

## Granulomatous Peritonitis in a European Brown Bear Caused by *Baylisascaris transfuga*

Klaudiusz Szczepaniak,<sup>1,4</sup> Piotr Listos,<sup>2</sup> Wojciech Lopuszynski,<sup>2</sup> Tomasz Skrzypek,<sup>3</sup> and Waldemar Kazimierczak<sup>3</sup> <sup>1</sup>Sub-Department of Parasitology and Invasive Diseases, Institute of Biological Bases of Animal Diseases, Faculty of Veterinary Medicine, University of Life Sciences, 20-033 Lublin, Poland; <sup>2</sup>Department of Pathological Anatomy, Faculty of Veterinary Medicine, University of Life Sciences, 20-033 Lublin, Poland; <sup>3</sup>Department of Zoology and Invertebrate Ecology, Faculty of Mathematics and Natural Sciences, The John Paul II Catholic University of Lublin, 20-033 Lublin, Poland; <sup>4</sup>Corresponding author (email: klaudiusz.szczepaniak@up.lublin.pl)

**ABSTRACT:** We report a case of granulomatous peritonitis due to *Baylisascaris transfuga* in a young male European brown bear (*Ursus arctus*). At necropsy, there were extensive abdominal adhesions and extensive granulomatous tissue on the peritoneum and liver capsule. In the gastrointestinal tract, there were 58 nematodes that were identified as *Baylisascaris transfuga* using light and scanning electron microscopy.

A 47-kg, young, European brown bear (*Ursus arctus*) from the Tatra Mountains in the West Carpathians was necropsied at the Faculty of Veterinary Medicine, University of Life Sciences, in Lublin, Poland. According to witnesses, the bear had been drowned in the river by tourists. Findings included extensive abdominal adhesions between the small intestine, omentum, and the peritoneum of left abdominal area and an oval-shaped, 40-mm-wide scarified wound from a previous perforation of the abdominal wall. There were numerous granulomatous lesions, 5–20 mm in diameter, on the peritoneum and liver capsule. In most granulomas, ascarid ova were surrounded by infiltrates of macrophages, lymphocytes, and neutrophilic and eosinophilic granulocytes together with epithelioid cells (Fig. 1). In some lesions, there were also fragments of nematodes. Ova isolated from granulomas were classified as *Baylisascaris* sp. based on measurements and morphology.

*Baylisascaris transfuga* infection of the bear was confirmed by gastrointestinal tract parasitology examination. Fifty-eight nematodes were recovered from the small intestine. The 29 females, 20 males, and

nine larvae were fixed in 70% ethanol with glycerin. The anatomic criteria and morphometric characteristics of cervical alae, labial papillae, precloacal, cloacal, and postcloacal papillae, uterus structure, and spicules seen using scanning electron microscope identified the nematodes as *B. transfuga* (Fig. 2).

The ursine ascarid *B. transfuga* is a nematode parasite reported in captive and free-ranging populations of several bear species (Crum et al., 1978; Schaul, 2006). The life cycle of *B. transfuga* is similar to the closely related parasite *Toxascaris leonina*, which is frequently found in dogs, cats, and foxes. Development of *B. transfuga* outside the gastrointestinal tract has not been observed in bears. *Baylisascaris transfuga* usually does not impact natural host survival but may indirectly reduce



FIGURE 1. Micrograph of brown bear peritoneal granuloma with distinct nematode eggs identified as *Baylisascaris transfuga* (arrowheads) and partly resorbed fragments of nematodes in a granulomatous tissue (arrow) with intense inflammatory infiltrates of histiocytic and lymphoplasmacytic cells as well as granulocytes. Hematoxylin-eosin stain. Bar=100  $\mu$ m.

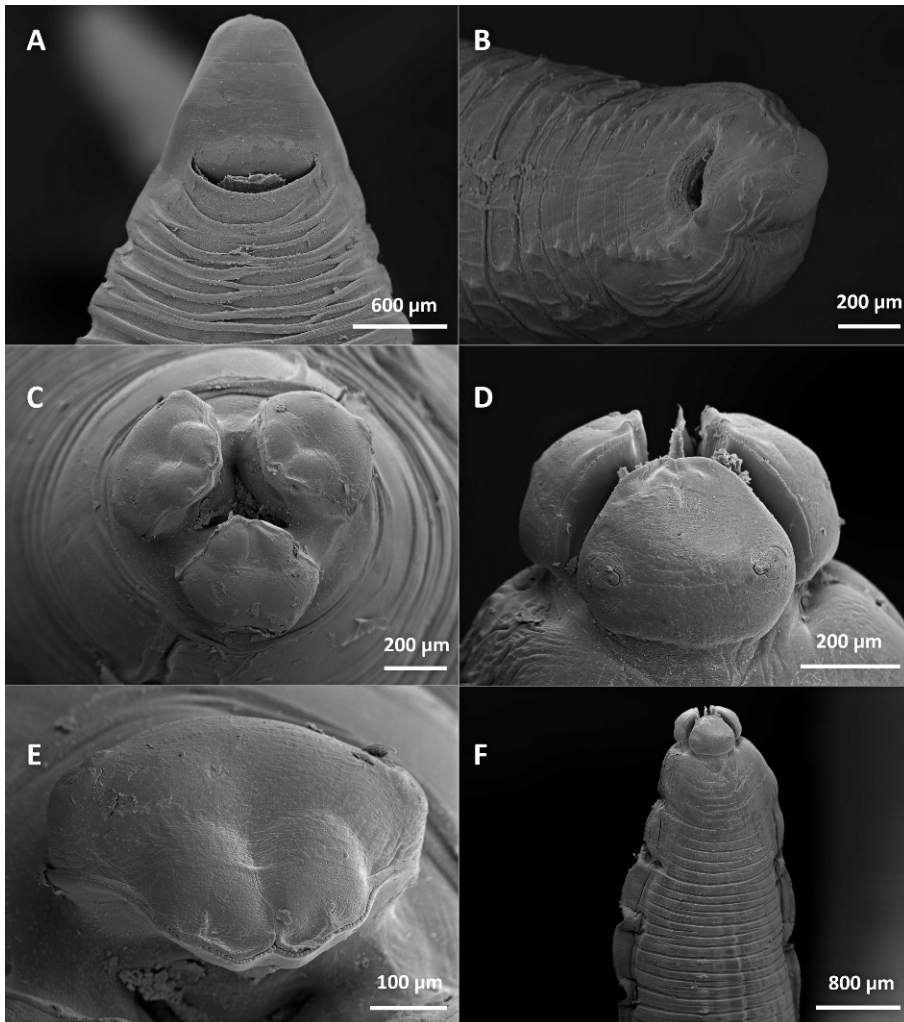


FIGURE 2. Morphologic details of *Baylisascaris transfuga* as seen under scanning electron microscope. (A) The distal end of a female. (B) The distal end of a male showing precloacal, cloacal, and postcloacal papillae. (C) En-face view of the anterior end with three lips. (D) Lateral view of the dorsal lip showing two sensory structures. (E) Details of the dorsal lip showing the dentigerous ridge with denticles. (F) Anterior end showing cervical alae.

host condition (Fu et al., 2011). The most serious complication associated with *Baylisascaris* is larva migrans, mainly caused by larvae of the common raccoon parasite *Baylisascaris procyonis* in intermediate and occasional hosts.

Granulomatous peritonitis is one of the possible complications of extra-intestinal ascariasis. Such cases are most commonly reported in humans and are usually associated with infection by *Ascaris lumbricoides*. Granulomatous peritonitis

caused by ascarid eggs has also been observed in laboratory animal studies (Cooray and Panabokke, 1960). In heavy ascaris infestation, a mass of worms can block the digestive tract and perforate the intestinal wall. Deposition of ova in the peritoneal cavity by adult worms provokes an intense granulomatous inflammatory reaction (Chin and Bo, 1997).

To the best of our knowledge this is the first description of granulomatous peritonitis caused by ascarid ova in brown bear.

We conclude that the previous mechanical trauma of the abdominal wall most probably lead to intestinal perforation and migration of adult nematodes into the peritoneal cavity, leading to a granulomatous inflammation associated with dead adult nematodes and their ova.

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