INTRODUCED SPECIES AND THEIR IMPACTS IN THE BLACK SEA

Naciye Erdogan [1], Ertug Duzgunes [2]*, Hamdi Ogut [2] and Nazli Kasapoglu [2]
[1] ODÜ University Faculty of Marine Sciences
[2] KTU Faculty of Marine Science(2) - ertug@ktu.edu.tr

Abstract

In the last half of the 20th century, many forms of marine organisms, belonging to various levels of food chain, native to Indian Ocean and the Mediterranean Sea have been unintentionally introduced into the Black Sea mainly by the means of shipping vessels or water exchange through Sea of Marmara. Along with the changes in the climate due to the global warming, a process namely "Mediterreneanisation" has been taken place in the Black Sea, leading to collapse of fisheries i.e impact of Comb jellyfish on anchovy stocks, and Rapa whelk *Rapana venosa* on mussel banks.

Keywords: Black Sea, Bivalves, Gastropods

Introduction

Hundreds of species from various flora and fauna have been introduced to the Turkish seas since the beginning of 20th century. For instance, more than 85 species of macrophytes including "killer algae" introduced to the Mediterranean, nine of them are considered as invasive, i.e., playing a conspicuous role in the recipient ecosystems. The Black Sea biodiversity has become extremely more sensitive to immigrants' expansion than those in other seas. Rich diversity of biotopes and the poor local species diversity provide favorable conditions for some exotic invaders finding naïve ecological niches with no competitors or predators (Gomoiu, 2001). Unfortunately, the data generated from controlled experiments are very limited; therefore, observations will be presented here.

Invasive Species The number of invasive species penetrations into the Black Sea peaked during 2000s (Fig. 1) (Gomoiu 2001). The main invaders establishing and having the most dramatic impacts on species diversity are Rapa whelk *Rapana venosa*, *Scapharca cornea*, Comb jelly fish *Mnemiopsis leidyi*, Pacific Mullet *Mugil soiuy*. *Rapana venosa*, introduced during 1940s, spread all over the Black Sea due to lack of predators ie sea stars (Duzgunes and Feyzioglu, 1994; Saglam et al, 2009).

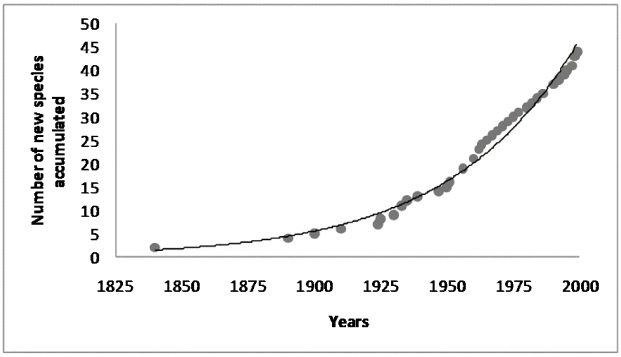

Fig. 1. Number of new species accumulated for years (redrawn, Gomoiu, 2001)

It has devastatedmajority of mussel banks *Mytilus galloprovincialis* and baby clam *Chamelina gallina* stocks (Table 1). At present, mussels only survived at habitats having steep slopes and high currents. Mussels are essential organisms to slow down or prevent eutrification by filter feeding in the Black Sea. Another introduced species *Scapharca cornea*, a filter feeder bivalve, become established and spread due to the fact that they are less exposed to predation owing to thicker shell (Duzgunes, 1995). Comb jelly fish *Mnemiopsis leidyi*, feeding on eggs and larvae of small pelagics e.g. anchovy, caused to collapse of fisheries in the Black Sea during the late 1980s. Total anchovy catch in the Black Sea dropped sharply from 526000 metric tonnes to 85000 from 1988 to 1991 (Dumont et all, 2002).

Tab. 1. Impact of major introduced species in the Black Sea

Species	İmpact	Remarks
Rapana venosa	Destroyed mussel and baby clam stocks	No predator in the Black Sea and due to its resistant egg cysts reproduction rate is too high
Anadara cornea	Replaced *Mytilus galloprovincialis*	Have no economical value and under predation of *Rapana venosa* at present
Mnemiopsis leidyi	Predating on fish eggs and larvae of small pelagics	Decreased overall biodiversity in the Black Sea
Mugil soiuy	Food competition with native mullet species	Majority of the native mullet species are now out of fisheries

Pacific mullet, introduced into Azov Sea in 1985, was first observed in the Black Sea in 1989 (Ünsal,1992; Okumus and Bascinar, 1997). It successfully competes with such native mullet species as *Mugil cephalus*, *M. auratus* for food. As a result of this competition, catch quantity of native mullet species declined from 14189 tones to 1518 tones during the period 2000-2008. At present commercial catch shifted from native to the pacific mullet. Establishment of both *Rapana venosa* and *Mugil soiuy* was so efficient, as a result the species were able to increase their numbers significantly allowing an economically feasible fishery towards their harvest.

Conclusions

Species abundance and diversities changed significantly as a result of introduced species.

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