

MACRO AND MICROALGAL COMMUNITIES AS INDICATOR OF TROPHIC LEVELS IN A SHELLFISH FARMING LAGOON

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Abstract

This study measures marine macrophyte and phytoplankton communities composition and specific diversity in a French Mediterranean lagoon (Thau lagoon) subject to intensive shellfish farming activity. We define in three sites, different dominant macrophytes and microphytes communities characterised by increasing eutrophication (increase of siltation and shell fragments in sediments to the detriment of sand).

Keywords: Mediterranean lagoon, eutrophication, macrophytes, microphytes

Results – Discussion

The study was conducted seasonally at 1.5 m water depth.

Along the increasing eutrophication gradient, the dominant macrophyte communities were:

(i) pure eelgrass (*Zostera marina* L. and *Z. noltii* Hornem.); (ii) eelgrass invaded by seaweed (Rhodophyceae and Chlorophyceae); and (iii) a red seaweed community dominated by three *Gracilaria* species. In the first site, the eelgrass predominated on the sand. The macroalgal diversity was maximal in the second site, because the shell debris in the sediments increased the surface available for the settlement of algae. In the third site the shells were smothered by mud, the sea-grass disappeared and the red algae were dominant as the turbidity increased with increased siltation.

The phytoplankton communities, in the two last sites, in spite of the seasonal changes, always differed. Both sites were dominated by nanoflagellates. The most oligotrophic site was characterised, above all, by diatoms which are usually planktonic and pelagic (i.e. *Chaetoceros affinis* and *Pseudonitzschia heimii*). At the eutrophicated site, epiphytic (i.e. *Cocconeis molesta*, *C. scutellum* and *Licmophora debilis*) and benthic (i.e. *Amphora veneta* and *Pleurosigma formosum*) diatoms were abundant.

Conclusion

The increasing eutrophication gradient demonstrates the stages of eelgrass degradation in a longterm evolution. The phytoplanktonic species confirm these results, which are important for the management of marine areas impacted by shellfish farming.

