

Original papers

Microfilariae *Onchocerca alcis* Bain et Rehbinder, 1986 – a new parasite of moose *Alces alces* (L.) in Poland

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ABSTRACT. *Onchocerca alcis* Bain et Rehbinder, 1986 belongs to the subfamily Onchocercinae. Mature nematodes of *O. alcis* are located on the surface of hindlimb tendons. The aim of this article was to describe the occurrence of microfilariae of *O. alcis* in the skin of moose from Kampinos Forest. This is the first report of *O. alcis* in moose from Poland and the third finding of this rare species in the world.

Key words: *Onchocerca alcis*, microfilariae, moose, *Alces alces*, Kampinos Forest

Introduction

The filariae belong to the widespread, but still poorly-examined, group of cervid parasites, which is represented in Poland by the subfamily Onchocercinae. Their intermediate hosts are arthropods, particularly the bloodsucking insects of the Simuliidae and Ceratopogonidae. Upon infecting wild ruminants, adult nematodes release numerous first-stage larvae called microfilariae, which migrate passively with the blood stream or actively penetrate through tissues to reach the capillaries of the skin. Circulating microfilariae are taken up with a blood meal by the arthropod host, whereupon they penetrate through the gut of the insect to muscles and organs, where they molt twice. Invasive third stage larvae migrate to the head and gather in the mouthparts. During the next feeding, the insects transmit invasive larvae into the skin of the host. The larvae then migrate to suitable tissue, and develop to maturity [1,2]. The life cycle of these nematodes proceeds in isolation from the external environment, inside the organism of the host. Although the occurrence of nematodes from the Onchocercinae subfamily of red deer and roe deer in Poland has been investigated [3], no such information is available about *Onchocerca* infection in moose.

Materials and Methods

In November 2017, a necropsy was performed of a three-year-old female moose, killed in a car accident in Kampinos Forest District, Kampinos National Park. During the necropsy 1 cm² of a skin sample from the inguinal area of the moose body was collected. After removing the hair, the skin sample was cut into small slices, 1–2 mm wide, and placed in a Petri dish, filled with physiological fluid. The skin slices were incubated in 22°C for 24 hours, after which the skin slices were removed and the remaining sediment and fluid examined under a stereoscopic microscope (magnification 40×). Microphotographs and measurements of microfilariae were performed using an OLYMPUS 50 BX microscope and the Cell D program. The microfilariae were classified to species level based on morphometric features.

Results

A few microfilariae from the family Onchocercinae were found in the skin sample. The microfilariae were thin, with transverse striation of the cuticle (Fig. 1). The anterior end of the larvae was rounded and narrowed slightly (Fig. 2), whereas the posterior end was pointed (Fig. 3). After fixation in 70% alcohol, the larvae assumed a

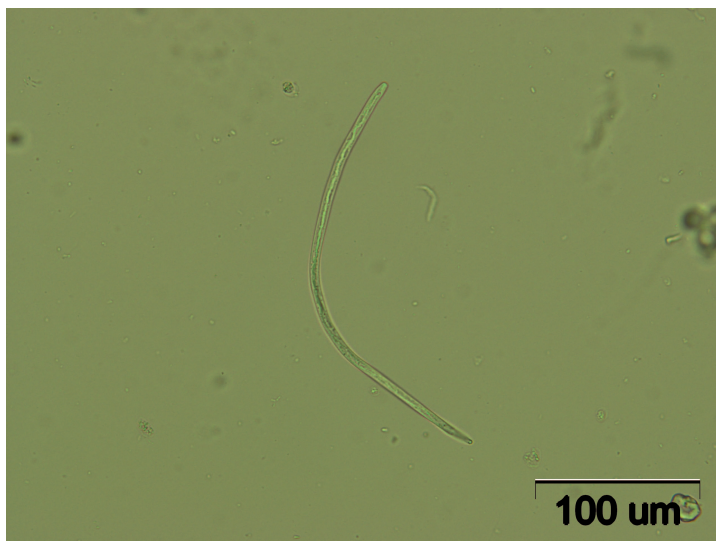


Fig. 1. Microfilaria of *Onchocerca alcis*



Fig. 2. Anterior end of microfilaria of *O. alcis*



Fig. 3. Posterior end of microfilaria of *O. alcis*

crescent shape and the posterior end was bent to the abdominal side. The microfilariae were 0.272–0.286 mm long and 0.06–0.07 mm wide. Morphometrical features allowed to the microfilariae to be classified to the species *Onchocerca alcis*.

Discussion

Infection with nematodes from the genus *Onchocerca* was first observed in moose in Sweden in 1984. However, the exact species of the parasite was not recognized. Although serious gross lesions, including inflammatory granulomas, were observed in 98% of adult moose aged over 1.5 years, no such lesions were found in calves. The lesions were mainly located in tendineous tissues. Predilection sites were the insertions of *musculus sartorius* and *m. semitendinosus* at the tibia. The location of the nematode in the host and its morphology were similar to those of *Onchocerca tarsicola*, known also as *O. skrjabini*: a typical parasite of red deer. As the nematodes were very common in moose and seemed to be well adapted to these animals, the authors assume it to be a species of *Onchocerca* specific to moose [4]. It was described in 1986 as a new species of moose parasite, *Onchocerca alcis*, with larval forms called microfilariae [5]. Bain et al. [6] suggest that nematodes found by Gubanov in moose in East Syberia in 1964 and mistakenly described as *Acanthospiculum cervipedis* (Wehr et Dikmans, 1935) were in fact identical with *O. alcis*.

Six species of filariae from the subfamily Onchocercinae have been found in cervids in Poland so far, including *Onchocerca flexuosa*, *O. jakutensis*, *O. garmsi*, *O. skrjabini* and *Cutifilaria wenki* infecting red deer and *Dipetalonema rugosicauda* in roe deer. These nematodes localise in the cutaneous tissue of different parts of the body, and their larvae, microfilariae, in the capillaries of the skin [7–10]. Nematodes from the subfamily Onchocercinae are parasites of high veterinary and economic importance. In ruminants, being their typical definitive hosts, *Onchocerca* nematodes are the cause of local inflammatory processes manifesting in infiltration, oedema and hyperemia of blood vessels, as well as foci of necrosis. When migrating in the capillaries of the skin, microfilariae damage the connective tissue, causing small foci of necrosis, followed by perforation of the skin and reduction of its economical value. Microfilariae are considered to be

pathogenic also for nonspecific hosts, including humans [3]. Therefore, further studies are required to identify mature nematodes of *O. alcis* in moose and to determine the prevalence of *Onchocerca* infection in moose in Poland.

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