molecular tools can enable field studies to improve knowledge of the scale of variability of blooms and toxin production, and are critical to advance our understanding of the triggers of toxin production in cyanobacteria.

30-O Microcolony formation in non-axenic *Synechococcus* cultures: do the associated bacteria matter?

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Cyanobacteria belonging to the genus *Synechococcus* are present in lake waters typically as planktonic single cells and monoclonal microcolonies in association with heterotrophic bacteria. Previous studies have postulated that the formation of *Synechococcus* microcolonies is an efficient defence strategy against grazing activity by size-selective predators. The aim of this study is to evaluate the effect of nanoflagellate predation on microcolony formation in two *Synechococcus* strains belonging to different phylotypes and on their associated heterotrophic community. We designed a factorial experiment with non-axenic *Synechococcus* PE (phycoerythrin-rich cells, Group A, LL) and PC (phycocyanin-rich cells, Group I, MW101C3) as single cultures (PE, PC) and co-cultures (PE+PC) with (+P) and without (-P) the addition of axenic *Poterioochromonas* sp.. During four days of incubation, we followed the dynamics of single-cells, microcolonies and flagellates by flow cytometry, also performing genetic analyses at T_0 and T_4. We observed that the nanoflagellates fed directly on PE cells, and on its associated heterotrophic microbial community, but they were not efficient in removing PC cells. Such prey selection produced a marked decrease of PE single cells and a concomitant increase of PE microcolonies in single (PE+P) and co-cultures (PE+PC+P). On the other hand, PC single cells increased in number, while PC microcolonies were few and did not increase in both treatments (PC+P and PC-P). In PC both the presence of genes involved with predator avoidance like the Exopolymeric Substances (EPS) and the absence of genes involved in cell adhesion (*pil*A) could explain the difference observed in the response of two *Synechococcus* strains to predation. The heterotrophic bacterial community associated to *Synechococcus* was composed of 94 operational taxonomic units (OTUs) dominated by *Gamma-*, *Alpha-*, *Beta-proteobacteria*, and *Flavobacteria* (16S rRNA gene Illumina Miseq sequences). PE and PC cultures differed in the composition of the associated bacteria: in PC Gammaproteobacteria and Flavobacteria dominated while *Sediminibacterium* and *Sphingomonas* were distinctive of PE OTUs. The beta-diversity analysis showed that the communities clustered in two main groups. The one group comprised of the treatments with PC single cultures, with and without predators; the second group comprised of the treatments with PE in single culture and PE+PC co-cultures, with and without predation. 41% of the beta-diversity was explained by the presence of PE, while PC only explained the 9% of the diversity. Moreover, bacterial diversity increased in the presence of predation and in co-culture.

30-O Allelopathic activity of the picocyanobacterium *Synechococcus* sp. on selected cyanobacteria and microalgae.

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Allelopathy may be one of the key factors contributing to the formation and maintenance of cyanobacterial blooms (Suikkanen et al., 2004), which strongly affected aquatic ecosystems (Stal et al., 2003). Moreover, Allen et al. (2006) described that blooms are occurring in more areas than ever before and new massive blooms are reported regularly. There are some reports of allelopathic effects caused by Baltic cyanobacteria (Suikkanen et al., 2004; 2005), but no information about allelopathic potential of picocyanobacterium *Synechococcus* sp. on coexisting cyanobacteria and microalgae has been found.

The main aim of this work was to estimate the allelopathic interaction of the Baltic picocyanobacterium *Synechococcus* sp. on the coexisting cyanobacteria *Nodularia spumigena* and *Aphanizomenon* sp., green algae *Chlorella vulgaris* and diatom *Skeletonema marinoi*. In this study, the influence of allelopathic activity on the analyzed species was investigated by single and repeated addition of cell-free filtrate of *Synechococcus* sp. Moreover, the influence of allelopathic activity on the growth, chlorophyll fluorescence and photosynthesis performance of analyzed target organisms was investigated.

The present study indicated for the first time that the common Baltic picocyanobacterium *Synechococcus* sp. affect coexisting cyanobacteria, green algae and diatom negatively. The highest decline in growth, fluorescence parameter