

Destruction and recovery of hermatypic coral communities after the mass bleaching event at Ishigaki Island

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Abstract: Destruction and recovery of hermatypic coral communities during and after the 1998 bleaching event were compared quantitatively among three representative field sites (inner reef flat, outer reef flat, and reef slope) at Urasoko Bay, Ishigaki Island, southwestern Japan. As a result of bleaching, corals drastically decreased in number and coverage at all study sites and final coral coverage, at the heavily destroyed outer reef flat, was only 8.2 % of that prior to bleaching. Differential susceptibilities and survival were noted among coral species and among study sites. Bleaching damage most severely affected the outer reef flat, followed by the reef slope, whereas it less severely affected the inner reef flat, where sea water temperatures were highest. The degree of bleaching response among sites was not simply thermal-dependent but species-related. Several species of *Acropora* (*A. digitifera*, *A. nobilis*, *A. formosa*, *A. pulchra*, *A. microphthalma*, *A. hyacinthus*, *A. echinata*, *A. subglabra*, and so on) suffered the most damage from bleaching, and consequently the rich coral communities disappeared from the outer reef flat and the reef slope. At the inner reef flat, some species of *Montipora* (*M. digitata*, *M. cactus*, *M. stellata*, *M. aequituberculata*) recovered considerably after bleaching, despite conspicuous bleaching during the early bleaching phase. The present results indicate the possibility that some species inhabiting under thermally severe conditions have potentially acclimatized enough to endure such stress, and consequently they could live for a long period of more than six months in a bleached condition. Although the species richness (number of species) decreased at all sites, the species diversity indices often increased as a few dominant species of *Acropora* were reduced, and as a consequence, species evenness increased.

Key words: hermatypic coral, bleaching, community, diversity, Ryukyu Islands