ABSTRACTS

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Do Mangroves And Seagrass Beds Contribute To Coral Reef Fish Productivity in The Indo-Pacific?

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Coastal marine ecosystems are increasingly threatened across the indo-pacific region; yet the faunal interactions that exist between the different component habitats of these ecosystems remain poorly understood. This information is vital as stress on one inter-connected habitat may have cascade effects on other habitats. Promoting and raising the conservation importance of biodiverse yet unappealing habitats such as seagrass beds and mangrove forests requires a better knowledge of their connections to coral reefs and their use as fishing grounds. By extensively examining the fish assemblages of seagrass beds, mangroves and coral reefs within Eastern Indonesia we have developed a greater understanding of the usage of these habitats by fish assemblages and individual fish species. Our research found that seagrass beds were an important feeding habitat and nursery ground for many species and families of reef fish, this nursery role was found to be highly influenced by the presence of mangroves and the link with nearby coral reefs. Fish abundance and species richness in seagrass beds in close proximity to mangroves was at least twice that found in seagrass beds that were distant from mangrove habitats. We also found data to suggest that individual coral reef fish species may preferentially utilize certain environmental zones within those habitats at different stages of their development. Although indirectly important to seagrass and reef fish, mangroves are not an important juvenile reef fish habitat but harbor juveniles of many fish species of economic and subsistence importance across the indo-pacific. Our study indicates that Indo-Pacific seagrass beds play an enhanced role as fish nurseries, but this is influenced by the availability of nearby reef and mangrove habitats, and provides information to support the use of ecosystem level management of coral reef and associated fisheries within the Indo-Pacific region.

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Genetic Connectivity Of *siganus Fuscescens* Populations Along The Northwest Luzon Coast Based On Microsatellite Data

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Estimating the rates, extent, and patterns of connectivity among populations is important in the study of the population biology of marine organisms, and assumes critical importance in the design of spatially explicit management and conservation schemes. This study employs molecular genetic techniques to examine levels and patterns of connectivity among populations of the mottled rabbitfish, Siganus fuscescens, a valuable fishery species widely distributed in seagrass-dominated reef flats. Samples were collected from six sites along the northwest Luzon coast: Currimao, Ilocos Norte ; San Fernando, La Union; Bolinao, Pangasinan; Masinloc, Zambales; Morong, Bataan; and Padre Burgos, Quezon. Individuals were genotyped at 10 microsatellite loci. Population genetic diversity estimated from multilocus genotypes indicated high levels of heterozygosity (ranging from 0.66 to 0.79) among the six populations. Significant genetic differentiation was observed over all six populations (Fst = 0.047; P < 0.0001), spanning a distance of ~650 km. An analysis of molecular variance (AMOVA) was performed to test the significance of various hypothetical spatial genetic structures. AMOVA results suggest the most likely partitioning of the six populations into three genetically distinct groups broadly consistent with geographical location: (1) Currimao (north); (2) San Fernando-Bolinao-Masinloc-Morong (central); and (3) Padre Burgos (south), with 16% of the total variance accounted for by among-group variation. There was no significant correlation between genetic distance and geographic distance. Relatively high levels of connectivity among samples from San Fernando to Morong (~250 km) were inferred, with these samples apparently constituting a single panmictic population. Connectivity between this central group and a southern site (Padre Burgos) appears to be greater than connectivity between the central group and a northern site (Currimao), which may be influenced by hydrographic features (current flow) and habitat availability.

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Genetic Evidence Supports Larval Retention in The Western Caribbean For An Invertebrate With High Dispersal Capability (*ophiothrix Suensonii*: Echinodermata, Ophiuroidea)

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Understanding connectivity at various spatial and temporal scales can aid in reef management. Here we report on the dispersal dynamics and demographic history of a coral reef invertebrate with high dispersal potential (up to 49 days larval duration in culture): the brittle star *Ophiothrix suensonii*. Mitochondrial COI sequences from 266 individuals collected from 10 locations throughout the Florida reef tract and Caribbean showed high overall connectivity ($\Phi ST = 0.05$). However, pairwise comparisons revealed three significantly differentiated regions: Florida, Honduras, and the remaining Caribbean, with Honduras showing substantially higher differentiation. A Bayesian analysis of migration was concordant with the AMOVA showing the lowest migration between Honduras and the remaining Caribbean. In contrast, migration rates between Honduras and Florida, and the Caribbean and Florida were considerably higher (19 and 45 times respectively). Despite long-range dispersal of *O. suensonii* throughout the wider Caribbean, the Honduras population appears isolated, and the persistent eddy current over the Meso-American Barrier Reef could be a major factor contributing to larval retention in this region. The phylogeographic pattern among haplotypes indicated a population expansion (confirmed by mismatch distribution) and coalescence analysis estimated that the expansion commenced approximately 300,000 years ago. A derived lineage dominated by Florida and virtually all Honduran haplotypes supports a colonization of Honduras from Florida. The large number of private haplotypes in Honduras and similar levels of molecular diversity for Honduras and Florida, suggest that Honduras has been genetically isolated for an extended period of time, likely predating the region wide population expansion. Finally, three widely distributed haplotypes formed a highly divergent lineage; the genetic distance between this lineage and the remaining haplotypes was comparable to other echinoderm congeners, suggesting cryptic speciation. The genetic isolation detected in Honduras, possibly due to local current patterns, highlights the need for independent management of reefs in this region.

14.502

Contribution Of Mangrove Nursery Habitats To Replenishment Of Adult Reef Fish Populations in Southern Florida

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The idea that connectivity between mangrove forests and coral reefs, mediated by ontogenetic migrations of reef fishes that use mangroves for nursery habitat, is crucial for the replenishment of adult populations on the reef has recently received renewed attention. However, direct evidence of this linkage and an understanding of the influence variability of juveniles within mangrove nurseries has on the dynamics of adult reef fish populations is still lacking for many species. The present work is part of a larger study integrating two long-term and on-going efforts in southern Florida using visual survey methods to monitor fishes inhabiting (1) the Florida Keys reef tract and (2) adjacent inshore mangrove nursery habitats in Biscayne Bay. Our objective was to synthesize both data sets to establish the nature and extent of the linkage between mangrove and reef habitats and construct predictive models of recruitment dynamics, based on the mangrove survey data, that account for environmental variation and allow estimation of reef fish stock size. Length and abundance data of eleven species of fishes from nine families collected during >1000 mangrove survey transects over a nine year period (1999-2007) form the basis of the analysis. Data were partitioned according to one spatial (mainland vs. key) and two temporal (season, year) treatments and a variant of MANOVA appropriate for ecological data was used to identify significant effects, establish the influence of five environmental variables (salinity, temperature, depth, dissolved oxygen, and proximity to freshwater discharge), and derive an index of recruitment (IR). Significant differences in length and abundance due to spatial, temporal, and interaction effects were present but varied with species. Examining the concordance between the mangrove-based IR and reef fish population size forms the basis of future work.