

SMALL OITHONID COPEPODS IN THE NORTHEASTERN MARMARA SEA

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Abstract

Abundance, population structure and salinity tolerance as an index of adaptive capacity were studied in cyclopoid copepods *Oithona nana* and *Oithona davisae* in the Golden Horn Estuary and adjacent Marmara Sea during October 2015. For comparison the data on *O. davisae* from Sevastopol Bay (Black Sea) and *Oithona similis* (common for all studied regions) were presented. Our field and laboratory data suggested high adaptive potential in *O. davisae* recently penetrated from the Black Sea into the Marmara Sea.

Keywords: Copepoda, Marmara Sea, Salinity

Introduction

Warm-water *Oithona nana* and cold-water *Oithona similis* were the only mass small oithonids in the Marmara Sea and Bosphorus area before the appearance of alien estuarine *Oithona davisae* in this region in 2014 [1, 2]. All these oithonids of the Black Sea origin inhabited upper layers of the Marmara Sea with low salinity of about 18 psu. To understand the invasion success of *O. davisae*, we conducted comparative population studies of *O. nana* and *O. davisae* in the Marmara Sea and Golden Horn Estuary and *O. davisae* in the Black Sea (Sevastopol Bay) during the same period (November 2015). In order to evaluate the environmental adaptability of *O. davisae*, we compare their salinity tolerance with that of *O. nana* and *O. similis*.

Material and methods

Horizontal hauls (30 m) at the depth of 1 m with a Nansen net (100 µm mesh size, 0.5 m diameter) were performed for calculating the abundance of copepodites and adults of the studied species. To determine the number of nauplii and early copepodite stages, synchronously to net tows the integrated sea water samples were collected by plastic sampler of 10 L along the net track from the same depth. In the laboratory experiments females of studied species collected at 18 psu were subjected at 20 C to a gradual salinity decrease or increase at a rate of 2-3 psu per h during 6 - 10 h. Salinity tolerance ranges of the copepods were estimated taking into account the lethal salinity values affecting 50 % of the initial number (LS₅₀) of individuals in 24 h after salinity changes.

Results and Discussion

The data obtained showed that age structure of *O. davisae* populations, as in the Golden Horn Estuary, as in the Marmara Sea, was similar to that in Sevastopol Bay in the same period. Total density of *O. davisae* populations in the Marmara Sea, Golden Horn Estuary and Sevastopol Bay amounted to 151000, 95000 and 342000 ind m⁻³, respectively (Fig. 1A). In all studied areas we did not observe significant differences in population age structure which indicated close reproduction modes. Therefore, at present time the parameters of *O. davisae* population in the Marmara Sea are close to those in Sevastopol Bay where this species appeared 14 years ago. Moreover, dominating of *O. davisae* over *O. nana* in the Marmara Sea and especially in the Golden Horn Estuary can be evidence of the process of competitive exclusion of *O. nana* from the zooplankton community. The salinity tolerance range after one day following gradual salinity change with the rate of 2-3 psu per h in alien *O. davisae* (5 - 45 psu) was much wider than those in indigenous *O. similis* (10 - 30 psu) and especially in *O. nana* (15 - 28 psu) (Fig. 1B). This indicates higher adaptive capacity of Asian estuarine *O. davisae* [3] in comparison with marine small oithonids of the Marmara and Black Sea areas.

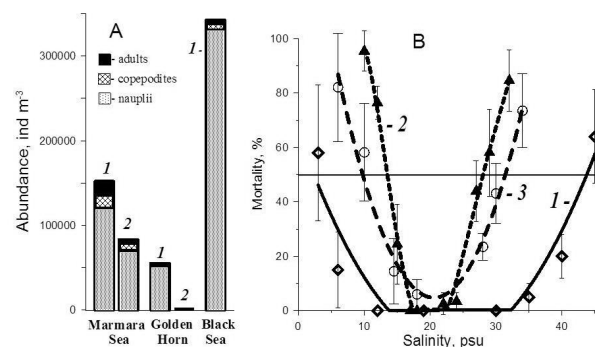


Fig. 1. Abundance and population structure (A) of *Oithona davisae* (1) and *Oithona nana* (2) in October 2015 in the Marmara Sea, Golden Horn Estuary and Black Sea, and salinity tolerance ranges (B) of *Oithona davisae*, *Oithona nana* and *Oithona similis* (3).

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References

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