

## **Investigating the environmental control of planktonic proteobacterial groups during the phytoplankton spring bloom in two contrasting South Coast UK estuaries**

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Seasonal changes in bacterioplankton populations in two south coast UK estuaries Southampton Water and Christchurch Harbour have been investigated between March and November 2013. Four different phylogenetic bacterial groups with two alphaproteobacteria clades were quantitatively determined in subsurface water samples by Fluorescence in-situ hybridization (FISH) with oligonucleotide probes during phytoplankton bloom periods. During the spring phytoplankton bloom in Southampton water, extracted chlorophyll-a concentrations of between 6.7 and 7.6  $\mu\text{g L}^{-1}$  were detected while gammaproteobacteria relative abundances (28.7-32.8%) and alphaproteobacteria (35.0-44.0%) dominated the eubacteria with smaller proportions of betaproteobacteria (6.4-13.0%) under high salinity conditions (27.9-32.7). Gammaproteobacteria abundance was significantly negatively correlated with chlorophyll-a concentration ( $R = -0.5$ ,  $p < 0.05$ ). In the Christchurch Harbour estuary, betaproteobacteria (21.2-41.1%) dominated throughout the study period in lower salinity waters (1.3-20.7). A significant relationship with negative trend was detected in both estuaries between salinity and betaproteobacteria ( $R = -0.95$ ,  $p < 0.0001$ ). A higher proportion of gammaproteobacteria (29.7-30.3 %) occurred after the spring bloom chlorophyll-a concentration of 5-44.3  $\mu\text{g L}^{-1}$  and proportion of alphaproteobacteria was highly variable. Archaea were detected in low percentages throughout the blooming season in both estuaries with maximum detected relative abundances of 10.6% in Southampton water and 8.2% in Christchurch harbour. The variation in salinity range therefore between the two estuaries plus the differences in phytoplankton biomass had a marked influence on the dominance of the different proteobacterial groups detected.