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Faunal and Floral diversity of hard substrate from the CHERLOC experimental dike

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Contexte

The world's coastal landscapes are in constant transformation through Human infrastructure constructions and effects of climate change. In this context, the CHERLOC project main objective is to create and study two pilot sites in the Région Normandie (France) by integrating two types of artificial blocks to existing dikes.

Material and methods

This new experimental dikes were installed in March and June 2021 in the Ouistreham and Cherbourg city.

- A monitoring of the artificial blocks was made at each site every quarter during two years.
- A benthic diversity monitoring was carried out every semester, at the two sites, before and after the blocks installation, during four sampling campaigns.

For fauna, three zones were sampled at the Ouistreham site in the mediolittoral hard substratum whereas two zones were sampled at the Cherbourg site. The sampling corresponded to a scraping of the hard substrate using a quadrat of 0.1m². For each station, five scraping replicas were carried out.

For flora, one area of interest was selected in Ouistreham, one on the Cherbourg external site and three on the Cherbourg internal site.

- Macroalgae qualitative status determined (Ar Gall and Le Duff, 2012 method : indices of characteristic and opportunistic algal diversity and the percentage of macroalgal cover
- Estimation of the abundance of microphytobenthos and measurements to determine the physiological state and productivity of both groups of flora studied.
- The same method was also applied to the slabs installed on the foot of the dyke from November 2021.

Results

A total of 134 faunal taxa were recorded between October 2020 and March 2022. Results show taxonomic richness variation between the two sites and between sampling stations (Figure 1).

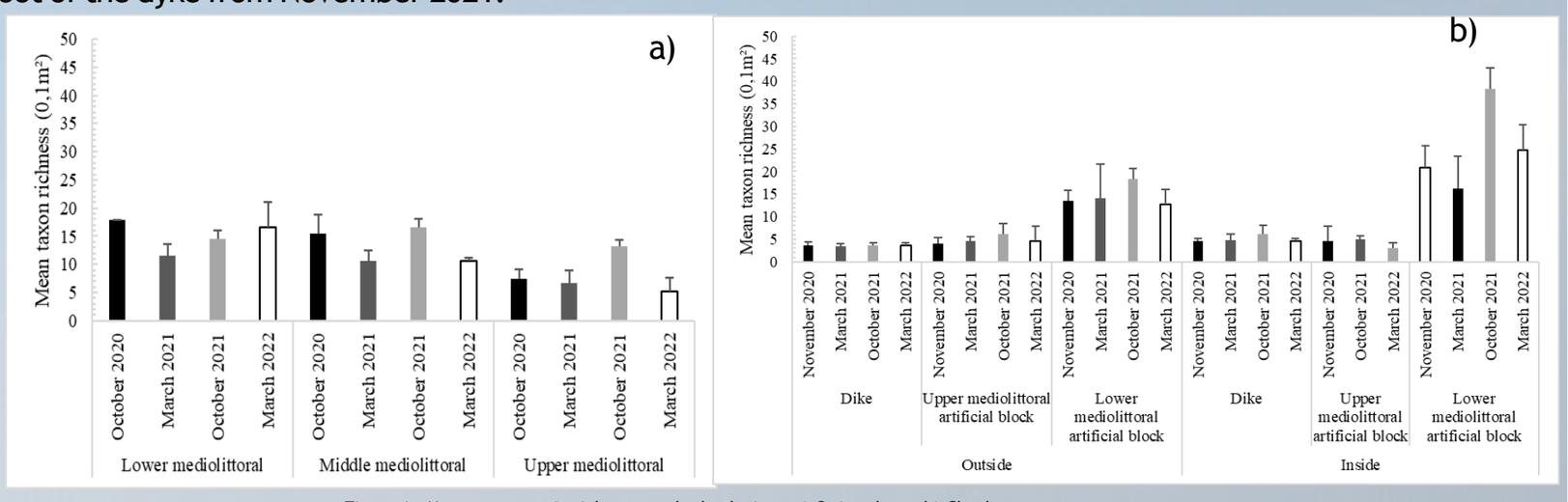


Figure 1 : Mean taxonomic richness at the both sites: a) Ouistreham, b) Cherbourg

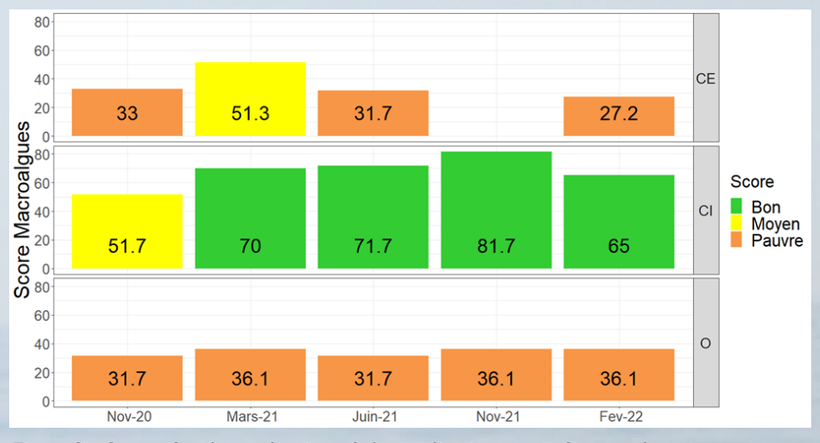


Figure 2 : Scores for the evaluation of the qualitative state of macroalgae present on the riprap around the study sites (CE = Cherbourg External Site, CI = Cherbourg Internal Site, O = OuistrehamSite)

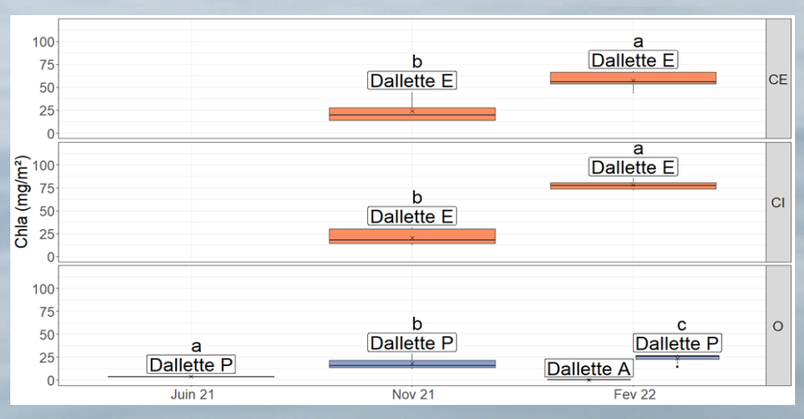


Figure 3 : Evolution of the microphytobenthic biomass present on the slabs installed on the riprap (The letters "A", "E" and "P" correspond respectively to the seasons of installation of the slabs: "A" for "Autumn", "E" for "Summer" and "P" for "Spring")

For flora, the community on the riprap around the Ouistreham site is stable over time.

The Cherbourg sites show seasonal variations (Figure 2).
On the new experimental blocks, the first macroalgae were observed from November 2021 with insufficient diversity to establish a qualitative state at this stage.

A significant increase in microphytobenthic biomass over time was observed at each site, but more so at the Cherbourg sites (Figure 3). It can be added that these microphytobenthic biomass values are two to eight times higher than those measured on the surrounding riprap.

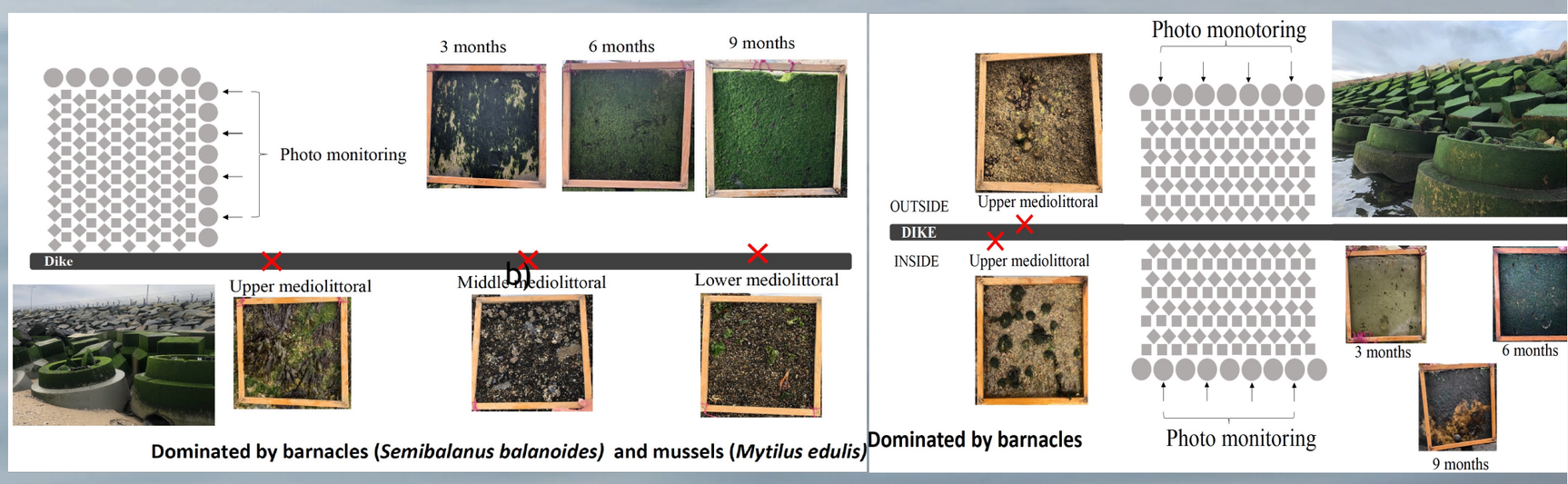


Figure 4 : Monitoring of the hard bottom benthic communities surrounding and on the experimental dike : a) Ouistreham, b) Cherbourg

Benthic faunal species were on observed the artificial blocks three months and six months after after their installation (Figure 4)

For macroalgae, we are still in the early stages of colonisation, only a few juveniles of characteristic species have been observed on the new experimental blocks for the moment.
The same dynamics is observed for the microphytobenthos, a rise of biomass is expected till a plateau before a decrease when the grazing gastropods have settled on it.

Perspectives

After this initial colonisation phase, longer-term monitoring is essential to assess the impact of the structures on the ecosystem and to evaluate the establishment of new balances.

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