

Environmental Research, Technology Demonstration and Conference Project

ECF Project:	ECF 2017-03
Project Title:	Thermal and salinity thresholds of bleaching in Hong Kong corals
Principal Investigator:	Professor QIU Jianwen, Department of Biology, Hong Kong Baptist University
Total Approved Grant:	\$909,600
Duration:	1/6/2018 to 31/5/2021
Project Status/Remarks:	Completed
Project Scope:	<p>Coral bleaching is one of the most major threats to coral reefs worldwide, but little is known about the potential stressors that can cause coral bleaching in local waters. The project proposes a series of experiments to determine the high temperature and low salinity thresholds of coral bleaching in Hong Kong corals. The project will construct custom-made exposure systems, conduct experiments to quantify coral bleaching thresholds in six species of corals that may be different in susceptibility to bleaching due to their growth forms, and measure a suite of physiological parameters associated with coral bleaching. This study will help predict the potential winners and losers of corals due to global climate change, and the results will be useful for informed management of local coral communities.</p>
Summary of the Findings/Outcomes:	<p>Hong Kong is located at a subtropical area where annual temperature changes and salinity fluctuations have been higher than their counterparts in the tropics. Therefore, corals in Hong Kong might have performed different coping strategy and stress responses towards environmental changes. In the present study, the project team assessed two stress tolerant thresholds, which were hyposalinity and high temperature, of six local coral species. The six coral species were <i>Montipora peltiformis</i> (plating form), <i>Pavona decussata</i> (upward-plating form), <i>Porites lutea</i> (massive form), <i>Dipsastraea rotumana</i> (encrusting/sub-massive form), <i>Echinophyllia aspera</i> (plating/ encrusting form), and <i>Platygyra carnosa</i> (massive form). It was the first ex situ coral threshold experiment has been conducted in Hong Kong, which revealed various tolerant levels of different factors.</p> <p>In general, the project results suggested that corals are more tolerant to hyposalinity than heat stress where most of the corals showed rapid bleaching responses to heat stress. Most corals persisted 29 psu, and 25 psu, and demonstrated adverse physiological responses to 21 psu salinity after a 15- to 20-day exposure. For heat stress, in contrast, <i>Pavona decussata</i>, among the six coral species tested, showed a quick bleaching sign but remained alive under heat stress whereas <i>Montipora peltiformis</i> bleached and induced mortality within 20 days.</p>