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**OCCURRENCE OF *Percottus glenii* Dybowski 1877 (*Perciformes*,
Odontobutidae) IN THE MIDDLE STRETCH
OF THE VISTULA RIVER, POLAND**

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ABSTRACT. Fish catches were carried out in 1996-1997 in old beds of the Vistula River, along a 40 km stretch from Kazimierz Dolny to Dęblin, as well as along Wieprz (right-hand tributary of the Vistula) and Tyśmienica (right-hand tributary of Wieprz) rivers to find an East-Asiatic fish *Percottus glenii*. 15 stations were selected along the Vistula, and 9 along the Wieprz and Tyśmienica. It was found that *P. glenii* was a popular fish in old Vistula beds, but it did not inhabit Wieprz and Tyśmienica rivers.

Key words: DISTRIBUTION, *Odontobutidae*, *Percottus glenii*

INTRODUCTION

Percottus glenii is one of a few fish species, which have recently appeared in Polish inland waters. Since it has no Polish name as yet, two names taken from the Russian language are commonly used: „gołowieszka” and „trawianka”. There are two other names, „rotan” and „byczek”, but these are less frequently used (Załączkowski 1992, Antychowicz 1994, Woźniewski 1997). The latter two names are also known in Russian. *P. glenii* was described for the first time in 1877 by an outstanding Polish scientist Benedykt Dybowski (1923). In the ichthyological literature the following synonymous names are also used: *Eleotris glehni*, *Eleotris pleskei*, *Eleotris dybowskii*, *Percottus pleskei*, *Percottus glehni* (Berg 1916, 1949, Nikolsky 1956). The last name is used in all references cited in this paper, with the exception of Golubtsov et al. (1993). Sometimes spelling mistakes occur, so that the species name appears as e.g. *Percottus glehni* (Travkina 1997).

Percottus glenii is classified as belonging to the order Perciformes, suborder Gobioidi (Berg 1949, Nelson 1994). Gobioidi are a group of small fish with numerous species (about 600), inhabiting mostly coastal marine waters, usually in the tropics, less so in the temperate zone. Berg (1949) included three families into this suborder: Eleotridae, Gobiidae and Periophthalmidae. Many species belonging to this suborder are important for the fishery. According to the same author and also to Nikolski

(1956) *P. glenii* belongs to the family Eleotridae. Hoese and Gill (1993), on the other hand, suggested that the genus *Perccottus*, as well as the genera *Micropercops* and *Odontobutis* should be included into the family *Odontobutidae*. Nelson (1994) also supported this suggestion. According to Berg (1949) and Nikolski (1956) species belonging to this family are freshwater fish inhabiting North Vietnam, China, Korea, Japan and Russia. *P. glenii* is an East-Asiatic species inhabiting the middle and lower course of the Amur River and its tributaries, as well as the rivers Uzurii, Tugur, Sungarii, Sajfun, Tumien'-Ula, Port Arthur and Zeja. It is also present at the coast, in Lake Khanka, and in Sakhalin, and is fairly common in north-east Korea and Manchuria (Dybowski 1923, Yakovlev 1925, Rozov 1934, Berg 1949, Nikolski 1956, Spanovskaya et al. 1964, Elovenko 1981, Glukhovtsev and Dukravets 1986).

P. glenii prefers stagnant waters and bogs. It does not have high environmental requirements and can be found in lakes, old river beds, small pools and bog waters, in which only crucian carp is able to live. In water reservoirs this fish will stay mostly in the near shore zone, densely overgrown with submerged vegetation. It is frequent in waters with frequent oxygen deficits and high temperature variations. It happens that it is found in waters that can get totally dried or freeze down to the bottom. In these cases *P. glenii* will bury itself in the mud and become inert (Berg 1949, Nikolski 1970). Reproduction in the Amur basin takes place in May and June, at water temperature 15-20°C, at the age 2+ and body length 5-6 cm (Nikolski 1970). Spawning is preceded by a mating dance. Spawners exhibit in this period a very distinct dimorphism; males become intensively coloured and develop a forehead nodule. Eggs are spawned in batches. A female will lay 1000-2000 sticky eggs, slightly oval, about 1 mm in diameter. The eggs get attached to underwater objects. Male takes care of the eggs until larvae hatching. Juvenile stages feed on zooplankton. Adults consume insect larvae, but also eggs and juveniles of other fish. Growth is slow. The fish reach maximally 15-25 cm and body weight 200 g. Growth rate decreases drastically in fish bigger than 12 cm. Males are usually bigger than females (Berg 1949, Verin 1978).

Perccottus glenii has no economic value, but it is fished for and consumed in some regions. Sometimes it is treated as an ornamental fish (Axelrod 1991, Załachowski 1992), and sometimes is taken by anglers (Dmitriev 1971, Verin 1978). It was brought to the former USSR either accidentally, together with the stocking material of phytophagous fish, or introduced on purpose to a number of water bodies in the European and Asiatic part, in this as a biological means of combating mosquito larvae (Berg

1949, Elovenko 1981).

The first stations of this species were found in Poland in the old Vistula River bed near Dęblin (Antychowicz 1994) and in Kazimierz Dolny (Terlecki 1995, Terlecki and Pałka 1997).

The objective of this study was to find new stations of *Percottus glenii* in old river beds and water bodies along the Vistula.

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MATERIAL AND METHOD

Catches of *Percottus glenii* were performed in 1996 and 1997, mostly in August and September, when aquatic plants were already well developed. The fish were caught with a landing net with mesh size 5 mm, and a small tow net, mesh size 2 mm. At first, in 1996, catches were performed near Kazimierz Dolny, where *P. glenii* was found for the first time. Then the study area was broadened to comprise a number of small water pools and old river beds along the Vistula and its tributaries. There were

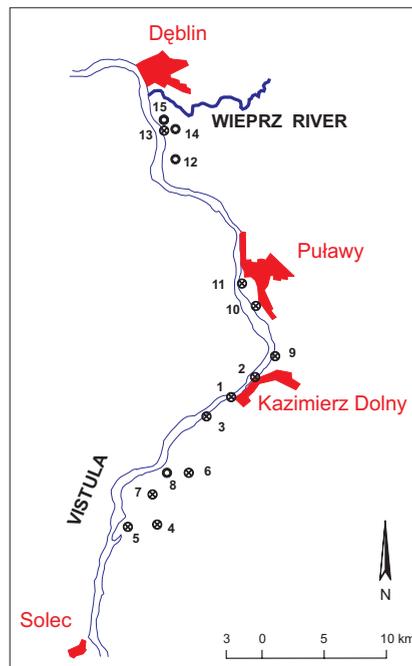


Fig. 1. Study area; catching points as in table 1; empty circle – *P. glenii* not caught

15 water bodies surveyed in 1996 (fig 1). They yielded totally 736 fish of this species, of body length (lc) from 1.5 to 9 cm. In 1997 catches were carried out in old river beds of Wieprz with Tyśmienica rivers, a right-hand tributary of the Vistula near Dęblin - 9 stations were selected. Stations, dates of sampling, numbers and body length of the fish caught are presented in table 1.

TABLE 1

Characteristics of the collected material

No.	Sampling stations	Body water/ river	Date of collection	Number of fishes	Standard length (lc), in mm
1.	Kazimierz Dolny Krakowska str	Vistula river	15.08.96	30	20.0-80.0
2.	Kazimierz Dolny Puławska str	Vistula river	15.08.96	6	25.0-75.0
3.	Męcierz	Vistula river	15.08.96	11	15.0-60.0
4.	Kolonia Koło	Vistula river	25.08.96	191	18.2-88.7
5.	Kolonia Koło-Trzczańskie Pola	Vistula river	25.08.96	27	14.8-92.1
6.	Dobre	Chodelka river	07.09.96	4	28.1-36.6
7.	Urządów	Wrzelowianka	07.09.96	8	23.2-50.2
8.	Kolonia Wilków	Vistula river	07.09.96	no caught	-
9.	Bochotnica	Vistula river	05.09.96	128	20.5-43.1
10.	Włostowice-Parchatka	Vistula river	05.09.96	223	19.0-83.9
11.	Włostowice-Puławy	Vistula river	05.09.96	48	16.9-51.3
12.	Gołąb	Vistula river	10.09.96	no caught	-
13.	Gołąb-Matygi	Vistula river	10.09.96	60	16.5-75.8
14.	Jeziro Nury	Lake Nury	10.09.96	no caught	-
15.	Jeziro Borowiec	Lake Borowiec	10.09.96	no caught	-
16.	Jeziro	Tyśmienica river	03.05.97	no caught	-
17.	Uroczysko Wąsocze	Tyśmienica river	05.05.97	no caught	-
18.	Uroczysko Pastewnik	Tyśmienica river	05.05.97	no caught	-
19.	Pogonów-Baranów	Wieprz river	20.09.97	no caught	-
20.	Cezaryn	pond	21.09.97	no caught	-
21.	Strzyżowice	Wieprz river	21.09.97	no caught	-
22.	Kośminy	Wieprz river	21.09.97	no caught	-
23.	Obłapy	Wieprz river	22.09.97	no caught	-
24.	Niebrzegów	Wieprz river	22.09.97	no caught	-

A number of anglers and local people were also interviewed on the occurrence of *P. glenii* at particular stations.

All fish were packed to plastic bags and frozen. Measurements of body length (*longitudo corporis*) were performed in the laboratory using a slide calliper and the accuracy up to 0.1 mm.

RESULTS

Sampling stations can be divided into four groups: (i) water bodies in which *P. glenii* was caught together with a few other fish species, in this of economic value, (ii) waters in which *P. glenii* occurred together with gold fish (*Carassius auratus gibelio*) and minnow (*Misgurnus fossilis*), or with one of these two species, (iii) waters in which *P. glenii* occurred by itself, and finally, (iv) waters where no *P. glenii* was found.

Two old river beds in Kazimierz Dolny belonged to this group: one in vicinity of Bochoznica, and one in the vicinity of Puławy (stations 1, 2, 9, 10 and 11). All of them are periodically connected with the Vistula River. Besides *P. glenii*, stations 1 and 2 were inhabited by tench (*Tinca tinca*), gold fish, pike (*Esox lucius*), perch (*Perca fluviatilis*), roach (*Rutilus rutilus*), ruffe (*Gymnocephalus cernuus*), minnow and bleak (*Alburnus alburnus*). As regards station 9, *P. glenii* occurred there together with gold fish and common crucian carp (*Carassius carassius*) as well as pike, while at stations 10 and 11 there was tench instead of pike. The discussed old river beds were about 0.5 ha in area. That one near Puławy was an exception. Its length was 4 km and width - 15-30 m. Average depth of all these places was from 0.5 to 1.0 m. Bottom was muddy, overgrown with submerged and emergent macrophytes as well as plants with floating leaves.

The second group comprised stations 3, 4, 5, 7, and 13. All of them except station 3 (a small water pool located on an island of the Vistula) had no connection with the Vistula River. They are located farther from this river (e.g. station 4 - Kolonia Koło - is 3 km away from), or are separated from the Vistula by an anti-flood dike. They are water bodies of from 0.3 to a few ha, muddy bottom, sometimes overgrown with submerged vegetation. Average depth of these waters ranged from 0.5 to 1.0 m.

The third group comprised only one water body. It was an old bed of a small stream Chodelka, right-hand tributary of the Vistula (station 6 - Dobrze). This station is located 3 km away from the inflow of Chodelka to the Vistula River. The old river bed is composed of a few pools 0.1-0.2 ha in area and average depth 0.3-0.5 m. They have no emergent vegetation and can dry completely. Vistula waters sometimes overflow this bed in the periods of high waters.

The fourth group comprised those sampling stations, where no *P. glenii* was found. There were four stations located along the Vistula stretch (fig. 1): Kolonia Wilków, Gołab, lakes Nury and Borowiec (stations 8, 12, 14 and 15). Only gold fish

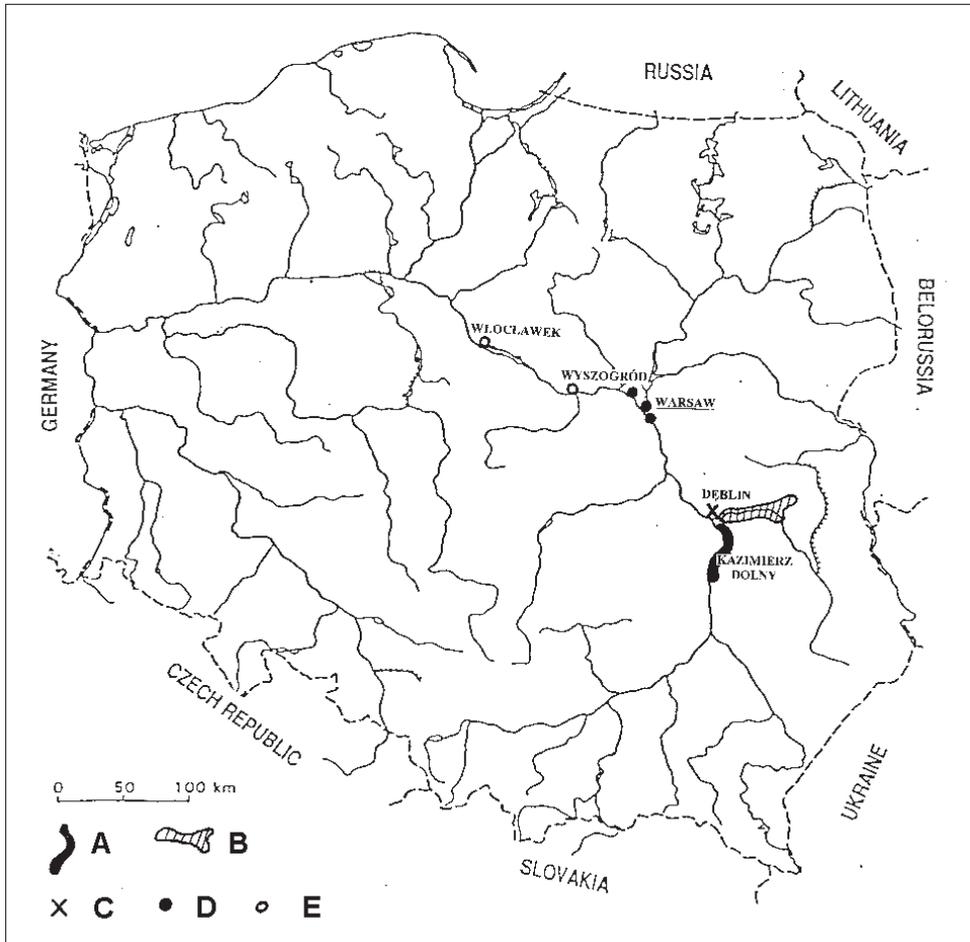


Fig. 2. Distribution of *Perccottus glenii* along Vistula River. A – authors, B – authors (*P. glenii* not found), C – Antychowicz (1994), D – Woźniewski (1997), E – Kakarego (in press).

and minnow were caught at these stations. Area of these stations ranges from 0.5 to 1.0 ha, average depth is 0.5-2.0 m. None of these water bodies is connected with the Vistula. They are frequently located nearby the waters inhabited by *P. glenii*. This group comprises also all stations located along the investigated stretches of the Wieprz and Tyśmienica rivers (tab. 1). Gold fish was the most frequent fish in these waters, but there were also places with many fish species, in this also pike, tench, minnow, gold fish, perch, roach, brown bullhead (*Ictalurus nebulosus*) and stickleback (*Gasterosteus aculeatus*). All of these stations resembled habitats with *P. glenii*.

Surveys carried out in 1996 suggest that *P. glenii* is a common fish species along the selected 40 km long stretch of the Vistula. This fish was found at 11 out of the 15 stations (tab. 1, fig 1). It must also occur in high numbers: as many as 736 fish were collected. Places with no *P. glenii* have been for a long time isolated from the river and its high waters. In the study area, *P. glenii* usually inhabited old river beds characterised by harsh thermal and oxygen conditions. Frequently it was the only fish species in these habitats. Surveys carried out in 1997 proved that *P. glenii* did not occur in the basin of Tyśmienica and Wieprz rivers, although there were suitable habitats there too (tab. 1, fig. 2).

DISCUSSION

The first documented introduction of *Perccottus glenii*, from Zeja River to park ponds at the outskirts of St. Petersburg, took place at the beginning of this century. The fish spread from there to the nearby lakes and shallow waters of the Bay of Finland (Elovenko 1981). In 1950, the species was transferred from the Amur River to a few water bodies near Moscow (Spanovskaya et al. 1964, Dmitriev 1971), and in 1970 - to a fishery enterprise near Nizhny Novgorod, Gorkovsky area, where it was accidentally brought with Amur carp (Kuderskiy 1980). *P. glenii* migrated from Moscow area, via Moskva and Oka rivers, and invaded flood plains and old beds of the middle Volga, where it was found in 1977-1979 (Elovenko 1981). It reached Kama River from the middle Volga, and was found in the vicinity of Perm (Glukhovtsev and Dukravtes 1987). Diripasko (1997) caught this species during 1982 in the lake Inzeger (south-eastern part of Kaliningrad). This lake is connected with the river Pregel which flows to the Vistula Lagoon. In 1958-1960 it was brought to the ponds in Kazakhstan, together with phytophagous fishes transferred from the town of Charbin, by Syngaria River. It then migrated to natural water bodies of middle Asia, connected with the Aral Sea and Lake Balkhash basins (Seleznev 1974, Smirnova 1974, Diarova 1975, Elovenko 1981, Glukhovtsev and Dukravets 1987).

In Poland, *P. glenii* was found for the first time in summer 1993 and spring 1994, in an old river bed of the Vistula, near Kazimierz Dolny (Terlecki 1995, Terlecki and Pałka 1997). Antychowicz (1994) reported that this fish was caught in December 1993 by an angler fishing in the Old Vistula bed near Dęblin. In 1997 it was found in the Vistula, in three sections near Warsaw: in the region of Otwock, at the height of Old Town of Warsaw, and in the region of Łomianki (Woźniewski 1997). In 1998 Kakare-

ko (in print) observed *P. glenii* in Włocławek Dam Reservoir. Interviews with anglers and people living in the vicinity of the examined water bodies suggest, however, that this species has been found here much earlier. One angler stated that he had caught it already just after the II World War. He did not know the species, but he described it and his description suggests that it might have been *P. glenii*. This information should be, however, taken with a lot of caution.

Results presented in this paper as well as the literature data reveal that *P. glenii* occurs in the middle section of the Vistula River, along the stretch of some 250-300 km, from Włocławek Dam Reservoir upstream to the region of Kazimierz Dolny, and that it reproduces in a variety of waters. It is fairly common along the stretch from Dęblin to Kazimierz Dolny. Numbers of fish caught (736 specimens) suggest that the fish is quite abundant in this region. It inhabits mostly old river beds of Vistula, sometimes areas which dry up in summer and characterised by harsh oxygen conditions, and in these waters it is frequently the only representative of the ichthyofauna. On the other hand, it has not been found in the old beds of Wieprz and Tyśmienica rivers, although „visually” these habitats resemble those inhabited by *P. glenii*.

A question arises how *Perccottus glenii* has reached Polish waters? It seems that human activities were the direct reason for its appearance in our country. *P. glenii* could have been brought to Poland accidentally, together with the introduced new fish species. Kuderskiy (1980) advocates that this is the most frequent reason for expanding the area occupied by this species in Russia. Anglers' participation cannot be excluded either; some of them might have released these fish as an unused live bait. This would explain its presence in water bodies that have no connection with any river. It should be also remembered that *P. glenii* is cultured as an ornamental fish (Axelrod et al. 1992, Załachowski 1992, Antychowicz 1994). Consequently, it is highly probable that some fish have been released (thrown out) to the old river beds by the ornamental fish breeders or traders. The river, and more specifically - high waters, resulted in further expansion of the fish to new areas, where it has found favourable conditions for reproduction. Elovenko (1981) also pointed out rapid expansion of this species. He also thinks that *P. glenii* might have migrated also to the basins of Dnieper, Don and Daugawy rivers.

CONCLUSIONS

1. *Perccottus glenii* is a common fish in the old beds of the Vistula River, along the section from Kazimierz Dolny to Dęblin.

2. No *Perccottus glenii* was caught in the surveyed old beds of Wieprz and Tyśmienica rivers.
3. *Perccottus glenii* inhabits old river beds of small area, shallow, muddy, usually overgrown with submerged, floating and emergent vegetation, irrespective of whether these areas are connected with the river or not.
4. *Perccottus glenii* usually occurred together with gold fish (*Carassius auratus gibelio*) and minnow (*Misgurnus fossilis*).

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STRESZCZENIE

WYSTĘPOWANIE *Percottus glenii* Dybowski 1877 (*Perciformes, Odontobutidae*) W ŚRODKOWEJ WIŚLE.

W latach 1996 – 1997 przeprowadzono połowy w starorzeczach na 40 km odcinku Wisły od Kazimierza Dolnego do Dębina oraz wzdłuż Wieprza, (prawobrzeżnego dopływu Wisły) i Tyśmienicy (prawobrzeżnego dopływu Wieprza) w poszukiwaniu wschodnio-azjatyckiego gatunku ryby *Percottus glenii*. Wzdłuż Wisły wytypowano 15 stanowisk, a wzdłuż Wieprza i Tyśmienicy – 9. Z przeprowadzonych połowów wynika, że na terenie badań wzdłuż wybranego odcinka Wisły *P. glenii* występuje pospolicie. Stwierdzono go w 11 z 15 przebadanych stanowisk (tab. 1, rys. 1.). Razem złowiono 736 o długości ciała (l.c.) od 1,5 do 9,0 cm. Rozmiary ciała oraz liczba złowionych ryb świadczą o rozradzaniu się i masowym występowaniu *P. glenii* na tym terenie. Miejsca w których nie stwierdzono tego gatunku są izolowane od bardzo długiego czasu od rzeki i jej wód wielkich. Na terenie badań *P. glenii* zasiedlał głównie starorzeczka o surowych warunkach termicznych i tlenowych, najczęściej występując razem z karasiem srebrzystym (*Carassius auratus gibelio*) i piskorzem (*Misgurnus fossilis*). Nie stwierdzono obecności *P. glenii* w starorzeczach związanych z Wieprzem i Tyśmienicą, mimo iż istnieją tam dla niego dogodne warunki bytowania (tab. 1, rys.2).

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