

Population dynamics of *Noctiluca scintillans* in the Belgian part of the North Sea and its relation with small gelatinous plankton

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Climate change and global warming are reshaping plankton communities. With rising sea surface temperatures, heat-favouring species are expected to thrive. *Noctiluca scintillans*, a common and potentially harmful dinoflagellate, can reach enormous densities in hot summers and can affect plankton communities resulting in a competition for food sources. Population dynamics of gelatinous zooplankton have been found to be associated to abundances of *N. scintillans*. *N. scintillans* itself is not commonly preyed upon and forms a trophic dead end.

In this study, we aim to evaluate the population dynamics of *N. scintillans* in the Belgian Part of the North Sea (BPNS) and whether this is related to gelatinous zooplankton. We expect *N. scintillans*, as a heat-favouring species, to be more abundant during years with higher average summer temperatures and to have a small cell volume during bloom conditions, as this indicates a good nutritional status. We also assume that high *N. scintillans* abundances might negatively affect gelatinous zooplankton abundances due to the competition for food sources.

Abundances of *N. scintillans*, 23 taxa of zooplankton of which four are gelatinous plankton, and associated water quality parameters are collected by the Flanders Marine Institute, in the framework of the LifeWatch project. Five years of data from nine onshore stations are incorporated in the analysis. Imaging techniques of the ZooSCAN yielded detailed and reliable length measurements of each individual specimen in the studied samples. Consequently, the occurrence, abundance, size and cell volume of *N. scintillans* and their possible effects on small gelatinous plankton were studied. This is the first study that performs length measurements on zooplankton on a large scale in the BPNS and that consistently counts *N. scintillans* cells. The ZooSCAN facilitates counting a high number of cells, which is not feasible with e.g. microscopy.

Preliminary results show that *N. scintillans* is most abundant in May and June and that the cell volume is largest in this period. During the recent years, *N. scintillans* is observed more frequently outside the summer months and in a larger geographical area. It also reaches higher peak densities than before. First results indicate temperature to be one of the main drivers of *N. scintillans* dynamics and shows indications of an interrelation with *Appendicularia* dynamics.

Keywords: *Noctiluca scintillans*; Population dynamics; Gelatinous zooplankton; Plankton imaging