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瀬底島周辺におけるミドリイシ属サンゴの個体群動態とサンゴ群集構造の成立要因

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Form 3

Abstract

Title: Dynamics of *Acropora* populations and assembly of coral communities around Sesoko Island, Okinawa.

瀬底島周辺におけるミドリイシ属サンゴの個体群動態とサンゴ群集構造の成立要因

The intermediate disturbance hypothesis proposes that species diversity of local communities will be maximum at intermediate frequencies and intensities of disturbances by enabling the communities to be at a non-equilibrium state in which both early and late successional species can coexist. In the past few decades, frequencies and intensities of anthropogenic disturbances increased drastically, resulting in mass mortalities and a decline in coral cover worldwide. Coral community recovery is driven by various environment variables such as wave exposure, habitat rugosity, and depth, which may vary at small spatial scales of tens of meters. Species and colony-morphology dependent demographic rates of corals, which may vary at the above environment scale, also influence the dynamics. The drivers of recovery dynamics may change from early to late successional stages. Therefore, community or population dynamics under the range of pre- and post-disturbance regimes, or at different successional stages, should be studied to understand coral community assembly processes. In this study, I followed dynamics of hard coral communities and *Acropora* population at sites with different levels of wave exposure and anthropogenic stress around Sesoko Island with temporal scales of 5 years (2011-2017), 3 years (2015-2018), 1 year (2015-2017) and 5 months (October 2016-February 2017). By including different temporal scales, I could examine the effect of physical disturbances by typhoons, heat and cold stresses on the dynamics. The main findings of the present thesis were as follows. 1) long-term community trajectories changed from early to late successional stages of hard coral communities, and the pattern of species diversity supported the prediction by the intermediate disturbance hypothesis. 2) demographic rates of *Acropora* populations were species-specific and varied spatially. 3) effects of physical disturbances by typhoons, and heat and cold stresses on *Acropora* populations were spatially variable and were species-specific. 4) heat-sensitive *Acropora* species might have acclimatized to the moderate heat stress. 5) moderate heat stress might facilitate evolutionary changes in heat-sensitive *Acropora* species. This study identifies the importance of local -spatial variability and moderate disturbance regime on the dynamics of coral communities and *Acropora* populations around Sesoko Island.

Name SINGH TANYA