Single cell carbon and nitrogen dynamics in chain forming diatoms, including their resting stage

In this thesis, I study how two common chain forming diatoms survive the unfavourable conditions between annual algae blooms; *Skeletonema marinoi*, a cosmopolitan species which dominates the beginning of spring blooms and *Chaetoceros affinis*, a larger diatom common after blooms. I showed that *C. affinis* seemed to recycle N with help of associated bacteria, to endure post bloom conditions. *S. marinoi* assimilated excess of nitrate during high availability and stopped assimilation before getting limited by diffusive N fluxes. There was virtually no difference in nitrate uptake between solitary cells and cells in chains for either species. Chain length did not impact assimilation rates either.

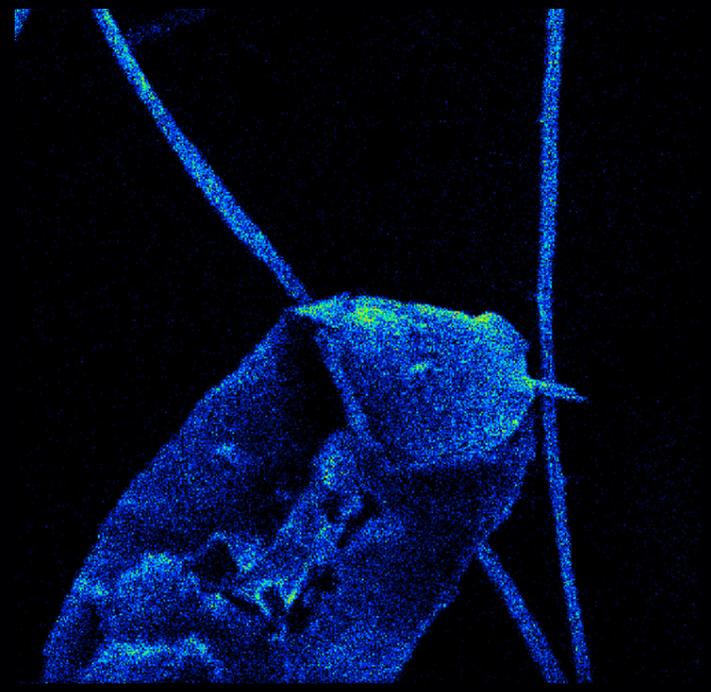
These diatoms can escape the unfavourable conditions following a bloom by aggregating and sinking down to sediments, there they can survive decades and potentially seed new blooms. It was shown that resting stages of *S. marinoi* were able to assimilate acetate, ammonium, nitrate, urea and respire using dissimilatory nitrate reduction to ammonium under dark, anoxic conditions. My findings show that these two diatoms have different strategies to deal with N limitation which reflects their respective niche. This thesis has only scratched the surface on chain forming diatoms responses to N limitation, potentially the responses are as diverse as the diatoms themselves.

Rickard Stenow

ISBN 978-91-8069-375-2 (PRINT)
ISBN 978-91-8069-376-9 (PDF)

Single cell carbon and nitrogen dynamics in chain forming diatoms, including their resting stage | Rickard Stenow 2023

PH.D. THESIS



Single cell carbon and nitrogen dynamics in chain forming diatoms, including their resting stage

Rickard Stenow

DEPARTMENT OF
MARINE SCIENCES

UNIVERSITY OF
GOTHENBURG