A bloom of cyanobacteria (*Cylindrospermopsis raciborskii*) in UHE Carlos Botelho (Lobo/Broa) reservoir: a consequence of global change?

Tundisi, JG., a,b*, Matsumura-Tundisi, T.a, Tundisi, JEM.a, Blanco, FP.a, Abe, DS.a, Contri Campanelli, L.a, Sidagis Galli, G.a, Silva, VT.a and Lima, CPP.a

aInstituto Internacional de Ecologia, Rua Bento Carlos, 750, CEP 13560-660, São Carlos, SP, Brazil
bUniversidade Feevale, ERS-239, 2755, Bairro Vila Nova, Novo Hamburgo, RS, Brazil
*e-mail:tundisi@iie.com.br

Recieved: November 7, 2014 – Accepted: December 11, 2014 – Distributed: May 31, 2015

The UHE Carlos Botelho (Lobo/Broa reservoir) was selected in 1971 for a program of ecological research, and in the last 44 years continuous sampling and studies, characterized very well this artificial ecosystem and its watershed (Tundisi and Matsumura Tundisi, 2013). The mechanisms of functioning of the reservoir were well known and the maintenance of good water quality (low conductivity – average (10-20uSxcm \(^{-1}\)); periodic turbulence with re-oxygenation of the whole water column, and high saturation of oxygen (80-100%); low retention time (< 20 days) and an extensive macrophyte grow in the headwaters that prevent high nutrient load. This is the picture for the last 44 years. The phytoplankton composition was consistent with the oligomesotrophic characteristic of the reservoir: predominance of diatoms and chlorophyceae with a maximum of 10µg/l chlorophyll. However in the winter of (july) 2014 the following changes were observed: a heavy bloom of cyanobacteria occurred for the first time in the reservoir. This cyanobacteria *Cylindrospermopsis raciborskii*, is a invasive species. Very high chlorophyll levels (up to 100µg/l) were measured and high concentration and input of phosphorus was also detected (Tundisi and Matsumura-Tundisi, 2014).

As a further consequence of this process,extensive periods of drought prevent silica discharge into the reservoir reducing diatom growth; the Lobo/Broa reservoir had a predominance of *Aulacoseira italic*a during many years due to silica concentrations of up to 5mg/l. This effect of silica reduction was described by Schindler (2006) in his review of eutrophication.

Effects on the overall economy of the region and on the ecosystem services, are being quantified (Periotto and Tundisi, 2013).

Acknowledgements

The authors express their thanks to the finantial support of FAPESP (Processes number 51502-3/2012) and CNPq (Processes number 403820/2012-0). This is part of the Long Term Ecological Research Program of CNPq and FAPESP-PEDL, and the support of Prof.Dr. Sandra Feliciano de Azevedo from the Institute of Biophysics UFRJ in the identification of the cyanobacteria and toxicity of the blooms.
References


TUNDISI, JE. and MATSUMURA-TUNDISI, T., 2013. The ecology of UHE Carlos Botelho (Lobo/Broa reservoir) and its watershed, São Paulo, Brazil. *Freshwater Biology*, vol. 6, p. 75-91.