

# THE ASCIDIA *STYELA PLICATA* AS A NATURAL EUTROPHICATION CONTROL. PRELIMINARY RESULTS OF AN EXPERIMENTAL APPROACH

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## Abstract

The potential of the solitary ascidia *Styela plicata* as a natural eutrophication control was investigated at the inner Thermaikos Gulf. Experimental work was carried out in the laboratory to estimate filtration efficiency, and in the field to study the colonization potential. *S. plicata* specimens halved the original concentration of particulate organic matter in about 2 hours, and successfully colonized a variety of artificial substrates within 3 months. These results support the abilities of this species as biological filter.

**Keywords :** Aegean Sea, Tunicata, Eutrophication, Diet, Recruitment.

## Introduction

Suspension feeders dominate benthic communities in eutrophic environments [1]. In Thermaikos Gulf the species *Styela plicata* (Lesueur, 1823) is among the dominant biota, both in terms of population density and expansion [2]. The purpose of this work was to investigate the abilities of *S. plicata* as a natural eutrophication control, by estimating the filtration efficiency, i.e. the amount of retained particulate organic matter (POM), and the colonization success on various artificial substrates.

## Materials and Methods

Thirty specimens of *Styela plicata* were collected with SCUBA diving from the inner Thermaikos Gulf, weighted and transferred to three experimental aquariums (10 each) with continuous airflow. After three days of acclimatization, 15g of phytoplankton were added in two aquariums (the third one served as control). Three water samples (100 ml each) were collected from each aquarium at 30-min intervals, for the estimation of POM [3]. To study the colonization of *S. plicata*, ropes (2 x 10 m, each), wooden and plastic plates (3 replicates of 30 x 30 cm each) were deployed (40°30'49" N 22°54'25" E) at 10 m depth in March 2005 (Figure 1), and visually sampled every 15 days for 6 consecutive months.

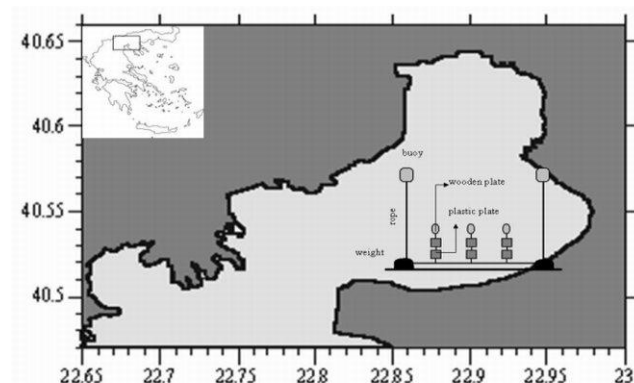


Fig. 1. Map of the study area and location of experimental artificial substrates.

## Results and Discussion

The filtration efficiency of *Styela plicata* was equal at both experimental aquariums (Kruskal-Wallis statistic 6.48,  $p > 0.05$ ). Mean concentration of particulate organic matter (POM) dropped within the first two hours of the experiment to 50% of its original level, showing that *S. plicata* can assimilate half of the input food (15g POM) in about two hours. Thereafter POM started to increase again and stabilized to a lower concentration than the original input (around 9g POM), as the specimens started to produce faeces [4] and the experimental aquariums were closed circuits, so the seawater was not renewed. The colonization process started within the first 15 days with the development of the biological film. Thereafter, and within the first month, organic matter started to accumulate as well as the eggs of squids and cuttlefishes. Next, a dense population of the amphipod *Corophium sextonae* appeared, followed by *Mytilus galloprovincialis* recruits. Finally, after about 3 months of the experimental deployment, the first ascidians (length about 2 cm) were recorded. These results, although

preliminary, support the use of *Styela plicata* as a biological filter to reduce particulate organic matter. Considering the importance of the species as human food (Japan) and fishing bait (Europe), the produced biomass can be exploited respectively [5].

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