

An overview of the Quaternary Ostracoda from the Gulf of Gdansk, the Baltic Sea

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In the Polish maritime zones of the Baltic Sea thus far 49 (14 marine and 35 fresh- and/or brackishwater) living ostracod species have been recorded (NAMIOTKO, in press), which constitutes 38% of the total number of extant ostracod species known from the whole Baltic (FRENZEL et al. 2010). Quaternary ostracod faunas of the Polish coastal marine zone have been poorly investigated. Until the end of the last century 19 species in total have been reported from boring holes at the modern coastal inland sites (BRODNIOWICZ 1972, 1979; BRODNIOWICZ & ROSA 1967; KOPCUYNSKA-LAMPARSKA et al. 1984) and/or from cores taken from the bottom of the Vistula Lagoon (JANILSZEWSKA-PACTWA 1973). Recently, an ostracod study has been undertaken also in the open sea zone along the southern Baltic shore (KRZYMINSKA & PRZEZDZIECKI 2001, 2010), bringing the total number of Quaternary ostracod species recorded in the Polish maritime zones of the Baltic Sea to 28, of which 19 have been reported from the Late Glacial/Holocene deposits of the Gulf of Gdansk, south-eastern bay of the Baltic with the present-day maximum depth of 118m and water salinity 7–8‰.

The present contribution presents new data on the distribution of ostracod valves from 20 cores recovered from the bottom of the Gulf of Gdansk. Previous lithological and petrographical studies as well as radiocarbon dating showed that these deposits are of Late Glacial and Holocene age (USCINOWICZ & ZACHOWICZ 1994). Interestingly, the studied ostracod palaeoassemblages appeared typical of freshwater environments which is evidenced by frequently occurring valves of such lacustrine species as *Candona neglecta* Sars, *Cyclocypris laevis* (MÜLLER), *Ilyocypris lacustris* KAUFMANN, *Herpetocypris reptans* (BAIRD), *Limnocythere inopinata* (BAIRD) and *Cytherissa lacustris* (Sars). Especially the latter species, which is a polyoxyphilic, inbenthic ostracod that avoids sulphidic and organically enriched sediments (DANIELOPOL et al. 1990), indicates deep lacustrine oligotrophic conditions.

In silty sands of the profile WB7 (the bottom layers radiocarbon dated to 6720 ± 130 BP) except the above-mentioned species, several other species were recorded which may suggest a shallower bottom at the time of deposition: *Candona angulata* MÜLLER, *Pseudocandona compressa* (KOCH), *Scottia tumida* (JONES), *Limnocytherina sanctipatricii* (BRADY & ROBERTSON), *Metacypris cordata* BRADY & ROBERTSON and *Darwinula stevensoni* (BRADY & ROBERTSON).

In the central part of the Gulf of Gdansk, silty sand and dark grey sandy mud with detritus from the 1ZG54 profile (lower section radiocarbon dated to $12,200 \pm 240$ BP; USCINOWICZ & ZACHOWICZ 1994), yielded valves of: *Candona candida* (MÜLLER), *C. neglecta*, *L. inopinata* and *C. lacustris*. Similar ostracod assemblages were found also in the other profiles from the central (sites 4ZG148 and 2ZG138) and western part (R16), which were palynologically dated (USCINOWICZ & ZACHOWICZ 1994) to the Preboreal and Boreal. In the eastern part of the Gulf sandy mud and brown-grey silty sand of the EL1 core included also freshwater ostracods: *Candona candida*, *C. neglecta*, *Ilyocypris decipiens* MASI, *Limnocythere sanctipatricii* and *Cytherissa lacustris*. The lower part of this core was radiocarbon dated to $10,650 \pm 160$ BP (USCINOWICZ & ZACHOWICZ 1994). Freshwater character of sedimentation was also recorded in other cores taken from this part of the Gulf: R3/82, R3a/82 and R 127. Finally, *Candona candida*, *Limnocythere inopinata* and *Cytherissa lacustris* were found in the cores R6/82, R5/82, R4/82, R119 and 20 situated along the transect parallel to the foreland of the Vistula River mouth. In the cores R4/82 and R6/82, in silty sand of the Boreal period, valves of brackishwater ostracod species *Cyprideis torosa* (JONES) and *Cytheromorpha fuscata* (BRADY) occurred.

To summarise, a total of 18 species were identified in the Quaternary (Late Glacial/Holocene) sediments recovered from 20 core sites of the Gulf of Gdansk, of which five are known to live today in the Gulf. The most common species in the studied cores were *Candona neglecta* (16 sites), *Cytherissa lacustris* (15 sites) and *Candona candida* (13 sites), however, the species richness in the recovered cores differed. The structure and species composition of the ostracod palaeoassemblages indicated that the studied sediments were deposited in freshwater lacustrine conditions, confirming and consolidating inferences based on previously published data on other biotic (Mollusca: KRZYMINSKA 2001) and abiotic (seismoacoustic: KRZYMINSKA & PRZEZDZIECKI 2010) indices from this area.

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References

- BRODNIOWICZ, I. (1972): Brenkowo. Faunal analysis. – In: International Conference of INQUA, Sub-commission on shorelines of northwestern Europe. Guide-book of the excursions. – 29-32, Polish Academy of Sciences, Committee for Quaternary Research, Warsaw.
- BRODNIOWICZ, I. (1979): Faunistic analysis of Late Glacial fresh water deposits from the sea-cliff near Ustka town (Poland). – In: GROCHOLSKI, W. (ed.): Od czwartorzędu do prekambriu. Seria Geologiczna UAM Poznan, 9: 3-27, Uniwersytet im. Adama Mickiewicza, Poznan. [in Polish with English abstract].

- BRODNIOWICZ, I. & ROSA, B. (1967): The boring hole and the fauna at Czołpino, Poland. – *Baltica*, 3: 61-86, Vilnius.
- DANIELOPOL, D.L., OLTEANU, R., LÖFFLER H. & CARBONEL, P. (1990): Present and past geographical ecological distribution of *Cytherissa* (Ostracoda, Cytheridae). – *Bulletin de l'Institut de Géologie du Bassin d'Aquitaine*, 47-48: 97-118, Talence.
- FRENZEL, P., KEYSER, D. & VIEHBERG, F.A. (2010): An illustrated key and (palaeo)ecological primer for Postglacial to Recent Ostracoda (Crustacea) of the Baltic Sea. – *Boreas*, 39(3): 567-575, Oxford.
- JANILSZEWSKA-PACTWA, H. (1973): Variability of the hydrological and biological relations on the base of the results of the investigations of the fauna contained in the bottom sediments of the Vistula Lagoon and Lake Druzno. – *Przegląd Geofizyczny*, 25(1/2): 133-140, Warszawa. [in Polish with English abstract].
- KOPCUYNSKA-LAMPARSKA, K., CIESLA, A. & SKOMPSKI, S. (1984): Evolution of fossil lake basins of the Late Glacial and Holocene in the cliff near Niechorze (Pomerania Lakeland, Poland). – *Quaternary Studies in Poland*, 5: 39-58, Poznan.
- KRZYMINSKA, J. (2001): Assemblages of molluscs in the Quaternary deposits of the southern Baltic Sea. – *Biuletyn Państwowego Instytutu Geologicznego*, 397: 67-116, Warszawa. [in Polish with English abstract].
- KRZYMINSKA, J. & PRZEZDZIECKI, P. (2001): Palaeogeography of Late Glacial and Lower Holocene lakes in the Pomeranian Bay area on the basis of malacofauna and ostracods and seismoacoustic data. – *Studia Quaternaria*, 18: 3-10, Warszawa.
- KRZYMINSKA, J. & PRZEZDZIECKI, P. (2010): Fossil lacustrine bodies in the Gulf of Gdansk as recorded by seismoacoustic data and ostracodological analysis. – *Baltica*, 23(1): 25-32, Vilnius.
- NAMIOTKO, T. (in press): Musselshrimps (Ostracoda). – In: BOGDANOWICZ, W., CHUDZICKA, E., PILIPIUK, I. & SKIBINSKA, E. (eds.): *Fauna of Poland*. – Characteristics and checklist of species, 5. – Museum and Institute of Zoology, Polish Academy of Science, Warsaw.
- USCINOWICZ, S. & ZACHOWICZ, J. (1994): Geological Map of the Baltic Sea Bottom 1:200 000, Commentary, Sheets: Gdansk, Elblag, Gdansk Deep. – Polish Geological Institute, Warsaw.

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