

Algal toxins in the Baltic Sea – effects on fish health?

Degree project (master), internship or research training.

Within this project you will have the chance to evaluate how exposure to algal toxins in fish from the Baltic Sea has changed over time, and in addition link levels of these substances to fish health data from ongoing environmental monitoring.

Background:

The eutrophication of the Baltic Sea is driving large blooms of phytoplankton and cyanobacteria as well as contribute to the occurrence of filamentous algae. The increased abundance of these primary producers can lead to an elevated production of algal toxins with potentially harmful effects on fish. As part of current environmental monitoring is the programme *integrated coastal fish health monitoring* – a programme where coastal fish (e.g., perch) is examined in relation to different fish health parameters, from different reference stations along the Swedish coastline. At station Kvädöfjärden in the Baltic Proper, an assumed unaffected area but with large algae blooms during the summer, ongoing health examinations show that perch is far from unaffected. Signs of oxidative stress, immunological response and altered metabolism that cannot be coupled to anthropogenic contaminants points to algal toxins, showing similar effects in ecotoxicological studies, as a potential cause for the deteriorating fish health status in the area.

Project/Method:

The project will take advantage of material (perch) collected within the *integrated coastal fish health monitoring* and stored at the Environmental Specimen Bank at the Swedish Museum of Natural History to do a retrospective study of algal toxins in perch from 1995 to 2019, as well as combine the information with already existing data for fish health. By doing so you will be able to answer how these substances change over time, are the exposure stable or is there an upward/downward trend? You will also have the opportunity to evaluate possible effects of algal toxins in the environment by coupling the chemical data to fish health parameters from the same individuals. Combined, these two research questions will advance the field of algal toxins in the Baltic Sea and contribute to the overall understanding of future needs in this area; no problem exists, annual

monitoring is necessary, improved measures to reduce nutrients is warranted, other conclusions?

Practical parts of the project involves sample preparations (and possibly aiding in the chemical analysis) done at Stockholm University at the Department of Environmental Science (ACES). In addition to that, data handling and statistical analysis as well as scientific writing will be included and conducted at the Freshwater Institute at Drottningholm, Stockholm.

The project will be supervised by Dr Caroline Ek. The student should have an interest in fish, contaminant science/ecotoxicology, data analysis and scientific writing.

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