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SHORT COMMUNICATION

Tropical snail *Melanoides tuberculata* Müller, 1774 (Thiaridae) found in thermally polluted canal in Central Poland

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ABSTRACT

Freshwater snails *Melanoides tuberculata* are among the most commonly kept aquarium molluscs. Their ability to rapidly grow population and a relatively low cost contribute to uncontrolled introductions in new areas by irresponsible owners. The species has been recorded so far in several countries of Western Europe, as well as in Poland, where it was able to settle a stable population in the thermally polluted system of Koninskie Lakes. The paper describes a new statement of this species in the Żerań Canal in Warsaw, Central Poland, where environmental molluscs of the *Corbicula* genus have also been noted. Four adult snails with black color of spirally twisted shells have been caught. No epibionts were observed on the snails, which could get into the environment with the molluscs. Due to large fluctuations in the temperature of the water in the Canal and its direct connection with the Vistula, it is recommended to cover the site with regular monitoring to determine the potential threat posed by the presence of the *Melanoides tuberculata* species.

Keywords: aquarium, alien species, mollusc, uncontrolled introduction, Żerański channel, Vistula river, Warsaw

1. INTRODUCTION

Freshwater snails belong to the most-kept invertebrate animals in home aquariums (Duggan, 2002). Along with other ornamental animals, they are often the most important biotic element of the aquarium ecosystem. By feeding on algae and dead organic matter, these molluscs contribute to maintaining a proper biological balance in the tank (Kwong et al., 2010). Breeding work so far work has contributed to selection of many varieties of freshwater snails, and thus to increase their availability in the global aquarium market (Coehlo et al., 2012).

The relatively low environmental requirements of snails, as well as their huge reproductive potential (Livshits and Fishelson, 1982) in a short time may lead to a significant increase in the snail population in the aquarium. In order to limit this phenomenon in breeding practice, various methods of controlling mollusc numbers are used, among which the most common is the introduction of fish species, crustaceans and snails, whose diet is based mainly on the target species (Coehlo et al. 2013).

Unfortunately, the relatively low cost and good availability of freshwater aquarium molluscs results in the release of their surpluses in the natural environment (Maćkiewicz, 2013). As with other aquarium animals, uncontrolled introductions may possibly lead to a successful settlement of stable, local populations that could be a threat for native flora and fauna (Pointier, 1993). The phenomenon is observed in many regions of the world, including some members states of European Union, where freshwater molluscs commonly kept in aquariums are also noted in Polish waters (Pointier, 1993, Piechocki et al., 2003).

Mild winters in Europe observed in recent years are in favour to the invasion of typically exotic species, preferring higher water temperature, which are already inhabiting not only the southern part of the continent (Milenković and Gligorijević, 2012). In many cases, they are introduced into thermally polluted waters, which allows them to better acclimate in an environment characterized by colder periods during the year (Piechocki et al. 2003).

Melanoides tuberculata, known in Polish language under the colloquial name of a gimlet is a freshwater snail often kept in domestic aquarium tanks (Piechocki et al., 2003). It's a relatively small mollusc with an elongated, spirally twisted, brown to black shell. So far, its occurrence has been noted in Italy (Cianfanelli et al. 2007) in Germany, France and Austria (Milenković and Gligorijević, 2012) where as a foreign species it was dragged there from areas of primary occurrence, such as Africa and Southeast Asia (Piechocki et al. 2003). In Poland, for the first time the presence of the *Melanoides* species was noted in 2000 in the system of heated Konin lakes, where due to optimal environmental conditions, these molluscs managed to maintain the population until at least 2002 (Piechocki et al., 2003).

This work presents data confirming the presence of snails from the species *Melanoides tuberculata* (Müller, 1774) found during inventory work carried out in the thermally polluted channel Żerań (Warsaw, Poland) in 2018.

2. METHODS

2. 1. Locality

Observations were made at Żerański Channel (Fig. 1) that is an artificial 17.5 km long and around 2.5m depth watercourse connecting Zegrzyński Reservoir with Vistula River.

The channel is a part of Žerań Power Station cooling system contained heated waters and other nonnative molluscs like *Sinanodonta woodiana* or *Corbicula fluminalis*.



Figure 1. Žerań Channel in september 2018.

2. 2. Snail detection and identification

Snails were detected during day control in summer and autumn seasons. Controls were made in 14th September 2018 and 14th October 2018. Each of the controls lasted for ca. 150 minutes. Detected snails were caught by aquarium net and identified under microscope (Bolaji et al. 2011). Each individual was controlled for multicellular epibionts presence.

3. CONCLUSIONS

Four snails with similar morphological features were caught in the thermally polluted channel in Żerań. Three of them were found during the inspection of September 14, and on October 14, one more live animal was caught. The individuals were characterized by the black coloration of helically twisted shells (Fig. 2) and all were identified as *Melanoides tuberculata* (Bolaji et al. 2011). No multicellular epibionts that may be transmitted by aquarium animals were found on the surface of the animals (Maciaszek et al 2018). During the inventory work in this area, the presence of other molluscs native to the Corbicula species has also been reported, which stretch their range in the Vistula (Bonk et al., 2018). In collected animals, black coloration of the shell was also found. So far, it has not been determined whether in the case of both types of molluscs it is a feature acquired as a result of an attempt to adapt to the bottom lifestyle (Maćkiewicz, 2013), although it is not excluded to introduce such a color variety.



Figure 2. Representatives of the *Melanoides* genus caught in the Żerański Channel.

Melanoides tuberculata (Müller, 1774 per Piechocki et al. 2003) is a freshwater snail species for which the appropriate temperature range of the environment is from 18°C to 32°C (Mitchell and Brandt, 2005). Winter temperatures in Polish waters are far under the optimum range for this species (Marszelewski and Pius, 2016). Thermally polluted channel in which the individuals were caught, due to the unique environmental conditions could provide molluscs the ability to survive the coldest periods of the year and create a stable population in this area, just like in the case of a similar channel in the lower reaches of the Odra, which is the area of occurrence in Poland of several tropical species of bivalves (Łabęcka et al., 2005). Small size and demersal lifestyle would allow animals, like the molluscs of the genus *Corbicula* (Maćkiewicz, 2013), to be under increased pressure from predators. It has not been explained yet how the snails were introduced into the channel. Man's introduction of *Melanoides tuberculata* can not be ruled out (Piechocki et al., 2003).

4. SUGGESTIONS FOR MANAGEMENT

In a typical Polish climate, *Melanoides tuberculata* due to its thermal tolerance, should first be monitored for occurrence in heated water systems located in our country. A special type of control should cover reservoirs located within urban agglomerations, due to the high probability of introductions of animals by amateur aquarists and breeders. If the presence of specimens of this species in the environment is found, they should be eradicated due to the danger of further spreading of the population in the new area.

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