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Short note

First report of *Angiostrongylus vasorum* (Nematoda: Angiostrogylidae) in raccoon dog *Nyctereutes procyonoides* in Poland

Adam WÓJCICKI[1], Jerzy KOWAL[2], Marta BASIAGA[2]

[1]Department of Mountain Forests, Forest Research Institute, ul. Ujastek 7, 31-752 Kraków, Poland
[2]Faculty of Animal Science, University of Agriculture in Kraków, Al. Mickiewicza 24/28, 30-059 Kraków, Poland

Corresponding Author: Jerzy Kowal; email: jerzy.kowal@urk.edu.pl

ABSTRACT. The raccoon dog *Nyctereutes procyonoides* is a canid species native to East Asia, and a non-native in Europe, where it was introduced more than six decades ago. It is known to be a vector of numerous diseases and parasites. This paper reports the first in Poland, and second in Eurasia detection of parasitic nematode *Angiostrongylus vasorum* in a raccoon dog. Moreover, this represents the westernmost case of detection of parasite in this canid. The recent increase in the number and range of raccoon dogs in Europe and the relatively high number of zoonotic parasite taxa they harbour suggests that this species should be considered as an significant source of environmental contamination with zoonotic agents in Europe.

Keywords: alien species, canids, Europe, nematodes, parasites

Introduction

The raccoon dog *Nyctereutes procyonoides* is native to south-eastern Russia, the eastern provinces of China, northern Vietnam and Japan [1]. It was introduced to Europe from the Far East of the Soviet Union between 1929 and 1958 [2], and developed into an invasive alien species [1]. Due to its high reproductive potential, adaptability, omnivorous diet, ability to hibernate in northern areas, multiple introductions (> 9000 individuals from different areas) and migratory tendencies (allowing gene flow between populations), it is considered one of the most successful invasive alien predators [3]. It is also an important vector of many zoonoses and parasites [4–7].

To date, 25 species of Trematoda, 10 species of Cestoda and 19 species of Nematoda have been found in raccoon dogs within their native range in the Russian Far East (formerly the Soviet Union) and in introduced population in Europe [8]. *Angiostrongylus vasorum* was identified in only three of 240 raccoon dogs exanimated in Estonia between 2010 and 2012 [8], making it the only recorded case of this nematode species in raccoon dogs across Eurasia.

Angiostrongylus vasorum, commonly known as "French heartworm", is a metastrongylid nematode of dogs and other canids. The adults colonize the heart and pulmonary arteries, which can lead to serious consequences for the host. Symptoms of infection vary widely, ranging from a subclinical condition (with little or no signs) to a fatal outcome [9]. The disease is associated with coughing, dyspnea, exercise intolerance, weight loss, vomiting, abdominal and lumbar pain, neurological signs, heart failure, bleeding tendencies and sudden death [10,11]. Canids become infected through ingestion of intermediate hosts such as snails, slugs, and amphibians [8]. The highest levels of parasite infection are expected in the fall, when larvae are more abundant and develop in the intermediate hosts [12]. Young age and a history of worming are other factors that can increase the risk of infection for canids [13].

Materials and Methods

A female raccoon dog, *Nyctereutes procyonoides* was found in December 2024 on a public road in

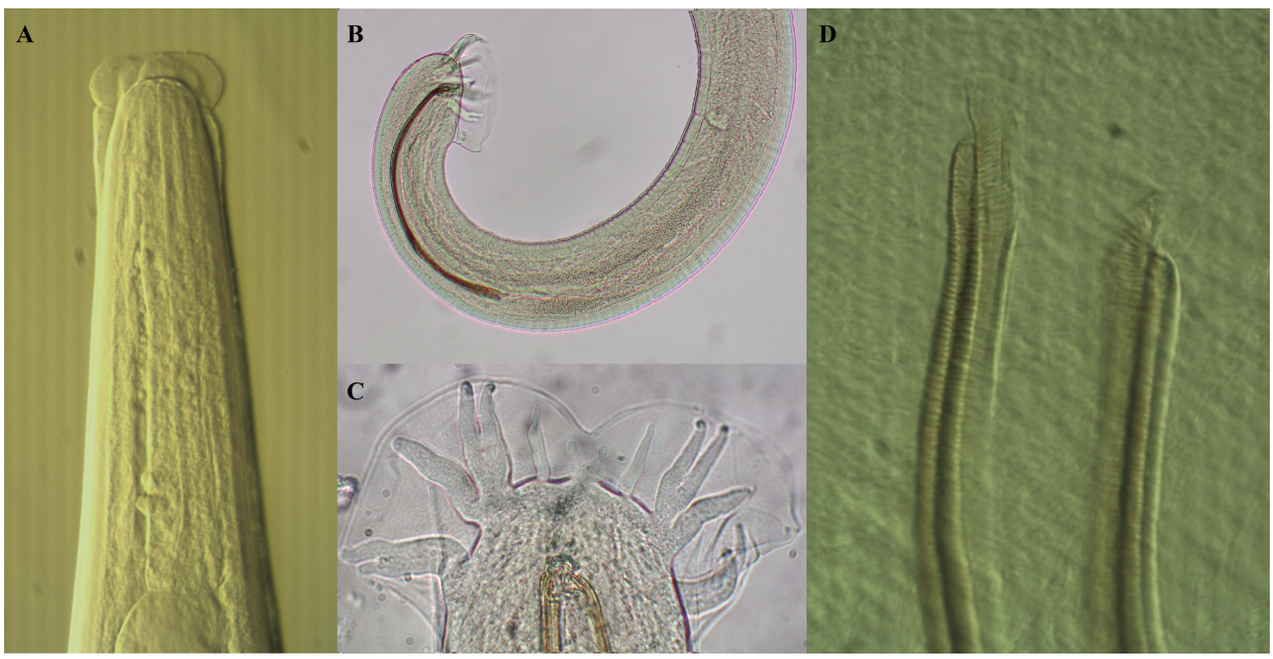

Figure 1. Specimen of *Angiostrongylus vasorum* found in raccoon dog. (A) Anterior end of the body; (B) Posterior end of body; (C) dorsal view of the caudal bursa; (D) Tips of the spicules

Mydlniki (50°05′01,1822″N 19°51′05,1618″E) in northwestern part of Kraków, Poland, after being killed in a road incident. This specimen was examined for internal parasites. Samples were collected in January 2025. For safety reasons, animal was kept at −85°C for 14 days before the parasitological examination [14]. The lungs, stomach and intestines were examined using established washing and sieving techniques to detect helminths [15].

Results and Discussion

An adult individual of *Angiostrongylus vasorum* (Baillet, 1866) was found in lung arteries (Fig. 1), along with three specimens of *Uncinaria stenocephala* (Railliet, 1884) founded in small intestine. Nematodes were morphologically identified based on descriptions provided by Anderson (1978) and Stefański (1963) [16,17].

To our knowledge, this is the second record of *A. vasorum* in raccoon dogs in Eurasia and the westernmost detection of this parasite in the host species. *Angiostrongylus vasorum* is potentially also harmful to their natural wild competitors such as foxes, *Vulpes vulpes*, which may also be infected with this nematode [8], and to protected large carnivores such as wolves *Canis lupus* [18]. Our finding is also relevant for veterinary medicine, as *A. vasorum* is described as detrimental to domestic animals [8]. As reported in previous studies, treatment is challenging [11], and new cases have raised concerns among veterinarians [19,20]. The presence of an infected raccoon dog population in a given area may increase the risk of parasite transmission to domestic dogs.

The second nematode species detected – *Uncinaria stenocephala* is a common parasite of canids, including dogs, foxes and wolves. It has previously been recorded in raccoon dogs from northern Poland [21]. While this parasite does not pose a zoonotic tread, raccoon dogs may serve as a reservoir of infection for other host species such as domestic dogs and foxes [22].

Research into diseases and parasites in species whose numbers are constantly increasing outside their natural range, such as the raccoon dog is essential, because they are highly capable of transmitting new types of pathogens and parasites, that can affect native fauna and domestic animals.

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