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## **DISTRIBUTION OF PHAGOTROPHIC DINOFLAGELLATE SPECIES IN ANTHROPOGENICALLY CONTAMINATED SEDIMENTS OF HUNTINGTON HARBOR**

by

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Benthic cysts of phagotrophic dinoflagellate species occur in abundance in highly organic surface sediment previously discharged from a sewage disposal plant in Huntington Harbor, New York. These nonphotosynthesizing species have been identified as *Protoperidinium leonis*, *P. compressum* and *Polykrikos schwartzii* on the basis of their cyst morphology. They occur in amounts which exceed ten times that of the photosynthesizing species (e.g. *Gonyaulax* spp.) We propose that their concentration in the bottom sediment is related to the ingestion of the nutrient-rich effluent deposited adjacent the sewage plant. Further, we suggest that, if the contaminated sediment is toxic with respect to specific organic compounds and/or heavy metals, the ingestion of this material may be passed into the food chain through copepods, shellfish and vertebrates in this area of Long Island Sound. Evidence in support of this hypothesis is presented from the profusion of copepod eggs associated with the phagotrophic dinocysts.

Recent studies have shown that the cysts of the "red tide" dinoflagellate *Alexandrium excavatum* in sediments off the Maine coast were toxic and were directly responsible for shellfish poisoning. These cysts were sedimented into deeper water (90m) where they were ingested by the shellfish. The anecdotal evidence for the alarming increase in toxic algal blooms has been reported by Culotta (1992, *Science* 257: 1476-1477) who indicated that the prime suspect is the continuous pumping of nutrients such as nitrogen and phosphorus into coastal waters via sewage and agricultural runoff. We hypothesize that a similar effect results from the benthic cysts produced by phagotrophic dinoflagellates which actually ingest the contaminated detritus. We believe that ours is the first attempt to determine the role that nonphotosynthesizing species play.

We are presently formulating a project which will test this hypothesis. During the summer months of 1994, we plan to conduct a

sampling program utilizing the research vessel RV Walford made available through the City University Marine and Freshwater Institute. The sampling program will take into account the dispersal pattern of sewage and the direction and strength of current activity in the Harbor, throughout Huntington Bay, and into adjacent Long Island Sound. We shall also examine the distribution of fine silt and clay as indicators of deeper, more quiescent, environments. Analysis of the sediments by Atomic Absorption Spectroscopy, SEM Energy Dispersive X-ray Spectroscopy and X-ray Fluorescence will be undertaken in order to determine if there are toxic concentrations in the effluent.