Restoration of deep-sea cold-water corals in the Mediterranean Sea: outcomes and lessons learned

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Cold-water coral (CWC) reefs are among the most vulnerable and ecologically significant deep-sea habitats, yet their active restoration remains largely uncharted. In 2024, the LIFE DREAM project deployed artificial reef structures (EcoReefs) in the Bari and Dohrn canyons (Adriatic and Tyrrhenian Sea, respectively), targeting habitats degraded by bottom fishing and marine litter, with the goal of promoting CWC recolonization.

One-year post-deployment surveys revealed that colonization is underway, with opportunistic early-successional taxa (mainly polychaetes and hydrozoans) already established on the structures. The absence of CWC specimens was expected given the slow growth rates of these organisms, and these early observations are nonetheless encouraging. However, the ecological succession is a complex process and a fundamental uncertainty remains: even if CWCs were to colonize the structures, we have poor information to even approximate how long that process might take, or how much time would be needed before self-sustaining colonies could develop.

In the last decade, the literature on in-tank and in-situ manipulative experiments on CWCs colonization has grown, advancing our knowledge of the timescales involved. We reviewed existing studies across the Mediterranean and Atlantic, considering different environmental settings and substrate types, with the aim of identifying, where possible, the expected temporal phases of the colonization process.

Gaining further insights will help us to contextualize where we currently stand in the colonization process, as well as informing cost-benefit analyses and long-term planning for CWC restoration initiatives. Since actual timescales are likely influenced by fine-scale environmental variables, identifying the current colonization phase is crucial to optimize monitoring strategy for a process that remains poorly known and highly complex.