Thermal Tolerance and Metabolic Response of the Scleractinian Coral *Lophelia pertusa* from Koster Fjord in Sweden and Blake Plateau off North Carolina

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Azooxanthellate hard coral *Lophelia pertusa* populations from 85 meters in the Koster Fjord on the west coast of Sweden and from 650 meters over the Blake Plateau off North Carolina were fed and kept alive at habitat temperature of 6 to 8°C in the laboratory. Individual polyps and branches of coral colony of 4 to 6 polyps were maintained at 8°C for 3 hours and the oxygen consumption rates were measured with polarographic oxygen electrodes, linked to an oxygen meter and a computer for continuous recording. The results suggest the metabolic rates at 8°C is comparable between the deep-sea Blake Plateau population and the shallow Koster Fjord population. Nevertheless, exposure to increasing temperature imposed severe stress to the Blake Plateau corals with upper lethal levels at 10°C but Koster Fjord corals exhibited physiological thermal acclimation to temperature as high as 16°C.

The results on thermal tolerance and metabolic responses of these two geographically isolated coral populations, possibly genetically different, are discussed in relation to climate change processes due to global warming or cooling phenomena. A hypothesis is postulated on the influence of climate history on the thermal physiology of bathyal versus shallow marine populations of *Lophelia pertusa*.

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