



In situ photobiological response of Symbiodiniaceae to diurnal light variation in the tropical clownfish-associated anemone (*Radianthus magnifica*) from Peninsular Malaysia

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ABSTRACT.—The clownfish-sea anemones are a diverse group of benthic anthozoans that are found predominantly in tropical to subtropical waters. However, little is known about their adaptation to changes in their environment. Here, we investigated the effects of high light (HL) and low light (LL) on the Symbiodiniaceae in *Radianthus magnifica* ($n = 8$) from depths of 4–8 m in Pulau Rawa and Pulau Tinggi. Effective quantum yield, F_q'/F_m' was studied on three different body sections of the sea anemone for three consecutive days. No statistical difference was found in temperature measurements, but photosynthetically active radiation (PAR) was significantly higher in Pulau Tinggi (HL) compared to Pulau Rawa (LL). In contrast, F_q'/F_m' was higher in LL Symbiodiniaceae compared to HL, while a distinct diurnal pattern in F_q'/F_m' was also observed. F_q'/F_m' increased in the morning hours as PAR increased then declined during the afternoon hours as PAR continued to increase indicating stress to the Symbiodiniaceae associated with these sea anemones. Interestingly, F_q'/F_m' values were different between body sections of *R. magnifica*, where the body column had the highest F_q'/F_m' compared to the oral disc and tentacles for both sites. Our findings show that symbionts were sensitive to light variation in their environment and their response was in the scale of hours throughout the day, indicating dynamic photoacclimation. Despite the differences in F_q'/F_m' , symbiont identity, cell density, and chlorophyll pigment content were similar between HL and LL, highlighting the complexity of the symbiosis and the need to improve our understanding of their responses to changes in the environment.



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