

ABSTRACT

A Temporary Symbiosis Between Benthic Macro-algae
and Gorgonian Corals

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This dissertation examines a symbiotic association between several species of benthic macro-algae and juvenile gorgonian corals in the shallow subtidal habitat of Discovery Bay, Jamaica. The non-random pattern of co-occurrence between algae and juvenile gorgonian colonies was described. Field manipulation experiments were done which removed one or other member of this plant-animal pair, to test hypotheses of neutral, commensal or mutualistic association. Laboratory experiments tested the effects of individual predator species (the urchin Diadema, three species of parrotfish and two of surgeonfish) on gorgonians and algae. Samples were collected from gorgonian colonies to determine seasonal patterns of reproductive activity, and to find larvae for settlement experiments. Finally, changes in the study site after the epidemic death of Diadema were documented, including urchin density, algal

area cover, algal species composition, and other indirect effects.

Some support for the hypothesis of mutualistic association was found. Juvenile gorgonian mortality was lower in sites with algae than in those from which algae had been removed. Algae were inferred to benefit from the refuge provided by upright gorgonian colonies, until the expanding colony holdfast overgrows this space. The nature of the association appeared to be one in which each member benefitted for a limited, but important, period. Diadema was believed to be more important than fish predators in structuring and maintaining this association. Reproductive activity in the three major species of gorgonians occurred throughout most of the year. Changes after mass mortality of Diadema included a large increase in the area covered by resident algae, the recruitment of many new algal species into this fore-reef area, rapid and frequent changes in species dominance, and no apparent decrease in gorgonian recruitment.