

Benthic composition as an environmental factor structuring assemblages of coral reef associated fish; 2013–2014

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Benthic habitat composition is a key ecological factor that structures assemblages of coral reef fishes. However, natural and anthropogenic induced disturbances impact the relationship that may exist between benthic components and fish assemblages. This study applied hierarchical cluster analysis to identify and characterise reefs, based on benthic cover of coral, algae and rubble from 32 sites in the east coast of Africa. Twelve coral associated fish functional groups were linked to the identified habitats and their relative abundance and biomass in each habitat compared. Analysis revealed five habitat types showing a dominance of hard corals (51.9 ± 11.3 sd %), diversified hard corals (42.5 ± 8.5 sd %), diversified soft corals (33.3 ± 15.3 sd %), fleshy algae (37.5 ± 13.5 sd %) and turf algae (42.0 ± 18.9 sd %). Coastal sites from central Tanzania and northern Mozambique were associated with a dominance of hard corals, fleshy and turf algae. Northern Madagascar reefs showed a dominance of multiple habitats including hard corals, fleshy algae and diversified hard and soft corals. Hard corals, diversified hard coral and turf algae habitats dominated reefs in Comoros. Corallivores, invertivores, detritivores and grazers showed a high preference to diversified coral dominated habitats while planktivores and small excavators showed an antagonistic preference to the same habitats. The preference by nearly 60% of fish functional groups to diversified coral habitats conformed to intermediate disturbance hypothesis. Algal dominated habitats were associated with a higher biomass of browsers and omnivores than coral dominated habitats. Integrated coastal zone management specifically reduction of land based nutrient input and establishment of marine protected areas is recommended especially in disturbed habitats dominated by fleshy and turf algae. These measures will in time shift the disturbance from high to intermediate leading to phase shift reversal and recovery of fish functional diversity.

Keywords

Benthic structure; diversified habitats; fish functional groups; intermediate disturbance.