Self-recruitment *versus* larval dispersal between populations of skunk clownfish on coral reefs near Zanzibar

Huyghe Filip and Marc Kochzius

Marine Biology, Department of Biology, Vrije Universiteit Brussel, Pleinlaan 2,
B-1050 Brussels, Belgium
E-mail: fhuyghe@vub.ac.be

Threatened by a combination of environmental and human factors, coral reefs are disappearing fast worldwide. At the same time, coral reefs provide food, income, and many valuable ecosystem services to coastal communities, often in developing countries. Marine Protected Areas (MPAs) have been suggested as the ideal instrument for protection and management. These MPAs fulfil multiple functions. They serve as sanctuaries and help preserving both species and genetic diversity, but also support ecosystem functioning and provide new fish stock to neighbouring exploited areas in the form of spill-over. For MPAs to efficiently fulfil these three functions, information on connectivity, the exchange of individuals between reefs, needs to be taken into account. To preserve genetic diversity, not connected and differentiated populations, separated by a genetic break, need to be identified and managed as separate units. This can be done by estimating gene flow within an evolutionary timeframe, using genetic markers and applying F-statistics. To support healthy ecosystems and provide spill-over to exploited areas, however, the spatial design of MPAs needs to take into account present day gene flow between reefs. As most adult coral reef associated organisms are unable to migrate between reefs, gene flow is exclusively mediated by larval dispersal. Demographic connectivity between reefs and spill-over from MPAs to adjoining reefs is measured by comparing levels of self-recruitment, larvae returning to their home reef, with larval dispersal to other reefs. In this project, we will assess self-recruitment in skunk clownfish (*Amphiprion akallopisos*) populations on small reefs located close off the coast of Unguja Island, Zanzibar. Five unprotected reefs, exploited by local fishermen, are located close to a highly protected MPA (Chumbe Island) and an exploited but partly protected area, managed by the local community (Menai Bay). Our first aim is to assess whether the protected reefs export larvae to the exploited reefs. Second, we want to evaluate the importance of self-recruitment versus connectivity between reefs through larval dispersal. And third, we will measure temporal and seasonal variation in levels of self-recruitment within and between reefs. Fin tissue samples will be collected from the entire adult populations of *A. akallopisos* on coral reefs near Unguja Island, as well as from all new recruits settling on reefs within the research area. The skunk clownfish has a monthly reproduction cycle, so new recruits can be sampled on a monthly basis. For the analysis, 16 highly polymorphic microsatellite loci have been identified, providing sufficiently detailed genetic information to assess parent-offspring relations. This information will be used to assign new recruits to putative parents (parentage analysis) and to their reef of origin (assignment tests). With these results, we aim to improve knowledge of connectivity and dispersal patterns between reefs and contribute to a better management of coral reefs through well-spaced MPAs.