

## *Bucephalus polymorphus* Baer, 1827 – a new fish parasite in Austria?

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### *Bucephalus polymorphus* Baer, 1827 – ein neuer Fischparasit in Österreich?

**Zusammenfassung.** Im Rahmen parasitologischer Untersuchungen an der jüngst nach Österreich eingewanderten Fischart Schwarzmundgrundel *Apollonia melanostoma* (Pallas, 1814) von 3 Standorten an der Donau im Jahr 2007 wurde der digene Trematode *Bucephalus polymorphus* Baer, 1827 zum ersten Mal in Österreich nachgewiesen. Enzystierte Metazerkarien des Wurmes wurden auf den Flossen, der Haut und den Kiemen der Fische gefunden. Das Vorkommen des Parasiten ist an das der Dreikantmuschel *Dreissena polymorpha* (Pallas, 1771) gebunden, da sie als ausschließlicher erster Zwischenwirt fungiert. Sie ist ebenfalls in Österreich neu eingewandert, jedoch schon ca. 1870. Ob der Parasit erst mit den Grundeln oder schon zuvor nach Österreich gekommen ist, wird sich wohl nicht mehr mit Sicherheit klären lassen, doch sollten die Fragen ob eine stabile Etablierung des Parasiten in Österreich möglich sein wird, und welche Auswirkungen diese neuen Parasitenart auf die einheimische Fischfauna haben wird, Gegenstand von zukünftigen Untersuchungen sein.

**Summary.** During parasitological studies of the invasive round goby fish species *Apollonia melanostoma* (Pallas, 1814) from the Danube River in 2007 the digenean *Bucephalus polymorphus* Baer, 1827 was detected for the first time in Austria. Encysted metacercariae of the parasite were found on the fins, skin and gills of the fish. The occurrence of the parasite is strictly dependant on the zebra mussel *Dreissena polymorpha* (Pallas, 1771), which acts as the obligatory first intermediate host in its life cycle. The mussel has also invaded Austrian waters, but has appeared in 1870 already. It will not be possible to establish whether the parasite was introduced to Austria with the gobies, or has arrived earlier, but it should be the sub-

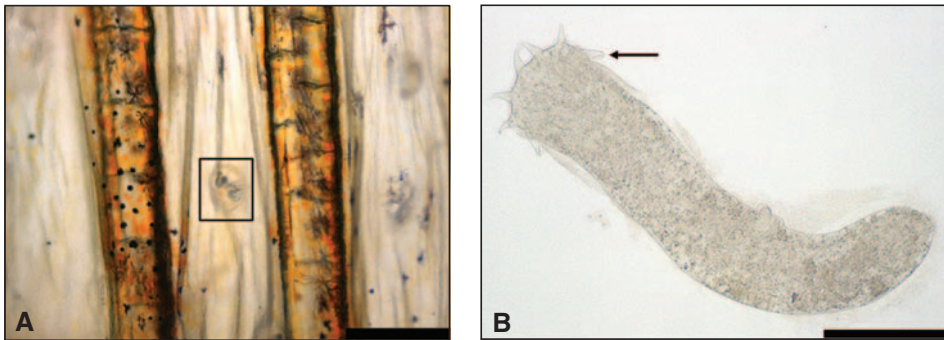
ject of future investigations to ascertain whether the parasite will be able to establish a firm population in Austria, and whether this introduction puts additional pressure on the native fish populations.

**Key words:** Neobiota, parasites, *Apollonia melanostoma*, *Dreissena polymorpha*, Danube.

### Introduction

*Bucephalus polymorphus* Baer, 1827, named after its cercaria's swimming movements, which give it the appearance of a buffalo head [1], is a small trematode with a significant anterior end both as metacercaria and adults it bears a sucker which is surrounded by seven contractile muscular digitate processes [2], Fig. 1. Its life cycle includes two intermediate hosts and one final host. The first intermediate host is the mollusc *Dreissena polymorpha* (Pallas, 1771) from which the highest number of *B. polymorphus* cercariae emerge between June and September [3], although it should be mentioned that there is an ongoing discussion whether other bivalves can act as intermediate hosts too [4]. As the second intermediate host a large variety of fish species has been described and metacercariae develop in epidermal cysts, not limited to a specific location on the fish body. The final hosts are various piscivorous fish species [5]. The highest pathogenicity is described for the cercariae that cause mechanical damage by penetrating the fish body and death of fish and fry has been reported [6]. Hyperaemia and haemorrhage are also frequent pathological symptoms [7]. During parasitological examinations performed in 2007 on an invasive fish species into the Danube River, the round goby *Apollonia melanostoma* (Pallas, 1814), *B. polymorphus* was recorded for the first time in Austrian waters. *A. melanostoma* (formerly *Neogobius melanostomus* [8]) is an original Ponto-Caspian gobiid fish species that has spread with high velocity and invaded the big river systems in Europe during the last decades. It even made its way to the Great Lakes of North America. The successful spread of this benthivorous fish is be-

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**Fig. 1.** Cyst (A) and metacercaria (B) of *Bucephalus polymorphus*. A: Cyst on dorsal fin of *Apollonia melanostoma*, scale bar: 500 µm. B: Excysted metacercaria with contractile muscular digitate processes (arrow) scale bar: 200 µm

lied to be closely related to human activities like river regulation, the connection of contiguous basins by canals and ballast water transport by ships [9]. In Austria it was recorded for the first time in the year 2000 by Wiesner [10].

## Material and methods

Fish samples were taken between May and October 2007 from three different sampling sites along the Danube River: Two sites were located in the municipal area of Vienna: “Winterhafen Freudenau”, and “Neue Donau”. The third sampling site, the estuary of the Ybbs River, is located approximately 90 km upstream of Vienna. A total of 79 *A. melanostoma* were collected using hooks at the Viennese sites in early summer and fall, at the “Ybbs River” site fish were collected by electro fishing only in July (summer). Fish were kept in aerated tanks for up to 36 hours, killed by cervical dislocation and examined for parasites using standard parasitological methods.

## Results and discussion

Encapsulated metacercariae of *B. polymorphus* were found on the fins, skin and gills from the sampling sites “Winterhafen” and “Neue Donau” only in fall, and were absent at the “Ybbs River” site. The highest infection rates occurred at “Winterhafen” with a prevalence of 78.3%, a mean intensity of 17.4, and a maximum intensity of 54. At “Neue Donau” infection rates were significantly lower: a prevalence of 6.7%, a mean intensity of 1.0 and maximum intensity of 1.

The life cycle of *B. polymorphus* is strictly linked to the occurrence of the zebra mussel *D. polymorpha* as first intermediate host [3], an invasive species in Austria [11]. The mussel had been native to large parts of Europe in the early tertiary, but was repressed to the Ponto-Caspian area in the glacial epoch. Since the end of the 18<sup>th</sup> century *D. polymorpha* is spreading over Europe again [12]. It is not evident whether the introduction of *B. polymorphus* is linked with the invasion of *A. melanostoma*, but it seems plausible, as parasitological examinations of sympatric fish species from the Danube River during the last years did not show any infection with *B. polymorphus* [13, 14]. Furthermore, the parasite was not found on the bighead goby *Neogobius kessleri* (Günther, 1861) during the present survey. Although *B. polymorphus* was recorded in the Dyje and Danube River during the 1950ies from

the Slovak Republic [15, 16] the report on the round goby in our study present the first evidence of this parasite in Austria.

Further investigations of *D. polymorpha* and possible final hosts will show whether this parasite will establish a firm population in the Austrian part of the Danube River and whether this introduction puts additional pressure on the native fish populations.

## Conflict of interest

The authors declare that there is no conflict of interest.

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