

Ectoparasitic species from red foxes (*Vulpes vulpes*) in East Slovakia

Alica Kočišová*, Peter Lazar, Valéria Letková, Ján Čurlík,
and Mária Goldová

Department of Infectious and Parasitic Diseases, University of Veterinary Medicine, Košice, Slovak Republic

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ABSTRACT

The study was carried out from November 2002 to April 2005, with 78 red foxes (*Vulpes vulpes*) in East Slovakia. A total of 2506 ectoparasites were found corresponding to two species of fleas (*Chaetopsylla globiceps*, *Ctenocephalides canis*), ticks (*Dermacentor reticulatus*, *Ixodes ricinus*) and mites (*Sarcoptes scabiei*, *Otodectes cynotis*). The overall prevalence of flea infestation was high (72%) with the dominance of the *Chaetopsylla globiceps* (95.4%). The number of fleas per animal was moderate to high (38 and 25% respectively). *Felicola vulpis* was not found in the present study. The prevalence of mite and tick infestation was moderate (27 and 22% respectively), 19 red foxes were infected with *Sarcoptes scabiei* (the prevalence 24.4%) and 14 individuals were infected with *Dermacentor reticulatus* (the prevalence 17.9%). *Otodectes cynotis* was determined at two animals (2.6%) and the prevalence of *Ixodes ricinus* was 3.8%.

Key words: red fox, mite, tick, flea, prevalence

Introduction

Foxes are known to carry many species of ectoparasites such as fleas, mite and ticks, the majority of which are potentially transmissible to humans, pets and livestock. These parasitoses, generally associated with dermatitis, affect animals to different degrees depending on their nutrition, immunological condition and parasite intensity, and in extreme cases can lead to death. On the other hand, ectoparasites that affect foxes can also act as vectors of pathogenic agents. In contrast with internal parasites of red foxes (*Vulpes vulpes*), limited data are available on the prevalence of ectoparasites in red fox populations in Slovakia.

The most significant ectoparasitic infection carried by foxes is sarcoptic mange. This

* Contact address:

Dr. Alica Kočišová, Department of Infectious and Parasitic Diseases, University of Veterinary Medicine, Komenského 73, 041 81 Košice, Slovak Republic, Phone: + 421 55 6332213; E-mail: kocisova@uvm.sk

is caused by the mite *Sarcoptes scabiei* that burrow under the skin of the host, causing intense discomfort, scratching and gnawing of infected areas resulting in extensive hair loss and skin lesions. Many foxes can lose up to 50% of their body weight. Tissue fluids exuding from lesions congeal and form a crust, often up to 1 cm thick and can contain many millions of mites. Sarcoptic mange mite infections are endemic and highly prevalent in red foxes in Europe and may reduce the abundance of foxes by over 70% (FORCHHAMMER and ASFERG, 2000). Sarcoptic mange found in red foxes accounts for substantial mortality in late winter and early spring, when they die in about 3 to 4 months. Therefore mange in red foxes is considered one of the limiting factors furthering the decline its population density (GOLDOVÁ et al., 2003). Ear canker mite (*Otodectes cynotis*) can be responsible for serious clinical signs in foxes on fur-farms, although the significance is not fully known in free living red fox populations (MEHLHORN et al., 1993). Red foxes can be infected with many tick and flea species (JESSUP, 1979; PATRICK and HARRISON, 1995).

The present study was conducted in order to determine and compare the prevalence and intensity of mite, tick and flea infestation of red foxes in East Slovakia.

Materials and methods

The carcasses of 78 foxes were collected from East Slovakian sites around Košice, Vranov, Prešov, and Rozhanovce and in the neighbouring countries between November 2002 and April 2005. Most of them had been killed in traffic accidents, or shot on farms. The fresh carcasses were collected in plastic bags, stored in a hand icebox and carried to the laboratory within 3 h. According our practice (GOLDOVÁ et al., 2003) such transport does not affect the results in connection to species and numeric representation of ectoparasites. The whole body surface of each fox was examined by gross examination and skin scraping method (GOLDOVÁ et al., 2003) for the presence of ectoparasites. They were collected in separate glass tubes containing 70% ethanol and fleas were washed and stored in 10% KOH solution for 24 hours before identification. The identification keys of ROSICKÝ (1957) and DANIEL and ČERNÝ (1971) were used for species identification.

Results

Six taxa of ectoparasites were identified from 78 red foxes in East Slovakia. The flea *Chaetopsilla globiceps* was the most common ectoparasite on red foxes, found on 67.9% of foxes (Table 1). A total of 1836 *Chaetopsilla globiceps* was collected, with a mean of 35 fleas per fox. Another flea species, *Ctenocephalides canis*, was found on 12 foxes, with a mean of 7 fleas collected per individual (Table 1).

Two tick species, *Dermacentor reticulatus* and *Ixodes ricinus* were collected from

red foxes, with a total of 39 ticks and prevalence of 17.9 and 3.8% respectively (Table 1).

Sarcoptic mange was observed in 24.4% of the foxes, with total number 506 mites. Ear canker mites *Otodectes cynotis* were collected from only two foxes (2.6%), with 18 mites per animal (Table 1).

Table 1. Ectoparasite prevalence and mean intensity of red foxes in East Slovakia

Ectoparasites	Prevalence (%)	Abundance		
		Total	Mean	Range
Fleas				
<i>Chaetopsilla globiceps</i>	67.9	1836	35	3-183
<i>Ctenocephalides canis</i>	15.4	89	12	2-17
Mites				
<i>Sarcoptes scabiei</i>	24.4	506	27	3-72
<i>Otodectes cynotis</i>	2.6	36	18	17-19
Ticks				
<i>Dermacentor reticulatus</i>	17.9	35	2,5	1-7
<i>Ixodes ricinus</i>	3.8	4	1,3	1-2

Discussion

The present study shows that ectoparasites are very common in red fox populations in Slovakia, because all the foxes had at least one ectoparasite. According to our study, fleas were the most abundant ectoparasites, followed by mites and ticks. *Chaetopsilla globiceps* is a typical fox flea that is widespread in Europe. Our results are comparable with the majority of European data (SCHUSTER et al., 2001; SRÉTER et al., 2003; DOMINGUEZ, 2004).

Sarcoptic mange was observed in 24.4% of the foxes. Our findings correspond with the prevalence of sarcoptic mange described by SCHOFFEL et al. (1991) and by MORNER (1992). In skin scraping numerous mites were found of all developmental stages of *Sarcoptes scabiei*.

Ticks recorded on foxes are common parasites of a wide range of free-living animals in Slovakia. In comparison with results obtained in Hungary (SRÉTER et al., 2003) the prevalence of *Ixodes ricinus* was lower (3.8%), but on the other hand the prevalence of *Dermacentor reticulatus* was higher (17.9%).

Ticks and fleas may not influence the overall condition of the red fox population in Slovakia directly and significantly. Nevertheless, the highly prevalent but generally low-intensity, three-host tick infestations may play a role in the transmission of several pathogens among foxes. In contrast with the above ectoparasites, sarcoptic mange should be considered as the most important parasitoses of red foxes in Slovakia (GOLDOVÁ et al., 2003). The appearance of foxes in the synantropic environment and the high prevalence of mange, flea and tick infestation of these animals may result in the increasing incidence of accidental flea, tick and pseudo scabies infestation of man, pets and domestic animals and may increase the transmission rate of some vector-borne diseases.

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SAŽETAK

Istraživanje je provedeno u razdoblju od studenoga 2002. do ožujka 2005. godine na 78 lisica (*Vulpes vulpes*) sa područja istočne Slovačke. Ukupno je pronađeno 2506 vanjskih nametnika, od čega prema vrstama, dvije vrste buha (*Chaetopsylla globiceps*, *Ctenocephalides canis*), dvije vrste krpelja (*Dermacentor reticulatus*, *Ixodes ricinus*) i dvije vrste šugaraca (*Sarcoptes scabiei*, *Otodectes cynotis*). Prosječna prevalencija invazije buhama je bila izrazito visoka (72%), s pretežitim udjelom vrste *Chaetopsylla globiceps* (95,4%). Broj buha po životinji kretao se od umjerenog do visokog (38 i 25%). *Felicola vulpis* nije dokazana u predmetnom istraživanju. Učestalost šugaraca i krpelja bila je umjerena (27 i 22%), pri čemu je na 19 lisica zabilježena invazija šugarcima vrste *Sarcoptes scabiei* (24,4%), a na 14 lisica su dokazani krpelji vrste *Dermacentor reticulatus* (17,9%). Šugarci vrste *Otodectes cynotis* su dokazani u dvije životinje (2,6%), dočim je učestalost invazije krpeljima vrste *Ixodes ricinus* iznosila 3,8%.

Ključne riječi: crvena lisica, šugarci, krpelji, buhe, učestalost
