Ontogenetic habitat use by mangrove/seagrass-associated coral reef fishes shows flexibility in time and spac

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Abstract

Tropical shallow-water habitats such as mangroves and seagrass beds are widely acknowledged as important juvenile habitats for various coral reef fish species, most of which are commercially important to fisheries. Spatio-temporal variability in ontogenetic habitat use by fish among these tropical coastal ecosystems has rarely been investigated, yet there are sufficient reasons to believe that this plays an important role. In the present study, we test the spatio-temporal variability in patterns of ontogenetic habitat use by some mangrove/seagrass-associated coral reef fishes (Lethrinus harak, Lethrinus lentjan, Lutjanus fulviflamma and Siganus sutor). Abundances of these four species were investigated during two years in Tanzanian coastal waters, using underwater visual census in mangrove, seagrass, shallow and deep mudflat, and shallow and deep coral reef habitats. The study covered four distinct seasons of the year and was done at two spatially separated (>40 km) locations. Averaged across locations, seasons and years, juveniles (<=10 cm length) of the four study species had significantly higher relative densities in shallow-water (mangroves and seagrass beds) than in deep-water habitats (deep mudflats or coral reefs), whereas the opposite pattern was found for the adults (>15 cm). These findings suggest a strong and general pattern of ontogenetic habitat shifts from shallow- to deep-water habitats. However, specific habitat-use patterns of juveniles as well as adults differed significantly in time and space. Various species showed subtle to considerable flexibility in juvenile as well as adult habitat use across seasons, years, or at different locations. Furthermore, for some species the data suggest presence of ontogenetic habitat shifts at one location but lack thereof at the other location. In summary, ontogenetic habitat use needs to be considered at various spatial and temporal scales for the interpretation of habitat utilization by fish during different life stages. This is important for conservation and management of these habitats, as essential habitats or seasons may be ignored or over-emphasized with respect to their importance for fish during different parts of their life cycle

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