

HYDROBIIIDAE AND RISSOIDAE (GASTROPODA: PROSOBRANCHIA) FROM PUCK BAY (THE BAY OF GDAŃSK, SOUTHERN BALTIC)

ROMAN WENNE

Institute of Oceanology, Polish Academy of Sciences, Powstańców Warszawy 55, 81-712 Sopot, Poland

ABSTRACT: The paper deals with distribution and systematic position of gastropod species of the families Hydrobiidae and Rissoidae from Puck Bay (the Bay of Gdańsk). Three hydrobiid species: *Hydrobia ulvae*, *H. ventrosa* and *Potamopyrgus jenkinsi*, have been found together with the rissoid *Rissoa membranacea*.

KEY WORDS: Truncatelloidea, Rissoidea, species distribution, taxonomy

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Abstract: The paper deals with distribution and systematic position of gastropod species of the families Hydrobiidae and Rissoidae from Puck Bay (the Bay of Gdańsk). Three hydrobiid species: Hydrobia ulvae, H. ventrosa and Potamopyrgus jenkinsi, have been found together with the rissoid Rissoa membranacea.

INTRODUCTION

The systematics and biology of marine species of the family Hydrobiidae were studied within the British coastal waters (Anderson 1971, Chatfield 1972), Baltic Sea (Hylleberg 1976, 1978, 1986, Lassen and Clark 1979, Lapalainen 1979, and Schüller 1984), White Sea (Kaufman 1977) and Black Sea (Čuchčín 1976). The distribution of the Hydrobiidae in the Inner Puck Bay has been studied so far only as a part of general studies on the zoobenthos (Żmudziński 1967, SKNO manuscript, Legeżyńska and Wiktor 1981, Wenne and Wiktor 1982). Falniowski (1987) gave a morphological-anatomical characteristics of the Hydrobiidae of Puck Bay and discussed the systematic position of the group. The occurrence of representatives of the family Rissoidae in the Inner Puck Bay and, thence, by the Polish coast, was recorded first in 1973 (Falniowski, Dyduch and Smagowicz 1977), but their distribution and systematic position were poorly recognized.

This paper is to present the distribution of the hydrobiid and rissoid species which are known to occur in Puck Bay, together with some aspect of their ecology.



MATERIAL AND METHODS

Samples were taken from 4 to 17 August 1977 at 28 stations distributed within the inner Puck Bay, at a depth of up to 5 m (Fig. 1). At each station three Ekman grab samples were taken and washed on a sieve with a re-

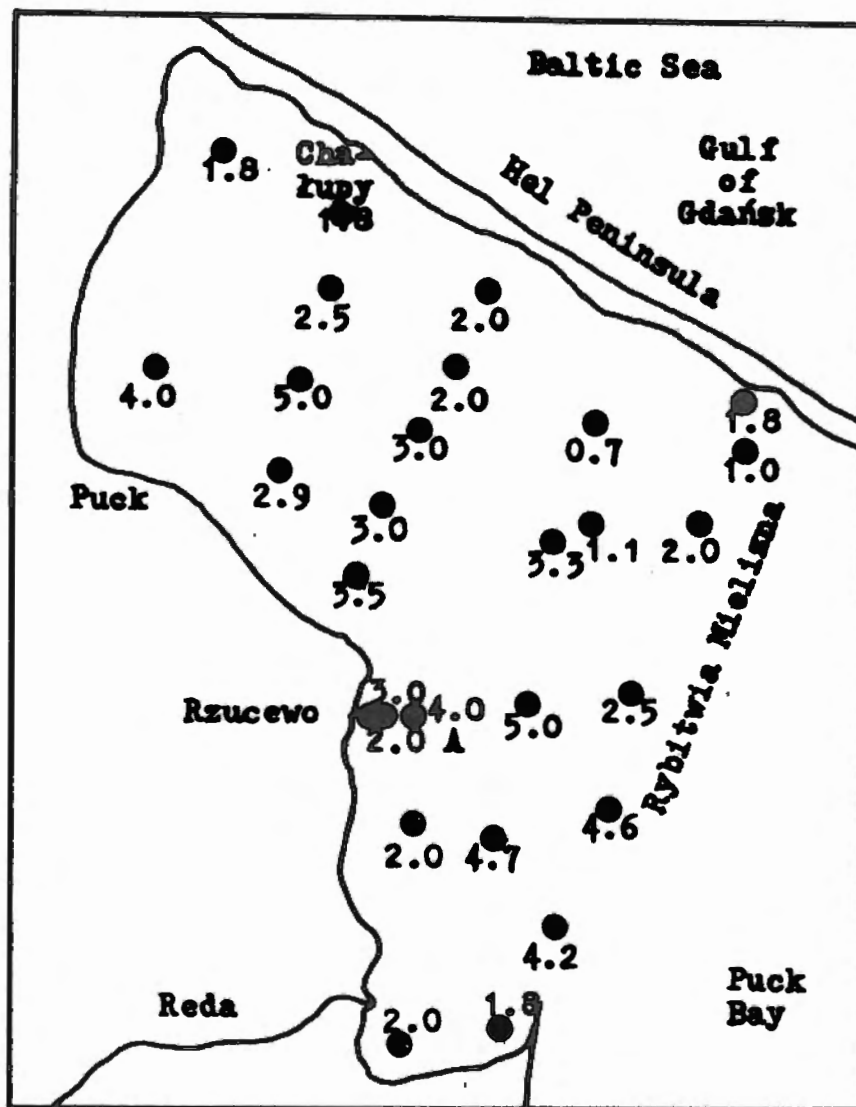


Fig. 1. Inner Puck Bay, stations are marked with dots, figures refer to depths in m.

gular square mesh of 1 mm. The area of each sample was 1/64 sq m. Another material used for the study was collected in 1984 from several stations, by means of a dredge. Living specimens were sorted and then fixed with 4% formalin solution. For systematic purposes the radulae of the gastropods studied were etched with 10% potassium hydroxide solution. The shell di-

mensions (height and width) were measured by means of a stereo-microscope with accuracy ± 0.001 mm.

RESULTS AND DISCUSSION

Hydrobiidae

Hydrobia ulvae (Pennant, 1777) (the generic name Peringia is often used) occurred most abundantly near Rzucewo (up to 9,850 ind. per sq m), Ryf Mew (9,423 ind. per sq m) and Jama Chałupska (4,587 ind. per sq m), while most scarcely in the shallowest parts of the Bay (Fig. 2). The mean densi-

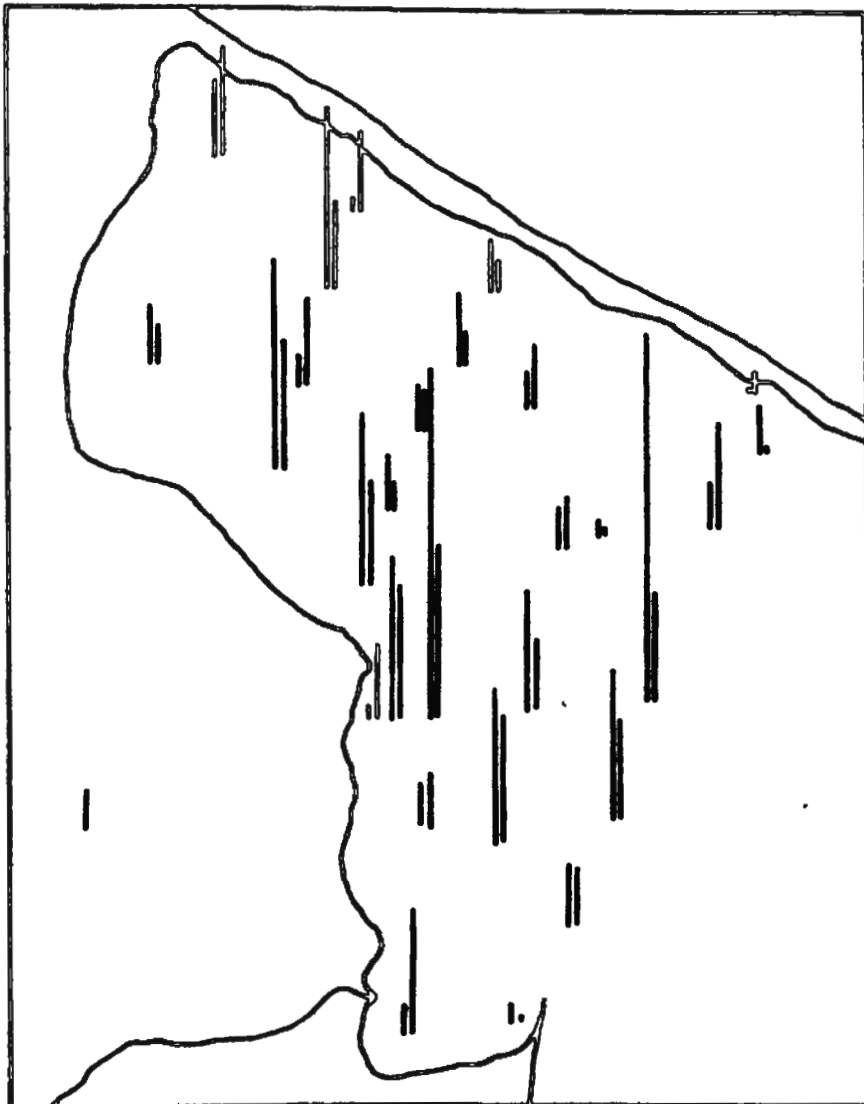


Fig. 2. Distribution of Hydrobia ulvae and H. ventrosa in the Inner Puck Bay.

ty of H. ulvae in the Inner Puck Bay was 2,393 ind. per sq m. Size frequency is shown in Fig. 3 concerning the size classes that cover individuals having their shells more than 1.5 mm high and wide, collected at station A. Near the coast of Sweden H. ulvae larvae settle in early summer; in August juveniles reach 0.6 - 0.8 mm, while in December 1.3 mm in height (Lappalainen 1979). Hence, the two generations visible in Fig. 3 correspond to age classes 1+ and 2+. The proportion of height to width was 1.2 - 2.9 (most commonly 1.7), being higher in older individuals.

Hydrobia ventrosa (Montagu, 1803) was the most abundant in the region of Rzucewo (up to 4,480 ind. per sq m), near the outlet of the River Reda (3,200 ind. per sq m), Ryf Mew (2,604 ind. per sq m) and Władysławowo (2,602 ind. per sq m), while least numerous occurred in the shallowest parts of the Bay (Fig. 2). The mean density of H. ventrosa was 1,842 ind. per sq m). The numbers of H. ulvae and H. ventrosa were positively correlated (correlation coefficient: 0.66, $p = 0.01$). Shells of both species may be a substrate for sedentary macroorganisms. Less than 0.5% of the individuals had their shells overgrown with filamentous algae, or less often with the bryozoan Membranipora crustulenta (Pallas).

Potamopyrgus jenkinsi (E. A. Smith, 1889) in the Inner Puck Bay was found only before the outlet of the River Reda, at a depth of 2 m (43 ind. per sq m).

In the earlier literature diagnoses of Hydrobia neglecta (Muus, 1963) were not clear owing to the similarity of its shell to that of H. ventrosa. According to Hylleberg (1976) the key character in the identification of H. neglecta is the appearance of the central tooth of the radula. The central tooth of the radula of this species bears two conspicuous basal cusps, which corresponds to the picture of H. minuta (Totten, 1834) published in Nordsieck (1972, Fig 16c, Tafel RII). The apex of the shell of H. neglecta is rounded and corroded; the shell is thin, varied in colour, bearing a rather deep suture which is intermediate, between H. ventrosa and H. ulvae (Hylleberg 1976). However, the shell morphology is not a character which would allow for discrimination between H. neglecta and H. ventrosa. Other important characters are the penis habitus and head pigmentation, whose description was given by Falniowski (1987).

The specimens of H. ulvae and H. ventrosa found by the author in the Inner Puck Bay had the radulae bearing only one distinct pair of basal cusps (without another pair of even vestigial ones), similar to the ones shown in Figs 1 and 3 in the paper of Hylleberg (1976) and that of "H. stagnalis" presented by Nordsieck (1972) in Fig. 16b, Tafel RII. A central tooth with a vestigial cusp is shown in Fig. 5 in the paper of Falniowski, Dyduch and Smagowicz (1977). The specimens described in the present paper,

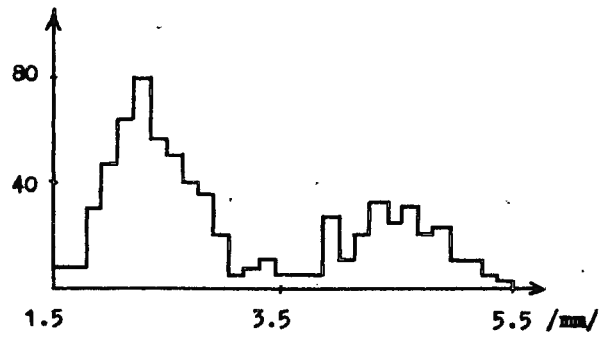


Fig. 3. Height frequency of *Hydrobia ulvae* at station A .

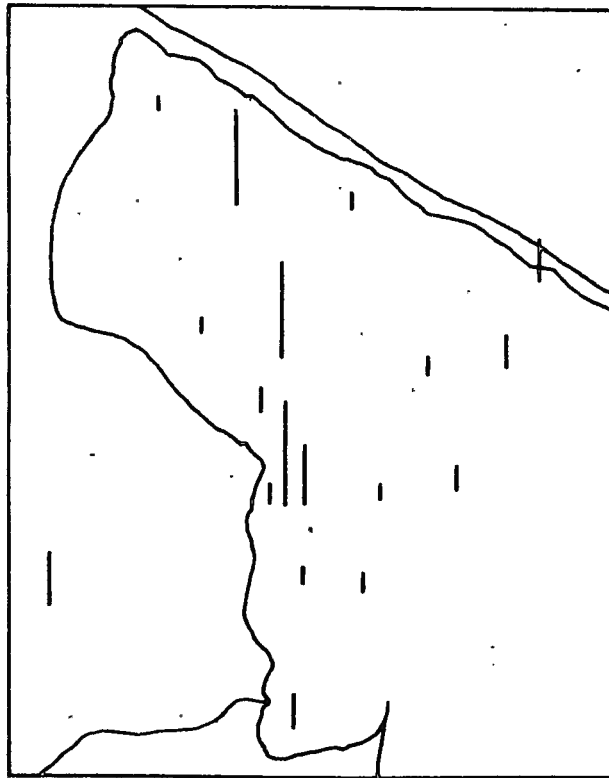


Fig. 4. Distribution of *Rissoa membranacea* in the Inner Puck Bay

their shells resembling the one described for H. neglecta, had the central tooth with one basal cusp on both sides, so they were regarded as H. ventrosa. The form described in the paper of Falniowski, Dyduch and Smagowicz (1977), and determined as H. neglecta, differs from the Hylleberg's description of the species in having a hardly visible (actually vestigial) additional basal cusp on each side of the central tooth. In the Inner Baltic H. neglecta was recorded from the western part of the GDR coast (Schüler 1984). It was not found near the islands Rugia (Schüler 1984), Rland and Askö (Hylleberg 1986). H. neglecta can bear, though not breeding, a salinity of 8 - 10‰ (Hylleberg 1986).

The distribution pattern of Hydrobia spp. in the Inner Puck Bay, presented in this paper, corresponds with results of the studies carried out in the same year by Legeżyńska and Wiktor (1981). The highest densities of Hydrobia spp. were observed near Rzucewo, Władysławowo and Ryf Mew. Spatial differences in the population density of Hydrobia spp. were also reported occurring in other geographic regions as, for instance, Great Britain (Anderson 1971, Chatfield 1972), Denmark (Hylleberg 1986) and Finland (Hylleberg 1978). If particular stations do not significantly differ in salinity and temperature, as for instance in the Inner Puck Bay, the availability of food may be an important factor controlling the species density. The main component of the food of Hydrobia spp. is benthic diatoms (Bianchi and Levinton 1984, Levinton, Bianchi and Stewart 1984).

The mean number and biomass of Hydrobia spp. as given by various authors for the Inner Puck Bay, are listed in Tab. 1. The present results confirm the observation of Legeżyńska and Wiktor (1981) concerning an increase in the number of Hydrobia spp. in the seventies. The differences in Hydrobia spp. mean numbers recorded by various authors in 1977 might have been due to various meshes of the sieves they used.

Table 1

Mean number (ind./sq m) and biomass (g/sq m) of Hydrobia spp. in the Inner Puck Bay

Study period	ind./sq m	g/sq m	number of stations	square mesh	Author
1962 - 1963	2,500	-	30	0.5 mm	Żmudziński 1967
August 1974	3,600	15	30	0.5 mm	SKNO 1975
August 1977	10,987	50	30	0.5 mm	Legeżyńska and Wiktor 1981
August 1977	4,235	-	28	1.0 mm	this paper

Rissoidae

Rissoa membranacea (J. Adams, 1797) is a very variable species, there being several forms of it, described so far (Mars 1956, Rehfeldt 1968, Nordsieck 1972, Čuchčín 1975). Some authors place it either in the genus Rissostomia (e. g. Nordsieck 1972) or Zippora (e. g. Worthmann 1976, Wenne and Wiktor 1982). Rehfeldt (1968) described two forms of R. membranacea from Danish waters. Form A, characteristic in its protoconch and teleoconch much smaller than those of form B, has no pelagic larva, and can bear a salinity of less than 15‰. Form B, having a pelagic veliger stage, does not occur at a salinity of less than 15‰. Specimens from the Inner Puck Bay, occurring at a salinity of 7.5‰, differ from form A in smaller protoconch and teleoconch, their shell and radula being very similar (A. Waren, the University of Goteborg, the opinion based on an analysis of a sample of the author's material). It is very likely that R. membranacea from the Inner Puck Bay does not have a planctonic veliger stage, too. The above data suggest that the Bay of Gdańsk is inhabited by the more brackish form of R. membranacea. However, the data available at present are insufficient to regard the form as a separate species (Rissostomia brunosericea Smagowicz, 1977). The specimens determined by Falniowski, Dyduch and Smagowicz (1977) as Turboella sarsi (Lovén, 1846), are apparently juveniles of R. membranacea, having their shells slightly darker. Both the radula structure and shell appearance seem to indicate this (A. Waren personal communication). The studied material comprised both specimens with smooth shells, being similar to the ones described by Smagowicz (1977), and specimens whose shells bore distinct ribs or knobs. The distribution of R. membranacea in the Inner Puck Bay is presented in Fig. 4. The species occurred most numerously near Rzucewo (192 ind. per sq m) and Jama Chałupska (171 ind. per sq m). Occurring only at a salinity of 7.5‰, it was not found to inhabit a partly freshened zone within the outlet of the River Reda. The species was also recorded from Puck Bay at Mechelinki and Jastarnia (at a depth of up to 20 m), and from the Bay of Gdańsk at Sopot (Wenne and Wiktor 1982).

No other rissoid species has been found in the collected material. The possible occurrence of the species known from the literature as Rissoa inconspicua Adler, 1844, whose nomenclature, however, needs verification, should be checked in further studies on the Rissoidae in Polish waters.

CONCLUSIONS

Three hydrobiid gastropod species (Hydrobia ulvae, H. ventrosa and Potamopyrgus jenkinsi) and a rissoid one (Rissoa membranacea) were found

to inhabit the Bay of Gdańsk which is acknowledged being the extreme E locality of *Rissoa membranacea* in the Baltic Sea.

Results of this study prove the hypothesis put forward by Legeżyńska and Wiktor (1981) about an increase in the density of *Hydrobia* spp. in the Inner Puck Bay.

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Institute of Oceanology
Polish Academy of Sciences
Powstańców Warszawy 55
81-967 Sopot, Poland

HYDROBIIDAE I RISSOIDAE (GASTROPODA, PROSOBRANCHIA) Z ZATOKI
PUCKIEJ (ZATOKA GDAŃSKA, BAŁTYK POŁUDNIOWY)

Streszczenie: W pracy przedstawiono rozmieszczenie i taksonomię ślimaków z rodzin Hydrobiidae i Rissoidae w Zatoce Puckiej. Stwierdzono trzy gatunki Hydrobiidae: Hydrobia ulvae, H. ventrosa i Potamopyrgus ienikinsi oraz jeden gatunek Rissoidae - Rissoa membranacea.