

Marine research in Greece and the additional Greek marine research centres: Progress and present situation

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ABSTRACT: Greece, as is known, has a coastline of 17 000 km, and over 2000 small and large islands. As expected, the quest of humankind for new sources of matter and energy has been focussed on the sea, with fishery being its primary interest. A number of philosophers and scientists have been involved in the study of this vast ecosystem since ancient times (Aristotle). The political, social and geographical upheavals witnessed in the Greek area, have, however, resulted in bringing all these activities to a halt. The first contemporary research work commenced at the end of the 18th century/beginning of the 19th – with marine flora and fauna as its starting point. The first investigations had, of course, been limited to random collections of marine material done in the frame of international exploratory expeditions. Studies became more systematic by the end of the 19th and beginning of the 20th century, with priority being given to the animal kingdom (fish, molluscs, etc.). Investigation of the marine phytobenthos (macrophyceae, phytoplankton) was to follow. The past 40 years research has been more extensive, not limited only to biogeographical evaluations, but also having expanded to physiological and ecological levels. The relevant institutes of Greek universities have all the while watched and contributed to this effort. Today, this kind of research is being supported by the N.M.R.C., the Center of Marine Research, University of Crete, and two research boats which sail the Greek seas. In the ever-changing world, the study of marine flora and fauna has certainly made great progress; however, there are still two big problems to be faced. The first deals with increasing pollution of the seas, the second, with the difficulties in finding and affording adequate financial resources that would enable a more detailed and complete execution of this research work.

Greece, as is known, has a coastline of 17 000 km and over 2000 small and large islands (Fig. 1). As expected, the quest of humankind for new sources of matter and energy has been focussed on the sea, with fishery being its primary interest. Interest in marine animals and plants as well as the phenomena concerning coastal and open sea waters can, in Greece, be traced back to the Minoan times. The frescoes of Knossos and Santorini, the teachings of the Ionian philosophers, Aristotle's books, all testify to this uninterrupted tradition, which has continued right up to the present.

After the Independence of the Greek State, in 1828, several scientific studies on the marine biology, geology and physiology of the coastal areas were published, both by foreign and Greek scientists (Apostolidis, 1907). However, only in 1912 did the Greek Government decide to take action by inviting Prof. Dr. Vinciguerra, Director of the Rome Fish Station, to study aspects of fishing and fish culture. So, in 1914, a station was established in a suburb of Athens, on the coast of Paleon Phaliron, and started operating the following year. Dr. Athanasopoulos, who in reality was the first Greek of modern Greece to spend a lot of his time on marine fish research, worked as curator at this station

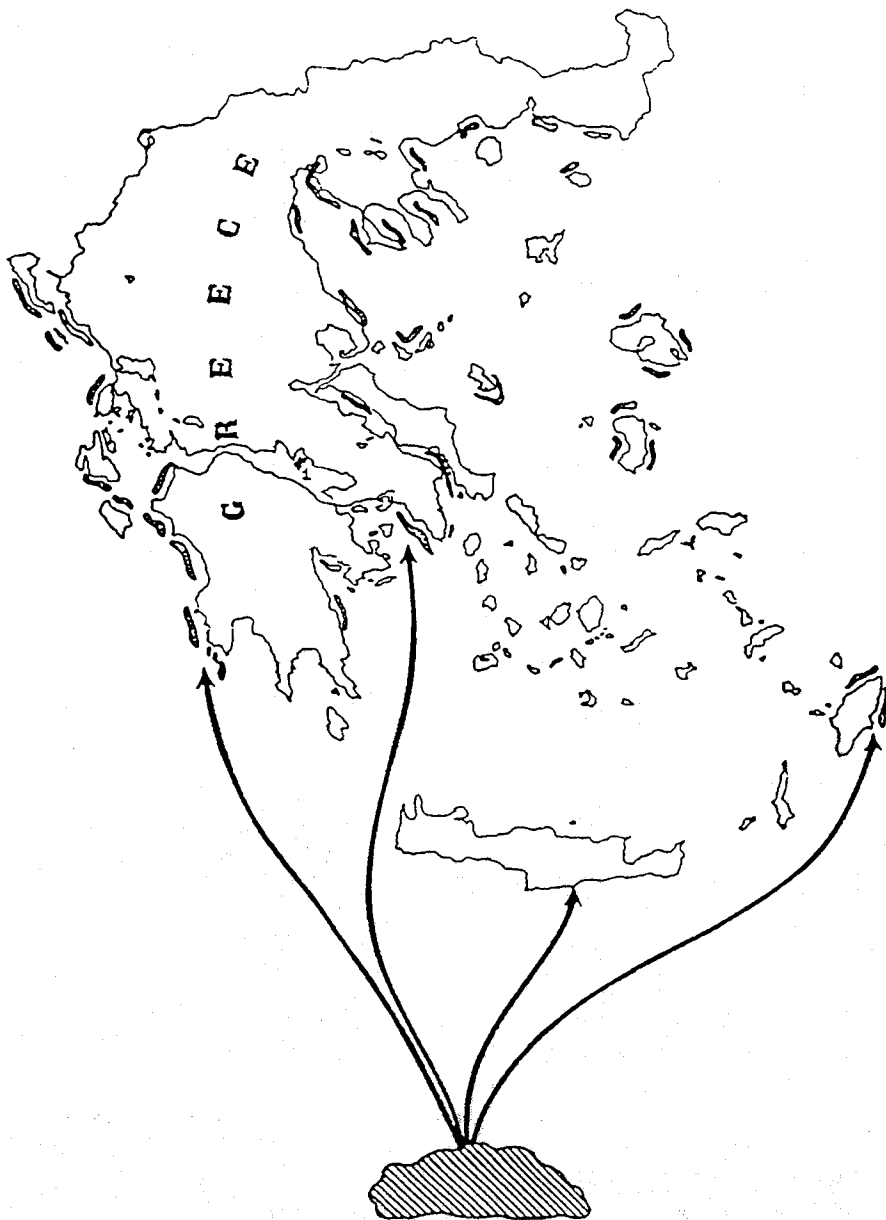


Fig. 1. Map of Greece. Migration of *Halophila stipulacea* to the Greek seas is shown by arrows

from 1916 until 1928. Dr. Athanasopoulos (1917) had proposed the establishment of other scientific centres, fishery schools for amateurs and professionals, as well as the establishment of fish culture units. He had predicted that over-consumption of sea products would sooner or later cause problems in the market. He had also suggested that the growth and

development of fish, molluscs, etc. could be better checked in water cultures. By 1928 when he became Professor at the Aristotle University of Thessaloniki, he had managed to organize the Hydrobiological Station, the contemporary descendent of which is the N.M.R.C., that even today is in many ways a true follower of his proposals.

Marine research, in general, had, however, begun to evolve. Foreign ichthyologists would visit and make collections from the Greek seas in the frame of oceanographic expeditions. Helderich (1878) had studied and published the "Faune de Grèce", in which a good deal of information on marine flora is included. Studies by Greek scientists followed – such as the one by Apostolidis in 1883. The part on the Greek fishes was revised in 1907. In the meantime, Athanasopoulos continued to publish, from 1917–1940, while Borodin (1932) during an oceanographic expedition on board the yacht "ARA" was able to identify 31 species of fish found in Greek waters.

With the outbreak of the Second World War, there was a halt in the research. Ananiadis (1947) and Stefanidis (1947) managed to complete the list of the Greek marine fish. Tortonese (1947), on the other hand, published a paper on marine fauna of the island of Rhodes (Dodecanese). From 1970 onwards, an adequate number of fully-detailed research papers has been published by Greek colleagues of our Institutes and Universities.

The study of marine flora has not advanced as rapidly, for, as expected, human beings have primarily been concerned with obtaining immediate food despite the fact that the role micro- and macro-algae play in food chain is vital (Fig. 2). The first studies in

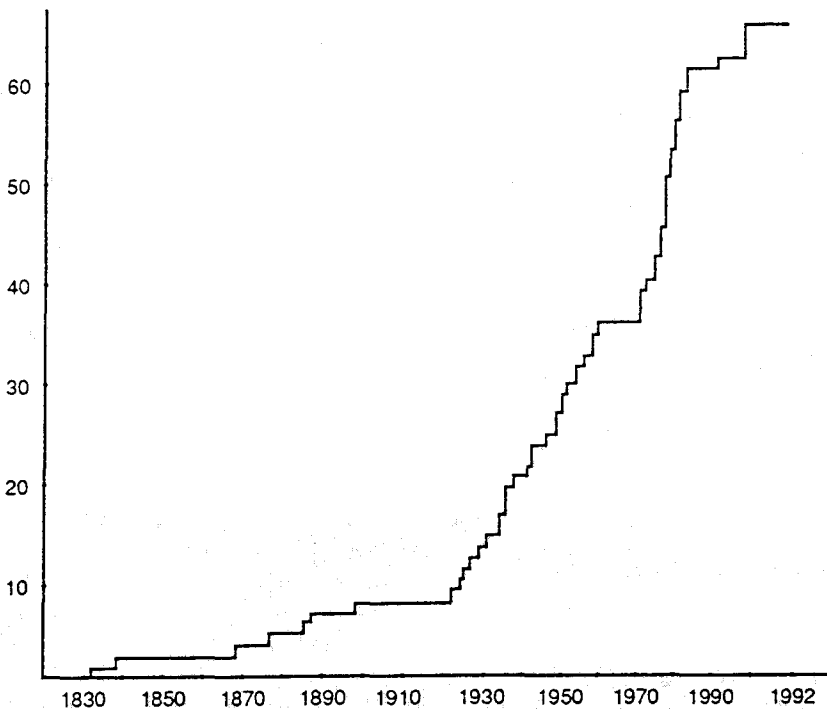


Fig. 2. Progress of macrophytological research in Greece

this field were again conducted by foreign researchers (Bory de Saint-Vincent, 1832), whereas in Institutes (N.M.R.C. and the University of Crete), satisfactory research done up till now has resulted in the publication of a check-list of 550 species (Fig. 3) (Haritonidis et al., 1992).

The oceanographic expeditions carried out in Greece were enough to cover our aquatic space. Research of this kind had been initiated in modern Greece in 1921 aboard the boat "Glafki" owned by the Academy of Athens. Significant progress was made in the field of physical, chemical and biological oceanography. Investigations continued on board the boats "Alkionis", "Ariadne", "Vegas", "Aegean" and "Philia".

Scientific research in any field is today performed by not only one scientific unit, institute or organization, but is the outcome of the combined collaboration of many teams. Therefore, it is advisable that, apart from the University Laboratories and Institutes, the centres of Marine Research should constitute the main coordinators of this effort. N.M.R.C., for example, as it is today organized in Athens, comprises one such remarkable centre. The administration of the N.M.R.C. is directed by the Fishery Department of the Greek Ministry of Agriculture – covering all fields of Oceanography since 1987. Its ship, "The Aegean" (51 m long), has been sailing the Greek waters since 1984, and selecting more information in many different fields of marine research in Greece. The newly-established Institute of Marine Research at the University of Crete also assists in the investigation, by exploring the South Aegean and North Libyan Seas on board the ship "Philia".

Investigating never ceases – even if one works within a closed system which can be characterized as stable. This can, by no means, be applied to the Greek Seas, because the opening of the Suez Canal in 1860 has caused the ecosystem of the Eastern Mediterranean and of the whole basin in general to be continuously altering.

Continuous studies of the flora, fauna and abiotic system as well, have shown that species migration is quite important. Ben-Tuvia (1978), Lipkin (1972), Haritonidis (1978) and Por (1971) demonstrated that approximately 36 animal species crossed the Suez Canal, constituting the current emigrants of the Eastern Mediterranean, while 12 species have migrated over the past 10 years (Tables 1 and 2).

The typical example of the marine phanerogam *Halophila stipulacea* along with the Chlorophyceae *Caulerpa racemosa* again testifies to this migration. *Halophila stipulacea* has reached the boundaries of the Central Aegean and Ionian Seas, moving further up north. According to Por (1989), the Eastern Mediterranean Sea may as well become the great Sea of Tethys. Now, if we take into account that the Nile today provides the Mediterranean with 10 % of its nutrient-poor aquatic mass, then we should regard the above hypothesis quite possibly to become real.

Increasing pollution, on the other hand, has compelled the Greek team to think and advance in the formation of aquatic cultures in order to cover our needs in fish etc. Nowadays there exist 120 units of aquatic cultures in Greece which are not enough to satisfy local consumption; therefore imports from other countries are carried out. One can see that we are facing a big problem here that demands a solution. The following train-of-thought should be considered in order to be able to reach a safe conclusion:

In 1991 Greece spent 280 million dollars on importing 56 000 tons of fish and molluscs, while our exports amounted only to 16 000 tons. Over the past five years, fish consumption has reached 210 000 tons annually. Fishery still plays the role of our

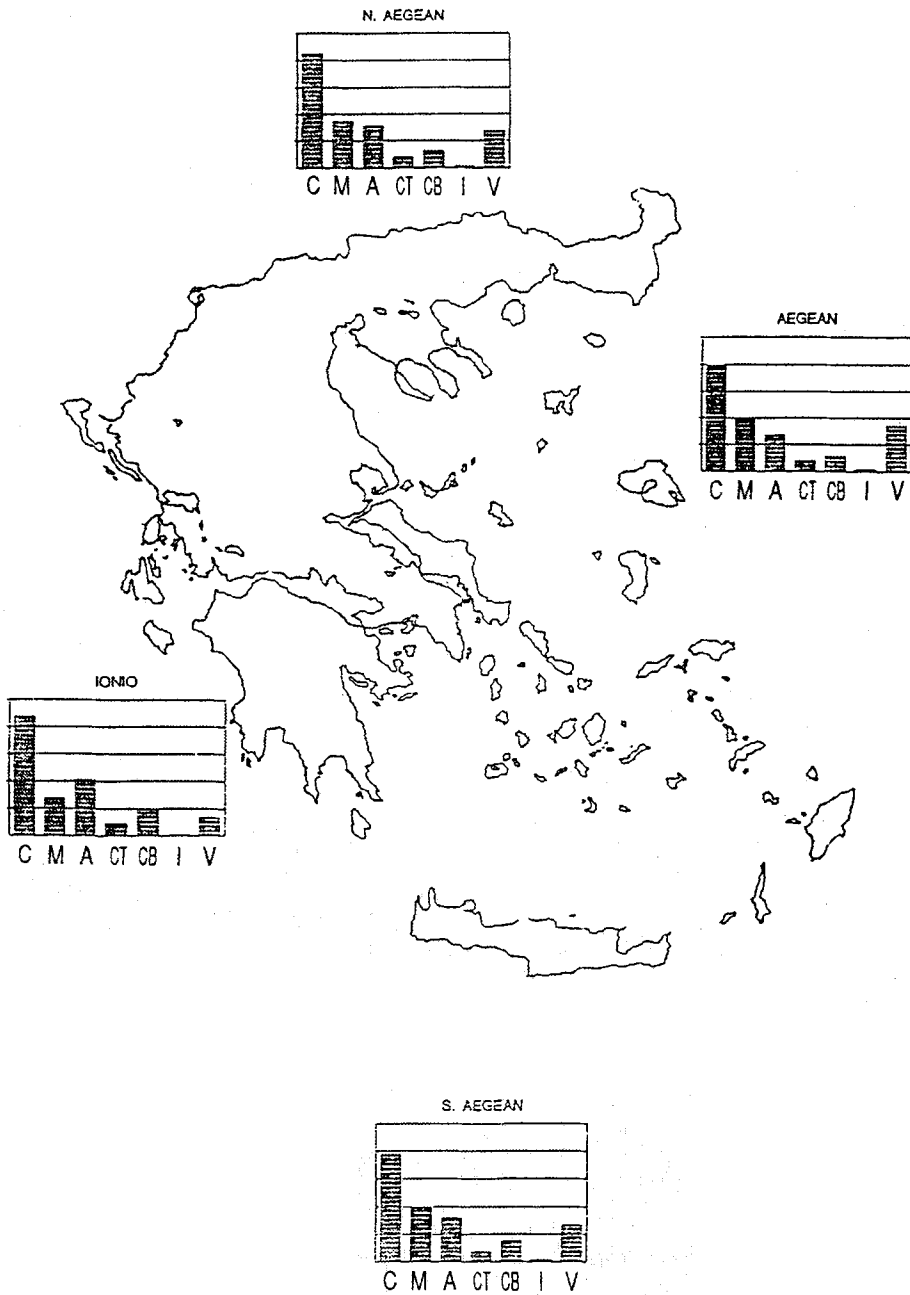


Fig. 3. Present picture of marine macroflora in Greece

Table 1. Red Sea fishes in the Mediterranean Sea (according to Ben-Tuvia, 1978)

<i>Spratelloides delicatulus</i>	<i>Silago sihama</i>
<i>Herklotsichthys punctatus</i>	<i>Rhonsicus stridens</i>
<i>Tylosurus choram</i>	<i>Crenidens crenidens</i>
<i>Sebastapistes nuchalis</i>	<i>Rastrelliger kanagurta</i>
<i>Epinephelus tauvina</i>	<i>Scomberomorus commerson</i>
<i>Autistes puta</i>	-----
<i>Pelates quadrilineatus</i>	<i>Halophila stipulacea</i>

Table 2. Mediterranean fishes in the Red Sea (according to Ben-Tuvia, 1978)

<i>Carcharhinus plumbeus</i>	<i>Dicentrarchus punctatus</i>	<i>Liza aurata</i>
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economy's "poor relative". The number of professional fishermen decreases by 1.5 % every year, despite financial support from the E.C. and other sources; also, our fishing fleet is quite old-fashioned. Finally all these aquatic culture units, which have wildly propagated the past few years, having not come up with the expected profits, are now fighting for survival. In order to achieve better results from this effort, we should concentrate on a better coordination of activities, the modernization of our fleet, and a more effective training of the crews involved.

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