Coral bleaching and habitat effects on colonisation of reef fish assemblages: An experimental study

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Abstract

Degradation and mortality of corals is increasing worldwide and is expected to have significant effects on coral reef fish; hence studies on these effects are essential. In the present study, a field experiment was set up within Mafia Island Marine Park in Tanzania (East Africa) to examine the effects of bleaching and habitat structure on colonisation of coral reef fish assemblages. Live and bleached staghorn coral *Acropora formosa* was transplanted onto plots in a site dominated by sand and rubble, and the experimental design comprised of three treatments: live coral, bleached coral and eroded coral rubble. There was an immediate increase (within 24 h) in fish abundance and diversity in the two treatments with standing corals. Overall, live and bleached coral plots showed similar effects, but differed from the eroded coral plots which had a much lower abundance and diversity of fish. In general, fish species diversity changed with time over the study period while fish abundance did not. Multivariate analyses showed that while there were differences in fish assemblage structure between standing corals and the eroded coral treatment, there was neither a difference between live and bleached coral treatments nor any temporal effects on fish assemblage structure. Our findings suggest that physical structure and complexity of habitat have stronger effects on colonisation of reef fish assemblages than changes in coral health (such as bleaching) which do not affect coral structure. This may have important implications for appropriate coral reef management.

Keywords: coral reefs; fish communities; habitat degradation; disturbance; field experiment; resilience