ANNUAL VARIATIONS IN PHYTOPLANKTON ASSEMBLAGES OF A CERRADO STREAM

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INTRODUÇÃO

Cerrado (Brazilian savanna) is the second largest Brazilian vegetable formation. This vegetation covered originally two million Km^2, encompassing 10 Brazilian States. Some studies asserted that 67% of its original area is considered highly modified by human activities, with remains of only 20% of the original vegetation cover (Mittermeyer *et al.*, 1999). The accelerated disappearance of Cerrado emphasizes the need of knowledge concerning the remaining fragments of this biome, in order to support environmental programs and conservation strategies. Terrestrial floristic composition of Cerrado biome has been well studied, although the aquatic flora remains practically unknown, especially at Northwestern Sao Paulo State. Amongst several assemblages of aquatic flora, phytoplankton can be considered the most important group, since it constitutes the basis of aquatic trophic chain. In this context, anthropic impacts on aquatic environments can promote changes in structure and dynamics of several trophic levels (Odum 2004).

OBJETIVOS

The aim of this study is to analyze the phytoplankton assemblage structure (composition, richness, diversity, and abundance) along different periods of the year in a Cerrado stream.

MATERIAL E MÉTODOS

Fieldwork was conducted in a forth order Colono Stream stretch (21°35' 22.31"S and 50° 00'59.5"W), located at Avanhadava municipality, Northwest of São Paulo State, at approximately 1.5 Km from stream mouth into the Pato River, in the hydrographic basin of Promissão Reservoir. Maximum stream depth was 2.5 meters and maximum width was5 meters. The samples were carried out in eight expeditions (at each 3 months) from January/2008 to December/2009. For phytoplankton quantitative analysis, unfiltered samples were taken at subsurface (0.5 m) and then fixed and preserved with Lugol solution. After sedimentation, the organisms (cells, colonies, and filaments) were counted using inverted microscopy at a magnification of 400x. Filtered samples were also collected with vertical and horizontal net hauls (20 μm mesh size) and preserved in 4% formalin. Phytoplankton organisms were identified up to species level using an optical microscope (maximum magnification of 1000x) (Bicudo & Menezes 2005). As an index for determining phytoplankton biomass, chlorophyll a (total) concentration was determined by cold acetone (90%) and manual maceration (Talling & Driver 1963). Physical and chemical data were obtained at subsurface using a Horiba model U - 22 probe. Transparency was measured by Secchi disk. Suspended matter was determined by gravimetry (Cole, 1979), total nitrogenous and total phosphorus were determined by the methods of Mackereth *et al.*, (1978) and Strickland & Parsons (1960), respectively. The correlation between abiotic and biotic variables was determined by the canonic correspondence analyses, CCA (Pcordwin). All data were previously standardized (log

x+1), except the pH.

RESULTADOS

The phytoplankton assemblages were composed by 64 species. Cryptophyceae was the most abundant group, followed by Bacillariophyceae. The most abundant and widely distributed species was *Cryptomonas brasiliensis* (Castro, Bicudo and Bicudo). For both years, richness and diversity were higher during the spring, while phytoplankton abundance and chlorophyll a concentration were greater during the autumn. Indeed, phytoplankton assemblages showed great seasonal changes along the two years. The CCA analysis showed variations in composition, abundance, and biomass, indicating that phytoplankton assemblages were influenced by meteorological factors, like precipitation and temperature and input of nutrients in the system from the local agriculture zone (Santos & Rocha, 1998, Ferrareze & Nogueira, 2006). The physical and chemical variables that better indicated differences in water condition were conductivity, dissolved oxygen and transparency. There was also a noticeable increase in the concentration of nitrogen, phosphorus and suspended solids in the water during summer due to direct effects of the rains. In the particular case of suspended solids, the concentration in summer was about 40 times higher than winter. The maximum nitrogen and phosphorus were 1,30 mg L^{-1} and 402 mg L^{-1}, respectively, and was observed during summer. It is important to stress the necessity to consider the role of the stream in large hydrographic basins and associated biotic communities. Small and medium - size tributaries are generally considered of minor importance because of their lower water volume, although they can influence the water quality conditions of large rivers. Since they come from different areas, with particular urban and agricultural characteristics, they contribute with significant inputs of loads and organisms into the large river or the reservoir (Henry *et al.*, 1999; Moretto & Nogueira 2003; Ferrareze & Nogueira 2006).

CONCLUSÃO

The results showed that the phytoplankton respond quickly to environmental variations (Reynolds 1984). The great diversity and abundance of Phytoplankton assemblage found herein reflected the extensive sampling program and evidenced the need to consider the whole hydrograph basin to assess the biodiversity status of inland water ecosystems.

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