MICROBIAL POPULATIONS AND BIOLUMINESCENCE OF OCEANIC FECAL PELLETS AND SEDIMENT TRAP PARTICLES

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ABSTRACT

The metabolic activities of microbial populations associated with fecal pellets collected from oceanic zooplankton were quantified during VERTEX field experiments over a period of three years. Rates of RNA and DNA synthesis (indicators of microbial growth and reproduction rates, respectively) were monitored in fecal pellets at time of egestion and during subsequent ageing. Results showed that biomass and growth were highest at time of egestion. Bioluminescence was detected in freshly excreted fecal pellets and in particulate matter collected in sediment traps from depths of 50 to 2000 m. The occurrence of bioluminescence associated with large rapidly sinking oceanic particles had not been observed previously and it was determined that this bioluminescence was bacterial in origin. An hypothesis was developed for a relationship between bacterial bioluminescence and zooplankton feeding in the trophic structure of the mesopelagic realm of the ocean.