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The fox next door:

Urban foxes and the potential risk of alveolar echinococcosis in Timişoara:

A narrative review from a One Health perspective

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ABSTRACT

The fox has moved in next door. Across Europe, red foxes have left farmland for towns and residential neighbourhoods, and the fox tapeworm *Echinococcus multilocularis* has travelled with them. A harmless-looking intestinal worm of the fox, it is nevertheless one of the most serious zoonotic parasites of the temperate zone, and the disease it causes in humans is among the most feared. Romania lies within the medium-prevalence band for fox infection, so the question for Timișoara is no longer whether the parasite can be present, but where the human-fox interface comes closest to people's homes.

Infection does not require meeting the animal. Eggs shed in fox faeces reach people through soil, vegetable gardens and unwashed produce, and the domestic dog remains the shortest bridge between wildlife and the household. Distance matters: foxes readily use residential gardens, particularly where residents provide food, so exposure happens at the kitchen door rather than in a forest. Clinically, the disease gives few warnings-abdominal pain is the most frequent revealing symptom, often with asthenia, weight loss or jaundice, whereas a large share of patients have no symptoms at all and are diagnosed incidentally.Its slow progression and often asymptomatic early phase mean that diagnosis may occur years after exposure, highlighting the importance of awareness among healthcare professionals across different specialties, as well as veterinarians.

From a One Health perspective, the interface between urban wildlife, domestic animals and human populations warrants consideration when assessing exposure to *Echinococcus multilocularis*. In Timișoara, areas adjacent to the Bega corridor, railway embankments and residential gardens may merit targeted investigation, although local parasite circulation remains unconfirmed. Integrated monitoring could combine coproantigen detection and PCR analysis of fox faeces with environmental sampling and molecular testing. Prevention rests on hand hygiene, thorough washing of garden produce, and veterinary-guided praziquantel treatment of at-risk dogs and cats. Emphasis should fall on such practical measures and on public awareness to keep household exposure low, alongside proportionate veterinary and environmental surveillance.

Keywords: *Echinococcus multilocularis*; urban foxes; alveolar echinococcosis; environmental contamination; hygiene; prevention; One Health; Timișoara



Figure 4. *Illustrative spatial representation of publicly documented red fox (Vulpes vulpes) records in Timişoara municipality and its Functional Urban Area, Romania (1 January 2015- 30 September 2026). Urban (F) and peri-urban (P) records correspond to the records listed in Table 1. Locations indicate the approximate neighbourhoods or localities reported by the sources, rather than exact observation coordinates. F09 is not mapped because its location was unspecified. The records were derived from publicly accessible reports and were not independently verified in the field. The figure does not indicate denning sites, permanent occupancy or fox abundance*

CONCLUSIONS

Echinococcus multilocularis has been documented in Romanian red foxes, but its current circulation in Timișoara remains unknown. Publicly reported fox occurrences highlight the urban–peri-urban–human–wildlife interface without establishing parasite infection or human

INTRODUCTION

Red foxes (*Vulpes vulpes*) are definitive hosts of *Echinococcus multilocularis*, the causative agent of human alveolar echinococcosis. This severe zoonotic disease primarily affects the liver, progresses slowly and may remain asymptomatic for years.Clinical manifestations may include abdominal pain, weight loss, hepatomegaly and jaundice. Although the parasite has been detected in Romanian foxes, its circulation in urban foxes in Timișoara remains unknown, highlighting the importance of local surveillance from a One Health perspective.

MATERIALS AND METHODS

This narrative review synthesised previously published Romanian and European studies on *Echinococcus multilocularis*, including parasitological surveys of red foxes, alongside investigations targeting other fox parasites, surveillance reports and relevant veterinary legislation. Separately, publicly available reports of fox occurrences in Timișoara and its Functional Urban Area (2015–2026) were examined. Duplicate reports of the same event were consolidated, and available location information was used to develop an illustrative map. No animals were examined as part of this review.

RESULTS AND DISCUSSIONS

A previous Romanian parasitological survey detected *Echinococcus multilocularis* in red foxes, but none of the 19 foxes examined in Timiș County tested positive. A separate investigation of 550 foxes targeted lung nematodes rather than *E. multilocularis*. Therefore, the current infection status of urban foxes in Timișoara remains unknown.

Fourteen distinct fox-related events were documented in publicly available media reports from Timișoara and its Functional Urban Area (11 urban and three peri-urban). These reports highlight fox occurrences in inhabited areas, while the illustrative map neither identifies permanent fox habitats nor demonstrates infection.Their relevance lies in the potential for human exposure if local parasite circulation is confirmed, supporting the need for targeted parasitological surveillance.

The proposed One Health framework combines veterinary surveillance, environmental management and human health education. Preventive measures discussed in the review include avoiding fox feeding, appropriate waste management, fencing vegetable gardens, washing garden produce, hand hygiene after gardening or animal contact, and parasite control in companion animals.

