



World Scientific News

An International Scientific Journal

WSN 135 (2019) 289-293

EISSN 2392-2192

SHORT COMMUNICATION

Exotic fish, the guppy *Poecilia reticulata* (Peters, 1859) (Poeciliidae) found in thermally polluted canal in Central Poland

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ABSTRACT

This work describes the case of an introduction of the guppy *Poecilia reticulata* in a thermally polluted canal of the Żerań CHP plant in Warsaw. Captured individuals were identified and described. The find is discussed along with available scientific literature describing introductions of alien species of aquarium origin in Polish and European waters.

Keywords: alien species, aquarium, ornamental pet, pond, inland waters, Żerań canal, Vistula river, *Poecilia reticulata*

1. INTRODUCTION

The guppy, *Poecilia reticulata* (Peters, 1859) is a freshwater viviparous fish reaching 5 cm (male) and 6 cm (female) body length (Hugg, 1996). Naturally occurs in waters of northern part of South America, where it lives in waters of neutral acidity towards slightly alkaline (pH 7.0-8.0) and medium hardness. The species has been massively introduced in many regions of the world for mosquito control, which did not bring the desired effect while having a negative impact on native species (Kottelat and Whitten, 1996; Casatti et al., 2009).

Due to the fact they breed very easy and their small size and various colorful patterns, *P. reticulata* belongs to the most widespread fish on the aquarium market. High availability and the associated low price causes problems with distribution of offspring, and excessive reproduction of this species in aquarium conditions is often the cause of releasing fish into the natural ecosystems (Courtenay and Stauffer, 1990; Maceda-Veiga et al., 2013).

In Europe, introduced populations are known, among others from Albania, Czechia, France, Germany, Great Britain, Hungary, Italy, Ireland and Romania and Spain (Lehtonen, 2002; Hanel et al., 2011; Jourdan et al., 2014). In Poland, representatives of the *Poecilia* genus were recorded in the thermally polluted waters of Nowa Huta heating channel in Krakow (Southern Poland), however, the population considered stable has still not been properly documented (Witkowski, 2002; Nowak et al., 2008).

In this paper we present a new locality of *Poecilia reticulata* in thermally polluted waters of Żerań CHP plant in Warsaw, Central Poland.

2. MATERIAL AND METHODS

The work was a part of the Alien Hunter project (pl: Łowca Obcych), which aims are to locate and cover with the monitoring plants and aquarium animals introduced into Polish waters, where they may become a threat to the natural ecosystem.

Locality

The Żerań Canal in Warsaw is an artificial waterbody connecting the Zegrze Reservoir with Vistula River. The channel is about 17.5 km long and up to 2.5 m deep, is part of the cooling system of the Żerań CHP plant. Due to the elevated temperatures, the channel is an attractive place for anglers. In winter, the water temperature in the immediate vicinity of the power plant is around 10 °C.

Fish detection and identification

Alien aquarium fish were observed and caught by local anglers on 10.08.2019. Following the reporting of observations, several daily checks were carried out in the following days. Captured individuals were measured, photographed, and then identified using available scientific literature. In addition, consultations were held with local aquarists and fishermen to determine the likely causes of the introduction.

3. RESULTS

A total of 12 individuals identified as representatives of the *Poecilia* genus were observed during the control. 7 harvested adults were identified as *Poecilia reticulata* (Peters, 1859). The remaining specimens escaped during the trapping attempt. Subsequent attempts to observe them failed. The fish showed similar body color, characteristic of the "Round Tail Filigran Yellow" aquarium (Fig. 1). Individuals with an average body length of 5.45 cm (Table 1) had minor bodily injuries, usually present on the fins. The observed individuals swam herds near the water surface a short distance from the shore neighboring fishing stands. No other exotic fish species were observed during the observation.



Figure 1. Adult *Poecilia reticulata* caught in Žerań Canal.

Table 1. Sex and length of caught fish.

No	Species	Sex	Body length [cm]
1	<i>P. reticulata</i>	F	6.05
2	<i>P. reticulata</i>	F	6.05
3	<i>P. reticulata</i>	F	6.00
4	<i>P. reticulata</i>	F	5.57
5	<i>P. reticulata</i>	F	5.56
6	<i>P. reticulata</i>	M	4.50
7	<i>P. reticulata</i>	M	4.41
Average			5.45

4. DISCUSSION AND CONCLUSIONS

The similarity in the coloration and the size of the fish caught allow us to suppose that they were the result of a single introduction. The observed damages to the fins are most likely the result of being bitten by other fish. It is believed that they could have arisen both after the introduction - by the carp fish abundantly present at the edge of the canal, as well as in the aquarium due to the tank's over-fishing.

Based on consultations with local anglers and aquarists, it was established that aquarium fish are observed in Žerań Canal annually during the summer season. Their presence is probably associated with releases made by irresponsible owners. Populations observed in previous years do not survive winter seasons. According to the scientific literature on other species of the genus *Poecilia* (Hernández, 2002; Martínez, 2016), with proper, long-term acclimatization this would be possible in the immediate vicinity of the Žerań power plant.

Due to the thermal regime of Polish waters outside the species tolerance range, creating stable populations of *P. reticulata* is only possible in thermally polluted waters (Jourdan et al., 2014). However, in the case of the Žerań power plant, thermal pollution of waters is probably too low and limits population development. In unlikely event of surviving the winter season in the canal area, no further expansion of the species would be possible. Regardless of the low chances of survival, Žerań Canal should be monitored to capture new, potentially invasive, exotic species.

Acknowledgment

We would like to express our appreciation to Anna and Tomasz Czyż for their valuable support in fish variety identification.

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