

Light stress in intertidal diatoms: a comparative molecular and ecophysiological study

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Intertidal sediments are extreme environments, characterized by rapid changes in environmental conditions such as irradiance as a result of the interplay of tides, weather and biology. Nevertheless, intertidal sediments belong to the most productive systems on Earth (Underwood and Kromkamp, 1999) owing to the primary production of microphytobenthos, sediment-inhabiting micro-algae, (Cook *et al.*, 2007). Benthic diatoms thriving in these conditions can be divided into three groups: The epipelon, which consists of motile diatoms, mainly living on silty sediments, the epipsammon which are immotile and live attached to sand grains and the tycho plankton, which can be found both on the sediment as in the water column. As these groups show marked differences in life style, they are expected to show different responses in coping with intense light and rapid fluctuations in light climate. In this study we compared the response to high light of the model tycho planktonic diatom (*Phaeodactylum tricornutum*) and the recently sequenced epipellic diatom *Seminavis robusta*. Our study revealed pronounced differences in photophysiology and expression of genes involved in photosynthesis in both diatoms when exposed to high light. Our study is the first to describe the molecular acclimation of an epipellic diatom and reveals a different way to cope with high light. Current research focuses on different physiological processes involved.

References

- Underwood G.J.C. and J. Kromkamp. 1999. Primary production by phytoplankton and Microphytobenthos in estuaries. *Advances in Ecological Research* 29:93-153.
- Cook P.L.M. and H. Roy. 2006. Advective relief of CO₂ limitation in microphytobenthos in highly productive sandy sediments. *Limnology and Oceanography* 51:1594-1601.