



Diel pattern with abrupt crepuscular changes of zooplankton over a coral reef

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ABSTRACT: We studied zooplankton abundance and emergence patterns over coral reefs in the Gulf of Aqaba using high-resolution acoustics (multibeam sonar, FTV, 1.6 MHz, and WH600 ADCP, 614 KHz), emergence traps, and an underwater pump, supplemented with field observations on feeding behavior of zooplanktivorous fish. The zooplanktonic community over coral reefs is a complex and highly dynamic mixture of pelagic plankton advected into the reef, larvae and eggs released by benthic animals, and demersal plankton. At sunset (0 ± 4 min, mean 695% confidence interval) acoustic back-scattering intensity and zooplankton biomass started to increase rapidly. In contrast with this ascent, the predawn decline began much earlier during the dark (82 ± 5 min before sunrise) and terminated before sunrise. This light-dependent diel behavior was highly consistent throughout the year, regardless of seasonal and environmental changes. Smaller zooplankters (500-700 μm) ascended first and demersal zooplankton accounted for most of the increase in zooplankton soon after sunset. Surprisingly, the emergence of zooplankton occurred while large schools of diurnal zooplanktivorous fish were still foraging in the water column. However, at that time, prey-capture efficiency by the fish is greatly reduced and corals had not yet expanded their tentacles, producing an optimal window of opportunity of low risk for emergence.

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