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FIRST RECORD OF *CORBICULA FLUMINALIS* (O. F. MÜLLER, 1774) (BIVALVIA: CORBICULIDAE) – IN POLAND

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ABSTRACT: A human-modified environment may provide a favourable habitat for acclimation of invasive species. The resulting new niche is often unavailable for the native fauna and, consequently, can be successfully inhabited by alien invaders. This is also due to relatively low competition for food resources and space. New species inhabiting heated waters are being reported increasingly often. Recently, the presence of an Asiatic clam, *Corbicula fluminalis* (O. F. Müller, 1774), was confirmed in the lower course of the Odra River. This is the second taxon of the genus *Corbicula* found in Poland, in Western Pomerania, in a heated channel.

KEY WORDS: Asiatic clam, *Corbicula fluminalis*, bivalves, heated waters, invasions of molluscs, Poland

INTRODUCTION

The first taxonomic reference to the genus now called *Corbicula* appeared in 1774, when O. F. Müller described three species, and at that time assigned them to the genus *Tellina*: *T. fluminalis*, *T. fluminea*, and *T. fluviatilis*. Later papers refer to these bivalves as *Corbicula*, members of which inhabit freshwaters and estuaries of South-East Asia, India, the Pacific islands, as well as a major part of eastern Europe and Africa (MCMAHON 1983, after ARAUJO et al. 1993). According to palaeozoological data, the range of *Corbicula* once covered Europe, North America, and Japan.

Corbicula fluminalis is one of the best known interglacial bivalves whose fossils have been identified in north-western Europe. According to MEIJER & PREECE (2000), S. V. WOOD found it in Stutton (England) in 1834 and described as *Cyrena trigonula*. Later, its fossils were also found in France, Belgium, Holland, Germany, Austria, Denmark, and in the Russian Far East city of Omsk. Fossil *Corbicula fluminalis* was also found in Poland with Pleistocene mollusc fauna, e.g. in drill core samples of interglacial sediments in Koczarki, Masuria (SKOMPSKI 2002).

A number of reports have been published lately on the progressive world-wide spreading of two *Corbicula* species. Until quite recently, the first site in Poland inhabited by *Corbicula fluminea* (O. F. Müller, 1774) was located in the bottom of the cooling channel in the lower course of the Odra River (DOMAGAŁA et al. 2004). In May 2004, at the same place, *C. fluminalis* was found as well. Previous instances of colonisation of new waters by this species were reported in Germany, in the Rhein, Neckar and Main rivers, during 1980–1985 (GLÖER & MEIER-BROOK 1998), as well as in France and Portugal (MOUTHON 1981). According to CSÁNAI (1998–1999), the bivalve was caught in the Danube in Hungary.

RESULTS AND DISCUSSION

Fig. 1. shows the location of the sampling site. Qualitative samples of molluscs were collected manually from the depth of 0.2 to 2 m, at a distance of less than 20 m from the shore – on a shallow bank, wading in the water. In a deeper part, the samples were collected by a scuba diver. *C. fluminalis* was found on a sandy substrate. In the examined malacocenosis, also *Anodonta anatina* (Linnaeus, 1758), *A. woodiana* (Lea, 1834), *Unio pictorum* (Linnaeus, 1758), *U. tumidus* (Phillipson, 1788), *C. fluminea*, and *Dreissena polymorpha* (Pallas, 1771) were identified. With *C. fluminalis*, the heated channel in the lower Odra River has become a habitat for four (besides *D. polymorpha*) Asiatic bivalve species (DOMAGAŁA et al. 2003, 2004).

The temperature tolerance for *Corbicula*, according to MATTICE & DYE (1976), ranges between 2°C and 34°C. The thermal regime of the channel water, heated by the "Dolna Odra" power station cooling effluent, is influenced by air temperature and the temperature of the inflowing Regalica River. The main factor, however, is the number of currently operating power units and the usage of their nominal power. Long-term observations show that the lowest mean monthly temperatures are recorded in winter, in 2002 and 2003 being recorded in February (9.3°C). The highest mean monthly temperatures, on the other hand, are recorded in July and August, 24°C and

Fig. 1. The locality of *Corbicula fluminalis* in Poland

Table 1. Shell measurements of the smallest (S) and the largest (Lg) specimens of *Corbicula fluminalis*

	L	D	H
S	1.15	0.75	1.01
Lg	2.37	2.15	2.39

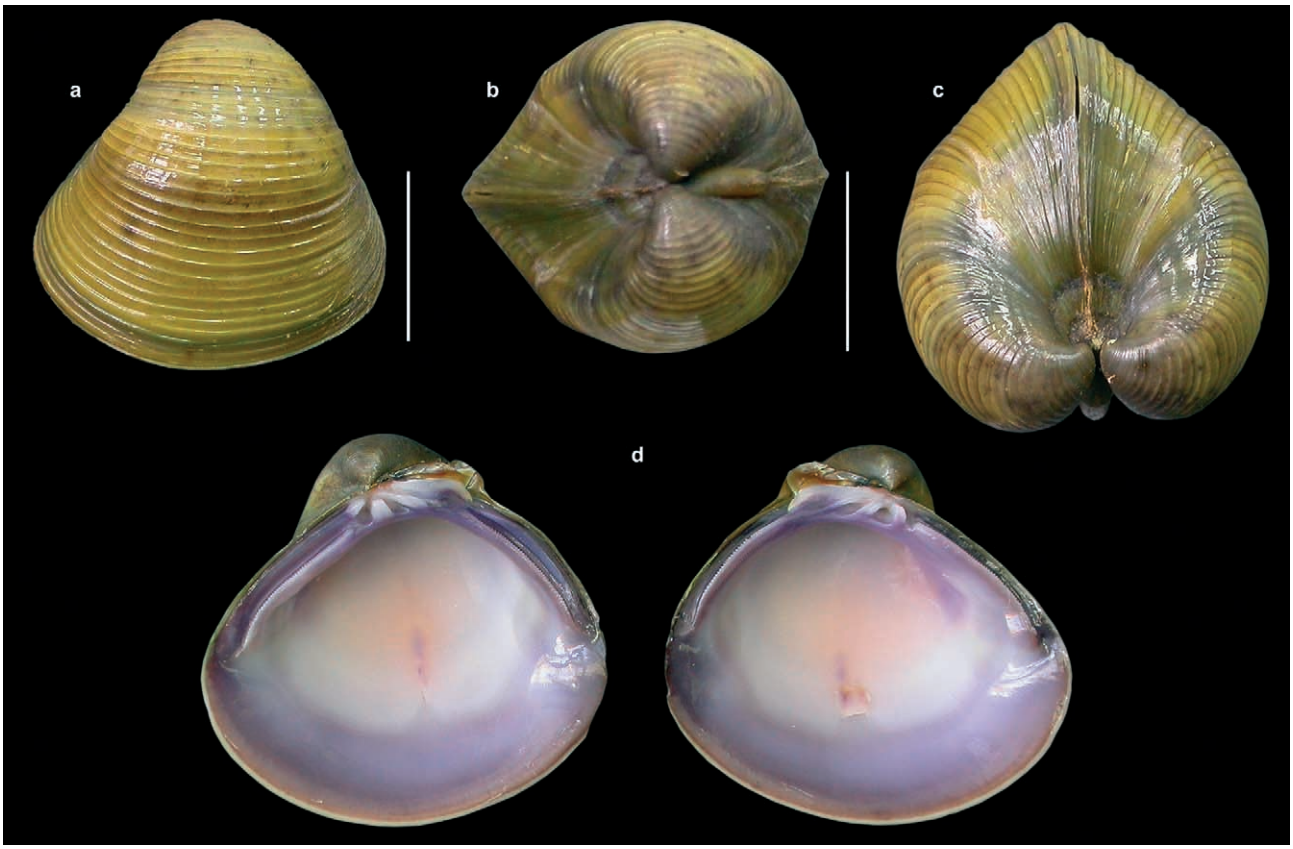

Fig. 2. *Corbicula fluminalis*: a – shell shape; b – umbo and ligament view; c – anterior part; d – endostracum; scale bars=1 cm

27°C. On the day of sampling, 27th May 2004, the water temperature was 22°C.

Specimens of *C. fluminalis* found in the heated channel had the following mean shell measurements (n=18): L (length) = 2.0 cm, D (width) = 1.8 cm, H (height) = 2.0 cm, which precisely corresponds to the data published by GLÖER & MEIER-BROOK (1998) (Table 1).

The colour of the periostracum was olive green-yellow. The ornamentation in the form of narrow and tightly packed ridges was visible on the triangular, though asymmetrical shell of the bivalve. The posterior part was roundish and shorter than the anterior, sharper part of the shell. The nacre was intensively purple. Both the anterior and the posterior lateral teeth formed an arch (Fig. 2).

An integrated approach to the problem of invasive species consists in monitoring their distribution changes and population dynamics, which is to be undertaken in the near future. Undoubtedly, the hermaphroditic character of *C. fluminalis* reproduction, including self-fertilisation, may speed up its spreading rate. It should also be observed, how efficiently the species invades and colonises further parts of the river or its tributaries via the trochophore. The larva is a stage in *Corbicula* ontogeny; however, KRAEMER & GALLOWAY (1986) as well as NICHOLS & BLACK (1994) have stated that after leaving the gills, the trochophore has no chance of survival in the environment. Is this a rule?

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