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Understanding ecological functioning of ecological habitats, and building New Indicators based on Genetic Tools to assess their GES (Good Environmental Status).

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The coralligenous is a typical Mediterranean marine habitat, Paradoxically, unlike *Posidonia* meadows, it is poorly studied. Like the famous tropical coral reefs, it is a complex biogenic habitat, based on encrusting red algae (Ballesteros 2006).

Abstract

The aim of this project is to improve our understanding of its functioning and resilience capacity, and establish biodiversity and connectivity patterns among localities and ecological profiles, providing information for rationalizing the design of Marine Protected Area networks and monitoring methods.

To reach this goal, a multidisciplinary approach will be used, combining population genetics, community ecology, microbial ecology and physical oceanography.

This requests four tasks, partly using the same data, but different analysis methods.

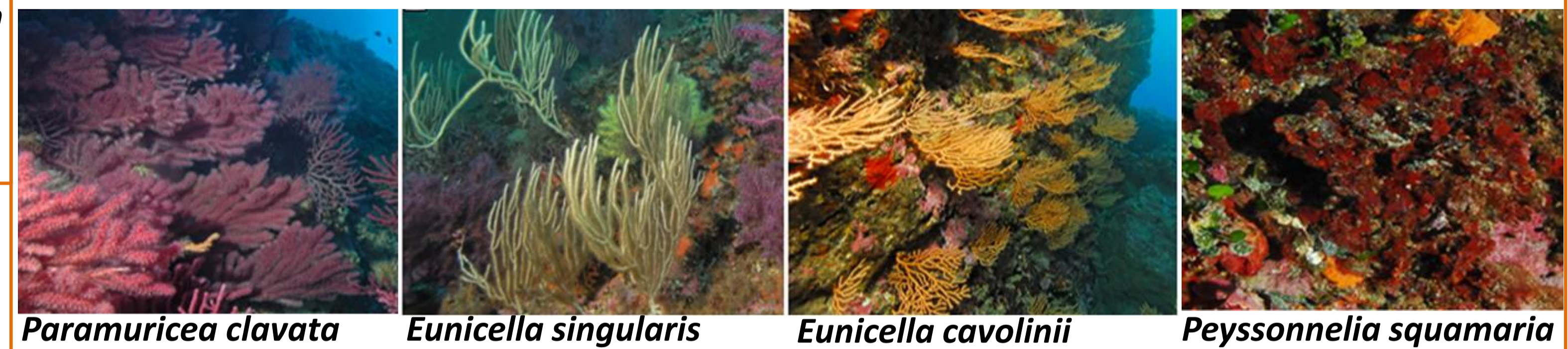
- 1- Establishment of the taxonomic composition of the engineer coralline algae.
- 2- Establishment of the species composition using metabarcoding (together with traditional taxonomy and photo quadrat validation for some samples)
- 3- Population structure and phylogeography of two selected taxa: a red alga *Lithophyllum* spp. and a bryozoan *Myriapora truncata*, on the CIGESMED sampling network.
- 4- Synthesis and Comparisons: Propose new GES (good environmental status) indicators for the coralligenous and biodiversity management rules.

Introduction

More precisely, it is defined by the bioconcretions of coralline red algae that grows at dim light conditions. Corallines are the main builders, or engineers species of this ecosystems but their diversity and their ability to colonize new sites is poorly understood.

The genus of calcareous red algae *Lithophyllum* is one of the most important builders in the area of Marseilles, but some marine invertebrates, such as *Myriapora truncata*, directly contribute to the framework of the habitats because they build their own calcareous skeleton (Hong 1980). However coralligenous habitats are built by various organisms and provide very different ecosystems services from recreational diving to shelter or nurseries for baby fishes and other species.

Heterogeneous coralligenous habitats



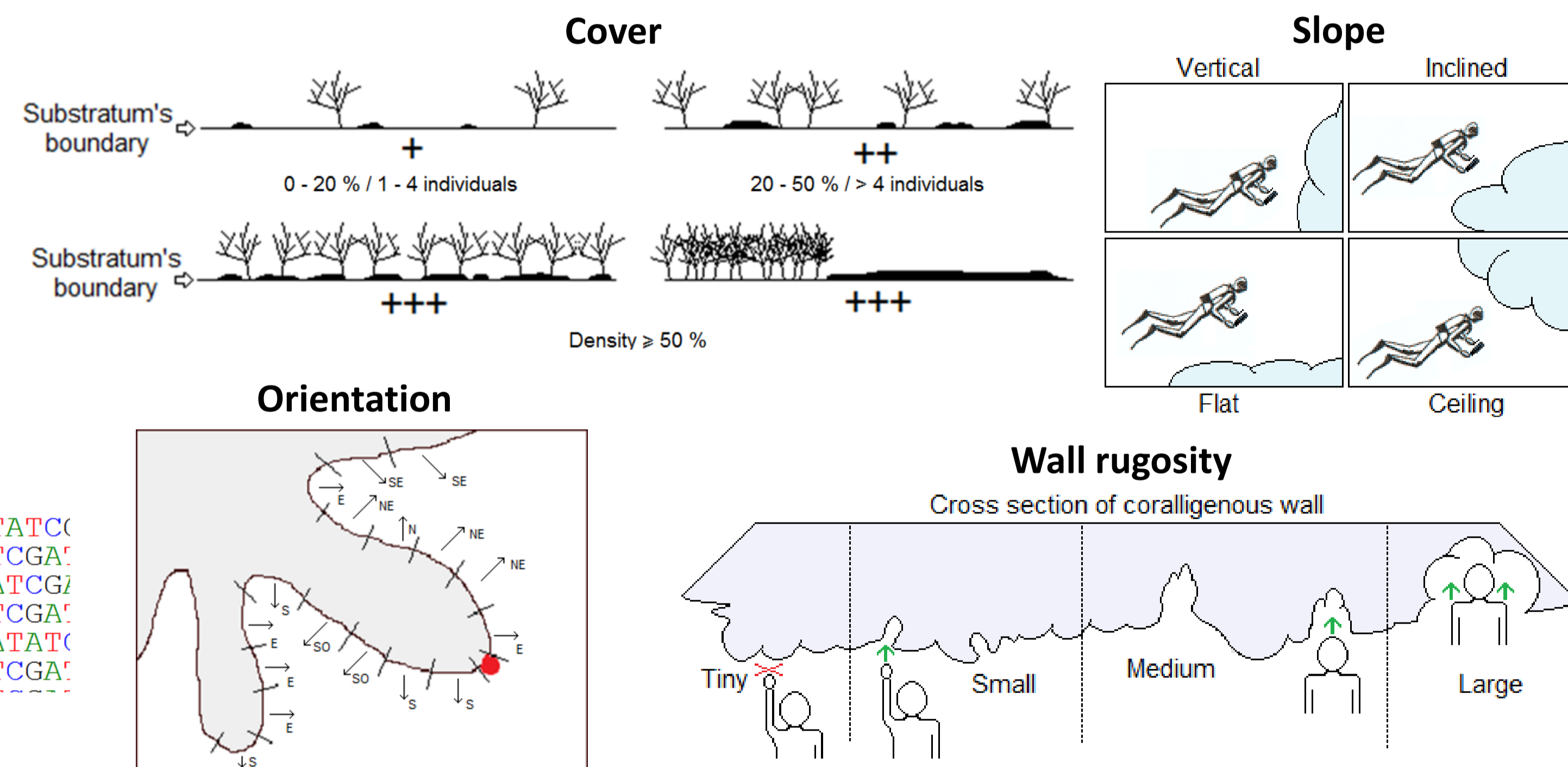
Data

Genetic data obtained after DNA extraction of the samples from the field



Lith	CAS	1.1	2	CATGCTTCGTTGCTGCTCCTCCCGTTGATATCG
Lith	CAS	1.3	3	TGCTTCGTTGCTGCTCCTCCCGTTGATATCGA
Lith	CAS	2.1	1	ATGCTTCGTTGCTGCTCCTCCCGTTGATATCG
Lith	CAS	2.1	2	TGCTTCGTTGCTGCTCCTCCCGTTGATATCGA
Lith	CAS	2.5	1	TCATGCTTCGTTGCTGCTCCTCCCGTTGATATCG
Lith	CAS	2.5	2	TGCTTCGTTGCTGCTCCTCCCGTTGATATCGA

Environmental data directly recorded on the field during the sampling



Photographic data



Method

In this project different methods DNA extraction, PCR, metabarcoding and disciplines will be used : population genetics, phylogeography, community ecology and hydrological modeling.

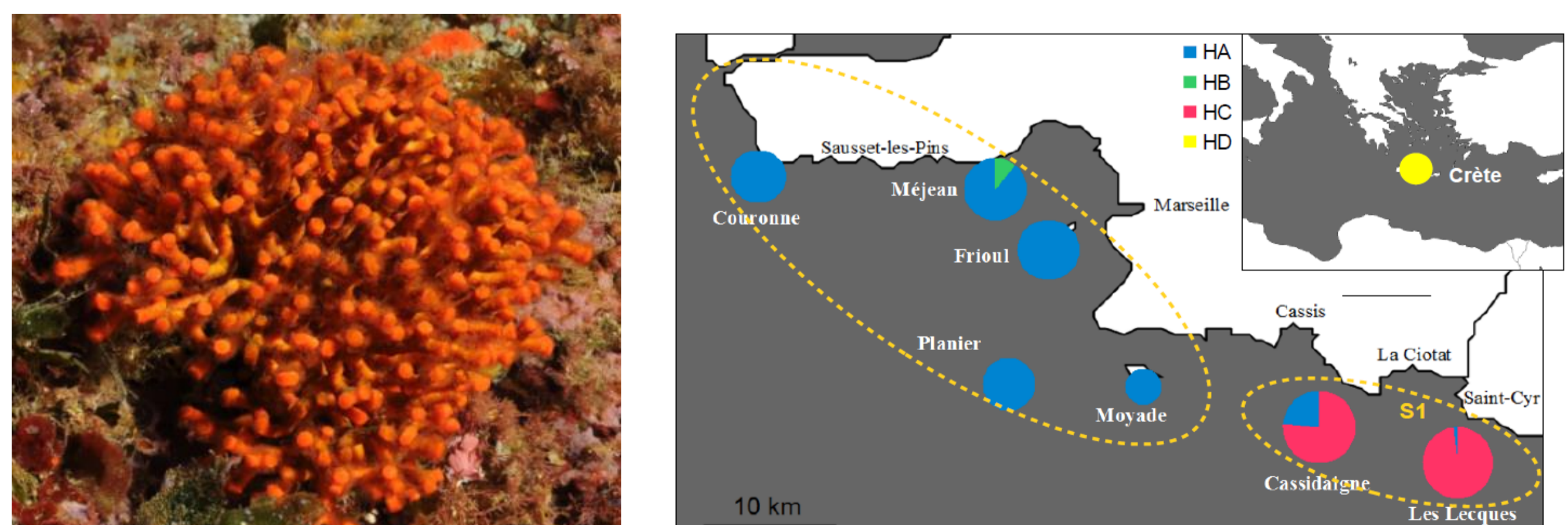
Principle of metabarcoding



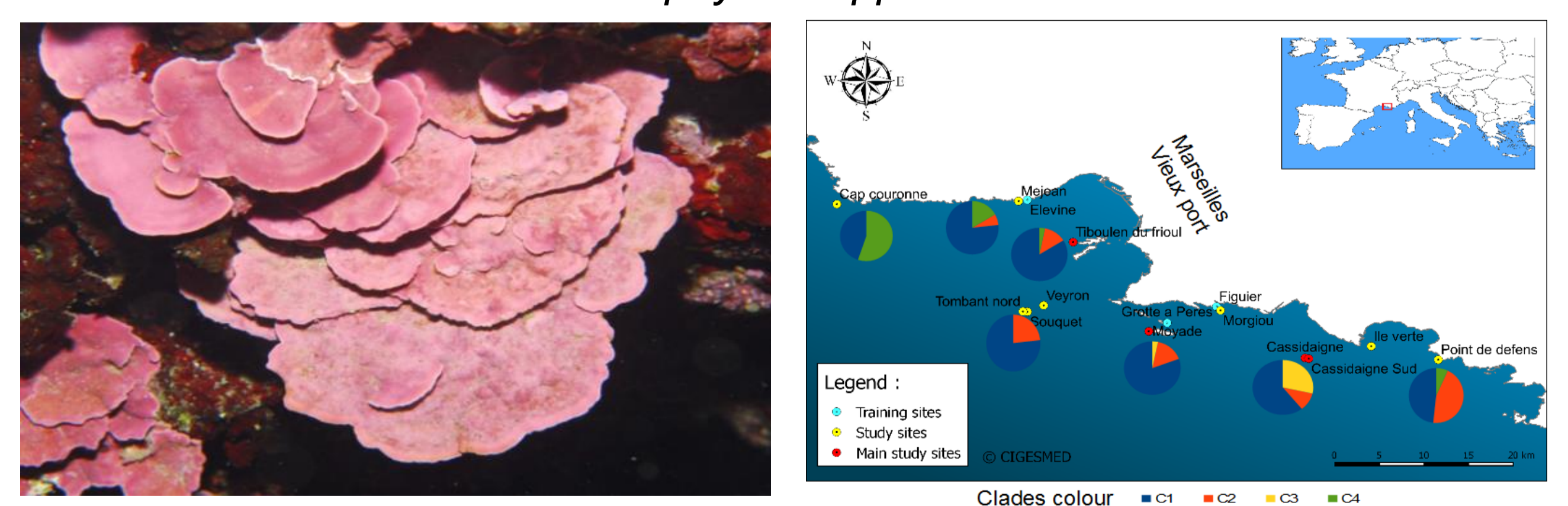
Results

Preliminary studies of the two engineers species revealed genetic differentiation in the Bay of Marseille.

Myriapora truncata



Lithophyllum spp.



Conclusions

Our first results suggests that the engineers species are actually composed of cryptic species that may have live in different ecological niches. It emphasizes our lack of knowledge about this endemic Mediterranean ecosystem and stresses our requirement for a better understanding of its functioning in order to rationalize its monitoring and protection.

Acknowledgements

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