香港科技大學
THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY

南方海洋科學與工程廣東省實驗室（廣州）香港分部
HONG KONG BRANCH OF SOUTHERN MARINE SCIENCE AND ENGINEERING GUANGDONG LABORATORY (GUANGZHOU)

Hong Kong Branch Distinguished Seminar Series

Interactive effects of temperature, irradiance, nutrient limitation, and CO2 partial pressure on the growth and physiology of the marine cyanobacterium *Synechococcus*

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Abstract: The marine cyanobacterium Synechococcus strain CCMP 1629 was grown in a continuous culture system at temperatures of 20–45 Celsius, high and low irradiance (300 and 50 mmol quanta m−2 s−1 of photosynthetically active radiation, respectively), high and low partial pressures of CO2 (1000 and 400 ppmv, respectively), and under either nutrient-replete or nitrate-limited conditions. The goal of the study was to test the relative growth rate hypothesis of Joel Goldman, the algal growth model published by Richard Geider et al. (Marine Ecology Progress Series 148: 187–200), and the analysis of likely effects of elevated CO2 partial pressures published by Hopkinson et al. (Proceedings of the National Academy of Sciences 108(10): 3830–3837).

Results showed that changing the partial pressure of CO2 from 400 to 1000 ppmv had little or no discernible effect on the growth rate or composition of CCMP 1629. Results were generally consistent with the relative growth rate hypothesis of Goldman, i.e., carbon/nitrogen (C/N) ratios under nutrient-replete conditions were roughly constant across the 25-degree range of temperatures, but C/N ratios were systematically higher at high irradiance. C/N ratios were approximately constant when cells were grown under nitrate-limited conditions at half their nutrient-replete growth rates at the same temperature, irradiance, and CO2 partial pressure, a result consistent with Goldman's relative growth rate hypothesis. Although the initial slope of the photosynthesis-irradiance curve was independent of growth conditions, there was a strong interaction between the effects of temperature and irradiance on the growth rates and cellular composition of CCMP 1629 that was inconsistent with the model of Geider et al.

10 June 2021 (Thursday)
10 am - 11 am (GMT +8, HK Time)
https://hkust.zoom.us/j/2074605139
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