Variable stress responses of tissue balls from hard corals harbouring clades C and D symbionts

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This study investigated the effects of thermal stress and extracts of sponge (Haliclona sp.) and ascidian (Didemnum molle) on the tissue balls (TBs) density from three hard corals and on the photosystem II functioning (effective quantum yield, FφPSII) of their zooxanthellae. The corals Fungia repanda and Pocillopora damicornis harboured clade C symbionts while Acropora muricata had either clades C or D. Thermal stress experiments, in absence of chemical stress, revealed that higher temperatures, 28 and 31˚C, tended to have a negative effect on the TB density from A. muricata with clade C and F. repanda but not from P. damicornis, when compared to the control temperature of 25˚C. FφPSII decreased in A. muricata with clade C but remained stable in F. repanda, P. damicornis, and A. muricata with clade D, under the effect of thermal stress. A combination of thermal stress with 50 µg.ml-1 D. molle extract, had more pronounced effect on the density of the TBs, but did not affect the FφPSII in all three species, irrespective of the symbiont clade harboured. An increased concentration of D. molle extract at 200 µg.ml-1 combined with thermal stress, also affected the FφPSII in A. muricata with clade C and F. repanda, as compared to P. damicornis. Thermal stress with 50 µg.ml-1 Haliclona sp. extract, affected the TB density in all three coral species, but caused a reduced FφPSII only in A. muricata, as compared to the 200 µg.ml-1 Haliclona extract with thermal stress which affected both TB density and FφPSII in all three corals. The results suggest a variable susceptibility among the three corals, with A. muricata harbouring clade C being most susceptible. This implies that under climate change-driven ocean warming the variable chemical stress responses of A. muricata harbouring different symbiont clades might interact differently with other sessile marine organisms.