



## Epidemiological investigations on *Trichinella* infections in farmed fur animals of Estonia

I. Miller<sup>a</sup>, T. Järvis<sup>a,\*</sup>, E. Pozio<sup>b</sup>

<sup>a</sup> Institute of Veterinary Medicine and Animal Sciences, Estonian University of Life Sciences, Tartu, Estonia

<sup>b</sup> Department of Infectious, Parasitic and Immunomediated Diseases, Istituto Superiore di Sanita, Rome, Italy

Received 29 June 2005; received in revised form 21 February 2006; accepted 27 February 2006

### Abstract

Farming of fur animals represents an important income in Estonia. Even though *Trichinella* worms does not induce a symptomatic disease in carnivores, the carcasses of skinned animals can increase the biomass of the parasite in the environment, if they are not properly destroyed. The aim of the present survey was to study the prevalence of *Trichinella* worms in farmed fur animals of Estonia. Of 281 muscle samples from blue foxes (*Alopex lagopus*), silver foxes (*Vulpes vulpes fulva*), minks (*Mustela vison*) and raccoon dogs (*Nyctereutes procyonoides*), which were collected in eight farms, *Trichinella* larvae have been detected in 21 animals (8%) from two farms by HCl-pepsin digestion. The highest number of larvae per gram of muscle was found in the front limb muscles. Larvae of the 21 isolates have been identified as *Trichinella britovi* or *Trichinella nativa* by a multiplex-PCR analysis.

© 2006 Elsevier B.V. All rights reserved.

**Keywords:** Fur animals; Blue fox; Silver fox; Mink; Raccoon dog; Prevalence; *Trichinella britovi*; *Trichinella nativa*

### 1. Introduction

The first fur animal farm was established in Estonia in 1924, when silver foxes (*Vulpes vulpes fulva*) were imported from Norway. The climate favoured the increase of farmed animals and, consequently, the number of farms increased. Blue fox (*Alopex lagopus*) and mink (*Mustela vison*) farms were established in late 1930. In 1938, more than 3000 fur animals were reared. In the Soviet period, the number of farmed fur

animals increased rapidly. The first objective of fur animal farmers was to increase the fertility rate and the fur production; whereas, less attention was paid to the quality of the fur. In the newly independent Estonia, the transition from a planned economy to a free-market economy initially depressed the development of fur animal farming. However, in the last years, the fur animal breeding was again on the path of progress. In 2003, the number of reproductive animals in fur animal farms reached 32,368 (4192 silver foxes, 8316 blue foxes and 19,860 minks) (Saveli, 2004).

Infections due to *Trichinella* worms are widespread in wild animals of Estonia, both in mainland and in the

\* Corresponding author. Tel.: +372 7313210; fax: +372 7313230.  
E-mail address: [parasit@eau.ee](mailto:parasit@eau.ee) (T. Järvis).

islands of Saaremaa and Hiiumaa, where wild carnivores harboured *Trichinella britovi* and *Trichinella nativa* (Pozio et al., 1995; Miller et al., 1998; Jarvis et al., 2001; Miller and Jarvis, 2004). Since the farming of fur animals represents an important income for the Estonia economy, the improvement of breeding condition to reach a high quality of the furs, is imperative. Consequently, it is important to investigate on the infectious diseases, which can be transmitted within farms. Even though *Trichinella* infection does not induce a symptomatic disease in carnivores, the carcasses of skinned animals can increase the biomass of the parasite in the environment, if they are not properly destroyed, representing a risk for domestic animals and for humans.

The objective of the present study was to investigate the prevalence of *Trichinella* worms in farmed fur animals of Estonia.

## 2. Material and methods

In winter the period of skinning, muscle samples were collected from fur animal carcasses of eight farms (seven on the mainland and one on the island of Hiiumaa) and from fur animals ( $n = 6$ ), which died for other causes in the same farms (Table 1). A total of 281 fur animals (157 adults of 1–4 years of age and 124 juveniles of 6 months old) were investigated for *Trichinella* larvae: 103 blue foxes (49 adults and 54 juveniles), 128 silver foxes (86 adults and 42 juveniles), 35 minks (22 adults and 13 juveniles), and 15 juvenile raccoon dogs (*Nyctereutes procyonoides*). Additionally, 18 brown rats (*Rattus norvegicus*) caught in the feed preparation unit and adjacent rooms of the farm on the Hiiumaa island were also investigated for *Trichinella* larvae. Samples (5–10 g) were collected from the diaphragm, masseters, temporal muscles and from the upper part of the front limbs of carnivores. Pooled samples of the limb muscles were taken from rats. Furthermore, 190 samples of imported feed-briquettes (consisted of raw pork leavings) used to feed farmed carnivores, were also investigated to identify the possible source of infection. Muscle samples and pork scraps were digested in a water solution containing 1% HCl and 1% pepsin by a Stomacher apparatus at 40 °C, at the Institute of Veterinary Medicine and Animal Sciences

of the Estonian Agricultural University. The number of *Trichinella* larvae per gram of muscle tissue (LPG) was determined. The prevalence was calculated by 95% confidence intervals (95% CI) according to standard method (Gupta and Gupta, 2004). From 5 up to 20 larvae of *Trichinella*, according to the number of recovered larvae, were identified at the species level by a multiplex-polymerase chain reaction (PCR) analysis, according to a previous published protocol (Pozio and La Rosa, 2003).

## 3. Results

*Trichinella* larvae were detected in fur animals from two of the eight investigated farms. One farm was located on the island of Hiiumaa and the second one on the mainland. Of 281 examined fur animals, 21 (8%), all breeders, were positive for *Trichinella* larvae (Table 1). The average number of LPG in the muscles of front limbs was 8.6 (range 0.1–19), in the masseter 6.0 (range 4–8), in temporal muscle 3.8 (range 3–7) and in the diaphragm 3.6 (range 2–6). In blue foxes the muscles of front limbs were most heavily infected (9.6 LPG), followed by the masseter muscle (6.1 LPG). The prevalence of infection in breeder blue foxes was 31%, in minks 23% and in silver foxes 1% (Table 1). The average LPG in blue foxes was 5.2, 4.8 in minks and 2 in silver foxes (range 0.1–19.0) (Table 1). Two adult brown rats (11%) were also infected with 33 and 90 LPG (Table 1). No *Trichinella* larva was found in the feed-briquettes for fur animals. *T. britovi* larvae were identified in blue foxes and brown rats from the farm on the Hiiumaa island; whereas, *T. nativa* larvae were identified in blue foxes and in one silver fox from the mainland farm. The pathological findings in the six blue foxes found dead in the farm and harbouring *Trichinella* larvae, were pneumonia, hepatodystrophy, toxicosis, abortion and rupture of the uterus.

## 4. Discussion

*Trichinella* worms are common parasites in wildlife of Estonia with an overall prevalence up to 20.3% (Pozio et al., 1995; Miller and Jarvis, 2004; Jarvis and Miller, 2004). The highest prevalence up to 79% was detected in wolves (*Canis lupus*); whereas, the rate of

Download English Version:

<https://daneshyari.com/en/article/2472485>

Download Persian Version:

<https://daneshyari.com/article/2472485>

[Daneshyari.com](https://daneshyari.com)