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ENRICHMENT OF INORGANIC NUTRIENTS: BIOLOGICAL CONSEQUENCES OF GIANT CLAMS (TRIDACNIDAE)

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ABSTRACT

Some aspects were considered here: 1) giant clam populations around the world are depleted rapidly; 2) giant clams can be easily cultured, 3) coral reef ecosystems (where clam populations can be found) have low concentration of nutrients. Laboratory experiments showed that increasing nutrient concentration enhanced the clams growth rate, soft tissue weight, zooxanthellae density, chlorophyll a content. These results have raised the suggestion that it is, possibly, important to fertilize the sea bed where the clams being cultured. Field experiments, however, did not observe changes in clams growth, soft tissue weight, and respiration/photosynthetic rates of the clams. These results suggest that enrichment of nutrient in the field not only impracticable and uneconomical, but also does not give any advantages to the clams.

Keywords: fertilization, inorganic nutrients, giant clam (Tridacnidae)

I. INTRODUCTION

One of the important features of giant clam biology is the occurrence of dinoflagellate algae which live in association with clams. Within the clams, these algae, which commonly known as zooxanthellae (*Symbiodinium* sp) are extracellular, unlike hermatypic corals where zooxanthellae are located intracellularly. Initially it was agreed that zooxanthellae in giant clams are located freely in the haemal sinuses of the siphonal tissue which expand along the dorsal surface of the clams (Frankboner 1971; Trench *et al.* 1981). Norton *et al.* (1992), however, found the existence of a tubular system associated with zooxanthellae within giant clams, previously reported by Mansour (1946). Norton *et al.* (1992) concluded that zooxanthellae in clams are located in a branched tubular structure, with a single layer of thin cells separating zooxanthellae and haemolymph.

Zooxanthellae are capable of transferring part of their photosynthetic products to the host (Muscatine 1967; Streamer *et al.* 1988; Fitt 1993). Infact this contribution plays a very important role on the clams nutrition (Ambariyanto, 1997). Their contribution depends primarily on the light intensity (*via* photosynthesis) and on clam size, both of which affect the proportion of zooxanthellae reached by the light (Heslinga and Fitt 1987).