

A Preliminary Study on the Diagnosis of Coral Reef Healthiness and Establishment of Coral Replenishment Technology

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Field surveys for coral reef through line-intercept-transect (LIT) and temperature profiling using data-loggers were done at three layers of 5, 10, and 15 m depths in coral reef areas, Nogas Island, Anini-y, Antique, Philippines. Preliminary data based on the LIT survey showed that both coverages of substrates by any type of organism and by Scleractinia decreased in the deeper layers. For Scleractinia, *Porites* sp. occurred predominantly in all the depth layers with the occurrence decreasing with depth. Temperature fluctuation was largest in the 5 m depth layer, where effects of tidal level were also confirmed. While the average temperature decreased with depth, this did not differ beyond 1°C between 5 and 15 m layers during November 2012 to March 2013. Fragments of the *Porites* sp. and *Acropora* sp. were sampled and transferred to aquaria at the Tigbauan Main Station of SEAFDEC/AQD. *Acropora* sp. sampled from the deepest layer alone showed bleaching and thereafter, a part of the fragments regained the color. Experimental trials to clarify the effects of ocean acidification and warming on the health of the coral using the live fragments of *Porites* sp. showed decreasing trends in both photosynthetic rates and daily growth rates in acidic condition (pH = 7.6), while decrease of zooxanthellae density was observed under warmer conditions (31°C) for one month. A new methodology for the determination of density of zooxanthellae was established using the fragments of *Porites* sp. In this study, the need for studies on several coral communities as well as further basic research on coral biology, particularly, responses to the changing environments are discussed for diagnosis of coral reef healthiness and establishment of effective coral replenishment technology.

Keywords: *Porites* sp., *Acropora* sp., coral reef healthiness, coral replenishment