

***Parvatrema affinis* (Jameson et Nicoll, 1913) James, 1964 in the Baltic clam *Macoma balthica* (Mollusca: Bivalvia) in the Gulf of Gdańsk**

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ABSTRACT. **Background.** *Macoma balthica* is the major zoobenthic species in the Gulf of Gdańsk. **Material.** Two (4.2%) of the 48 *M. balthica* specimens collected in 2002 from the depth of 40 m were found to harbour metacercariae-containing sporocysts of *Parvatrema affinis* (Jameson et Nicoll, 1913) James, 1964. **Results.** The paper reports morphoanatomical dimensions of 30 sporocysts and metacercariae. Due to the common occurrence of the intermediate (*Macoma balthica*) and definitive (anseriform and charadriiform birds) hosts of *P. affinis* in the Gulf of Gdańsk, the trematodes are regarded as a constant component of the local biocoenose.

Key words: Baltic clam, Gulf of Gdańsk, *Macoma balthica*, *Parvatrema affinis*.

A total of 48 Baltic clams, *Macoma balthica* (8.0–14.0 x 10.1–17.8 mm), collected in 2002 from the depth of 40 m in the Gulf of Gdańsk were examined. Two specimens (4.2%; 14x17.0 mm and 14x17.1 mm) were found to harbour sporocysts (8 and 20) containing metacercariae (from 18 to 63; 40.9 on the average) of *Parvatrema affinis* (Figs 1, 2). The sporocyst body was usually egg-shaped, more seldom oval. After preservation in 4% formaldehyde the sporocysts (n=28) measured 226–649 x 211–468 (429–351) µm. The number of metacercariae depended on the sporocyst size; a similar pattern was mentioned by Swennen and Ching [1]. The sporocysts measuring 226–498 x 211–347 µm contained up to 45 metacercariae, larger sporocysts carrying up to 63 metacercariae. The metacercariae (n=30) were egg-shaped and measured 117–164 x 78–97 (148.5–96.1) µm. The acetabulum dimensions were 55–64 x 58–74 (59.4–67.6) µm; the pharynx measured 16–23 x 12–19 (18.9–16) µm; the dimensions of the ventral

sucker were 27–43 x 35–41 (35.6–38) µm. The distance between the ventral sucker mid-point and the anterior tip of the body was 84–121 (103.7) µm. The excretory bodies (196–272; 249.7 on the average) were arranged in two distinct elongated fields. The dimension ratios were as follows: body length/body width 1.45–1.95 (1.7) µm; body length/acetabulum length 2.02–2.90 (2.52) µm; acetabulum length/ventral sucker length 1.28–1.83 (1.78) µm; acetabulum width/ventral sucker width 1.49–2.0 (1.78) µm; distance from ventral sucker mid-point/body length 0.58–0.95 (0.7) µm. Some metacercariae, particularly those found in larger sporocysts, showed the reproductive system primordia (testes, ovaries, vitellaria).

The definitive hosts in the life cycle of *P. affinis* include anseriform (Anseriformes) and charadriiform (Charadriiformes) birds [2–5] and the experimentally infected domestic cat (*Felis silvestris catus*) [6], while *Macoma balthica* bivalves function as the first and second intermediate hosts [6]. The

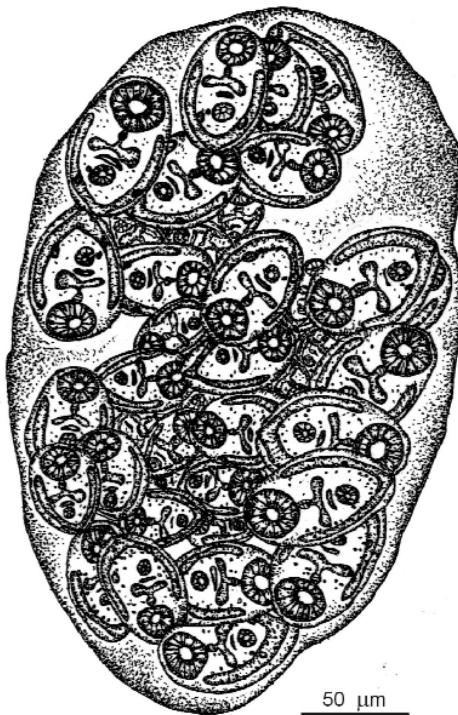


Fig. 1. *Parvatrema affinis* sporocyst with metacercariae

cercariae develop into the metacercariae inside the sporocyst, without leaving the intermediate host [6,7]. It is worth adding that a reduction of the cycle (skipping the stage of free-living cercariae), i.e., the simultaneous occurrence of sporocysts, cercariae, and metacercariae in an intermediate host boosts the parasite's reproductive success. In addition, maturation of the metacercariae in the bivalves results in a faster maturation in the definitive hosts (birds): according to Zelikman [6], the parasites are mature as soon as in 48 hours.

The geographic range of *P. affinis* covers the Palaearctic [4]. In Poland, the adult trematodes had earlier been reported from the common Eider (*Somateria mollissima*), velvet scoter (*Melanitta fusca*) and common scoter (*Melanitta nigra*) near Górk Wschodnie and Hel [8] as well as from the long-tailed duck (*Clangula hyemalis*) in the Gulf of Gdańsk [9]. In addition Wenne and Klusek [10] reported finding the metacercariae in 1.4–3.7% of the Baltic clams from the Gulf of Gdańsk they examined. Furthermore, Markowski [11] found flukes in a Baltic clam (0.7%) which he described as belonging to a new species *Metacercaria morula*. However, as Zelikman [6] later pointed out Markowski's *M. morula* belonged to a known species *Gymnophallus affinis*, which was subsequently transferred by James [12] to the genus of

Parvatrema. Flukes found by other authors [1, 13] also had features that correspond with those of *M. morula*. While recently found metacercariae are also similar in their structure to *M. morula*, questions are raised by the fact that the reproductive opening in *M. morula* metacercariae is oval, while in recent specimens it is crescent-shaped, which fits Zelikman's [6] description. Moreover, according to Markowski [11] the sporocysts (cysts) were unattached, whereas in the present specimens they are found to be fixed to the internal organs of the molluscs. Other authors do not specify the way that *P. affinis* sporocysts attach themselves to their host, but only their location, which suggests that they were in fact attached. For comparison, in the Wadden Sea in Denmark, the *M. balthica* infection prevalence was 4.3% [14] and 4.4–44% [15], 7.5% in the North Sea [13], and 0.2% [16] and 20–100% [17] off the Finnish coasts in the Baltic, higher prevalences being usually observed in larger clams.

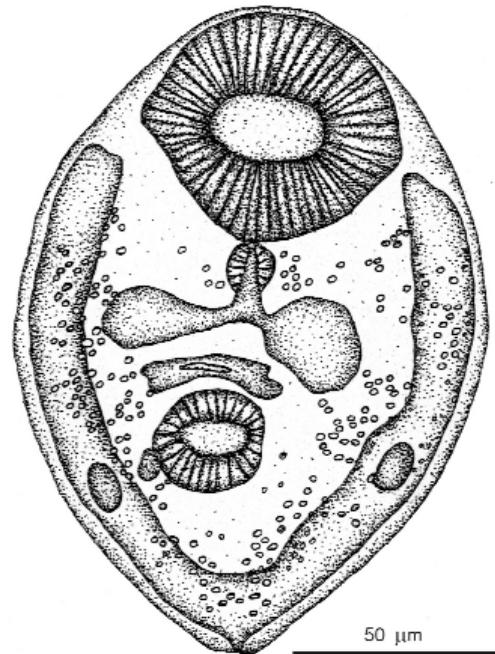


Fig. 2. *Parvatrema affinis* metacercariae

It is worth adding that *P. affinis* affect the Baltic clam's behaviour. The infected bivalves do not burrow as deep as do healthy specimens. They frequently crawl upon the sediment surface and migrate, leaving visible crawling trails [14,15,18], thereby becoming visible to predators, including birds, the definitive hosts of the parasite.

Despite the low degree of infection in the bivalves, *P. affinis* should be considered a constant

component of the Gulf of Gdańsk biocoenose because both the intermediate hosts — *M. balthica* (more than 94% of the zoobenthos biomass at depths larger than 20 m in the Gulf of Gdańsk; [19]) and the definitive hosts — the Charadriiformes and Anseriformes [20] are common in the area.

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Wpłynęło 10 maja 2006

Zaakceptowano 17 sierpnia 2006