

Jonsson, L.G. 2006. Ecology of three coastal cold-water cnidarians, in particular the scleractinian *Lophelia pertusa*. Department of Marine Ecology, Göteborg University, Tjärnö Marine Biological Laboratory, 452 96 Strömstad, Sweden

Abstract: *Lophelia pertusa*, *Bolocera tuediae* and *Pachycerianthus multiplicatus* are key species of subtidal cnidarians in Northeast Atlantic coastal waters. In this thesis their interactions with associated fish and invertebrate fauna are analysed, using ROV technology.

A small Swedish *L. pertusa* reef was mapped in detail and found to consist of two patches, 250 m², and 50 m², with slightly more than 200 and 45 colonies respectively. The health status of the colonies was better in the large patch than in the small patch and the largest colonies (>1,000 polyps) were only found there. Small colonies (1-100 polyps) dominated both patches. Many colonies showed an irregular growth form with the majority of them facing the prevalent tidal currents from SSE and NNW. Two poriferans *Mycale lingua* and *Hymedesmia* sp, constituted a threat to the *L. pertusa* colonies, growing over them and smothering the polyps, 37–50 % of the colonies were threatened.

The associated fish fauna at eight *L. pertusa* reefs (including a shipwreck) contained altogether 25 fish species, of which 17 are of commercial interest. The majority of the observed fishes, 80 %, were associated with the reef habitat, with only 20 % observed on the surrounding seabed. A division of the composition of the fish fauna occurred at 400 m depth. In total 82 % of the individuals were from commercial species.

The abundance of sessile species decreased significantly with distance from a small *L. pertusa* reef, while mobile species showed no preference for the reef area. Similarly, filter feeders and predators decreased with distance from the reef, suspension feeders increased, while omnivores showed no discernible pattern. Total number of individuals increased from 7 m⁻² in the surrounding seabed habitat to 21 m⁻² in the coral habitat, indicating the qualitative importance of small *L. pertusa* reefs for the local fauna.

Size and type of habitat of *L. pertusa* reefs influenced the associated fauna when comparing the associated fauna of 3 reefs of different sizes (5,000, 100,000 and 20,000 m²), from the same geographic area and under similar environmental conditions. The total number of taxa observed was 103, of which 35 % were found on only one of the reefs. Highest species richness was found on the two larger reefs and in the sediment habitat surrounding the reefs, while highest number of individuals was found on the smallest reef. The faunal differences between habitats, live coral reef, coral rubble and sediment, were larger than between reefs.

Symbiotic associations between sea anemones and crustaceans are common in tropical waters, but almost unknown in temperate waters. A close facultative commensalistic association between two anthozoans, *B. tuediae* and *P. multiplicatus*, and five shrimps species and the anomuran *Lithodes maja*, was observed. All observed *B. tuediae* and 93 % of *P. multiplicatus* had shrimps aggregated beneath them, seeking protection from predators. 72 % of *L. maja* were observed beneath *B. tuediae*, and laboratory experiments suggested shelter was more important for female than male crabs.

Keywords: coral, anthozoan, sea anemone, cerianthid, crinoids, species-area relationships, individuals-area relationships, associated fauna, fish fauna, biodiversity, symbiosis, *Eunice norvegica*, *Lithodes maja*, coral rubble, transects, ROV-technology, *Mycale lingua*, *Hymedesmia* sp,