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INVESTIGATION OF *TRICHINELLA* IN WILDLIFE IN LATGALE REGION (LATVIA)

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Trichinellosis remains an important problem in Latvia. The objective of this study was to provide an overview of the current situation and trends for trichinellosis in Latgale region. During the period from July 2010 to June 2012 several animal species were examined for *Trichinella* detection. Muscle samples of 311 wild animals and birds were obtained: 218 wild boars (*Sus scrofa*), 12 red foxes (*Vulpes vulpes)*, 5 raccoon dogs (*Nyctereutes procyonoides*), 7 Eurasian lynxes (*Lynx lynx*), 13 Pine martens (*Martes martes*), 4 polecats (*Mustela putorius*), 8 wolfs (*Canis lupus*), 5 house mice (*Mus musculus*), 4 brown rats (*Rattus norvegicus*), 4 common moles (*Talpa europaea*), 12 Eurasian beavers (*Castor fiber*), 5 American minks (*Neovison vison*), 2 common buzzards (*Buteo buteo*), 1 ondatra (*Ondatra zibethicus*), 3 northern goshawks (*Accipiter gentilis*), 3 European hedgehogs (*Erinaceus europaeus*), 2 hooded crows (*Corvus cornix*), 1 rough-legged buzzard (*Buteo lagopus*), 1 house sparrow (*Passer domesticus*), 1 rock pigeon (*Columba livia*). Larvae of *Trichinella* were determined in 2 raccoon dogs, 7 red foxes, 6 martens, 3 lynxes, 6 wolfs,

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INTRODUCTION

Trichinella is widespread zoonotic agent with worldwide distribution exception of Antarctica. Three classes of vertebrates are known to act as *Trichinella* hosts - more than 150 mammalian species, birds and reptiles (Pozio 2005, 2007).

Latvia is one of countries where a high prevalence of *Trichinella* infection in wildlife designed for the market (Pozio & Rossi 2008).

According to epidemiological data were recorded 150 cases of human trichinellosis during 1986-1998 and in 2000; which was occurring by the consumption of undercooked pork (72%) or wild boar meat (23%). In 5% cases the sourse of infection was unknow or there were infected different wild animal meat (Viksna et al. 2002). Whereas, during 2002-2011 number of human trichinellosis has increased dramatically to 216 (LIC data).

During routine examination in Latvia the survey of *Trichinella* infection of wild boars dates from end of 1960s. Comprehensive investigation of

Trichinella infection in wildlife using the red fox (*Vulpes vulpes*) as marker species carried out in 2000 - 2001 during the FAO project "Improved Meat Production in the Baltic Region through Epidemiology-based Control of Trichinellosis – A Parasitic Zoonoses" (project number TCP/RER/0065(A)).

Some studies related to different species of wild animals – lynx (Bagrade et al. 2003), wolves (Bagrade et al. 2009). There are also reports involving data concerning *Trichinella* among different species of wild animals (Keidans et al. 2002, Malakauskas et al. 2007). But despite this data on the spread of trichinellosis in wildlife in Latgale Region are poor.

Latgale Region borders with Russian Federation in the east, Republic of Belarus in southeast, and Republic of Lithuania in the south. Territory of the Region is 14 547 square kilometres, which is 22,52% of territory of Latvia. Latgale Region is characterised by great diversity of woods, which make it different from other regions of Latvia. It has a typical continental climate, more severe winters with thicker snow cover.

Considering the role of many animal species in the dissemination of trichinellosis research of wide range of potential hosts is relevant.

The aim of the present study was to investigate the *Trichinella* larvae among wild animals from Latgale region.

MATERIALS AND METHODS

Sample collection

According to the current administrative division, Latgale Region incorporates 19 counties, sample collection carried out from 13 of them. During the period from July 2010 to June 2012 muscle samples of 311 wild animals and birds were obtained for *Trichinella* detection: 218 wild boars (*Sus scrofa*), 12 red foxes (*Vulpes vulpes*), 5 raccoon dogs (*Nyctereutes procyonoides*), 7 Eurasian lynxes (*Lynx lynx*), 13 Pine martens (*Martes martes*), 4 polecats (*Mustela putorius*), 8 wolfs (*Canis lupus*), 5 house mice (*Mus musculus*), 4 brown rats (*Rattus norvegicus*), 4 common moles (*Talpa europaea*), 12 Eurasian beavers (*Castor fiber*), 5 American minks (*Neovison vison*), 2 common buzzards (*Buteo buteo*), 1 ondatra (*Ondatra zibethicus*), 3 northern goshawks (*Accipiter gentilis*), 3 European hedgehogs (*Erinaceus europaeus*), 2 hooded crows (*Corvus cornix*), 1 rough-legged buzzard (*Buteo lagopus*), 1 house sparrow (*Passer domesticus*), 1 rock pigeon (*Columba livia*). Age and sex of animals were unknown. Musculature samples were taken by hunters from the shot or trapped animals during the hunting seasons; carcasses detected on the field or killed in an accident (hit by a car). Wild boar samples were obtained from the pillars of diaphragm and from lower right forelimbs of other animals. All collected samples origin is from Latgale region.


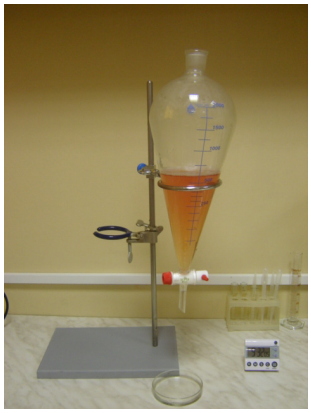


Fig.1., 2. and 3. *Trichinella* determination.

***Trichinella* detection method**

Muscle samples (25 g) were tested from each animal for the presence of *Trichinella* larvae by using magnetic stirrer artificial digestion employing the magnetic stirrer according Regulation (EC) 2075/2005.

All satisfied larvae were counted from positive samples individually and determined infection intensity - larvae per gram (l.p.g.).

Larvae collected and stored in 96° alcohols for future *Trichinella* species level identification by using molecular methods.

RESULTS AND DISCUSSION

Totally *Trichinella* spp. larvae were detected in six wild animals species: in red fox, marten, lynx, wolf, raccoon dog and wild boar. All infected animals originate from five counties – Dagda, Daugavpils, Ilukste, Preili, Rezekne.

Results of investigation show that trichinellosis was most prevalent among wild animals in Dagda county (16,2%) and found in 1 fox, 1 Pine marten, 1 lynx, 2 wolves and 1 raccoon dog. The biggest samples quantity (n=213) were collected and tested from Daugavpils county with prevalence of infection 7,5%. Larvae of *Trichinella* were detected in five animal species - 4 red foxes, 5 martens, 3 lynx, 2 wild boar and 2 wolves.

Nematode larvae was detected in 1 rough-legged buzzard (*Buteo lagopus*) from Rezeknes county and sent for *Trichinella* species identification to the Community Reference Laboratory for Parasites (Instituto Superiore di Sanita`) in Rome, Italy. The result of testing indicates not

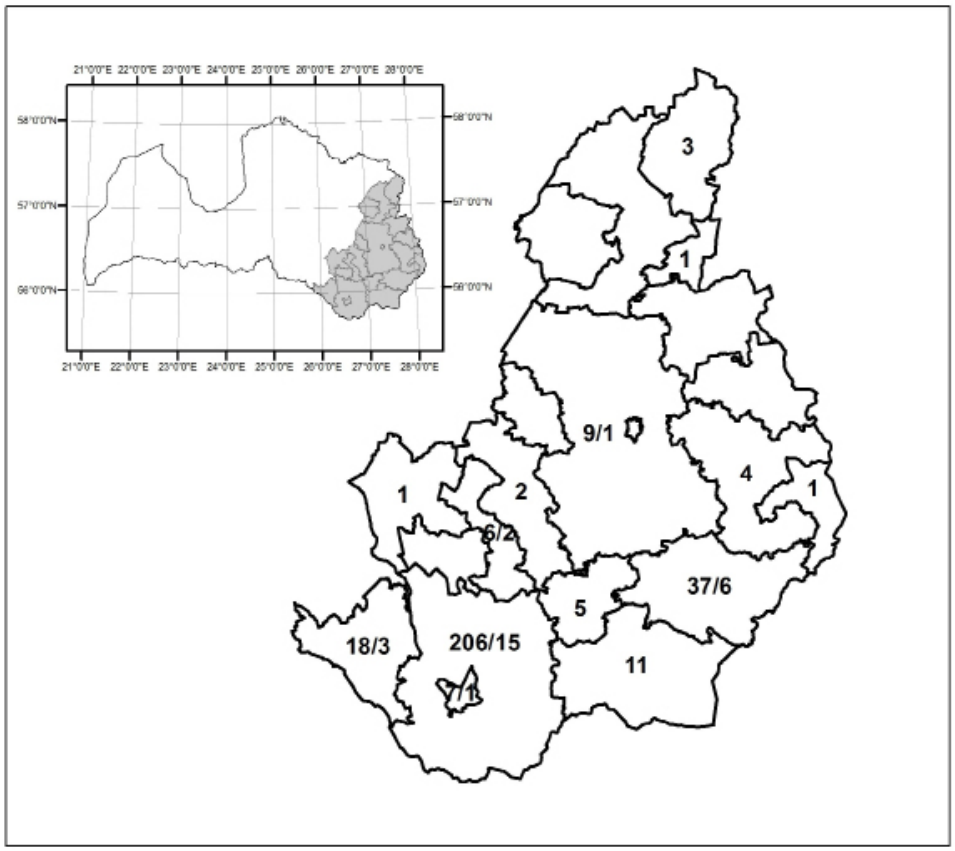

Fig.4. Samples collection places.

Trichinella larvae, but it are larva migrants which need future investigation.

Red foxes

7 out of 12 exanimated red foxes were infected by *Trichinella* spp. Four animals were hunted in Daugavpils county and one at a time from Dagda, Rezekne, Preili counties. Invasion intensity varied from 0,76 to 13,98 l.p.g. Highest intensity were in animals from Daugavpils and Rezekne counties (12.93 and 13,98 l.p.g. respectively), with mean intensity - 5,26 l.p.g.

Previous investigation revealed 28,9% prevalence of *Trichinella* among Latvian red foxes (Keidans et al. 2002, Malakauskas et al. 2007). Trichinellosis was registered in all regions of country, with varied prevalence from 16,4% and 60,0% (Keidāns et al. 2005). In neighboring country equally higher rate - Lithuania 40,0% (Malakauskas et al. 2007), but earlier study showed 33,3% of infected foxes (Senutaitë & Grikienienë 2001).

Martens

In 6 out of 13 tested Pine martens has been found trichinellosis causative agent. Five animals were from Daugavpils county and one from Dagda county. Intensity of infection within the same county was diverse and varied from 0,8 to 31,2 l.p.g. Infection intensity was 6,04 l.p.g. in animal from Dagda county, with mean intensity - 7,1 l.p.g.

Previous studies results demonstrate invasion prevalence 28,6% in Latvia (Keidans et al. 2002), slightly higher in in Lithuania - 40% (Malakauskas et al. 2007). Investigation carried out during 1987-2000 in Lithuania revealed higher prevalence among martens - 62,5% (Senutaitë & Grikienienë 2001).

Lynxes

Totally 7 lynxes were investigated and 3 of them were *Trichinella* infected. All animals were obtained in Daugavpils county. Infection intensity varied between 1,08 and 14,76 l.p.g., with mean intensity - 4,55 l.p.g.

The previous research suggests that almost half of the investigated lynx (46.4%) were infected with *Trichinella* sp., but there were no samples from Latgale (Bagrade et al. 2003). Investigation of lynxes from Lithuania indicate up to 61,5% of infected animals (Kazlauskas & Matuzevičius 1981).

Wolves

Eight wolves from 4 counties were tested for Trichinella spp. detection. Totally six animals were infected in Daugavpils, Ilukste, Dagda, and Preili counties. The highest intensity was in wolf from the Ilukste county in the amount of 41,79 l.p.g. The animal`s infection intensity didn`t exceed one l.p.g. from other counties. The mean intensity was 7,73 l.p.g. The previous investigation demonstrate prevalence 69,7% (Bagrade et al. 2009). Prevalence of invasion (14,3%) show one out of seven examined wolves was infected in Lithuania (Senutaitë & Grikienienë 2001).

Raccoon dogs

Two out of 5 tested raccoon dogs were infected by *Trichinella* with intensity 15,12 and 119,3 l.p.g. from Ilukste and Dagda counties, with mean intensity - 67,2 l.p.g. The previous study indicate 35,3% trihinellosis prevalence in Latvia (Keidans et al. 2002), about the same in Lithuania - 32,5% (Malakauskas et al. 2007).

Wild boars

Only in two wild boars from Daugavpils and Ilukste counties out of 218 investigated were detected *Trichinella* larvae. The prevalence amounted 0,92% with mean intensity 3,19 l.p.g. It was lower than in previous data concerning wild boar trichinellosis in Latvia 1,3% (Keidans et al. 2002). The same situation was in Lithuania - 0,51% of infected animals (Malakauskas et al. 2007).

Trichinella spp. is very frequent in foxes, martens, lynxes, wolves, also raccoon dogs, therefore the great importance of these animals as hosts in the parasite's sylvatic cycle is undeniable in Latgale region.

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