

Corals in Hot Water: Physiological Responses Of *porites Lobata* in A Diurnally Fluctuation Environment

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The Ofu back reef in the National Park of American Samoa hosts a wide variety of corals that withstand mean temperatures (up to 30°C) and daily fluctuations (3-4°C) greater than most coral reef habitats. Despite these known stressors, back reef corals appear healthy, exhibiting limited bleaching despite high levels of environmental fluctuation. We hypothesized that frequent exposure to the fluctuating environment of the Ofu back reef enhances the corals ability to cope with environmental stress. Samples from 4 source colonies of *Porites lobata* from the back reef and 4 colonies from the neighboring forereef were cross and back transplanted to each source location. Transplants were sampled every 24 hrs for 5 days following transplantation (n=40). Heat shock protein 70 (Hsp70), ubiquitin-conjugated proteins, manganese superoxide dismutase (MnSOD), and 4-Hydroxynonenal (4-HNE) protein levels were analyzed by Western blot for each sample. Ubiquitinated protein levels were higher in back reef source colonies for all transplants and all days (p<0.001). The high level of ubiquitin-conjugated proteins in the back reef corals could be indicative of more rapid protein turnover, enabling them to respond to the abrupt changes in their surrounding environment. Hsp70, MnSOD, and 4-HNE levels were higher in back reef source colonies (p<0.01), although not consistently for all days and sites. There were no differences among levels of any protein measured between cross and back transplants for back reef or forereef source colonies, suggesting that the corals are acclimatized or adapted to their native environments. Analyses of mitochondrial DNA (coral host), and nuclear rDNA (coral host and symbiont) revealed significant population differentiation between back reef and forereef hosts but not symbionts, providing additional evidence indicating a host adaptive response to the different environments.