

Enhancing the growth and color of *Pocillopora acuta* and *Stylophora pistillata* by different levels of blue light and heterotrophic

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Abstract

Recent studies showed that heterotrophic feeding can improve coral's growth rate and resilience against environmental stress, while blue light was able to enhance coral's calcification. In this study, we design a 90 days experiment by using *Stylophora pistillata* (SP) and *Pocillopora acuta* (PD), which are common coral species in Taiwan to investigate the effects of heterotrophic feeding and blue light on both coral species. Each coral species were divided into 72 nubbins and distributed evenly into four treatment group: the combination of different blue light intensity (High and Low) and different feeding concentration (High and Low). All coral nubbins were cultured in the Recirculating Aquaculture System (RAS) and fed to *Artemia salina* in different concentrations based on treatment twice a week. During the experiment, the Fv/Fm of all groups was higher than 0.6, showing that corals remain healthy and there was no mortality in each group. Based on the results, we observed that the specific growth rate and linear growth rate was highest in SP and PD under HLHF treatment, while SP under HLHF treatment had significantly different compared to other treatment, indicating there was an interaction effect between light intensity and feeding. Additionally, we conduct the coral's health analysis based on RGB value. The RGB value was highest in HL treatment of SP and PD and had remarkable distinct compared to other treatments, showing that corals were more healthy in HL treatment. We also observed that RGB values in tip and tissue parts of coral nubbins were different in each treatment. As a result, we demonstrated that high blue light intensity and heterotrophic feeding could improve the growth rate of both coral species. These results provide clues for further coral cultivation and restoration.

Keywords: *Pocillopora acuta*, *Stylophora pistillata*, RAS system, heterotrophic, color

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