



## Research Article

## Seasonal Shifts in Diatom Species Dominance in the Tidal Mangrove Estuary of Bangladesh

Jahid Hasan<sup>1</sup>, Dinesh Chandra Shaha<sup>2✉</sup>, Mousumi Das<sup>3</sup>, Sampa Rani Kundu<sup>4</sup>, Salman Ahmed<sup>2</sup> and MD Rashedul Haque<sup>5</sup><sup>1</sup>Department of Aquatic Environment and Resource Management, Sher-e-Bangla Agricultural University, Dhaka-1207, Bangladesh<sup>2</sup>Coastal and Marine Dynamics Laboratory, Department of Fisheries Management, Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur-1706, Bangladesh<sup>3</sup>Department of Aquaculture, Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur-1706, Bangladesh<sup>4</sup>National Oceanographic and Maritime Institute (NOAMI), Dhaka-1205, Bangladesh<sup>5</sup>Department of Marine Fisheries and Oceanography, Sher-e-Bangla Agricultural University, Dhaka-1207, Bangladesh

## ARTICLE INFO

## ABSTRACT

## Article history

Received: 15 January 2024

Accepted: 25 June 2024

Published: 30 June 2024

## Keywords

Estuary,  
Mangrove creeks,  
Phytoplankton community,  
Diatoms,  
Seasons

## Correspondence

Dinesh Chandra Shaha

✉: [dinesh@bsmrau.edu.bd](mailto:dinesh@bsmrau.edu.bd)

Sustainable estuary management provides fishery resources, supports livelihoods and maintains estuarine food webs. However, these are highly dependent on hydrological factors and nutrients effects of the estuary itself. We studied seasonal phytoplankton quantity and composition of the Pasur River estuary in the Sundarbans mangrove forest, Bangladesh to understand the phytoplankton structure and identify potential indicators of environmental changes. Water and phytoplankton samples were collected at 11 different locations around the study region from January to December 2019 to assess spatial and temporal differences. Significant differences ( $p < 0.05$ ) in the average salinity were observed between the dry and rainy seasons. Elevated phytoplankton (blue-green algae) concentrations were associated with decreased salinity while increased diatom abundance was linked to higher salinity. Phytoplankton succession from blue-green algae (wet season) to diatoms (dry season) occurred due to variations in physicochemical parameters and nutrient factors. Simultaneously, phytoplankton diversity and density were shown to change in response to habitat quality and seasonal variation. This study highlights the potential impacts of both human activities and natural factors on the population structure in these estuarine environments.



Copyright ©2024 by authors and BAURES. This work is licensed under the Creative Commons Attribution International License (CC By 4.0).

## Introduction

Estuaries, which are semi-enclosed coastal bodies of water connecting fresh, brackish, and marine waters, are the world's most productive ecosystems (Cameron and Pritchard, 1963). Tropical estuarine environments are particularly interesting for investigating phytoplankton dynamics due to their constantly changing hydrological conditions (Islam et al., 2006). Like other aquatic ecosystems, phytoplankton are the primary producers in estuarine environment, while heterotrophic bacteria play a crucial role as secondary producers (Yuan et al., 2018; Hilaluddin et al., 2020; Cornils et al., 2007). Phytoplankton communities undergo dramatic shifts in species composition and

abundance over space and time as a result of biogeochemical processes and fertilizer input from upstream (Collins and Williams, 1981). It has been established that certain types of microalgae, particularly diatoms and blue-green algae, can pose a threat to aquatic and human life (Valenzuela-Sanchez et al., 2021). Diatoms are a type of phytoplankton that can be found in both saltwater and freshwater environments (Hilaluddin et al., 2020). The ability of the phytoplankton community to adapt to seasonal changes is crucial for the health of aquatic environments. All characteristics associated with the photosynthesis, development, composition, and variety of phytoplankton will be impacted by shifts in

## Cite This Article

Hasan, J., Shaha, D.C., Das, M., Kundu, S.R., Ahmed, S. and Haque, M.R. 2024. Seasonal Shifts in Diatom Species Dominance in the Tidal Mangrove Estuary of Bangladesh. *Journal of Bangladesh Agricultural University*, 22(2): 231-240. <https://doi.org/10.3329/jbau.v22i2.74575>