

Manthachitra, V. and G.P. Jones. Experimental evaluation of the effect of local habitat degradation on coral reef fish assemblages at two geographic locations.

Abstract:

The effect of mechanical disturbance of the coral habitat on reef fish assemblages was experimentally investigated at two spatial scales, the regional and local. At the regional level, near-shore and highly impacted reefs at Phuket (Thailand) were compared with inshore, relative non-impacted reefs near the central Great Barrier Reef (Australia). Local variation was assessed by repeating experiments at two sites within each region. The structure of fish assemblages differed between the two regions in relation to biogeographic differences in the species pool. Phuket was dominated by both pomacentrids and labrids, while pomacentrids dominated at central GBR. Experimental manipulations involved a reduction in the cover of live hard coral (GBR and Phuket) and a reduction in live soft coral (GBR only), with appropriate controls. The response of fish to habitat disturbance varied regionally and locally, and depended on which fish taxa was examined and whether hard coral or soft coral was disturbed. In general, most fish taxa responded negatively to a reduction in living coral cover, with decreased diversity, species richness, and reduced abundance of coral-associated species. In contrast, removing soft coral appeared to have a positive effect on the abundance of many fish species, perhaps because it resulted in an increase in habitat complexity. The magnitude of the influence of habitat degradation appeared to differ between the two regions, with Phuket exhibiting greater extent of impacts with less tendency for recovery. In contrast, impacts on the central GBR were slight and recovery was rapid. The experimental manipulation, by reducing components of the habitat, illustrated that habitat structure and resource availability may have a strong impact on the structure of reef fish assemblages at widely separated locations.