Higher ecosystem biodiversity helps the single species coping with ocean acidification

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Ocean acidification is known to severely affect a wide variety of marine organisms, including key species of the Mediterranean coralligenous assemblages as the red coral *Corallium rubrum* and coralline algae. However, most of current evidences are based on the response of single organisms experimentally treated in isolation from their natural coralligenous habitat. Thus, it remains unknown if the presence of the original coralligenous assemblages might mitigate the observed impacts of ocean acidification on the single species inhabiting these complex systems. The new multispecies mesocosm experiments we conducted demonstrate that, despite the presence of the coralligenous in the mesocosms cannot significantly buffer the high-pCO_2 induced changes on seawater chemistry, the impacts on the dominant organisms (including *C. rubrum*, coralline algae and encrusting sponges) are progressively reduced with increasing biodiversity level of the natural coralligenous assemblage. Our results suggest that the complex networks of biological interactions occurring in this highly diversified natural ecosystem can increase the resistance of the single biotic components to ocean acidification. We conclude that the risk of extinction imposed by ocean acidification on key biotic components of the coralligenous habitat, fundamental in the overall Mediterranean ecosystem functioning, could be mitigated by adopting conservation strategies safeguarding its biodiversity.

Keywords: biodiversity; ecosystem functioning; calcification; conservation; red coral; coralline algae; sponge; coralligenous assemblages