PHYSIOLOGICAL RESPONSES OF *ANABAENA VARIABILIS*(CYANOPHYCEAE) TO INSTANTANEOUS EXPOSURE TO VARIOUS COMBINATIONS OF LIGHT INTENSITY AND TEMPERATURE

Authors: CAROL D. COLLINS AND CHARLES W. BOYLEN

Source: JOURNAL OF PHYCOLOGY Volume 18, Issue 2, Pages 206-211, June 1982

Abstract: Light intensity and temperature interactions have a complex effect on the physiological process rates of the filamentous bluegreen alga*Anabaena variabilis* Kütz. The optimum temperature for photosynthesis increased with increasing light intensity from 10°C at 42 $\mu E \cdot m^{-2} \cdot s^{-1}$ to 35°C at 562 $\mu E \cdot m^{-2} \cdot s^{-1}$. The light saturation parameter, I_K, increased with increasing temperatures. The maximum photosynthetic rate (2.0 g C·g dry wt.$^{-1} \cdot d^{-1}$) occurred at 35°C and 564 $\mu E \cdot m^{-2} \cdot s^{-1}$. At 15°C, the maximum rate was 1.25 g C·g dry wt.$^{-1} \cdot d^{-1}$ at 332 $\mu E \cdot m^{-2} \cdot s^{-1}$. The dark respiration rate increased exponentially with temperature. Under favorable conditions of light intensity and temperature the percent of extracellular release of dissolved organic carbon was less than 5% of the total C fixed. This release increased to nearly 40% under combinations of low light intensity and high temperature. A mathematical model was developed to simulate the interaction of light intensity and temperature on photosynthetic rate. The interactive effects were represented by making the light-saturation parameters a function of temperature.

Full article can be found at: http://dx.doi.org/10.1111/j.1529-8817.1982.tb03175.x