Genetic structure and variable connectivity in the stony coral *Acropora tenuis* in Kenya and Tanzania

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The reefs along the East African coast are facing a range of threats including climate change and the increasing occurrence of bleaching events. The ability of coral reefs to adapt to, and recover from, environmental stressors depends highly on genetic diversity of a population and connectivity among reefs. Connectivity between coral populations depends on the life history of the coral species, the geographic location of the reefs and oceanographic barriers between populations. Here, we present innovative research on the genetic diversity and connectivity of the stony coral *Acropora tenuis* along the coast of Kenya and Tanzania with a particular focus on the possibility of oceanographic barriers limiting dispersal. *A. tenuis* is a common Indo-Pacific coral species which reproduces by synchronised mass broadcast spawning events. Coral fragments were collected at five locations in Kenya and six locations in Tanzania, including three islands (Pemba, Zanzibar and Mafia Island). Multiplex PCR was performed with seven DNA microsatellite markers, followed by fragment length analysis. Results showed high allelic richness, and no indication was found of recent bottlenecks due to bleaching events. Moderate genetic structure was found when comparing all sites (F_{st} = 0.061), with variable connectivity between reefs, and no isolation by distance over the total 892km of sampled coral reefs. However, significantly higher differentiation was present among island sites compared to mainland sites. This indicates that while the connectivity between mainland sites is high, the connectivity between mainland and island sites and among island sites is more limited. The high connectivity can be explained by the long distance dispersal capacity of *A. tenuis* and by the influence of the northbound East African Coastal Current (EACC); aiding dispersal by effectively spreading larvae along the coast. Lower current speeds, as well as more sheltered sites around the islands could explain the limited connectivity of island sites. Based on Bayesian cluster analysis as implemented in STRUCTURE, two groups of sample sites with different genetic structure were identified. The first group is under influence of the EACC while the second group consists of sheltered reef sites that are geographically more isolated and under influence of the west bound South Equatorial Current (SEC). This study emphasizes the role of ocean currents and reef site characteristics in the connectivity between populations of a broadcast spawning coral.