Phytoplankton Community Succession in a Tropical Godavari River Estuary: Influence of Salinity

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Salinity in an estuary is one of the most important parameters in regulating phytoplankton community and biomass. In an unperturbed estuary different groups of phytoplankton communities are adapted to withstand a certain range of salinity levels and therefore show complex pattern of distribution along the salinity gradient from estuarine head to the mouth. Tropical Indian estuaries experience wet (June-September) and dry (October-May) conditions, which alter salinity structure in the estuary from freshwater to brackish respectively. Such dynamic system provides an ideal site to study the distribution and succession mechanism of phytoplankton communities.

In order to examine this, the entire estuary was occupied, covering about 35 kms, from upstream to mouth twice in a month during spring and neap tide in the Godavari estuary especially aimed to understand occurrence of blooms, community shifts, and their controlling factor along the salinity gradient. High Performance Liquid Chromatography (HPLC) derived class specific pigments were used as chemotaxonomic marker for identification and biomass estimation of phytoplankton.

Chlorophyll-a (Chl *a*) ranged from 1.54-21.37 mg m^{-3} during June and October with a distinct subsurface Chl *a* maxima at 5m and both diatoms and cyanobacteria contributed equally to phytoplankton biomass. The suspended matter load is directly proportional to the river discharge and thus controls the light penetration depth in the water column. The occurrence of blooms was associated with the sharp increase (decrease) in river discharge in June (October) suggesting availability of light also play significant role in occurrence of blooms. The initial phase of the blooms were contributed by cyanobacteria and later replaced by diatoms. From upstream to mouth of the estuary, phytoplankton diversity increased with dominance of cyanobacteria in the upstream to diatoms in the mouth. Salinity stratification clearly demarked the species occurrence as cyanobacteria was found in the upper 5m, whereas relatively freshwater was observed and diatoms were found below associated with brackish waters. Freshening of entire water column was observed during July to September favored cyanobacteria whereas diatoms completely wiped out suggesting that salinity plays major role on succession of phytoplankton community in the Godavari estuary.