

## PRACE ORYGINALNE

### COLONIZATION OF THE ROUND GOBY, *NEOGOBIOUS MELANOSTOMUS* (GOBIIDAE) BY PARASITES IN THE NEW ENVIRONMENT OF THE GULF OF GDAŃSK (SOUTHERN BALTIC)

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**ABSTRACT.** The round goby (*Neogobius melanostomus*) is a non-indigenous species in the Baltic Sea, introduced to its waters (the Gulf of Gdańsk) from the Black, Azov, and Caspian Seas. For this reason, an attempt was made to determine the species' parasitic fauna in its new environment. Within 1994–2000, a total of 201 round goby specimens caught in the Gulf of Gdańsk were examined. The parasites found represented protozoans (*Trichodina domerguei domerguei*), digenans (*Diplostomum* spp. metacercariae), cestodes (*Bothriocephalus scorpii*, plerocercoids), nematodes (*Hysterothylacium aduncum* L<sub>3</sub>, L<sub>4</sub>, and adults), and acanthocephalans (*Echinorhynchus gadi* and *Pomphorhynchus laevis*). The parasitic species found are common in the Gulf of Gdańsk. It should be emphasized that, since the round goby has only recently appeared in the Gulf, the parasitic fauna of this fish is not yet complete.

**Key words:** Baltic Sea, *Neogobius melanostomus*, parasites, round goby.

#### INTRODUCTION

The round goby (*Neogobius melanostomus*) inhabits the Black, Azov, and Caspian Seas. It was introduced into the Baltic in the early 1990s with the ships' ballast water and is observed to have successfully settled in the new environment (Skóra and Stolarski 1993). In the ecosystem trophic structure, gobiids are the benthivorous second order consumers that themselves are the food of the third order consumers: predacious fish, birds, and mammals. In the Baltic, they are particularly important as food of cod, one of the commercially most important fish species; the round goby accounts for almost 70% of the cod food (Morawski 1978).

The Polish literature contains no publications on parasites of this species. Apart from the round goby, the Gulf of Gdańsk (Southern Baltic) is inhabited by four other gobiids (*Gobius niger*, *Pomatoschistus minutus*, *P. microps*, *Coryphopterus flavescens*) the parasitic faunas of which had already been

studied (Markowski 1933, 1935; Stryjecka-Trembaczewska 1953; Raabe 1959; Cichowlas 1961; Koter 1962; Sołtyńska 1964).

This paper describes the first study on the composition and quantitative aspects of the round goby parasitic fauna in the environment new for the fish.

#### MATERIALS AND METHODS

The fish were caught with fyke nets, trawls, and scoop nets in selected areas of the Gulf of Gdańsk: off Rewa, in the Gdynia marina, and off Orłowo.

To identify the parasites found, the techniques and procedures appropriate for the individual taxa were used. Ciliates were treated with 0.5% silver nitrate ( $\text{AgNO}_3$ ), while helminths, fixed in a 19:1 mixture of glacial acetic acid and formalin, were stained with alum carmine, dehydrated in the alcohol series, cleared in creosote, and embedded in Canada balsam.

#### RESULTS

A total of 201 round goby specimens (6–23.2 cm, 68.2–191.2 g) were examined over April 1994–August 2000. The fish were found to host 6 parasitic taxa:

##### Ciliophora

*Trichodina domerguei domerguei* (Wallengren, 1897)

The protozoans were found to parasitise the skin and fins. The infection prevalence and mean intensity were 5.9% and 5 specimens, respectively.

##### Digenea

*Diplostomum* spp. (Rudolphi, 1819) metacercariae

The digeneans were located in the eye lenses. The infection prevalence and mean intensity were estimated at 8.1% and 2 specimens, respectively.

##### Cestoda

*Bothriocephalus scorpii* (Müller, 1776) plerocercoids

The intestine of two round goby individuals was found to host a total of two plerocercoids of the cestode.

##### Nematoda

*Hysterothylacium aduncum* (Rudolphi, 1802) L<sub>3</sub>, L<sub>4</sub> and adults

Among 28 nematode specimens found, 2 were identified as adults (non-ovigerous females), the remaining being classified as L<sub>3</sub> and L<sub>4</sub> larvae. The parasites were located in the intestine (L<sub>3</sub>, L<sub>4</sub> and adults) and in the body



cavity (L<sub>3</sub>). The infection prevalence and mean intensity were 11.4% and 1.2 individuals, respectively.

### Acanthocephala

*Echinorhynchus gadi* Müller, 1776

The acanthocephalan infection prevalence and mean intensity was 16.9% and 1.2 specimens, respectively. The parasites occurred in the intestine.

*Pomphorhynchus laevis* (Müller, 1776)

A total of 3 specimens of the acanthocephalan were found in the intestine of three round goby.

### DISCUSSION

The round goby has become the most common gobiid in the Gulf of Gdańsk. Nevertheless, the number of parasites species the fish was found to host has much lower than that found in the round goby of, e.g. the Black and Azov Seas where as many as 56 taxa were recorded (Najdenova 1974). The low number of parasites is probably a result of the fact that this fish has only recently settled in the new environment and is still subjected to gradual colonisation by the local parasites. It is interesting to note that the round goby examined carried no parasitic species indigenous to the original range of this fish. Perhaps those parasites are not able to adapt to the conditions offered by the Gulf of Gdańsk, for instance they cannot find appropriate hosts. It is also possible that the parasites did not survive their migration, in the ships' ballast water, to Europe.

Of the six parasites identified in the round goby living in the Gulf of Gdańsk, half (*Trichodina domerguei domerguei*, *Diplostomum* spp., *Pomphorhynchus laevis*) are freshwater species, while the remaining (*Bothriocephalus scorpii*, *Hysterothylacium aduncum*, *Echinorhynchus gadi*) are marine, although both types may occur in both types of habitats. Except for the acanthocephalan *Echinorhynchus gadi*, the parasites had already been recorded in other gobiids in the Gulf of Gdańsk (Markowski 1935, Raabe 1959, Cichowlas 1961, Koter 1962, Sołtyńska 1964). The parasites found in this study have a wide range of hosts and are common in the Gulf in fish species belonging to other families as well (Rokicki 1975, Rokicki and Vojtkova 1994, Køie 1999, Morozińska-Gogol 1999, Rolbiecki *et al.* 1999). In this context, it is interesting to note that it was only the protozoan *Trichodina domerguei domerguei* that had been recorded in the round goby in the Black and Azov Seas. On the other hand, the cestode *Bothriocephalus scorpii* and the nematode *Hysterothylacium aduncum* were identified in the Azov Sea in other gobiid species, i.e. in *Pomatoschistus microps leopardicus* and *Mesogobius batrachocephalus*, respectively (Najdenova 1974). Six other gobiids of the Black and Azov Seas were

found to host *Contracaecum* sp. larvae (not identified to species). Perhaps the nematode *Hysterothylacium aduncum* belonged to those.

It should be emphasized that, since the round goby has only recently settled in the Gulf of Gdańsk, and generally in the Baltic, the composition and quantitative aspects of its parasitic fauna are not yet complete. On the other hand, a new host species in the area is bound to affect the structure of the parasitic fauna in the ecosystem in question.

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