

# THE CHRONICLE OF ALIEN SPECIES IN DODECANESE ISLANDS: A PATHWAY OF INTRODUCTION IN EUROPEAN COASTAL WATERS

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## Abstract

Alien species introduction was analysed from its starting in one of the hot-spot region of the Mediterranean Sea. Their impact is also discussed.

**Keywords:** *Eastern Mediterranean, Biodiversity, Species Introduction, Aegean Sea*

Our attention focuses on the Dodecanese Islands, as it is the closest to the coast of Asia Minor Hellenic area and the easternmost European waters significantly affected by the so called "biological pollution". Of the 192 alien species currently known from Greek Seas [1], 86 (44.8%) occur along the Dodecanese coasts, almost all (84) from warm/tropical waters: 6 by shipping, 3 by unknown vector, 1 via Dardanelles, 3 via Gibraltar and 71 via the Suez Canal (Fig. 1).

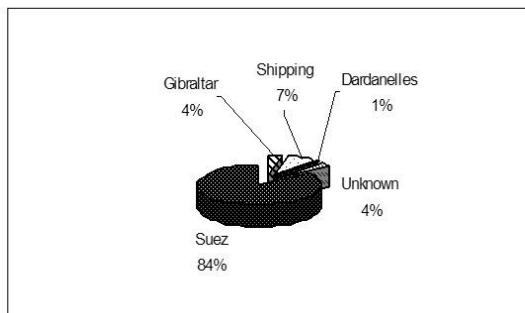


Fig. 1. Pathway of introduction

The first two lessepsian migrants were evidenced in Rhodes Island in 1894, the seagrass *Halophila stipulacea* and the macroalga *Hypnea cornuta*. Almost 40 years later (1930's) 3 Indo-Pacific fish species were recorded in the area, followed by other 5 during the 1940's. The first one, *Siganus rivulatus*, rapidly acquired commercial value. Thus, the corridor was open and changes in native communities and fishery activities started. During 1950's the first benthic invertebrate was recorded. A huge increase of alien species has been observed from the beginning of 1980s, after almost a century of "smooth" colonisation (Fig. 2).

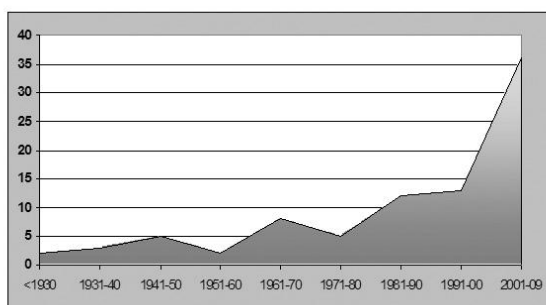


Fig. 2. Trend of introduction

It must be noticed that this increase parallels the observed warming of the area, which showed an abrupt shift by the end of 1990's, resulting to more favourable conditions for the establishment of alien species. A strong correlation between alien species entry and climate warming has been detected [2]. During the 1980's the alien biota was increased by 2 polychaetes, 6 planktonic, 3 fish species and 1 gastropod (*Strombus persicus*, 1986), which quickly invaded all sandy bottoms of the Island. From then towards the introduction of alien species in the area assumed the character of invasion, with the addition of 13 new species during the 1990's and 36 from 2001 to 2009! Zoobenthos (38%)

and fish (37%) are the most important groups, followed by phytobenthos (17%) and plankton (phytoplankton 6%, zooplankton 2%). The most evident effects of new species entry can be detected at three different levels: biodiversity, economy and human health. Until now, evidence for endangerment or extinction of native species in the study area has not been detected, although this does not mean that it may not have occurred or may not be occurring. However, the 32 alien fish present (28 of Indo-Pacific and 4 of Atlantic origin), almost all well established, constitute approximately the 10% of the total ichthyofauna diversity [3]. From an economical point of view, few introduced species are locally exploited (*S. persicus*, *S. rivulatus*, *S. luridus*, *Sphyrna chrysoaenia*, *Etrumeus teres*) and recent colonizers (*Sepioteuthis lessoniana* and *Upeneus pori*) show a rapid increase. *Fistularia commersonii*, a piscivorous fish abundant and seriously affecting native species, is not appreciated, thus discarded. An example of invasive species provoking damages to biodiversity, economy and human health is the toxic fish *Lagocephalus sceleratus*, which evidences the huge dimension of the problem worldwide. The gradual tropicalization of the Mediterranean and the higher resistance to natural changes of tropical compared to native species lead us to believe that alien tropical species, now mostly affecting the Eastern basin, will gradually colonize the rest of the Mediterranean.

## References

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