

SOME ECOLOGICAL OBSERVATIONS ON TROPICAL ROCK
BORING ECHINOIDS OF THE NORTH PACIFIC

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ABSTRACT

Echinometra oblonga and E. mathaei, two rock-burrowing echinoids, live in positive association on an Hawaiian algal reef. E. oblonga dominates in rough water; E. mathaei in calmer water. The distribution and abundance of these two species of echinoid are significantly correlated with water flow over the reef and detrital algae being deposited into their burrows. The mean size of each species increases with increase in water flow and food availability. E. mathaei and E. oblonga show no significant difference in growth rates.

Total bioerosion of CaCO_3 by E. mathaei, and an associated burrowing echinoid Echinostrephus aciculatus on Enewetak ranges from $.08 - .325 \text{ kg m}^{-2} \text{ y}^{-1}$. This represents from 2 - 8% of the total annual CaCO_3 production on the atoll. The daily mean erosion rates per individual ($\text{g d}^{-1} \text{ urchin}^{-1}$) range from .11 - .13 for E. mathaei and .15 - .5 for E. aciculatus. If these erosion rates are extrapolated to Hawaiian reef echinoids, the destruction of CaCO_3 substrate by Echinometra can exceed reef CaCO_3 production in areas of high population densities.