ASPECTS OF
HABITAT AND DISTURBANCE EFFECTS ON
TROPICAL REEF-FISH COMMUNITIES

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Abstract

Reef-fishes live in close association with the reef-habitat and should therefore be expected to respond to various aspects of habitat structure. In this thesis the influence of habitat structure on reef-fish communities is examined. Also, the effects of human disturbance is investigated with special attention given to the consequences of habitat destruction. The results presented were obtained by observational studies in the field as well as experimental work *in vitro* using aquaria. The field investigations were conducted in Sri Lanka which is situated in an area where no earlier quantitative studies in reef-fish ecology have been carried out. In view of the fact that most research in tropical reef-fish ecology has focused on coral reefs this study also considered other reef types including sandstone and rock reefs.

Results demonstrated that the fish communities had clear patterns in their distribution; most strongly among reef types but also among the different large-scale habitats they contained. These habitats had unique fish assemblages and most species were restricted in their distribution. Different families, as well as trophic groups, also showed distinct preferences. Reef-patches, which were disturbed by destructive fishing were dominated by coral rubble and these were compared with non-disturbed patches with a high degree of live coral cover. Disturbed patches had lower fish densities, lower species diversity and a more heterogeneous fish assemblage composition than nondisturbed patch reefs. These differences were interpreted as being caused by resource impoverishment as a consequence of habitat deformation.

Habitat effects on the fish fauna were confirmed when comparing habitat and fish related variables using both univariate and multivariate methods. However, many correlations were reef-type specific. For example, structural complexity appeared to increase fish diversity on the sandstone reefs but not on the coral reefs. In general, correlations suggested that food and shelter availability were important factors influencing distribution patterns. For example, species that used branching corals as a refuge clearly correlated with *Acropora* colonies.

Species within one family, the Chaetodontidae, received special attention as they have been suggested to be indicators of habitat disturbance. Assemblages within this family also showed among-habitat distribution patterns. Corallivores were the most common trophic group within the chaetodontids and they were most abundant in rich coral areas and correlated positively with live coral cover. They also showed lower numbers in disturbed areas. Results therefore suggested that chaetodontids may be useful as indicators of disturbance. However, it could be questioned whether these results can be applied in different geographic regions and on different reefs.

Habitat selection at settlement was investigated as a potential determinant of among-habitat distribution patterns. Settling larvae had the ability to choose among habitats and their preferences were in accordance with habitat associations of conspecific adults in the wild. A range of strategies were observed however, habitat choice was also modified by conspecific interactions

If the fish fauna within a given habitat is depleted as a result of human disturbance it would be beneficial to find a method to restore former abundances. This thesis also presents a method which enhances recruitment to artificial reefs by using lightattractors.