IN SITU OXYGEN CONSUMPTION OF REEF FISHES DURING QUIESCENCE

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Purpose: Monitor the oxygen consumption of reef fishes during quiescence (Report No. 80-4)

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Accomplishments: The oxygen consumption of bicolored damselfish (*Eupomacentrus partitus*), a diurnally active reef resident, and various cardinal-fishes, nocturnally active residents, was measured by "sealed-vessel" respirometry during periods of quiescent behavior. Glass and plastic aquaria of various sizes with glass tops were used as respirometers, weighted with gravel, and supplied with plastic shelters in the larger damselfish tanks. Fish were collected while they were active and held in respirometers fitted with netting for 7 to 10 hours prior to testing. At the beginning of quiescence, the netting was replaced with weighted glass tops. Fishes were then run for 10 to 13 hours at which time water samples were taken from the respirometers by the evacuation of air from standard BOD bottles. Dissolved oxygen was measured with a YSI model 544 oxygen meter. Preliminary laboratory studies amply demonstrated the superiority of this method over the originally proposed "flow-through" system, which significantly raised the metabolism of laboratory fish. The long incubation times and larger respirometers used in this study allowed the fishes to "settle

down" in their containers and perhaps, therefore, approach a measure of standard (resting) metabolism. In general, the respirometers functioned properly (i.e., fishes removed oxygen from the water according to their size). However, a larger damselfish respirometer without a plastic shelter (thus exposing the fish) consistently produced abnormally high metabolic rates. This was caused by piscivorous predators striking at the metabolism chamber. This situation was corrected using adequate shelter, and the metabolic rates declined. Sampling methods were improved, as was the reliability of the oxygen meter. During the study, a source of water with a predictable oxygen content was used to calibrate the meter.