zoonosis; *Echinococcus multilocularis*; *Toxocara canis*; Bayesian approach

1. Introduction

An increasing number of studies showed that the red fox *Vulpes vulpes* (Linnaeus, 1758) has entered and colonised several large cities in continental Europe, North America and Australia (Artois, 1989; Gloor et al., 2001). The fox colonisation of Brussels goes back to the 1980s (Brochier, 1990). A recent study has shown that foxes occurred in 35% of the Brussels-Capital Region (BCR) area and that densities ranged in function of the habitat from 0.6 up to 4 fox family groups per square kilometre (De Blander et al., 2006).

During last decades, red foxes have been implicated in the transmission of viral or parasitic pathogenic agents of public health concern and veterinary significance. In some countries of continental Europe, the red fox acts as reservoir of rabies virus, *Echinococcus multilocularis* and *Toxocara canis* in humans, respectively, responsible for rabies, human alveolar echinococcosis (AE) and toxocariasis *larva migrans*. In urban and suburban areas, risks of zoonoses transmission are likely to increase as a result of a higher rate of intra- and inter-species contacts (close contact between dense populations of foxes, pets and humans).

A successful program of fox vaccination resulted in the complete elimination of rabies from Belgium (Brochier et al., 2001). With regards to the current epidemiological situation in Western Europe and the fact that Brussels is situated north of Meuse-Sambre valley, where rabies has never been detected since active surveillance began in 1966, the risk of rabies spread in Brussels is presently not considered.

In Europe, the life-cycle of *E. multilocularis* (*Cestoda*, *Taeniidae*) is predominantly sylvatic, i.e. involving wild carnivores (mainly foxes of the genera *Vulpes* and *Alopex*) as final hosts and several species of rodents, mainly water vole (*Arvicola terrestris*), common vole (*Microtus arvalis*) and muskrat (*Ondatra zibethicus*) as prey/intermediate hosts (Eckert et al., 2001a).

Larval stages of *E. multilocularis* are responsible for AE, a rare but very severe liver condition in humans (Eckert and Deplazes, 1999). Recent studies have shown that *E. multilocularis* has a wider geographical range than was previously thought. At present, the known distribution of the parasite in Europe includes regions in 14 countries (Eckert and Deplazes, 2004; Deplazes et al., 2004; Hanosset et al., 2004). The prevalence of infection in foxes shows a wide variability between countries and in endemic areas, ranging from below 1 to more than 60% (Eckert and Deplazes, 1999).

In Belgium, the carriage of *E. multilocularis* by foxes was reported for the first time in 1991 (Brochier et al., 1992). Since then, further surveys conducted in foxes from rural areas of the whole country reported a high prevalence (33%) on the south-eastern high plateau of Ardennes and revealed a decreasing north–west gradient in prevalence (Losson et al., 1997,