SEASONALITY OF GELATINOUS MACROZOOPLANKTON OFF SINOP, SOUTHERN BLACK SEA, IN 2002-2003

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Abstract
Seasonal distribution, biomass and abundance values of gelatinous macrozooplankton (*Aurelia aurita*, *Pleurobrachia pileus, Mnemiopsis leidyi, Beroe ovata*) in the central southern Black Sea were studied during January 2002 - December 2003. The highest values of gelatinous macrozooplankton abundance were obtained from vertical tows in February and July of 2002, and in June and July of 2003, respectively. The maximum biomass of gelatinous macrozooplankton was recorded in March and July of 2003.
Keywords : Black Sea, Biomass, Cnidaria, Ctenophora.

Gelatinous macrozooplankton is one of the key components of the Black Sea ecosystem. In particular, the invasive ctenophore, *M. leidyi* is the agent responsible for the decrease of mesozooplankton and anchovy fishery in the Black Sea [1], most notably at the end of the 1980s, but also in mid 1990s. However, there are signs that the ecosystem of the Black Sea began to improve substantially due to sharp decreases in *M. leidyi* population as a result of appearance of its predator *Beroe ovata* in the late 1990s. The present study was carried out to determine gelatinous macrozooplankton structure in the pelagic ecosystem of the southern Black Sea. Seasonal distribution, biomass and abundance values of average gelatinous macrozooplankton in the Sinop peninsula of the central southern Black Sea were studied.

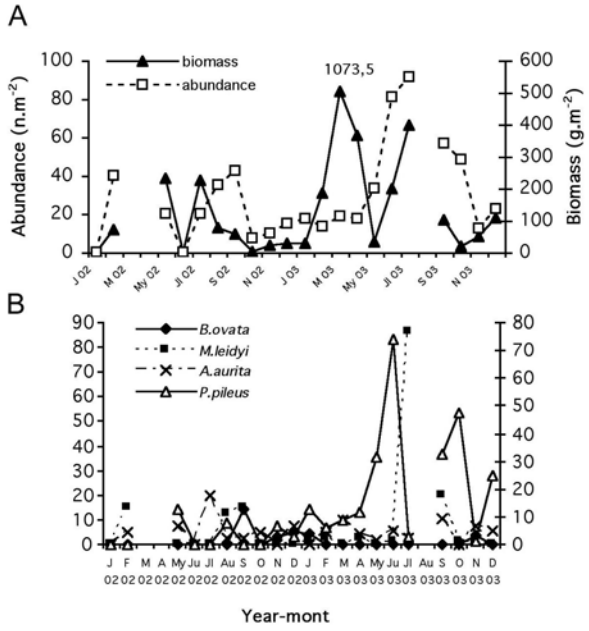

Fig. 1. Seasonal distribution of total gelatinous macrozooplankton (A) and species composition (B) of Sinop, in 2002 - 2003

The maximum abundance and biomass of total gelatinous macrozooplankton was obtained from vertical tows was 42,5 n.m^{-2} and 224.4 g.m^{-2} in September and July 2002. In June and July 2003, highest abundance values were 80.8 n.m^{-2} and 91.3 n.m^{-2} respectively. Maximum average biomass of gelatinous macrozooplankton were determined in March (1073.5 g.m^{-2}), April (365 g.m^{-2}) and July (397 g.m^{-2}) 2003 (fig. 1,A). Minimum abundance and biomass values were found in winter periods in both years.
In terms of annual abundance, *A. aurita* was the dominant species in 2002 and 2003. The highest abundance value of *A. aurita* was found in 2003 (55%). Abundance of *A. aurita* was 50 n.m^{-2}and 53,3 n.m^{-2}in 2002 and 2003, these walues were higher than in 2000. In terms of abundance the contribution of *P. pileus* was 21 % in 2002 and 23 % in 2003. In 2000, *P. pileus* was the most abundant species with approximately 80%, abundance value was 360 n.m^{-2} [2], whereas total percent of *P. pileus* decreased compared with the study of Unal (2002) for 1999 (49.5%) and its abundance was 734 n.m^{-2} [3]. In 2002 and 2003, abundance of *P. pileus* decreased to 29,1 n.m^{-2} and 253,5 n.m^{-2}. Maximum abundance of *P. pileus* was observed June 2003 (74,17 n.m^{-2}) (fig. 1,B).
Our samples show that the abundance of *M. leidyi* was 42,5 n.m^{-2} and 115 n.m^{-2} in 2002 and 2003. *M. leidyi* decreased compared to 1999 (546,5 n.m^{-2}) [3], and its abundance low in 2000 (30 n.m^{-2}) [2]. Maximum abundance of *M. leidyi* was determined in july 2003 (86,25 n.m^{-2}) (fig. 1,B). Abundance and biomass of *M. leidyi* showed oscillations until 1998, when its values declined [1]. In our study the percentage of *B. ovata* was significantly higher the 2002 (22,5 n.m^{-2})than the 2003 (7,91 n.m^{-2}). In 2000, *B. ovata* was found to constitute 2% of total gelatinous species [2], and its abundance 10 n.m^{-2}. In the northern Black Sea in 1999-2001, development of *B. ovata* demonstrated pronounced seasonal pattern. All mentioned species exhibited clear seasonality. This was especially apparent for *B. ovata* and *M. leidyi*. *M. leidyi* was more abundant from mid-spring to autumn. Its autumnal decline closely coincided with the appearance of *B. ovata*. This pattern was repeated in 2002-2003.

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