ABUNDANCE OF GELATINOUS ZOOPLANKTON IN IZMIT BAY, THE SEA OF MARMARA

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Abstract
Distribution and abundance of macrogelationous zooplankton were investigated from a total of 11 stations in Izmit Bay, Sea of Marmara with monthly intervals from July 2001 to September 2002. The maximum abundance of all gelatinous zooplankton was calculated as 0.485 ind.m^{-3} in September 2001. *A. aurita* was dominant species in Izmit Bay. Overall, the abundance of gelatinous zooplankton varied greatly spatially and temporally.
Keywords : Zooplankton, Ctenophora, Sea Of Marmara.

Introduction
Izmit Bay is a 310 km^2 large, elongated semi-enclosed water body with a length of 50 km, and a width varying between 2 and 10 km [1]. The bathymetry of the bay is comprised of three sub-basins separated from each other by shallow sills. Several industries have been developing rather rapidly around Izmit Bay. In addition to the increase of untreated, or partly treated domestic waste disposal enhanced by the heavy demographic pressure, the substantial industrial development, the heavy maritime traffic and the agricultural activities in the surrounding areas have caused a considerable pollution burden to enter Izmit Bay. Under the oceanographic point of view, the latter is an extension of the Sea of Marmara, having a permanent two-layer water system, characterized by the presence of less saline waters (Black Sea origin), overlying a more saline bottom layer (Mediterranean origin). Gelatinous zooplankton may affect pelagic food webs by exerting a top-down control on their ecosystems [2]. This has been well documented for estuaries and enclosed seas [3]. The aim of this study is to describe the abundance and distribution of gelatinous zooplankton in Izmit Bay.

Material and Methods
Between July 2001 and September 2002, gelatinous zooplankton was collected from the upper layer of the Black Sea waters in Izmit Bay at montly intervals. A total of 11 stations were sampled by horizontal towing, using a WP2 closing net (157 μm mesh size, 0.5 m mouth diameter). Gelatinous zooplankton samples were identified and measured onboard immediately after collection.

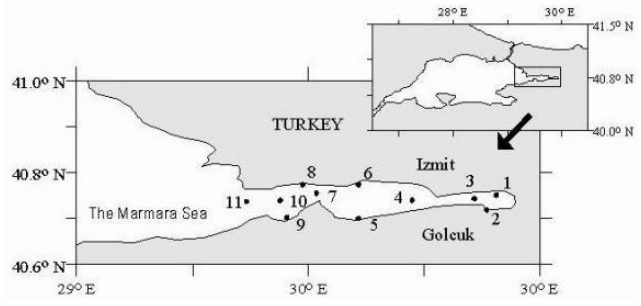

Fig. 1. Location of sampling stations in Izmit Bay, Sea of Marmara.

Results and Discussion
Four species of gelatinous macrozooplankton were found in Izmit Bay: one scyphozoan medusae *Aurelia aurita* and three ctenophores, i.e., *Mnemiopsis leidyi, Beroe ovata* and *Pleurobrachia pileus*. Totally, 768 individuals were counted from all the 11 stations, of which 382 specimens of *A. aurita*, 184 of *M. leidyi*, 129 of *B. ovata* and 73 of *P. pileus*. The maximum abundance of gelatinous zooplankton (0.485 ind.m^{-3}) was found in September 2001. At that time *A. aurita* was the most abundant species (51.4 %), followed by *M. leidyi* (23.3%), *B. ovata* (17.5 %), and *P. pileus* (7.8 %). All 4 species were ubiquitously present in the bay. *M. leidyi* (38%) was the dominant species in the eastern part of the bay, while *A. aurita* replaced *M. leidyi* in the middle (51%) and in the western areas (62 %). The maximum abundance of *B. ovata* (31%) was found in the middle of the bay, whilst *P. pileus* (12%) was in high quantity in the western part. Overall, the abundance of gelatinous zooplankton in the eastern bay was higher than in the western and middle areas. In general, there was a significant negative correlation between the abundances of *A. aurita* and *M. leidyi,* probably due to the high competition between them [4]. Finenko *et al.* (2001) demonstrated that, in the Black Sea, *B. ovata* could control the *M. leidyi* stock. Likewise, the present study reveals that the abundance of *M. leidyi* becomes limited in summer, when *B. ovata* is present in Izmit Bay. In the Black Sea, high abundances of *M. leidyi* were found during winter, while the abundance of *A. aurita* and *P. pileus* increased in summer [4,6,7]. On the other hand, in Izmit Bay, the abundance of *M. leidyi* reached its peak in summer, that of *P. pileus* in spring, whereas *A. aurita* and *B. ovata* were numerous in late summer and autumn. In spring, the latter began to spread all over the bay, although the highest abundances were observed in the eastern part of the bay during summer. As a result, the abundance of gelatinous zooplankton in Izmit Bay displays a great variability, both geographically and temporarily.

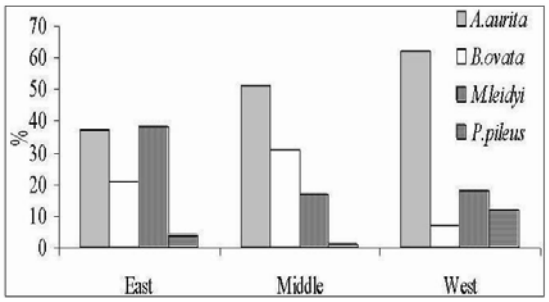

Fig. 2. Regional abundance of gelatinous zooplankton in Izmit Bay between July 2001 and September 2002.

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