
Population genomics of the red coral *Corallium rubrum*: from local adaptation to conservation

Didier Aurelle*¹, Marine Pratlong , Anne Haguenaier , Eve Toulza , Cristina Linares , Paula Lopez-Sendino , Joaquim Garrabou , Jean-Baptiste Ledoux , Guillaume Mitta , and Pierre Pontarotti

¹Institut méditerranéen de biodiversité et d'écologie marine et continentale (IMBE) – Aix-Marseille Université - AMU, CNRS : UMR7263, Institut de recherche pour le développement [IRD] : UMR237, INEE, INSU, INSB – UNIVERSITE PAUL CEZANNE AIX-MARSEILLE 3 Case 451 Av. escadrille Normandie-Niemen 13397 MARSEILLE CEDEX 20, France

Abstract

The recent methodological advances in molecular ecology allow renewed study of adaptive processes in heterogeneous environments for non model organisms. The precious red coral, *Corallium rubrum*, is a long lived species, present in very contrasted thermal conditions, from shallow to deep environments. Due to its life history traits, its ecological role and the anthropogenic (harvesting) and climatic (mass mortality events) pressures impacting its populations, this species is an original model to characterize the interaction of neutral and selective microevolutionary processes in the population response to global change. The first population genetics studies, combined with field experiments, allowed defining pertinent study scale in this species, and emphasized the importance of local processes in the population maintenance. The use of NGS, through RNA and RAD-sequencing, allowed a deeper investigation of local adaptation to thermal regime in this species, explaining potentially the differential mortalities observed in the field during mortality events. Nevertheless, a lack of convergence in gene candidates or functions was reported. A by-product of this study was the demonstration, for the first time in a non-bilaterian species, of a XX/XY sex determination system. These results have important implications for the management of red coral populations ranging from the design of marine protected area to potential restoration actions.

*Speaker