



Dynamics of plankton communities and trophic state in Taabo Lake (Côte d'Ivoire)

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ABSTRACT

Objective: This study examined spatial and seasonal patterns in the biomass of plankton assemblages (phytoplankton and zooplankton) and evaluated the trophic state of Taabo Lake, in order to determine how plankton dynamics reflect and influence the lake's level of eutrophication.

Methodology and results: Spatial and seasonal variation of biomass of plankton assemblages and Trophics stats were investigated in Taabo lake from November 2017 to October 2018 (Côte d'Ivoire; West Africa). Field sampling was conducted every 45 days at five sites representing different levels of anthropogenic influence. Plankton samples were collected at five sites along a seven-kilometer transect using a 20 μm mesh plankton net. Both the Carlson Trophic State Index and the Zooplankton Trophic State Index were employed to determine the trophic condition of Taabo Lake. High nutrient concentrations (PT: $1.5 \text{ mg}\cdot\text{L}^{-1}$; NT: $0.5 \text{ mg}\cdot\text{L}^{-1}$) coincided with an elevated phytoplankton biomass ($88 \text{ mg}\cdot\text{L}^{-1}$) during the rainy season, with Dinophyta contributing over 39% of the total phytoplankton density in October. In contrast, zooplankton biomass peaked during the dry season ($3.4 \text{ mg}\cdot\text{L}^{-1}$), dominated by copepods (>60%), followed by rotifers (>30%). Carlson Index values exceeded 50 at all sites and sampling periods, indicating eutrophic conditions in Taabo Lake (TSI > 50). Likewise, median values of the zooplanktonic trophic index ranged between 55 and 65 across seasons and stations. Together, these results confirm that the waters of Taabo Lake consistently fall within the eutrophic state.

Conclusion and application of results: The persistent eutrophic state of Taabo Lake highlights the influence of nutrient enrichment, particularly during the rainy season. These results support the implementation of nutrient reduction strategies, improved wastewater management, and the use of plankton-based monitoring as effective tools for water quality assessment and sustainable lake management.

Keys words: plankton, eutrophic, Carlson Index, zooplanktonic trophic index, Biomass, Taabo lake, Côte d'Ivoire, Trophic state.