**March 11, 2024**

Dear Editor, PLOS ONE.

We submit our manuscript “*Prochlorococcus marinus* responses to light and oxygen” for consideration for publication in PLOS ONE.

In this article, we present the growth responses of 3 *Prochlorococcus marinus* strains; MED4 from Clade HLI, SS120 from Clade LLII/III and MIT9313 from Clade LLIV across a matrix of peak irradiances, photoperiods, spectral bands, and dissolved oxygen. Our study is motivated by evidence of high-light and low-light ecotypes found in ocean regions beyond their optimal habitats, from ocean protein data (<https://www.oceanproteinportal.org/>); coupled with predictions that ocean warming may open permissive temperatures in new, poleward photic regimes, along with expanded Oxygen Minimum Zones. We found that MED4 from Clade HLI requires greater than 4 h photoperiod, grows at 25 µmol O2 L-1 and above, and exploits high cumulative diel photon doses. SS120 from Clade LLII/III is restricted to low light under full 250 µmol O2 L-1, shows expanded light exploitation under 25 µmol O2 L-1, but is excluded from growth under 2.5 µmol O2 L-1. MIT9313 from Clade LLIV is restricted to low blue irradiance under 250 µmol O2 L-1 but exploits much higher irradiance under red light. MIT9313 demonstrates a tolerance to higher light levels, equivalent to levels used to classify HL clades, under O2 concentrations of 25 µmol O2 L-1 and lower.

We confirm that neither the manuscript nor any parts of its content are currently under consideration or published in another journal. All authors have approved the manuscript and agree with its submission to PLOS ONE.

Sincerely Mireille Savoie,

on behalf of Aurora Mattison, Laurel Genge, Julie Nadeau, Sylwia Śliwińska-Wilczewska, Maximilian Berthold, Naaman M. Omar, Ondřej Prášil, Amanda M. Cockshutt & Douglas A. Campbell