COMPARATIVE ANALYSIS OF GENETIC DIVERSITY OF BENTHIC SPECIES ACROSS THE NORTH-WESTERN MEDITERRANEAN SEA: A PILOT STUDY FOR MANAGEMENT PERSPECTIVES

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Abstract
Relative genetic diversity patterns of six marine benthic species are compared in a common set of areas in the north-western Mediterranean Sea. Genetic diversity of populations of two ophiuroids, two echinoids and two gorgonians is analysed in areas with contrasted environmental and anthropogenic conditions, ranging from Catalonia to the French Riviera. This study may provide a first step toward a broader multi-species analysis at larger scale in the Mediterranean Sea with implications for biodiversity management and protection.
Keywords: Biodiversity, Genetics, Coastal Systems, Western Mediterranean

The assessment of biodiversity within and among sites is central to identifying and prioritizing area for monitoring, management and protection. Genetic variation is widely recognized as one of several currencies for biodiversity evaluation ([1]), and protection of genetic diversity is incorporated into many national and international conventions. While previous works were mainly dedicated to study genetic diversity of populations of single marine species ([2], [3], [4]), no study until now compared relative genetic diversity patterns of distinct species in a common set of Mediterranean sites.

In this pilot study, the relative genetic diversity patterns of 6 benthic species are compared across areas ranging from Catalonia to the French Riviera in the north-western Mediterranean Sea (Fig. 1). The species studied are *Amphipholis squamata*, *Ophioderma longicauda*, *Echinocardium cordatum*, *Paracentrotus lividus*, *Corallium rubrum* and *Paramuricea clavata*. Some of these species are exploited by humans and threatened by the current regional warming of the Mediterranean Sea ([5]). These species have different dispersal abilities (eg. *Amphipholis squamata* does not dispose of a free larval phase in contrast to *Paracentrotus lividus*) and movement abilities (mobile versus fixed). As a result, distinct studies showed that some of them could be strongly structured at both local and regional scales (eg. *Corallium rubrum* [4]), while other species were structured only at large scale (eg. *Paracentrotus lividus* [2]). In this context, the selected areas (Catalonia, Blue Coast near Marseilles, Marseilles bay, Marseilles Calanques, French Riviera (Porquerolles island, Villefranche sur Mer, Monaco), Corsica island) allow to consider contrasted distance, environmental and anthropogenic influences on the studied species.

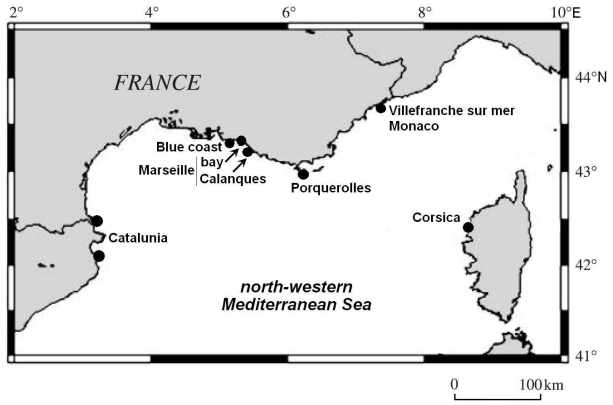

Fig. 1. Map of the commun areas for which relative genetic diversity patterns of distinct species are compared in the north-western Mediterranean Sea.

According to the species considered, sequences of two kinds of markers are analysed to investigate genetic diversity: mitochondrial DNA (ie. mitochondrial 16S rDNA and fragments of the mitochondrial gene coding for the subunit one of the cytochrome oxydase (mtCOI)), and nuclear DNA (ie. microsatellite loci). Genetic variability across populations in Mitochondrial DNA sequences and microsatellite loci, according to the species considered, are characterised by means of complementary diversity descriptors ([6], [7]).

Such an approach will allow to assess differences and/or similarities in genetic diversity patterns that hold across species and areas studied, and to discuss management perspectives.

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