Romain DAVID, ARVANITIDIS C., ÇINAR M.E., SARTORETTO S., DOĞAN A., DUBOIS S., ERGA Z., GUILLEMAIN D., THIERRY DE VILLE D'AVRAY L., ZUBERER F., CHENUIL A., FERAL J.-P.
CNRS-IMBE: Mediterranean Institute of Biodiversity and marine and terrestrial Ecology, Station Marine d'Endoume, Marseille (CNRS, AMU, IRD, Avignon Univ).
Email: romain.david@imbe.fr

CIGESMED HABITAT'S CHARACTERIZATION: A SIMPLE AND REUSABLE TYPOLOGY AT THE MEDITERRANEAN SCALE

Abstract
The so-called coralligenous makes Mediterranean marine habitats that are of the most important in terms of complexity and biodiversity. Coralligenous is formed by the development of several types of communities where bio-constructor, bio-erodor engeneer and "habitat" species interact to build complex structures. The European program CIGESMED studies the Good Environmental Status (G.E.S.) of these habitats. Several protocols are implemented, in particular the cartography of abiotic context, and species observation by means of photo-quadrats. The cartography inventories the profiles types of the coralligenous sites with as robust as possible categories: depth, orientation, slope, roughness, and main coralligenous stands.
The objective is to establish a link between the species occurrence features, and the profiles features in order to understand the "natural" spatial variability of coralligenous habitats.

Key-words: Coralligenous habitats, protocols, cartography, photo-quadrats, contextualization.

Introduction
Many studies on coralligenous habitats have been published (Marion, 1883, Laubier, 1966; Hong, 1980). The coralligenous milieu hosts complex assemblages of more than 1,600 species. (Ballesteros, 2006). A better understanding of the variability of this habitat demands estimation/measurement, at a large spatial scale, using simple methods and variables that can explain the species assemblages.

Material and methods
Due to their topography and to their complexity, there are only a few accurate maps of coralligenous habitats. CIGESMED program is experiencing a way to symbolise them by means of easily recognizable signs. Based on the estimation of the diversity and abundance of species observed during field surveys, coralligenous habitats cartography should also take into account the profiling parameters (orientation, slope, roughness, and major covers) that favour one or another taxon. This study of the variability of the coralligenous habitats structure is made on small islands of Marseilles' bay at a constant depth of 28 (± 1) meters. Observations were done on different types of sites. Either around small islands and shoals, or along coastline with all orientations represented. Samples were collected along transects cut into segments of 5m long and 1m wide. To define the profile of each segment, a common typology has been applied. This typology can be apply easily by the under-water diver with anatomic references (finger(s), fist, head, shoulders) completed by main species covers. For data processing, the frequency of species observation for each segment was calculated for each profile setting.

Results

Using Hierarchical Ascendant Classification (HAC) on all processed data allowed: (i) to group species according to values of orientation, slope and roughness, and (ii) to pool profile parameters according to species per segment. This HAC show four groups of profile parameters (Fig. 1).

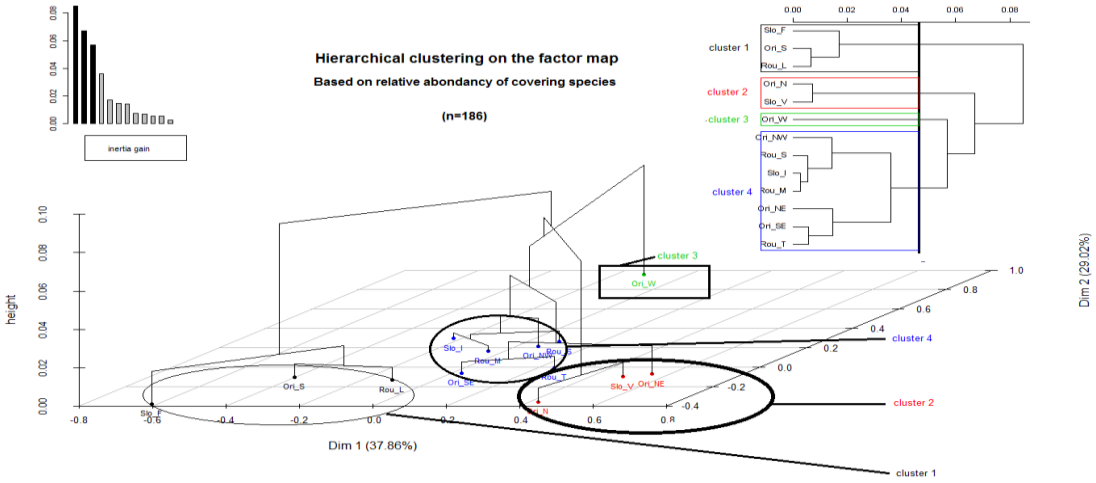

Fig.1: The two dimension HAC show a good repartition of species assemblages according to à first gradient (37,86% of the variability explanation) with two opposite clusters (cluster 1 and cluster 2), the second one for intermediates values of each categories.

Discussion and conclusion

For this first set of results, we can consider that the first axe of variability corresponds to the factor light, with two clusters grouping at opposite conditions of light. The second axis may pool factors according to light variability and currents (complementary studies are in progress). The preferences of species assemblages for different associations of parameters will permit to propose a coralligenous typology, and understand what the differences of preferences at the Mediterranean scale are. A "profile" is thus a combination of orientation, inclination and roughness parameters. Further detailed study will be conducted on associations of profile features to determine the preferential profiles of different coralligenous communities. The analysis should enable to identify metrics that are relevant, reliable, and efficient to explain this "natural" variability, taking in account the variability at the Mediterranean scale and a large panel of observers with different skills level.

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