

ABSTRACT

Toxic Phytoplankton Forms in Natural and Artificial Systems

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The phytoplankton community of three different systems, an artificial system represented by Brampton Farm, a semi-artificial system represented by Bowden Bay and a natural system represented by Pedro Bank were examined on a monthly basis between November 1999 and January 2001. The objectives of the study were to characterize and enumerate toxic and harmful phytoplankton species in natural and artificial systems and to compare biomass and abundance of inshore and offshore phytoplankton. Further objectives were to determine the level of variability within each system as well as to set standards needed for the establishment of a Harmful Algal Bloom monitoring programme. The objectives of the study were achieved by employing a number of indices in

the assessment of the phytoplankton population between and within each system.

The toxic phytoplankton species were found to be significantly different between the three systems with 37% of the species composition on Brampton Farm being toxic, 25% at Bowden Bay and 21% on Pedro Bank. *Prorocentrum minimum* was the most dominant toxic species at Brampton Farm while Bowden Bay and Pedro Bank were dominated by *Scirpsiella trochoidea*. The phytoplankton abundance and biomass increased by ten fold from the natural to semi-artificial system and by a hundred fold from the semi-artificial to artificial system. Different size fractions dominated the phytoplankton biomass in each of the three systems with the larger size fractions (net plankton and nanoplankton) dominating Bowden Bay and Brampton Farm respectively, while picoplankton dominated Pedro Bank.

Stations within Brampton Farm and Bowden Bay were significantly different while Pedro Bank appeared to be a homogeneous system. Brampton Farm typified eutrophic systems with a mean biomass of 91.14 mg m⁻³ chlorophyll *a* and phytoplankton abundance of 5.1 million Cells L⁻¹, while Pedro Bank with a mean biomass of 0.126 mg m⁻³ and abundance of 3 740 Cells L⁻¹ displayed oligotrophic conditions.

Standards were set to assist Managers with monitoring harvesting areas for toxic and harmful phytoplankton species, which may impact negatively on public health and the Jamaican Fishing Industry on a whole.

Keywords: Toxic phytoplankton; artificial, semi-artificial and natural systems; Jamaica.