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Further step to the west - *Obesogammarus crassus* (G. O. Sars, 1894) (Crustacea, Amphipoda) already in the Szczecin Lagoon

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With 1 figure and 1 table

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Schlagwörter: *Obesogammarus*, Amphipoda, Crustacea, Neozoen, Oder, Polen, Einwanderung, Ausbreitung, Fundmeldung

Obesogammarus crassus (G. O. Sars, 1894) was recorded from the Szczecin Lagoon (mouth of the river Odra) in samples collected in 1998 and 1999. This invasive Ponto-Caspian gammarid co-occurred with two other alien species - *Gammarus tigrinus* Sexton, 1939 and *Chelicorophium curvispinum* (G. O Sars, 1895). The range extension of *O. crassus* is discussed.

1 Introduction

The Ponto-Caspian invasive amphipod *Obesogammarus crassus* was found in Polish waters for the first time in 1999 by Konopacka & Jazdzewski (2002). The species was collected in oligohaline waters of the Vistula Lagoon and of the Dead Vistula (an old, now sluiced and stagnant, estuarine section of the Vistula River). The present paper reports the third, interesting locality of *Obesogammarus crassus*, namely the Szczecin Lagoon, indicating the progressive invasion of this species to the west from its native south-east European basins.

Obesogammarus crassus enriches a list of gammarids which recently invaded Polish waters. Another Ponto-Caspian species, *Dikerogammarus haemobaphes* (Eichwald, 1841), was recorded in Poland for the first time in 1997 from the lower Vistula River (Konopacka 1998), whereas *Pontogammarus robustoides* (G. O. Sars, 1894), also a Ponto-Caspian species, was first found by Gruszka (1999) in the Szczecin Lagoon, and soon after was reported by Konopacka (1998) from the lower Vistula River. Further species of Ponto-Caspian origin, *Dikerogammarus villosus* (Sovinsky, 1894) was found in 1999 in the Oder River (Gruszka 2001, Müller & al. 2001, Jazdzewski & Konopacka 2002) downstream from the canal connecting the Oder drainage system with the Elbe basin. The North American newcomer, *Gammarus tigrinus* Sexton, 1939 was recorded first from the Szczecin Lagoon (Gruszka 1995, 1999, Wawrzyniak-Wydrowska & Gruszka 2001). Detailed informations on the distribution of all above-men-

tioned species in Polish waters and discussion on their invasion routes were given by Jazdzewski & Konopacka (2000, 2002) and by Jazdzewski, Konopacka & Grabowski (2002).

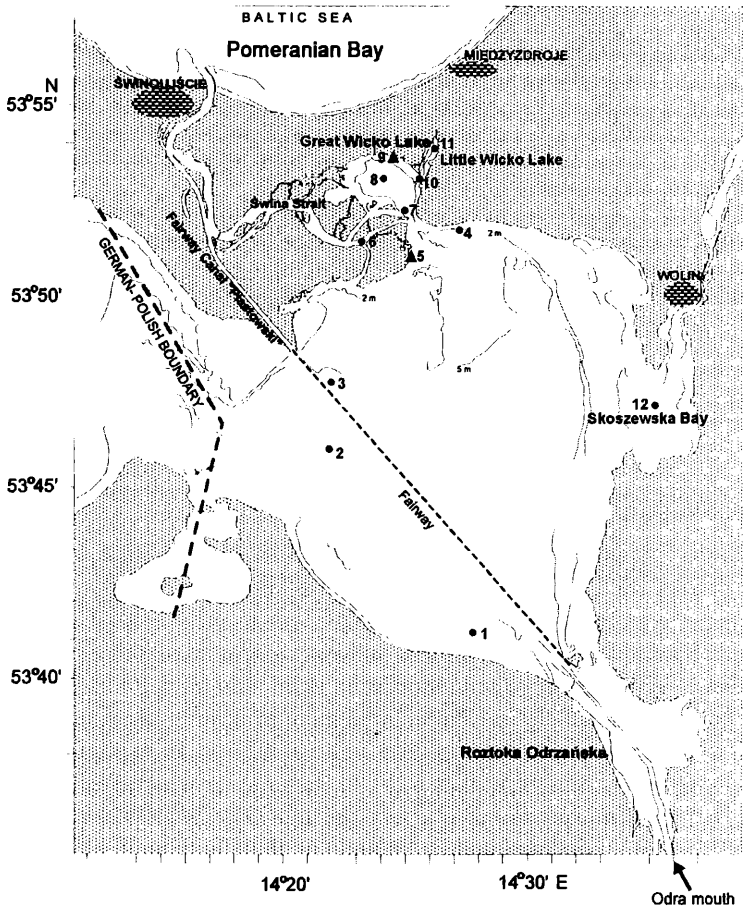


Fig. 1: Area of the Great Lagoon (Polish part of the Szczecin Lagoon) and the sampling stations. 1, 2, 3, 4, 5 = main basin, 6 = Old Swina, 7, 8, 9 = Great Wicko Lake, 10, 11 = Little Wicko Lake, 12 = Skoszevska Bay, ▲ = stations with *Obesogammarus crassus*

2 Study area, material and methods

The material studied came from the Sea Fisheries Institute in Swinoujście (Poland) and comprised a collection of 16 samples of fresh- and brackishwater amphipods from the Polish part of the Szczecin Lagoon and adjacent waters. The samples were taken from the open part of the Lagoon, the Great Wicko Lake and from the Little Wicko Lake using an Ekman-Birge grab or directly from the particular reed stems. The distribution of sampling sites is presented on figure 1 and the data on substratum, depth and species composition in samples are summarized in table 1. Detailed hydrological descriptions of the Szczecin Lagoon were given by many authors (e.g. Wiktor 1960, Wolnomiejski 1994, 2000). The surface area of the so called Great Lagoon (a Polish part of the Szczecin Lagoon) is 410 km², its maximum and average depths are 8,0 and 3,8 m respectively. This estuarine reservoir is oligomixohaline (salinity range 0,5-1,0 ‰), polymictic and polytrophic (Wolnomiejski, Luscinska & Grygiel 2000). The Great Wicko Lake (surface 12 km², depth 2,5-3 m, salinity range 0,7-1,0 ‰) and the Little Wicko Lake (surface 1 km², depth 2 m and salinity range 0,7-1,5 ‰) are in fact Lagoon bays isolated from the main water body (Wolnomiejski 2000).

Tab. 1: Species composition in particular stations. N = number of specimens, SL = Szczecin Lagoon; *station numbers as indicated on the map are given in brackets

Lp	Date	Station	Substratum	Depth	Species	N
1.	12.04.94	Lubin, NE of SL (4)*	muddy bottom	4 m	<i>Gammarus tigrinus</i>	5
2.	12.04.94	Little Wicko Lake (11)	muddy bottom	2 m	<i>Gammarus tigrinus</i>	1
3.	12.05.94	Lubin, NE of SL (4)	muddy bottom	4 m	<i>Gammarus tigrinus</i>	1
4.	14.06.94	Wamoleka, SW of SL (1)	muddy bottom	4 m	<i>Gammarus tigrinus</i>	2
5.	14.06.94	SL, most northern part (3)	muddy bottom	5,5 m	<i>Gammarus tigrinus</i>	3
6.	07.07.94	Great Wicko Lake, mouth part (7)	muddy bottom	3 m	<i>Gammarus tigrinus</i>	1
7.	17.07.94	Wamoleka, SW of SL (1)	muddy bottom	4 m	<i>Gammarus tigrinus</i>	1
8.	18.07.96	SL, middle part (2)	muddy bottom	6 m	<i>Gammarus tigrinus</i>	1
9.	23.07.96	SL, middle part (2)	muddy bottom	4 m	<i>Gammarus tigrinus</i>	19
10.	01.08.96	Przeznica, delta of Old Swina (6)	solid bottom	<2 m	<i>Gammarus tigrinus</i>	9
11.	23.09.96	Great Wicko Lake, middle part (8)	muddy bottom	3 m	<i>Gammarus tigrinus</i>	1
12.	09.10.96	Little Wicko Lake, mouth part (10)	muddy bottom	2 m	<i>Gammarus tigrinus</i>	2
13.	21.08.98	SL, NE (5)	reed stems	<1 m	<i>Gammarus tigrinus</i> <i>Obesogammarus crassus</i> <i>Chelicorophium curvispinum</i>	24 15 39
14.	14.07.99	SL, NE (5)	reed stems	<1 m	<i>Gammarus tigrinus</i> <i>Obesogammarus crassus</i>	74 3
15.	16.08.99	Great Wicko Lake (9)	reed stems	<1 m	<i>Obesogammarus crassus</i> <i>Chelicorophium curvispinum</i>	3 7
16.	03.10.02	Skoszewska Bay, N (12)	muddy bottom	4 m	<i>Gammarus tigrinus</i>	5

3 Results and discussion

A total of 216 amphipod specimens belonging to three species were found in the samples. The most abundant *Gammarus tigrinus* was found in 15 samples (149 individuals), *Obesogammarus crassus* occurred in 3 samples (21 ind.), and *Cbelicorophium curvispinum* in 2 samples (46 ind.) (Tab. 1).

Only single specimens of *Gammarus tigrinus* were found on the muddy, not vegetated bottom in the deepest parts of the basin, while on the reed stems the species was much more abundant and co-occurring with the other two species.

The present study along with the other papers concerning amphipod invaders in the Szczecin Lagoon (Gruszka 1995, 1999, Wawrzyniak-Wydrowska & Gruszka 2001) shows that *Obesogammarus crassus*, *Pontogammarus robustoides* and *Gammarus tigrinus* have become the most common gammarids throughout the whole Szczecin Lagoon. The exclusive presence of *O. crassus* in the samples obtained and the lack of *P. robustoides* may be the result of different habitat preferences or of successfully outcompeting the other pontogammarid species by *O. crassus*.

The newcomers almost completely replaced the native species that formerly inhabited this basin: brackishwater species *Gammarus duebeni* Liljeborg, 1852, *Gammarus salinus* Spooner, 1947 and *Gammarus zaddachi* Sexton, 1912 as well as predominantly freshwater *Gammarus pulex* (Linnaeus, 1758) – all these species reported by many authors (e.g. Neuhaus 1933, Micherdzinski 1959, Wiktor 1962, Kolasa 1973, Jazdzewski 1975).

Only several individuals of *Gammarus zaddachi* were found recently by Gruszka (1999) in the northern part of the Lagoon and in the Swina River, both affected by the inflow of Baltic waters. However the question still remains open whether the local gammarid fauna disappeared due to the heavy competition from the newcomers or to the increased level of pollution tolerable only for the euryoecious invasive species. It is interesting that *Gammarus tigrinus* has recently invaded not only most of the oligohaline waters of Poland (Vistula and Szczecin Lagoons, brackish Vistula estuary) but also successfully thrives in freshwaters e.g. the Oder River upstream as far as to the city of Opole (Jazdzewski, Konopacka & Grabowski 2002).

In the former Soviet Union, the Ponto-Caspian region has been a source for intentional introductions of amphipod species being attractive food base for many fish species in different water bodies. *Obesogammarus crassus*, the newest invader in the Szczecin Lagoon, occurred originally in brackish lagoons and in the lower courses of large rivers in the region (Dedju 1980, Jazdzewski 1980). The species has been one of the most frequently introduced gammarids in Soviet times. Since its introduction into the Kaunas artificial reservoir on the Nemun River (Lithuania) in the early 1960s, *Obesogammarus crassus* has success-

fully spread in this river and entered the Curonian Lagoon (Gasjunas 1972, Arbaciauskas 2002). Subsequently it invaded the Vistula Lagoon, via the Pregel River system that connects both basins or along Baltic Sea shores. Now the species entered a new basin, may be also along the Baltic Sea shores, possibly due to its wide tolerance to salinity (Jazdzewski & Konopacka 2002). It can be expected that from the Szczecin Lagoon the species will colonize coastal waters of Germany and maybe further western countries.

Obesogammarus crassus is rather similar to the another Ponto-Caspian invader, *Pontogammarus robustoides*, and thus can be misidentified. A simple illustrated key for the identification of Ponto-Caspian alien gammarids recently appearing in Polish waters was published by Konopacka & Jazdzewski (2002).

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References

- Abraciauskas, K. (2002): Ponto Caspian amphipods and mysids in the inland waters of Lithuania: history of introduction, current distribution and relations with native malacostracans.- In: Lepakoski, E., S. Gollasch & S. Olenin (eds). Invasive Aquatic Species of Europe: 104-115, (Kluwer Acad. Publ) Dordrecht
- Dedju, H. (1980): Amphipody presnykh i solonovatykh vod jugozapada SSSR.- (Izdatelstvo "Shtinica"), 223 pp., Kishinev
- Gasjunas, H. (1972): Obogashchenie kormovoj bazy ryb vodojemov Litvy aklimatizirovannymi rakobraznymi Kaspijskogo kompleksa.- In: Virbickas J. (ed.): Voprosy razvedeniya ryb i rakobraznykh v vodojemakh Litvy: 57-68, Vilnius
- Gruszka, P. (1995): *Gammarus tigrinus* Sexton, 1939 (Crustacea: Amphipoda) – nowy dla fauny Polski gatunek w estuarium Odry.- In: I Konferencja: Przyrodnicze aspekty badania wód jeziornych województwa szczecińskiego. Materiały Konferencyjne No.7, Uniwersytet Szczeciński, p. 44, Szczecin
- Gruszka, P. (1999): The River Odra Estuary as a gateway for alien species immigration to the Baltic Sea Basin.- *Acta hydrochimica et hydrobiologica* 27: 374-382, Weinheim
- Gruszka, P. (2001): *Atyaephyra desmaresti* (Millet, 1831) (Crustacea: Decapoda) nowy dla fauny Polski gatunek w rzece Odrze.- In: Sesja Naukowa z okazji jubileuszu 50-lecia Wydziału Rybactwa Morskiego i Technologii Żywności, 28-29 czerwiec, 2001, Akademia Rolnicza w Szczecinie: 31, Szczecin
- Jazdzewski, K. (1975): Morfologia, taksonomia i występowanie w Polsce kielży z rodzajów *Gammarus* Fabr. i *Chaetogammarus* Mart. (Crustacea, Amphipoda).- *Acta Universitatis Lodziensis*, 185 pp., Lodz
- Jazdzewski, K. (1980): Range extensions of some gammaridean species in European Inland waters caused by human activity.- *Crustaceana, Supplementum* 6: 84-107, Leiden
- Jazdzewski, K. & A. Konopacka (2000): Immigration history and present distribution of alien crustaceans in Polish waters.- In: Von Vaupel Klein, J. C. & F. R. Schram, (eds.): The biodiversity crisis and Crustacea.- *Proceedings of the 4th International Crustacean Congress vol. 2, Crustacean Issues* 12: 55-64, (Brill), Leiden

- Jazdzewski, K. & A. Konopacka (2002): Invasive Ponto-Caspian species in waters of the Vistula and Oder basins and of the southern Baltic Sea.- In: Leppakoski, E. S., S. Gollasch & S. Olenin (eds): *Invasive Aquatic Species of Europe*: 384-398, (Kluwer Acad. Publ.), Dordrecht
- Jazdzewski, K., A. Konopacka & M. Grabowski (2002): Four Ponto-Caspian and one American gammarid species (Crustacea, Amphipoda) recently invading Polish waters.- *Contributions to Zoology* 71(4): 115-122, The Hague
- Kolasa, J. M. (1973): Fauna denna strefy przybrzeżnej Rostki Odrzańskiej.- *Zeszyty Naukowe Uniwersytetu Gdańskiego, Oceanografia* 1: 73-96, Gdansk
- Konopacka, A. (1998): Nowy dla Polski gatunek kielza, *Dikerogammarus haemobaphes* (Eichwald, 1841) (Crustacea Amphipoda) oraz dwa inne rzadkie gatunki skorupiaków obunogich w Wisle.- *Przegląd Zoologiczny* 42: 211-218, Wrocław
- Konopacka, A. & K. Jazdzewski (2002): *Obesogammarus crassus* (G.O. Sars, 1894) - one more Ponto-Caspian gammarid species in Polish waters.- *Fragmenta Faunistica* 45: 19-26, Warszawa
- Micherdzinski, W. (1959): Kielze rodzaju *Gammarus* Fabr. (Amphipoda) w wodach Polski.- *Acta Zoologica Cracoviensia* 4: 527-637, Krakow
- Müller, O., M. L. Zettler & P. Gruszka (2001): Verbreitung und Status von *Dikerogammarus villosus* Sovinsky (Crustacea: Amphipoda) in der mittleren und unteren Strom-Oder und den angrenzenden Wasserstrassen.- *Lauterbornia* 41: 105-112, Dinkelscherben
- Neuhaus, E. (1933): Studien über das Stettiner Haff und seine Nebengewässer. I. Untersuchungen über die allgemeinen hydrographischen und biologischen Verhältnisse.- *Zeitschrift für Fischerei* 31: 427-489, Neudamm
- Wawrzyniak-Wydrowska, B. & P. Gruszka (2001): *Gammarus tigrinus* and *Pontogammarus robustoides* - new gammarid species in the river Odra/Oder estuary.- *Abstracts of the III International Symposium: Functioning of Coastal Ecosystems in Various Geographical Regions*, June 19-22, 2001: p. 29, Gdynia
- Wiktor, J. (1960): Zarys warunków biologicznych Zalewu Szczecińskiego.- *Polskie Archiwum Hydrobiologii* 7(20): 7-27, Warszawa
- Wiktor, J. (1962): Jakosciowe i ilosciowe badania fauny dennej Zalewu Szczecińskiego. Część II.- *Prace Morskiego Instytutu Rybackiego* A. 11: 81-112, Gdynia
- Wolnomiejski, N. (1994): Ekologiczne studium makrofauny dna mulistego Zalewu Szczecińskiego (1982-1992 r.).- *Studia i Materiały, Morski Instytut Rybacki*, ser. A, 31: 1-126, Gdynia
- Wolnomiejski, N. (2000): Stan degradacji ekologicznej i możliwości rekultywacji jeziora Wicko Małe.- In: *Zachodniopomorski Kongres Nauki na przełomie XX i XXI wieku*, 14-15 grudnia 2000, Szczecińskie Towarzystwo Naukowe: 331-336, Szczecin
- Wolnomiejski, N., M. Luscinska & I. Grygiel (2000): Algae in plankton and muddy sediments as well as in food content of the larvae *Chironomus f. l. plumosus* (L.) of the Szczecin Lagoon (The Great Lagoon).- *Oceanological Studies* 29(2): 43-56, Gdansk

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