

Tackling diversity through DNA barcoding and integrative taxonomy: Decapod Assemblages Revealed IN the Gulf of Naples (DARING)

Director of Studies: Fabio Crocetta

Department of Integrative Marine Ecology

Seat: Naples, Italy

Project Summary

Around 17.000 species inhabit the Mediterranean Sea, of which around $\frac{1}{4}$ is endemic. Such a species-specific richness, as well as the important proportion of endemisms, make the Mediterranean Sea one of the most important biodiversity hotspots worldwide. The study of its biota has a long-lasting history; however, many invertebrate groups have not yet been fully subjected to a deep review based on modern genetic methods, and the robust barriers to dispersal that have contributed to species differentiation make critical to widen the morphological approaches used until recently to refine species boundaries and to combine them with other tools. DNA barcoding and integrative taxonomy are two of them, and are now largely used in both biodiversity and evolutionary studies of aquatic and terrestrial organisms. The main aim of the present Ph.D. project will be to fill such a major biodiversity gap and to explore, through DNA barcoding and an integrative taxonomic approach, the morphological and molecular diversity of decapods in the Gulf of Naples (Italy, Mediterranean Sea). In particular, a preliminary literature review will be carried out as to highlight species originally described from the Gulf of Naples (topotypical) and/or of particular interest (e.g. type species of invertebrate genera). Then, decapod samples already available in laboratory or in the local museum of Stazione Zoologica Anton Dohrn, as well as samples newly collected during the project, will be subjected to a molecular screening as to compare them with molecular data already available from the eastern and western Atlantic Ocean, thus highlighting possible cryptic diversity or speciation in the Atlantic-Mediterranean transition or within the Mediterranean Sea. Finally, based on the results obtained during this first phase, one or more groups of interest (species complexes, genera, or even families that would require a reassessment of their supra-specific taxonomy) will be further studied in collaboration with other experts from Europe or even worldwide as to contribute to a better knowledge of the European decapod fauna. Biological collections, metadata, and stored DNA and ethanol-preserved samples, as well as results obtained, will be particularly relevant for the present-day marine biological research community. In addition, the project will have a social impact by starting training a new cohort of zoologists in the state-of-the-art taxonomic methods that will be thus prepared to take over the baton of a generation of zoologists about to retire.