PHYSIOLOGICAL RESPONSES OF THE FLUTED GIANT CLAM, *TRIDACNA SQUAMOSA*, EXPOSED TO DECREASED IRRADIANCE AND REDUCED SALINITY

Eva Blidberg, Tina Elfwing & Michael Tedengren.
Department of Systems Ecology, Stockholm University. S-106 91 Stockholm, Sweden

ABSTRACT

The primary production and respiration of the giant clam *Tridacna squamosa* were measured at different irradiance of natural sunlight by studying changes in dissolved oxygen. Moreover, the clearance rate (i.e. the filtration capacity) and absorption efficiency were studied in 100 % light and in complete darkness. The physiological responses in these metabolic rates to reduced salinity was also examined, since prod uction, respiration, clearance rate and absorption efficiency were studied at two different salinities, ambient (-32 ‰0) and 60 ‰ (-20 ‰0 S) sea wa te r. From the gross production (Pg) and respiration (R) the ratio (PglR) was calculated in order to estimate the relative importance of autotrophic production and heterotrophic feeding under different environmental conditions. At light intensities above compensation (PglR=l), the clams had higher PglR-ratios in ambient salinity than in lower salinity, due to higher production but also slightly lower respiration. The clams had significantly reduced clearance rates at the lower salinity, but clearance rates was generally higher in darkness, although significant only at 20 ‰0 S, which indicates some ability to compensate reduced light through increased heterotrophic feeding. The light intensity at which production exceeds respiration on a 24 hours basis in our laboratory experiments corresponds to the measured light penetration at about six meters in the field throughout the experimental period (November-January). This suggests that the maximum depth distribution of the giant clam *T. squamosa* could be largely restricted by reduced light availability in areas subjected to increased sediment output. To some extent these results can explain why *T. squamosa* is rarely found deeper than six meters in the inner Gulf of Thailand, whereas literature data from areas less affected by siltation and fresh water suggest a depth distribution of 5-15 m.