

Thermal acclimation range of two Mediterranean cold-water coral species

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Cold-water corals (CWCs) are among the main engineer species in the deep-sea ecosystems all over the world. Their distribution is mainly linked to seawater temperature, which controls all physiological processes. The thermal range of CWC is generally 6°C-12°C in most seas and oceans, except in some cases, such as in the eastern Mediterranean Sea, where *Dendrophyllia ramea* can grow at higher temperatures (16°C-17°C). In order to assess the thermal acclimation range of Mediterranean CWCs, and their response to the predicted increase in seawater temperature, *Dendrophyllia cornigera* and *D. ramea*, (living naturally at 12°C and 16°C respectively), were cultured under temperatures of 12°C, 16°C, 20°C and 24°C. Rates of calcification, respiration and total organic carbon release (TOC) were measured after 6 weeks and 16 months of acclimation. Our results show that *D. cornigera*, adapted to 12°C, died within few weeks at 20°C, but survived at least 2 years at 16°C, with a similar calcification rate than at 12°C. On the contrary, *D. ramea* showed a very large thermal tolerance (from 12 to 24°C) for more than 2 years, with a significant increase in growth rates at 24°C. Although temperature had a significant effect on CWC's calcification rates, it didn't induce any changes in respiration rates for both species or TOC release rates of *D. cornigera*. However, on the long-term, it "increased or decreased" TOC release rates of *D. ramea*. **Overall**, our results indicate that, in the Mediterranean Sea, not all CWC species are living at their upper thermal tolerance boundary.