



Distribution, production, and ecophysiology of *Picocystis* strain ML in Mono Lake, California

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ABSTRACT: A recently described unicellular chlorophytic alga isolated from meromictic Mono Lake, California, occupies a niche that spans two environments: the upper oxic mixolimnion and the deeper anoxic and highly reducing monimolimnion. This organism, *Picocystis* sp. strain ML, accounts for nearly 25% of the primary production during the winter bloom and more than 50% at other times of the year. In incubations, it is heavily grazed by the brine shrimp, *Artemia monica*. We assessed growth and photosynthetic parameters over broad ranges of irradiance, salinity, and pH and under oxic and anoxic conditions. *Picocystis* appears to be particularly adapted to low irradiance; we observed an order of magnitude increase in the cellular pigment concentrations, as well as marked increases in cell-specific photosynthetic parameters for cells acclimated to low-growth irradiance. Growth rates of 0.3-1.5 d⁻¹ were observed over a salinity range of 0-260‰ and a pH range of 4-12, with maximal growth at ~50 mmol photons m⁻² s⁻¹, 40‰, and pH 6-10. Growth and oxygenic photosynthesis were observed under anoxic conditions at rates comparable to those measured under oxic conditions. The ability of the organism to acclimate and grow under such a broad range of environmental conditions makes it an important component of the Mono Lake ecosystem and likely contributes to its dominance of the monimolimnion/mixolimnion interface.

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