A 2-year survey of phytoplankton in the Marne Reservoir (France): A case study to validate the use of an

For almost two years (2006–2007), phytoplankton structure and distribution were monitored using a combination of methods in the Marne Reservoir (France). We used the bbe FluoroprobeTM spectrofluorometer, which provides vertical profiles for different algal classes and chlorophyll analysis, based on the in vivo autofluorescence characteristics of the phytoplankton. In parallel, we measured chlorophyll a (chl a) concentrations using the classical extraction method coupled with spectrophotometric analyses, and calculated the biovolume of all the taxa identified using inverted light microscopy. A very close correlation ($\rho = 0.93$, $n = 243$, $p < 0.0001$) was found between the total equivalent chl a concentrations given by the bbe FluoroprobeTM and the total chl a concentrations (g·L–1) provided by the spectrophotometric analysis. The closest correlation was obtained for concentrations below 6.9 µg·L–1 whereas little or no correlation was found for those above 21.6 µg·L–1. The relationship was highly significant when total phytoplankton biovolume was compared with data from the probe ($\rho = 0.6$, $n = 243$, $p < 0.0001$), the strongest correlation being found for the group composed of diatoms, dinoflagellates and chrysophyceae ($\rho = 0.67$, $p < 0.0001$), while the weakest relationship was for the blue-green cyanobacteria ($\rho = 0.33$, $p < 0.0001$), although it was still highly significant. Our analysis, based on a large dataset, indicates that the FluoroprobeTM appears to be a reliable tool suitable for use by fresh water managers to monitor phytoplankton on any relevant time and space scales.

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