

ZOOPLANKTON FROM COASTAL SALT LAKES OF THE CRIMEA (UKRAINE)

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Abstract

The fauna of 5 coastal hypersaline lakes of the Crimea has been studied for the first time. Species assemblages were differently structured according to the season and the lake. *Artemia* sp. was the most common organism, but the population of the Koyashskoye lake is probably a species that is different from those occurring in the other lakes. The species assemblage of the Feodosiyskoye lake was surprisingly dominated by *Onychodiptomus* sp., a taxon endemic to North America.

Keywords : Black Sea, Zooplankton, Salinity.

Some salt lakes of the Crimea have already been considered for studies on *Artemia* sp., which is present with both parthenogenetic and bisexual populations in this region [1; 2]. But a complete survey of the Crimean salt-lake fauna has never been carried out. A total of 55 samples were collected from April 2004 to September 2006 (in different seasons) in 5 different salt lakes along the Black Sea coast. The organisms collected were grouped according to 35 categories (11 at the level of species or genus). The lowest number of categories (6) was typical of the most saline lake (Koyashskoye, 160-300psu). The highest number of categories (20) was found in the only lake (the Bakalskoye) which was affected by a marine ingression during the study period. *Artemia* sp. was the only ubiquitous organism (at least as eggs, it has been found in all the lakes). On the contrary *Mesopodopsis slabberi* (Mysidacea), and *Acartia tonsa* (Calanoida) were present in only one lake. The communities of coastal salt lakes were dominated by *Artemia* during summer and by *Cletocamptus* sp. (Harpacticoida) or *Moina salina* (Cladocera) during spring, in different lakes. The Feodosiyskoye lake had not a stable population of *Artemia* (only eggs were found) and it was dominated by *Onychodiptomus* sp. (Calanoida) during summer, and *Brachionus* sp. (Rotifera) during spring. It was noted that the plankton showed a benthos-derived composition related to the increase of water salinity. This is probably affected either by the sampling (the reduced water depth deriving from a decrease of water volume forces the net to collect closer to the bottom), and from the floating facilitation that organisms receive from the more salty (and more dense) water. The low number of species of lake Koyashskoye was attributed to its extremely high salinity (never below 160psu in all the study period). The lake was never considered in previous studies, and the *Artemia* which has been found was never observed before. The Koyashskoye *Artemia* is evidently dissimilar from all the other *Artemia* that have been reported from other Crimean lakes [3; 2] and even according our records in the present survey. The Koyashskoye *Artemia* population is bisexual (contrary to the other populations of the present study, which were parthenogenetic). Many morphological characters [4; 5] allowed us to consider the Koyashskoye population as belonging to a species different from other Crimean *Artemia*. The most evident differences are the long abdomen, the absence of the furca, and the exceptionally large antennae (A1) of the males. It is known that the morphology of *Artemia salina* is variable and affected by salinity [6], but the morphology of the Koyashskoye population probably deserves a deeper study.

The typical species composition of the Feodosiyskoye lake allowed us to consider it as not completely marine derived. Although it is located at 50-70m from the sea-shore, its salinity is probably more affected by continental supplies. The presence of *Branchinella* and *Artemia* eggs suggests that both these anostracans (which were not found as adults), could represent an allochthonous contamination. Otherwise they probably occurred as active organisms in the past (and they probably will occur in the future) under environmental conditions different from the present ones. In the same lake, the Calanoida (which dominated alternatively with Rotifera) were recognised as *Onychodiptomus* sp., a genus endemic to North America [7] at the present state of knowledge. Feodosiyskoye lake is surrounded by a densely populated area, and a role played by man is the main suspect to explain the presence of a taxon never recorded outside of its native area until now. This adds elements to the discussion about the Black Sea area as a sink site for allochthonous bio-invasers [8].

References

- 1 - Baitchorov, W.M. & Nagorskaya, L.L. (1999). The reproductive characteristics of *Artemia* in habitats of different salinity. *International Journal of Salt Lake Research*, 8: 287-291.
- 2 - Mura, G. & Nagorskaya, L.L. (2005). Notes on the distribution of the genus *Artemia* in the former USSR countries (Russia and adjacent regions). *Journal of Biological Research*, 4: 139-150.
- 3 - Triantaphyllidis, G.V., Abatzopoulos, T.J. & Sorgeloos, P. (1998). Review of the biogeography of the genus *Artemia* (Crustacea, Anostraca). *Journal of Biogeography*, 25: 213-226.
- 4 - Hontoria, F. & Amat, F. (1992). Morphological characterization of adult *Artemia* (Crustacea, Branchiopoda) from different geographical origins. Mediterranean populations. *Journal of Plankton Research*, 14: 949-959.
- 5 - Mura, G. & Brecciaroli, B. (2004). Use of morphological characters for species separation within the genus *Artemia* (Crustacea, Branchiopoda). *Hydrobiologia*, 520:179-188.
- 6 - Zernov, S.A. (1934). *Obschaja gidrobiologija* (General Hydrobiology), Moscow-Leningrad: Biomedgiz., 587 pp. (in Russian).
- 7 - Dussart, B. & Defaye, D. (2002). World directory of Crustacea Copepoda of inland waters. I. Calaniformes. Leiden: Backhuys Publishers, 276 pp.
- 8 - Zaitzev, Y. & Ozturk, B. (2001). Exotic species in the Aegean, Marmara, Black, Azov and Caspian Seas. Turkish Marine Res. Foundation, Istanbul, 267 pp.