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Differential environmental responses of tropical phytoplankton community in the southwest coast of India

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Abstract

Phytoplankton characteristics (biomass, primary productivity, species composition and community structure) were studied in a tropical estuary (Cochin estuary) and adjacent coastal marine region for understanding the factors controlling their productivity patterns and community dynamics. The Cochin estuary (CE) sustained a high level of inorganic nutrients supporting very high phytoplankton biomass, productivity, and abundance. Though the CE exhibited a 2-3 fold increase in the annual mean of chlorophyll *a* ($14.6 \pm 8.5 \text{ mg m}^{-3}$) and primary production ($1288 \pm 999 \text{ mgC m}^{-3} \text{ d}^{-1}$) than the coastal waters, both regions sustained with a substantial dominance of small-sized phytoplankton, in particular nanoplankton (2-20 μm), which apparently contributed >70% of total chlorophyll *a* and primary production. Diatoms were the dominant phytoplankton functional group (>75% of total abundance) prevailed over both sampling locations almost throughout the year, however, the sporadic dominance of certain species of dinoflagellates (during premonsoon) and green and blue-green algae (during monsoon) were also encountered in the estuary. The SIMPER analysis, based on phytoplankton species abundance data, revealed the presence of certain *characterizing species* exclusive for both estuary and coastal waters, and most

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