



NEW LOCALITIES OF *POTAMOPYRGUS ANTIPODARUM* (GRAY, 1843) IN THE WATERS OF THE WIGRY NATIONAL PARK

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ABSTRACT: *Potamopyrgus antipodarum* (Gray) was recorded from seven of 24 examined lakes of the Wigry National Park and from the river Kamionka. The snail had not been previously recorded from the lakes: Staw Wigierski, Pierty, Czarne Huciańskie and Koleśne. *P. antipodarum* inhabits waters of varied character (rivers, lakes of different morphometry and trophy). Its spread in the Park results probably from transport by birds and humans, and to a lesser degree by water currents.

KEY WORDS: *Potamopyrgus antipodarum*, expansion, new localities, Wigry National Park

INTRODUCTION

Potamopyrgus antipodarum (Gray, 1843) [= *Potamopyrgus jenkinsi* (E. A. Smith, 1889), *Potamopyrgus cristallinus carinatus* (Marshall, 1889)] is native to freshwaters of New Zealand. It was introduced in Europe most probably in the second half of 19th century. In 1883 it was found by E. A. SMITH (1889) in the mouth of the river Thames. Since then it has been spreading in fresh and brackish waters of Europe. In Poland it was first noted in 1933, in the Trłag lake, district Inowrocław (URBAŃSKI 1935). Its range in Poland is gradually increasing, new localities being found regularly (JACKIEWICZ 1973, STRZELEC & KRODKIEWSKA 1994).

The presence of *P. antipodarum* in the waters of the Wigry National Park was first observed by LEWANDOWSKI (1992) who found it at several localities in the Wigry lake, and regarded it as a rare species, though in several sites its density exceeded 1200 individuals/m². In 1993 KOŁODZIEJCZYK (1996) found it in the Białe Wigierskie lake which adjoins the Wigry lake but since 1993 has no connection with it. GRUŻEWSKI (1997) noted the presence of the snail in the river Kamionka, between the lakes Koleśne and Pierty.

The objective of this study was to map the distribution of *P. antipodarum* in the lakes and rivers of the Wigry National Park.

STUDY AREA AND METHODS

Samples of malacofauna were taken in the summer 1997 and 1998, in 24 out of 42 lakes of the Park and in 3 out of 6 rivers (Fig. 1). A short characteristics of the studied lakes is presented in Table 1. On each lake, depending on local conditions, 1 to 17 sites were selected. From each locality

macrophytes were taken and sediments were sampled with Birge-Ekman's apparatus, catch area 225 cm² (3–5 samples) from the depth of 0.5 m to the limit of mollusc vertical distribution. One plant sample was a portion of Characeae swept in the net, 10 shoots of *Potamogeton* or 10 blades of reed.



Fig. 1. Study area. Waters of the Wigry National Park. Water flow indicated with arrow, sampled lakes shaded



Table 1. Selected parameters of investigated lakes in the Wigry National Park (ZDANOWSKI et al. 1992)

| Lake | Area [ha] | Mean depth [m] | Secchi disc visibility [m] | PO ₄ -P [mg×dm ⁻³] | Plant-covered area [%] |
|--------------------|-----------|----------------|----------------------------|---|------------------------|
| Białe Pierciańskie | 6.0 | 6.0 | 4.4 | 0.06 | – |
| Białe Wigierskie | 100.2 | 13.2 | 6.65 | 0.017 | 29.2 |
| Czarne | 6.4 | 10.3 | 1.47 | 0.1 | 64 |
| Czarne Huciańskie | 7.8 | 2.3 | – | – | 21.4 |
| Długie | 80.0 | 6.4 | 3.0 | 0.015 | 23.8 |
| Gałężiste | 3.9 | 5.2 | 3.74 | 0.174 | – |
| Koleśne | – | – | – | – | – |
| Królówek | 9.9 | 2.2 | – | – | 54.5 |
| Leszczewek | 21.0 | 3.6 | 1.1 | – | 31 |
| Muliczne | 25.7 | 4.7 | 3.65 | – | 49 |
| Omułówek | 14.2 | 3.0 | 2.5 | – | 63.3 |
| Okrągłe | 12.2 | 6.7 | 2.6 | 0.004 | 32 |
| Pierty | 228.2 | 10.4 | 1.35 | 0.034 | 25.5 |
| Samle Wielkie | 2.1 | 5.5 | 2.7 | 0.108 | – |
| Staw Wigierski | – | – | – | – | – |
| Suchar I | 0.9 | 5.5 | 1.75 | – | – |
| Suchar II | 2.6 | 2.5 | 1.9 | 0.048 | – |
| Suchar III | 0.33 | 3.6 | 2.0 | – | – |
| Suchar IV | 1.15 | 1.9 | 1.55 | 0.072 | – |
| Suchar V | 0.5 | 3.2 | 2.0 | – | – |
| Suchar Demb. | 3.3 | 4.3 | 2.9 | 0.021 | – |
| Suchar Wielki | 8.9 | 3.6 | 2.6 | 0.006 | – |
| Wądołek | 1 | 8.6 | 1.5 | 0.24 | – |
| Wigry | 2118.3 | 15.8 | 2.3 | 0.096 | 23.8 |

“–” denotes the lack of data

Algal mats were also sampled. In each sites 5 plant samples were taken. In small, forest lakes only qualitative samples were taken in the littoral. The samples were washed on a sieve of 1 mm mesh, pre-

served in methyl alcohol or formalin and sorted macroscopically.

RESULTS AND DISCUSSION

P. antipodarum was found in seven lakes: Białe Wigierskie, Wigry, Okrągłe, Pierty, Staw Wigierski, Czarne Huciańskie, Koleśne and the river Kamionka. Of these, in the following lakes: Okrągłe, Pierty, Staw Wigierski, Czarne Huciańskie and Koleśne, the snail had not been observed prior to 1998 or there had been no data on its occurrence (Table 2). *P. antipodarum* was not found in small, isolated meso- and eutrophic (Samle Wielkie, Gałężiste, Białe Pierciańskie) or polytrophic lakes (Wądołek, Suchar Dembowski, Suchar Wielki, Suchar I–V) and in some lakes connected to the Wigry lake with small streams (Leszczewek, Omułówek, Czarne). It was also absent

from the lakes Muliczne and Długie though it was found in the Okrągłe lake, connected with them. However, it was found in two lakes completely separated from the Wigry lake: Białe Wigierskie and Staw Wigierski.

P. antipodarum was the most abundant in the Wigry lake – up to 12,000 individuals/m² reed surface and up to 10,000 individuals/m² sediment surface, but its distribution was very uneven: in the southern part (Plos Zakątkowski, Plos Bryzgzłowski) it was very numerous, while in the northern part (Plos Wigierski) it was sparse or absent. The snail was not found in two out of 17 sites in the Wigry lake. In the lakes Staw Wigierski,

Table 2. Occurrence of *P. antipodarum* in waters of the Wigry National Park

| Lake/river | 1992(1) | 1996(2) | 1997(3) | 1998 |
|--------------------|---------|---------|---------|------|
| lakes | | | | |
| Białe Pierciańskie | – | – | – | 0 |
| Białe Wigierskie | 0 | * | – | * |
| Czarne | – | – | – | 0 |
| Czarne Huciańskie | – | – | – | * |
| Długie | – | – | – | 0 |
| Gałężiste | – | – | – | 0 |
| Koleśne | – | – | – | * |
| Królówek | – | – | – | 0 |
| Leszczewek | – | – | – | 0 |
| Muliczne | – | – | – | 0 |
| Okragłe | – | – | – | * |
| Omulówek | – | – | – | 0 |
| Pierty | 0 | – | – | * |
| Samle Wielkie | – | – | – | 0 |
| Staw Wigierski | – | – | – | * |
| Suchar Dembowski | – | – | – | 0 |
| Suchar I–V | – | – | 0 | 0 |
| Suchar Wielki | – | – | – | 0 |
| Wądołek | – | – | 0 | 0 |
| Wigry | * | – | *** | *** |
| rivers | | | | |
| Czarna Hańcza | – | – | 0 | 0 |
| Kamionka | – | ** | * | * |
| Wiatrołuża | – | – | – | 0 |

0 – absent, * – rare, ** – frequent, *** – very frequent, – – no data. (1) – according to LEWANDOWSKI (1992), (2) – data from the lake Białe Wigierskie according to KOŁODZIEJCZYK (1996), from the river Kamionka according to GRUŻEWSKI (1993), (3) – data from the Wigry lake according to KOŁODZIEJCZYK (in press)

Okragłe and Koleśne only single live specimens and few empty shells were collected. In the lake Białe Wigierskie *P. antipodarum* was found only in one out of seven sites – near the canal separating this lake from the Wigry lake. The density there was 448 individuals/m² reed surface. In the Pierty lake single specimens were found at two out of eight localities – on reeds (6 indivs/m² reed surface) and in the sediments at the depth of 4 m (15 indivs/m²). In the Kamionka river *P. antipodarum* was present along the whole section between the lakes Koleśne and Pierty, except the rapids.

Most probably *P. antipodarum* invaded the lake Pierty from the Czarne Huciańskie lake with the current of the Kamionka river (both sites where it was found are located near the mouth of Kamionka), but still has not invaded the Wiatrołuża river which falls into the Pierty lake, nor the Królówek lake connected with them and Omulówek, located between the lakes

Pierty and Wigry. The presence of *P. antipodarum* in the lakes Białe Wigierskie and Staw Wigierski may result from its transport by animals or humans.

It is unknown how *P. antipodarum* arrived in the waters of the Wigry National Park. It is absent from the Czarna Hańcza river above the Wigry lake and, as observed by KOŁODZIEJCZYK (1994) from the waters of the Suwalski Landscape Park. The closest situated literature record is the Mikołajskie lake (KOŁODZIEJCZYK 1984). Most probably *P. antipodarum* spreads in leaps and bounds, introduced by aquatic birds or by humans. The invasion of the Wigry lake is a stage in its expansion to consecutive water bodies; because of the mass occurrence in the Wigry, the lake is a centre from which *P. antipodarum* spreads to other lakes of the Suwałki district. A better knowledge of the fauna of waters of north-eastern Poland is needed to trace the course and results of the expansion of this species.



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