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Obesogammarus crassus (G.O. SARS, 1894) – one more Ponto-Caspian gammarid species in Polish waters

Abstract: *Obesogammarus crassus*, a new Ponto-Caspian gammarid species has been recorded in Poland in the deltaic Vistula system. Notes on its origin, places of acclimatization in Europe, as well as probable ways of invasion are presented. Since the majority of alien gammarid species is still poorly recognized, the authors include a simple key and figures allowing the identification of all Ponto-Caspian gammarid crustaceans recently appearing in Polish waters.

Key words: *Obesogammarus crassus*, *Crustacea*, alien species, acclimatization, Vistula Lagoon, Dead Vistula

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INTRODUCTION

In 1998–2000, during extensive studies of the distribution of amphipod crustaceans in the lower Vistula and its deltaic system, a large number of gammarids were collected (over 60 samples with some 3000 specimens). In our earlier papers (JAŻDŻEWSKI & KONOPACKA 2000, KONOPACKA 1998) we have discussed the common and abundant occurrence of two invasive Ponto-Caspian species, *Dikerogammarus haemobaphes* (EICHWALD, 1841) and *Pontogammarus robustoides* (G.O. SARS, 1894), in the Vistula and in the Vistula Lagoon. *P. robustoides* was somewhat earlier discovered also in the Szczecin Lagoon by GRUSZKA (1999). MÜLLER *et al.* (2001) have recently recorded another Ponto-Caspian gammarid – *Dikerogammarus villosus* (SOVINSKY, 1894) in the lower Oder. This article is the first information on the occurrence of one more Ponto-Caspian gammarid – *Obesogammarus crassus* (G. O. SARS, 1894) in the deltaic system of Vistula.

DISTRIBUTION OF *OBESOGAMMARUS CRASSUS*

Obesogammarus crassus, described as *Gammarus crassus*, was first transferred to the genus *Pontogammarus* by SOVINSKY (1904). Some Russian authors (BIRSHTEJN 1945, BIRSHTEJN & ROMANOVA 1968) have treated this genus as a subgenus of *Niphargoides* G. O. SARS, 1894. However STOCK (1974) has proposed the new genus *Obesogammarus*, encompassing some 10 species and including the species discussed – *O. crassus*.

The original range of distribution of *O. crassus* included the Caspian Sea nearshore waters and lower courses of the rivers emptying into this sea, as well as the Black Sea lagoons (limans), coastal Black Sea lakes, and lower courses of such Pontic rivers as Kuban, Don, Dnieper, Ingulec, Boh, Dniester and Danube (BIRSHTEJN & ROMANOVA 1968, CARAUSU *et al.* 1955, DEDJU 1967, 1980, IOFFE 1973, KANEVA-ABADZHIEVA 1965, LUBJANOV 1953, MORDUKHAJ-BOLTOVSKOJ 1960, MORDUKHAJ-BOLTOVSKOJ *et al.* 1969, RUSSEV 1959, 1966).

In 1950's and 1960's in the former Soviet Union a large transplantation project was undertaken in which many crustacean species, especially from the Ponto-Caspian zoogeographical province, were transferred to many freshwater basins, especially to artificial lakes built on some large rivers (dam-reservoirs). The aim of these acclimatizations was to enrich the food-resources for fishes. In this way thousands of Ponto-Caspian *Amphipoda*, *Mysidacea* and *Cumacea* were transplanted, mainly from the Black Sea lagoons and sometimes even to rather remote regions, as, for instance, the Kaunas reservoir in Lithuania built on the Neman (Nemunas) river. Altogether some 30 species of malacostracan crustaceans, among them several species of the family *Pontogammaridae*, were transferred into different East-European basins (IOFFE 1973, KARPEVICH 1975, WIŚNIEWSKI 1976). Many species were successfully acclimatized in new places, thus remarkably extending their original distribution range (JAŻDŻEWSKI 1980). *Obesogammarus crassus* was one of such often transplanted species, first in Ukraine and Moldavia (DEDJU 1980, ZHURAVEL 1965) and then in Lithuania (GASJUNAS 1965, 1968, 1972, 1975).

We have recorded *O. crassus* in several samples collected in 1999 and 2000 in the littoral zone of the Vistula Lagoon and Dead Vistula, i.e. old Vistula River bed, now brackish (Fig. 1). Samples were taken using a hand net and a triangular dredge towed in the depths 0– 2 m among water weeds and between *Phragmites* stems. Water salinity in the investigated stations ranged from 3 to 6 PSU.

Evidently *O. crassus* entered these basins from Lithuanian waters. The immigration history of *O. crassus* is as follows. The successful transplantation of this species into the Kaunas reservoir was done in May 1961, introducing some 1500 specimens of 3 species of gammarids: *Pontogammarus robustoides*, *Obesogammarus crassus* and *Chaetogammarus warpachowskyi* (G. O. SARS) (ARBACIAUSKAS in press, GASJUNAS 1968, 1972). All these species soon became abundant in the Kaunas reservoir and from there they were introduced to many Lithuanian lakes and to the Curonian Lagoon; it appeared also that these gammarids penetrated in a natural way the Curonian Lagoon downstream the Neman river. Finally, different Ponto-Caspian crustaceans were acclimatized in a number of Lithuanian reservoirs (GASJUNAS 1972, LAZAUSKIENE 1997). In 1998– 2000 ARBACIAUSKAS (in press) has examined two dam-reservoirs and 12 lakes in Lithuania and revealed the presence of *O. crassus* in the Elektrenai reservoir and in 3 lakes, whereas the species was absent in the

Antaliepe reservoir and in 3 other lakes where it was formerly observed. *O. crassus* survived, among others, in lake Dusia, which is situated at the Polish-Lithuanian border.

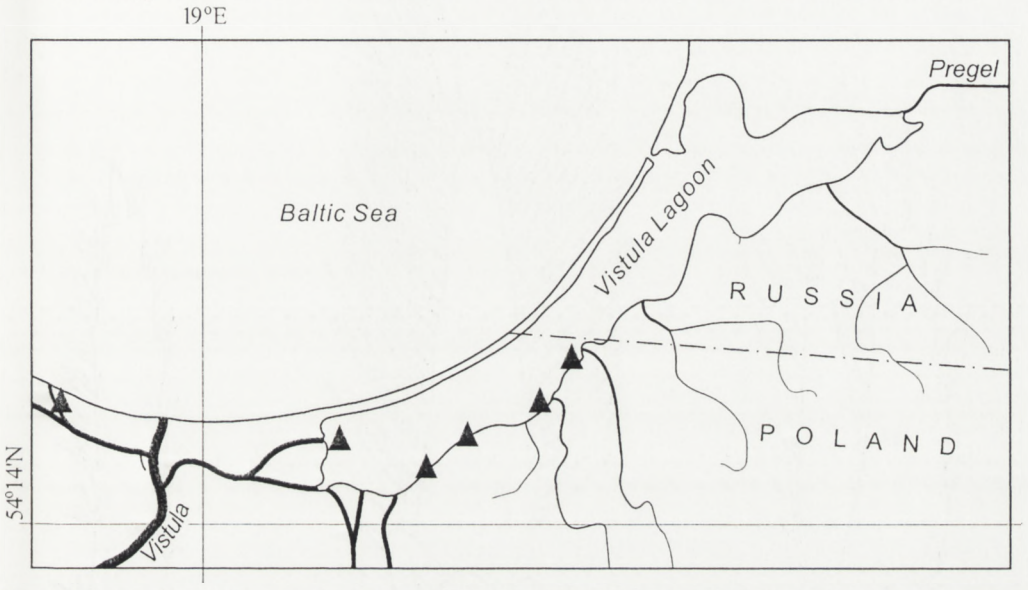

Fig. 1. Occurrence of *Obesogammarus crassus* in Polish waters. Triangles indicate the records of *O. crassus*; dashed line indicates country border.

O. crassus has invaded the brackish waters of the Vistula Lagoon and of the Dead Vistula most probably via the Pregel (Pregola) river system connecting the Curonian and the Vistula Lagoons. Another way of invasion could be the shallow Baltic sublittoral waters; the salinity of the Baltic in the section between Klaipeda and Baltijsk (i.e. entrances to the two lagoons) is about 7 PSU. Although in the Black Sea lagoons and river estuaries *O. crassus* inhabits oligohaline waters with a salinity not surpassing 5 PSU, judging from the data on its occurrence in the Caspian Sea (BIRSHTEJN & ROMANOVA 1968, STAROBOGATOV 1995, STOCK *et al.* 1998) the species can surely tolerate a higher salinity, at least for some time.

Since *O. crassus* is a new species in Polish fauna and since gammarids, despite two Polish keys by MICHERDZIŃSKI (1959) and JAŻDŻEWSKI (1975), are still poorly recognized by Polish hydrobiologists, we include a simple key allowing the identification of invasive alien representatives of the amphipod family *Pontogammaridae* recently appearing in Polish waters.

KEY FOR THE IDENTIFICATION OF PONTO-CASPIAN GAMMARIDS OCCURRING IN POLAND

1a. Uropod 3 (U3) of *magniramus*-type, i.e. endopodite longer than ½ of exopodite length (Fig. 2a) ..... *Gammarus* species
1b. Uropod 3 (U3) of *parviramus*-type, i.e. endopodite shorter than 1/3 of exopodite length (Fig. 2b,c) ..... Ponto-Caspian gammarids
2a. First antenna (A1) of *Gammarus*-type (Fig. 2d) **3**
2b. First antenna (A1) of *Pontogammarus*-type (Fig. 2e) **5**

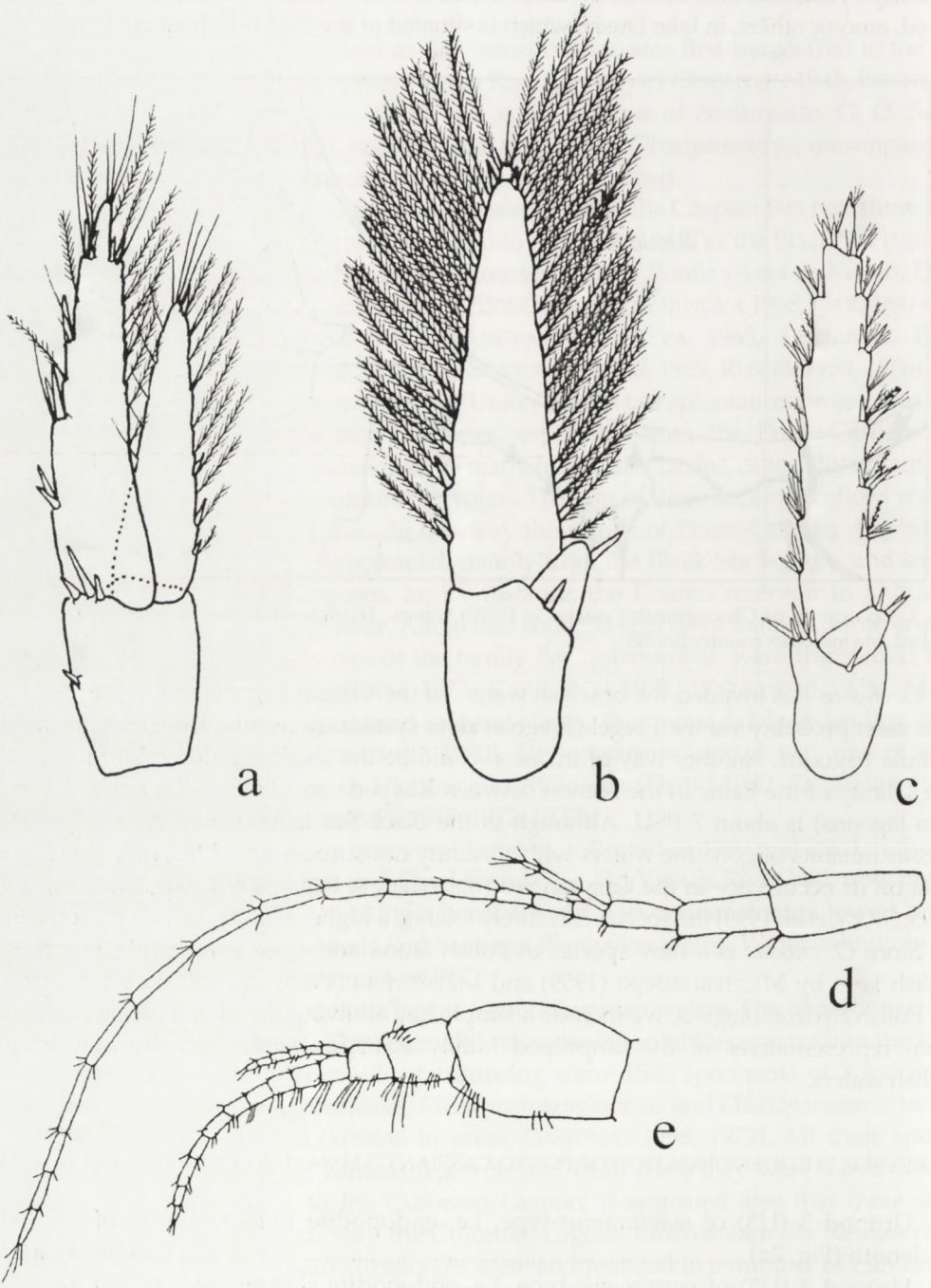

Fig. 2. Some basic features of gammarids occurring in Poland: a – U3 of *magniramus*-type; b, c – U3 of *parviramus*-type: b – U3 of *Dikerogammarus villosus*, c – U3 of *Chaetogammarus ischnus*; d – A1 of *Gammarus*-type; e – A1 of *Pontogammarus*-type; a, b, c – after JAŻDŻEWSKI (1975); d, e – after STOCK (1974).

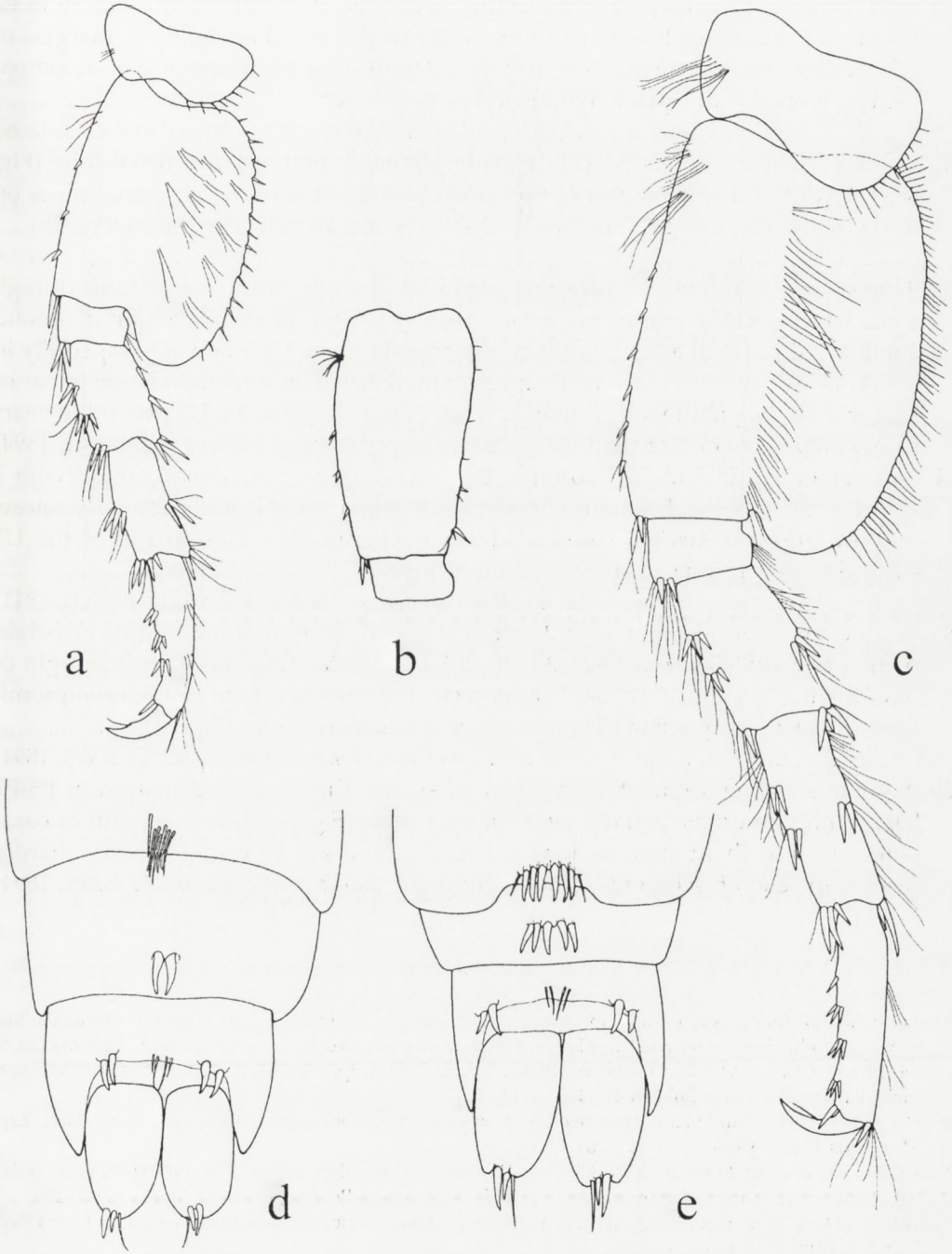

Fig. 3. Some basic features of gammarids occurring in Poland: a – P7 of *Obesogammarus crassus*; b – P7 basis of *Chaetogammarus ischnus* (after JAŻDŻEWSKI 1975); c – P7 of *Pontogammarus robustoides*; d – urosome of *Obesogammarus crassus*; e – urosome of *Pontogammarus robustoides*.

3a. Basis of seventh pereopod (P7) distally tapers and the width of this article in its distal part is more or less equal to the width of ischium (Fig. 3b). Both margins of U3 exopodite with numerous spines (Fig. 2c), usually in groups of 2–3, accompanied by few setae of equal length or somewhat longer ..... *Chaetogammarus ischnus* (STEBBING, 1899)

3b. Basis of seventh pereopod (P7) distally widened, with postero-distal lobe (Fig. 3a,c). Width of the distal part of this article is twice that of the ischium. Spines on the U3 exopodite margins are hardly visible because of rich U3 setation (Fig. 2b) 4

4a. Humps of the 1st and 2nd urosome segments strongly produced in form of high studs (stacks); these humps are armed with at least 3 spines. Flagellum of second antenna (A2) as well as distal part of gnathopods 1 and 2 (G1 and G2), especially in males, armed with numerous, long setae; these setae on gnathopods are equal or longer than the gnathopod propodus width. First article of the U3 exopodite bears spines only on its outer margin (Fig. 2b) ....*Dikerogammarus villosus* (SOVINSKY, 1894)

4b. Humps of the 1st and 2nd urosome segments not very prominent, armed with 2 spines and few setae. Flagellum of A2 and distal parts of G1 and G2 poorly setose, only in largest males with several distinct setae groups. First article of the U3 exopodite with groups of spines on both margins ..... *Dikerogammarus haemobaphes* (EICHWALD, 1841)

5a. Second urosome segment with 2 spines (Fig. 3d). Hind margin of basis of pereopods 5 to 7 (P5–P7) with few (abt. 10–20), short setae (Fig. 3a). Lower margin of coxal plates 1–4 with few (5–6) short setae. Posterodistal lobe of P7 basis prominent, distinctly surpassing in length the next article (ischium) (Fig. 3a) ..... *Obesogammarus crassus* (G. O. SARS, 1894)

5b. Second urosome segment with a row of spines (Fig. 3e). Hind margin of P5-P7 basis with numerous (usually over 30) long setae (Fig. 3c). Lower margin of coxal plates 1– 4 with numerous, long setae. Posterodistal lobe of P7 basis hardly reaches the end of ischium (Fig. 3c) .... *Pontogammarus robustoides* (G. O. SARS, 1894)

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STRESZCZENIE

[Tytuł: *Obesogammarus crassus* (G.O. SARS, 1894) – jeszcze jeden ponto-kaspijski gatunek w polskich wodach]

Niniejsza notatka przynosi informację o kolejnym, ponto-kaspijskim kiełżu z rodziny *Pontogammaridae* – *Obesogammarus crassus*, który niedawno zasiedlił polskie wody przybałtyckie.

Pierwotny zasięg *O. crassus* obejmował wody przybrzeżne Morza Kaspijskiego, dolne biegi rzek uchodzących do tego morza oraz limany Morza Czarnego, jeziora przybrzeżne rozmieszczone wokół niego, a także dolne biegi takich rzek, jak Kubań, Don, Dniepr, Ingulec, Boh, Dniestr i Dunaj (BIRHSTEJN & ROMANOVA 1968, CARAUSU *et al.* 1955, DEDJU 1967, 1980, IOFFE 1973, KANEVA-ABADZHIEVA 1965, LUBJANOV 1953, MORDUKHAJ–BOLTOVSKOJ 1960, MORDUKHAJ-BOLTOVSKOJ *et al.* 1969, RUSSEV 1959, 1966,). Na skutek szeroko zakrojonego programu transplantacji skorupiaków w byłym ZSRR, wiele gatunków zadomowiło się w nowych akwenach, co znacząco poszerzyło ich pierwotny areał występowania (JAŻDŻEWSKI 1980). *Obesogammarus crassus* był właśnie jednym z takich często introdukowanych gatunków, najpierw na Ukrainie i w Mołdawii (DEDJU 1980, ZHURAVEL 1965), a potem na Litwie (GASJUNAS 1965, 1968, 1972, 1975). Stwierdzony przez nas w słonawych wodach Zalewu Wiślanego i Martwej Wisły *O. crassus* niewątpliwie przedostał się tam z wód litewskich z Zalewu Kurońskiego, najprawdopodobniej poprzez system rzeki Pregoły łączący ten zbiornik z Zalewem Wiślanym.