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# Spatial-Temporal Diversity in the Recruitment of Scleractinian Corals and Associated Benthic Assemblages in Taiwan



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**Venue: Auditorium, 1st Floor,**

**Interdisciplinary Research Building**

**跨領域科技研究大樓1樓演講廳**

**Host: Dr. Chaolun Allen Chen 陳昭倫研究員**

**Doctoral Dissertation Defense Presentation**



## Abstract

Coral reefs are currently threatened by anthropogenic disturbances and climate change, rousing interest in determining whether mesophotic reefs ( $\geq 40\text{m}$ ) can act as a refuge from disturbances and help replenish deteriorated shallow reefs. We assess the reproductive potential of local mesophotic reefs by characterizing and quantifying spatial-temporal patterns of variation in the recruitment of scleractinian corals and associated benthic assemblages across bathymetric zones. During 2016-2018, benthic communities were surveyed and replicate artificial units of recruitment were immersed at shallow (15m) and mesophotic (40m) zones of two reef sites in Luda, Taiwan. In Chapter II, deep neural networks were used to analyze photographs of artificial and natural substrates at both depths, in order to characterize the structure, composition, and diversity of benthic communities at juvenile and adult life stages. Results provide strong evidence for structuration of communities among bathymetric zones and life stages. In Chapter III, corals recruiting on artificial substrates were censused using fluorescence and classified by molecular barcoding of COI, ORF and PaxC markers. We identified 451 coral recruits, comprising 37 OTUs and spanning 13 coral families. In Chapter IV, we investigated patterns of coral recruit density, spat size, settlement preference, community structure and composition at spatial-temporal levels. recruitment densities and spat sizes. We show that Taiwanese mesophotic reefs host recruit assemblages which are abundant, diverse, and distinctive from shallow reefs, indicating that these reefs are acting as viable larval sources. Our results are consistent with the hypothesis of mesophotic reefs acting as reproductive refuges for depleted shallow water communities and provide a unique assessment of recruitment in a region where mesophotic reefs are understudied. The ecological importance of mesophotic reefs in Taiwan highlights the importance of extending conservation measures to these ecosystems.