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Title: Diel cycles of planktonic respiration rates in briefly incubated water samples from a fertile earthen pond.

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Abstract: Planktonic community respiration rates were assessed every 30 min through two 48-h periods in near-surface water taken automatically from a fertilized earthen pond and incubated in a plastic chamber for 21 min of each sampling cycle. Parallel records of water temperature, air temperature, windspeed, and solar irradiance permitted calculation of gross and net primary production and photosynthesis-irradiance relationships. Nighttime respiration rates generally matched oxygen depletion rates in pond water, indicating that incubation-based rates were representative of a quickly darkened pond community throughout the day. Daytime rates averaged nearly 2 times the mean night rate and 58% higher than the mean day rate determined by a typical interpolation used in free-water production calculations. Daily gross production ranged from 0.7 to 1.2 mmol O_2 liter^{-1} d^{-1}; respiration constituted 65-75% of gross rates. Gross oxygen production per unit Chl *a* during sampling intervals was light saturated at irradiance values > 600 μEinst m^{-2} s^{-1}, with an asymptotic value of 1.58 μmol O_2 (μg Chl *a*)$^{-1}$ h^{-1}. This system and method were capable of resolving respiration and gross and net production when chlorophyll concentrations were near 40 μg liter^{-1}.

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