

# **Historical records and current status of Fucales**

## **(*Cystoseira* and *Sargassum* spp.)**

### **in the Gulf of Naples**

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of

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by

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## **Abstract**

Fucales are brown macroalgae that play a relevant structural and functional role in marine ecosystems but are experiencing a huge decline in many areas of the Mediterranean Sea. Despite the long tradition of phycological studies in the Gulf of Naples (Italy), a gap of knowledge on their dynamics and current status has been highlighted for the last 60 years in this area. This thesis aimed to provide an overview on long-term changes in the distribution ad abundance of *Cystoseira* spp. and *Sargassum* spp. along different sectors of the Gulf of Naples in the bathymetric range between 0 and 50 m depth.

Research was focused into three main objectives: 1) to assess the historical decline of Fucales the Gulf of Naples and their putative causes; 2) to map their current distribution; 3) to investigate the role of consumers in their loss. Results highlighted a decline of *Cystoseira* and *Sargassum* spp. mainly in the most urbanized areas of the gulf. Seven of the eighteen species recorded in the first half of the 20<sup>th</sup> century were no longer recorded; for other species the local decline could end up with their extinction if no action will be pursued for their conservation. A detailed georeferenced map (1:2,500) of Fucales has been elaborated for the shallow species; SCUBA surveys were performed for deep algae. Some human actions, such as coastal artificialization, can affect species richness and distribution in shallow sublittoral stands. Another mechanic pressure that can act on deep species is the intense fishing activities performed with fishing gears. Probably the interaction between the physic damage and the increase of water turbidity, related to a high eutrophication, can affect the vitality of deep species and their successful spread. The occurrence of patches of *Cystoseira*, among very dense and deep stands of *Posidonia oceanica* meadows in the oligotrophic waters around the island of Capri, seems to confirm this hypothesis. Another interesting result was obtained by a feeding choice experiment. The sea urchin *Paracentrotus lividus* fed indiscriminately on different macrophytes according to the equal choice behaviour between macrophytes offered alone or together, regardless of differences in total phenolic compounds content and C:N ratio. In conclusion, results infer that the improvement and maintenance of the environmental quality of the Gulf of Naples is a major issue not only for the welfare of the coastal ecosystems, but also for its social and economic spin off.