Resilience of an intertidal zoanthid colony and its endosymbionts under spatial competition with venomous anemones

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Abstract

Close-quarters interactions can affect intertidal colonial hexacorals greatly, due to limited substrate availability in constituent meso-habitats. In this work, we examine the physiological aspects of tidepool-dwelling *Zoanthus sansibaricus* zoanthid colonies spatially competing with *Bunodosoma goanense* anemones at Kunkeshwar, on West coast of India (16∘20'04.4"N, 73∘23'22.8"E). The evident perennial nature of this species confrontation was validated through co-occurrence analysis within the colonized tidepools on fieldsite. In ITS2 metagenomic profiling, endosymbiont communities were seen to maintain stable composition despite spatial interaction and seasonal variation, with *Gerakladium* genus playing a key role. Further, transcriptome based differential gene expression analysis of polyps from contact range, proximal range and beyond the reach of *B. goanense* (control) was conducted. Contact range polyps showed enhanced stress response, while proximal range polyps stimulated pathways for growth and propagation. Endosymbionts in contact and proximate range were seen to be modulating photo-adaption, oxidative stress response, secondary metabolite production and other processes. Magnitude of threat, being conceived differently by host and symbiont, led to contrast in regulatory pattern and functionality. Various intercellular signaling mechanisms induced by host-symbiont vulnerability to competitor may culminate into a colony level response. This dynamic response and endosymbiont community stability in response to spatial competitors permits *Z. sansibaricus* to form massive colonies, often leading to reef phase shifts.

Keywords: hexacoral, intertidal, ITS2, interaction, transcriptome

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