SMHI
Oceanographic Unit
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AlgAware
ALGAL SITUATION IN MARINE WATERS SURROUNDING SWEDEN

Sammanfattning
I Skagerrak var växtplanktonproverna tämligen låga i diversitet och fluorescensmaxima dominerades av dinoflagellaten *Ceratium tripos*. Fluorescensmaxima i Kattegatt dominerades av kiselalger, förutom vid Fladen där flera arter av släktet *Ceratium* dominerade.

I Östersjön hade ytansamlingarna av cyanobakterier vänts ner i vattnet av vind och vågor. Det var dock gott om aggregeringar och filament av cyanobakterier vid samtliga stationer i samtliga analyserade prover, både i ytprover och i integrerade (0-10m) prover. *Nodularia spumigena** dominerade vid de flesta stationerna. Med tanke på denna insamlade information kan det förutspås att lugnare väder kommer leda till nya ytansamlingar av cyanobakterier över alla områden i Östersjön som täckts av SMHIs expedition.

Växtplanktonanalyserna har genomförts ombord R/V Aranda med fokus på cyanobakterierna som dominerar i blomningarna i Östersjön. Analysmetoden är inte den bästa för andra plankton, men de som observerats rapporteras här.

För att se satellittolkningar av ytansamlingar av cyanobakterier: http://www.smhi.se/vadret/hav-och-kust/algsituationen-beta-1.31142

Abstract
In the Skagerrak, the phytoplankton samples were rather low in diversity and fluorescence maxima were dominated by the dinoflagellate *Ceratium tripos*. The Kattegat fluorescence maxima samples were dominated by diatoms, except at Fladen where several *Ceratium* species dominated.

In the Baltic, the cyanobacteria surface accumulations had been turned down in the water by wind and waves. Aggregations and filaments of cyanobacteria were abundant at all stations in all samples analysed, both surface samples and integrated (0-10m) samples. *Nodularia spumigena** dominated at most stations. Considering this information the prediction is that calmer weather will lead to new surface gatherings over the whole Baltic areas covered by the SMHI expedition.

Phytoplankton analyses have been made on board the R/V Aranda with main focus on the cyanobacteria dominating in the Baltic bloom. The method used here is not the best for other plankton groups, nevertheless all organisms observed are reported.

To follow the surface accumulations of cyanobacteria in the Baltic Sea by satellite interpretations: http://www.smhi.se/en/Weather/Sweden-weather/the-algae-situation-1.11631

More detailed information on species composition and abundance

Results from the microscope analysis.

50 ml of water was filtered through 10 µm polycarbonate filters before being analysed using a light microscope. Potentially toxic species are marked with *. The observed species are listed on page 5-6.

Small species were not analysed on board. Results of chlorophyll *a*, which will be analysed later at SMHI, will not be included in this report.

The Skagerrak

Å17 11th of July
The integrated sample was rather low in diversity, the diatom *Proboscia alata* had the highest cell number. The coccolithophorid *Emiliania huxleyi* was present. A chlorophyll fluorescence maximum at 20 meters depth was dominated by the dinoflagellate *Ceratium tripos.* The sample contained many species in low cell numbers, mostly diatoms.

Å15 11th of July
A chlorophyll fluorescence maximum at 30 meters depth was dominated by the dinoflagellate *Ceratium tripos.*

Släggö 11th of July
The phytoplankton composition was quite diverse, the dinoflagellate *Ceratium tripos*, the diatom *Proboscia alata* and the coccolithophorid *Emiliania huxleyi* were the most abundant species.

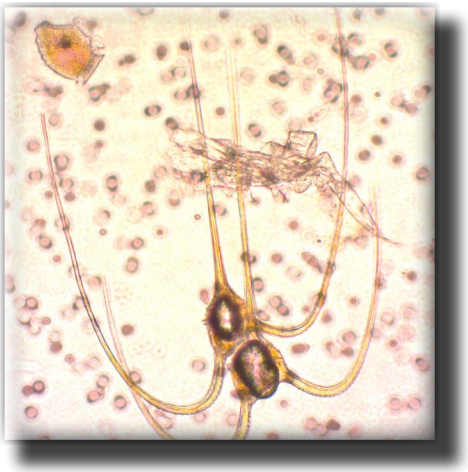
The Kattegat

Anholt E 11th and 12th of July
A chlorophyll fluorescence maximum at 30 meters depth was dominated by diatoms. The most abundant species were *Pseudo-nitzschia* spp*, *Coscinodiscus radiatus* and *Eucampia zodiacus*. At the second visit, an integrated sample (0-10) was analysed which was dominated by diatoms.

N14 Falkenberg 11th of July (0-10m)
The phytoplankton diversity was rather low. The diatom *Proboscia alata* was abundant, as were the dinoflagellate *Ceratium tripos*. The coccolithophorid *Emiliania huxleyi* was common in the sample.

Fladen 11th of July
A chlorophyll fluorescence maximum was found at 18 meters and was mostly caused by several species of the genus *Ceratium*, *C. fusus* was the most numerous, but *C. tripos*, *C. longipes* and *C. macroceros* were also abundant. The dinoflagellate *Dinophysis norvegica* was common.

W Landskrona 12th of July
A chlorophyll fluorescence maximum at 17 meters depth revealed a diverse phytoplankton community dominated by diatoms of which *Skeletonema marinoi* was the most numerous species.



The dinoflagellate *Ceratium macroceros* was abundant at Fladen.

The Baltic

Short summary of the observed accumulations.

Due to the weather situation with wind and waves and grey skies, surface accumulations had been turned down in the water. Aggregations were still there and would have been visible in the light from the sun which only shone approaching station BY20 in the very end of the expedition.

BY1 Arkona Basin 12th of July
A surface sample was dominated by the cyanobacterium *Nodularia spumigena**. Aggregations of the cyanobacterium *Aphanizomenon flos-aquae* were present.

BY2 Arkona Basin 12th of July
The integrated (0-10m) sample was dominated by *Nodularia spumigena** and aggregations of *Aphanizomenon flos-aquae* filaments were common. The third of the three main species of the filamentous cyanobacteria in the Baltic blooms, *Dolichospermum* sp., was present. A few other diatom and dinoflagellate species were observed as well as the chlorophyte *Planctonema lauterbornii*.

In the surface sample the amounts of *N. spumigena** and *A. flos-aquae* were approximately equal. *Dolichospermum* sp. was present.

The Hanö Bight 13th of July
The most abundant cyanobacterium in the surface sample was *N. spumigena** and there were several aggregations of *A. flos-aquae*.

BY4 Bornholm Basin 13th of July
*N. spumigena** dominated the surface sample and aggregations of *A. flos-aquae* were several. *Dolichospermum* sp. was present.

BY5 Bornholm Basin 13th of July
There was more of *N. spumigena** than of *A. flos-aquae* in the integrated (0-10m) sample although both species were less abundant than at BY2. *Dolichospermum* sp. was present and the chlorophyte *Planctonema lauterbornii* was quite numerous.

Comparing the cyanobacteria, *N. spumigena** was the dominant species in the surface sample and aggregations of *A. flos-aquae* were several.

The diatom *Chaetoceros impressus* was abundant at most stations.

Ref M1V1 13th of July
There were many aggregations of *A. flos-aquae* in the integrated (0-10m) sample but *N. spumigena** dominated amongst the cyanobacteria. *Dolichospermum* sp. was present. The diatom *Chaetoceros impressus* was abundant.

In the surface sample there were a lot of aggregations both of the individual cyanobacteria and of mixed aggregations of two or three species. Other organisms use the aggregations as a substrate to live on/in so the diversity was quite high in the surface sample.

BY38 14th of July
*N. spumigena** dominated amongst the cyanobacteria in the surface sample. The diatom *Chaetoceros impressus*, the chlorophyte *Planctonema lauterbornii* and the dinoflagellate *Dinophysis norvegica** were abundant.

BY10 14th of July
A surface sample was dominated by approximately equal amounts of aggregations of *Aphanizomenon flos-aquae* and filaments of *Nodularia spumigena**. *Dolichospermum* sp. was abundant and so were the diatom *C. impressus* and the chlorophyte *Planctonema lauterbornii.*

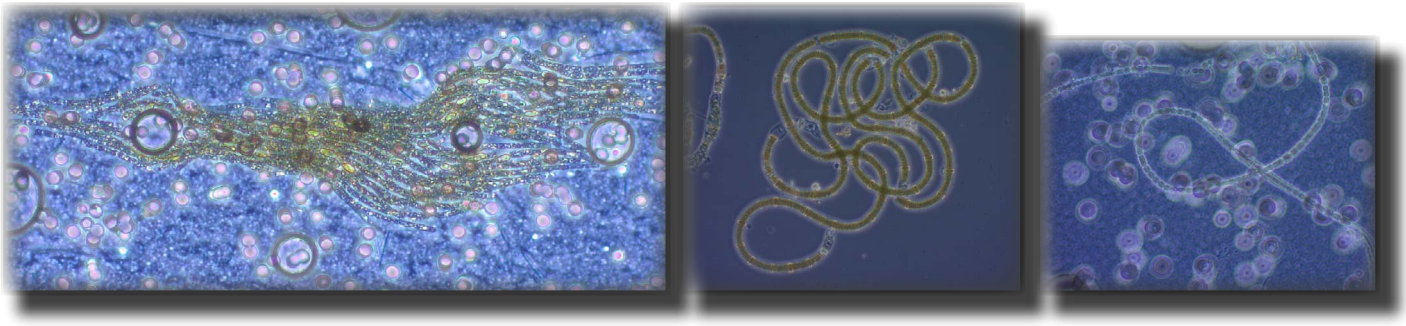
BY15 Eastern Gotland Basin 14th of July
*N. spumigena** filaments dominated the integrated (0-10m) sample and aggregations of *Aphanizomenon flos-aque* were abundant. There were many aggregations of individual cyanobacteria and mixes of the three main filamentous species. The dinoflagellate *D. norvegica**, the diatom *C. impressus* and the chlorophyte *Planctonema lauterbornii* were found in high cell numbers.

In the surface sample, both *N. spumigena** filaments and aggregations of *A. flos-aque* were found in very high amounts. All kinds of aggregations were found with cyanobacteria and other organisms

BY20 Fårö Deep 14th of July
The sun was shining and revealed the cyanobacteria gatherings in the water column as far as the eye could see, first time this journey.

Aggregations in the surface sample were plentiful, *N. spumigena** filaments dominated though. The dinoflagellate *D. norvegica**, the diatom *C. impressus* and the chlorophyte *Planctonema lauterbornii* were found in high cell numbers.

BY32 Western Gotland Basin 14th of July
Both filaments of *N spumigena** and aggregations of *A. flos-aque* were abundant in the surface sample. *Dolichospermum* sp. and the chlorophyte *P. lauterbornii* were abundant as well. The dinoflagellate *D. norvegica** and the diatom *C. impressus* were numerous.



The three filamentous cyanobacteria found in the Baltic bloom, from the left, *Aphanizomenon flos-aquae*, *Nodularia spumigena** and *Dolichospermum* sp.

Phytoplankton analysis and text by:
Ann-Turi Skjevik

Selection of observed species	Anholt E	N14 Falkenberg	Släggö	Å17
Red=potentially toxic species	12/7	11/7	11/7	11/7
Hose 0-10 m	presence	presence	presence	presence
Chaetoceros affinis			present	
Chaetoceros debilis			present	
Chaetoceros impressus	present			
Chaetoceros subtilis	present			
Chaetoceros tenuissimus	present			
Chaetoceros spp			very common	
Coscinodicus radiatus	present	present		
Cylindrotheca closterium	present	present	present	
Dactyliosolen fragilissimus	present	present		
Guinardia delicatula	common	present		
Leptocylindrus danicus			present	
Nitzschia longissima		present		present
Proboscia alata	common	very common	common	common
Pseudo-nitzschia spp		present	present	
Thalassionema nitzschioides	present			
Azadinium spp			present	
Ceratium furca			present	
Ceratium fusus	present	present	present	present
Ceratium macroceros	present		present	
Ceratium tripos	common	common	very common	present
Dinophysis acuminata	present			
Dinophysis acuta			present	
Dinophysis norvegica			present	
Gymnodinium simplex			present	
Lingulodinium polyedrum			present	
Prorocentrum micans			present	
Prorocentrum minimum	common	present		
Pyrophacus horologium			present	
Emiliania huxleyi	present	common	very common	present
Helicostomella subulata	present	present	present	

Selection of observed species	BY2	BY5	Ref M1V1	BY15
Red=potentially toxic species	12/7	13/7	13/7	14/7
Hose 0-10 m	presence	presence	presence	presence
Chaetoceros danicus	present	present		present
Chaetoceros impressus	present	common	2500	
Coscinodiscus spp	present	present	present	present
Cyclotella choctawhatcheana			present	
Ceratium tripos	present			
Dinophysis acuminata				common
Dinophysis norvegica				4060
Oocystis sp.				present
Planctonema lauterbornii	present	very common	present	very common
Ebria tripartita			present	present
pico cyanobacteria colonies	common	common	common	common
Dolichospermum sp.	present	present	common	common
Aphanizomenon flos-aquae	common	common	very common	very common
Nodularia spumigena	very common	common	very common	dominating
Helicostomella subulata			common	

Surface samples, bucket	The following filamentous cyanobacteria were observed:		
Station:	Aggregations of *Aphanizomenon flos-aquae*	*Nodularia spumigena**	Dolichospermum sp.
BY1	present	very common	present
BY2	common	very common	present
Hanöbukten	common	common	present
BY4	common	very common	common
BY5	common	very common	present
REF M1V1	dominating	dominating	common
BY38	common	dominating	common
BY10	very common	dominating	very common
BY15	dominating	dominating	very common
BY20	very common	dominating	very common
BY32	very common	dominating	very common