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Some results of recent zooplankton (including *Mnemiopsis*) studies in the Black Sea

Ahmet E. Kideys, Alexander Shulman*, Georgy Shulman*, Ferit Bingel & Ulrich Niermann
Institute of Marine Sciences, Middle East Technical University, Erdemli, 33731,Turkey,
Institute of Biology of the Southern Seas, Nahimov Ave. 2, Sevastopol, Ukraine

ABSTRACT

Black Sea ecosystem has experienced a considerable number of negative events over the last few decades due to miscellaneous anthropogenic activities, particularly affecting its shallow northwestern shelf. The degradation of the ecosystem became most apparent when the biomass of the alien ctenophore *Mnemiopsis sp.* bloomed to enormous values in 1989 followed with by very sharp decreases in the pelagic fishery of the riparian countries. However these marked events increased the efforts of the scientific community resulting in several investigations covering all compartments of the Black Sea pelagic ecosystem, including zooplankton. Some important results from these zooplankton studies are submitted here.

All related recent studies performed on Black Sea zooplankton indicate that there have been important changes in the zooplankton composition and structure. However, contrasting events taking place in different regions of the Black Sea indicate a non-uniform structure of its ecosystem.

It was found that several fodder zooplankton species have either disappeared from or substantially decreased in number at different sampling sites of the Black Sea over the last one or two decades. At the same time, some other species adapted to thrive in eutrophic conditions either increased in quantity, of appeared first time. The appearing alien species include the ctenophore *Mnemiopsis leidyi*, the copepod *Acartia tonsa* and very recently *Beroe sp.*

Meanwhile the biomass of the fodder zooplankton has also fluctuated considerably through the years. However there seems to be a reverse trend in the long-term variation of fodder zooplankton between the shallow western and deep eastern areas. Over the last few decades the abundance of fish larvae in the Black Sea has decreased significantly when compared either to past records or with larval abundances of other seas. This was shown to be due mainly to malnutrition of larvae. One of the most striking changes in the ichthyoplankton has been the shift in the spawning areas of the main fish species, the anchovy Engraulis encrasicolus from the northwestern to the southeastern Black Sea. It was not only fish larvae which became undernourished but even the invading ctenophore *Mnemiopsis* were starving. The condition of other species (*Calanus euxinus* and *Pleurobrachia pileus*) disclosed the fact that cyclonic regions where chlorophyll and nutrient concentrations are both high, provide better nutrition than anticyclonic regions.