

# OVERVIEW OF *ALARIA ALATA* DISTRIBUTION IN DIFFERENT HOST ANIMALS IN LATVIA

## PĀRSKATS PAR *ALARIA ALATA* SASTOPAMĪBU LATVIJĀ DAŽĀDOS SAIMNIEKOS

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### ABSTRACT

The digenean trematode *Alaria alata*, an intestinal parasite of wild canids is widely distributed in Europe. The recent finding of the mesocercarial life cycle stage in the paratenic wild boar host suggests that it may potentially infect humans. Overall 291 foxes, 194 raccoon dogs and 1305 wild boars were examined during 3-year period. The prevalence of *A. alata* ranged from 19% in wild boars to 80% and 87% in foxes and raccoon dogs. This study shows that *A. alata* is prevalent in wild carnivores in Latvia which may be a potential source of environmental contamination.

**KEY WORDS:** *Alaria alata*, hosts, prevalence, Latvia.

### INTRODUCTION

Recent incidental background findings of *Alaria alata* mesocercariae in meat of wild boars during official *Trichinella* inspection initiated a reassessment of the potential human health risk as posed by this parasite.

*Alaria alata*, a small fluke (0.5 - 1.5 mm) usually found in the small intestine of various carnivores in the western hemisphere. The life cycle of this parasite includes freshwater snails (e.g. *Helisoma* and *Planorbis* spp.) as first intermediate hosts. Cercariae emerge from the snails, penetrate tadpoles, and develop into mesocercariae (Möhl et al., 2009). A wide range of paratenic hosts can acquire infection by ingesting tadpoles or other infected paratenic hosts. Dogs, cats, foxes, mink, and other carnivores become infected by feeding on these animals. The young flukes migrate through various organs of the definitive host, including the diaphragm and lungs, before reaching the small intestine (Möhl et al., 2009). Although the flukes are generally considered to be non-pathogenic for the definitive host, large numbers may cause pulmonary haemorrhages during migration or enteritis when they mature in the small intestine. The recent finding of the paratenic hosts suggests that it may potentially infect humans (Möhl et al., 2009).

The aim of the present study was to establish the distribution of the adult helminth prevalence in sylvatic population and mesocercariae within their paratenic hosts of animals with respect to their introduction into the human food chain.

## MATERIAL AND METHODS

In 2010 and 2011 overall 291 red foxes and 194 raccoon dog samples were analyzed during Rabies eradication program. A helminthological analysis described by Skryabin (1928) was used for definitive hosts as red foxes and raccoon dogs, including investigation into the gastrointestinal tract, liver, gall bladder, lungs, trachea, spleen, kidneys, and urinary bladder. All helminths were collected, washed, preserved in 70% alcohol, and different helminth species were morphologically identified and counted.

In period from 2009 to 2011, 1305 retained samples of fresh meat from wild boars originating from different hunting areas in Latvia, which were tested for *A. alata* during the official *Trichinella* inspection in the Institute of Food Safety, Animal Health and Environment "BIOR". Findings of *A. alata* in wild boars have been documented in the past, and laboratory experts have a thorough knowledge of the parasite's morphologic features. In accordance with the requirements in Annex I of the Commission Regulation (2005) 50 g meat sample material consists of muscular tissue taken either from the pillar of the diaphragm or the tongue or a mix of these tissues. All meat samples were stored at +2°C until analyzes.

## RESULTS AND DISCUSSION

As stated above, *A. alata* is reported to be the species of European carnivores. In recent study we found 80.8% prevalence in red fox and 87.1% prevalence in raccoon dogs which is notably higher than in other countries of Europe. Also in previous study done in Latvian wolfs shows the *A. alata* prevalence 90.0% (Bagrađe et al., 2009). Mehlhorn (2008) estimated that about 30% of the wild Canids in Europe are carriers of *A. alata*. Variability of prevalence data is high, ranging, for example, in the red fox from 0.1% to 88.0% (Möhl et al., 2009). *Alaria alata* is the most frequently described trematode of the raccoon dog with prevalence data ranging from less than 10.0% to nearly 70.0% (Schuster et al., 1993). The number of parasites that were found per individual animal varied strongly and ranged from one to 1,533 adult helminths (Borgsteede, 1984; Castro et al., 2008; Moks et al. 2006; Shimalov et al. 2003; Wolfe et al., 2001). However, in present study intensity level was notably higher in red foxes and raccoon dogs, from one to 1,312 and from one to 7,499, respectively. Although only the definitive host of the parasite excretes its contagious eggs, transition of mesocercariae between paratenic hosts is quite common (Möhl et al., 2009). High infestation rates can therefore be found particularly in omnivores such as wild boars, which live in areas with high *A. alata* prevalence in the definitive hosts. This is because these animals, besides the obligatory second intermediate hosts, also feed on paratenic hosts such as rodents, reptiles, and amphibians (Dönges, 1969). Generally, a significant prevalence of *A. alata* mesocercariae in wild animal populations can be expected in water rich areas in which the suitable host species (snails, amphibians, and definitive hosts) are present. Wojcik et al. (2001) demonstrated the dependency between the occurrence of suitable snail and amphibian hosts and the prevalence of *A. alata* mesocercariae in wild boars. The studies were conducted between 1999 and 2001 in two hunting regions. Larval alariosis was only revealed in the boars from one of the studied regions. In this region, the results of the parasitological studies revealed definitive (domestic dogs) and intermediate hosts (snails, *Planorbis planorbis* and *Anisus vortex* as well as frogs: *Rana temporaria* and *Rana terrestris*) to be carriers of *A. alata* (Wojcik et al., 2001). There is still lack of alariosis studies in paratenic hosts as rodents, snails and amphibians in Latvia.

The *A. alata* prevalence in present study was 19.4% in wild boars. Observed intensity level reached one to 26 mesocercariae per sample. Our observed prevalence also in wild boars was

notably higher than in Germany, 11.5% (Reihn et al., 2012). However, intensity level ranged from two to 120 mesocercariae per meat sample of 100 g (Reihn et al., 2012). Also in study from Austria prevalence in wild boars was observed 6.7% with the mean intensity 4.5 mesocercariae per 35 g (Paulsen et al., 2012). Jakšić et al. (2002) demonstrated that 1.8% of 210 wild boar samples from Croatia were positive for *A. alata* mesocercariae. Positive carcasses were judged unfit for human consumption (Jakšić et al., 2002). Große and Wüste (2006) routine *Trichinella* inspection in certain areas of Germany (Brandenburg), indicating a potential health risk to consumers (Möhl et al., 2009). In 2007, *A. alata* mesocercaria was demonstrated in 0.24% of all *Trichinella* samples in Brandenburg. However, as samples were then pooled, the correct prevalence could not be exactly stated (Große, Wüste, 2006).

This study has shown that the prevalence of *A. alata* in wild carnivores in Latvia is comparable to other countries in continental Europe. It appears to have a restricted distribution, which should aid regulatory public health bodies in targeting measures preventing the transmission, in wild boar meat, of the parasite to humans.

## CONCLUSIONS

1. The prevalence of *A. alata* in wild carnivores in Latvia is notably higher than in other countries in Europe.
2. The prevalence and intensity of *A. alata* in wild boars is high and constant in Latvia.
3. There is necessity for further *A. alata* studies in different hosts in Latvia to understand the connection with definitive host, intermediate host and paratenic host infection levels.

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