

ADULT ECHINODERMS FROM FLUCTUATING ENVIRONMENTS: SCOPE FOR ADAPTATION OR ACCLIMATIZATION TO OCEAN ACIDIFICATION?

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Numerous echinoderm species are structuring the community in which they live, principally through trophic interactions. Therefore, any impact on these species has a strong risk to affect the whole community. Due to their low metabolism and ion regulation ability, adult echinoderms have been suggested to be particularly sensitive to ocean acidification. However, numerous echinoderms live in habitats characterized by low of fluctuating pH like upwelling zones, intertidal pools or the deep-sea, suggesting that members of this phylum do have adaptation or acclimatization abilities. Therefore, we investigated the response of different echinoderm species living in such fluctuating environments to acidification. The results indicate that different strategies are used in front of acidification. Sea urchins (except cidaroids) have a higher buffer capacity in their inner extracellular fluids than that of seawater and increase this capacity at low pH. Their respiratory metabolism is either increased or unaffected. On the contrary, starfish have a buffer capacity in their inner fluids similar to that of seawater and decrease their metabolism at low pH. In both taxa, this results in reduced differences between the pH of seawater and that of the inner extracellular fluids with decreasing pH. At short term (2 to 4 weeks), neither growth nor protein levels (expressed as RNA/DNA ratios) were affected by reduced pH. These results indicate that adult echinoderms from habitats with fluctuating conditions do have the ability to acclimatize to low pH at least at short term.

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