SMHI
Oceanographic Unit
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AlgAware
ALGAL SITUATION IN MARINE WATERS SURROUNDING SWEDEN

Abstract
Despite the great secchi depth, quite high phytoplankton cell numbers and many species were found at the Skagerrak coast. In the open sea area, phytoplankton were more scarce. In the Kattegat the diatom *Dactyliosolen fragilissimus* and the cyanobacterium *Anabaena* sp. were abundant.

In the Baltic Sea, filamentous cyanobacteria were found at all stations in varying amounts. Subsurface blooms were ongoing in the southern Baltic and from the Hanö Bight, throughout the western Gotland Basin. In the Hanö Bight streaks of surface accumulations were observed. East of Gotland, southwards and in the southeastern Baltic no blooms were seen in the samples, but the cyanobacteria species were present in low amounts.

Pico cyanobacteria colonies and the chlorophyte *Planctonema lauterbornii* were abundant in the Baltic samples. The dinoflagellate *Dinophysis norvegica** was present at all stations and was found with relatively high cell numbers at some stations.

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

Sammanfattning
Trots höga siktdjup observerades relativt höga cellantal av växtplankton och manga arter vid Skagerrak-kusten. I yttre Skagerrak var det färre växtplankton. I Kattegatt var kiselalgen *Dactyliosolen fragilissimus* och cyanobakterien *Anabaena* sp. talrika.

Filamentösa cyanobakterier fanns vid samtliga stationer i Östersjön i varierande mängder. Blomning pågick under ytan i södra Östersjön och från Hanöbukten genom hela västra Gotlandsbassängen. I Hanöbukten, norr om stationen, observerades stråk av ytansamlingar. Öster om Gotland och söderut samt i sydöstra Östersjön noterades ingen blomning i vattenproverna, men cyanobakterierna fanns där i små mängder.

Piko cyanobakteriekolonier och chlorofyten *Planctonema lauterbornii* var mycket talrika i Östersjöproverna. Dinoflagellaten *Dinophysis norvegica** fanns vid alla stationer, med rätt höga cellantal vid vissa.

Om du vill följa utvecklingen av ytansamlingar av cyanobakterier via satellittolkningar, se här: http://www.smhi.se/vadret/hav-och-kust/algsituationen-1.11383

A beautiful day in the Baltic Sea. Photo: Philip Axe.

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 pages 5-6.

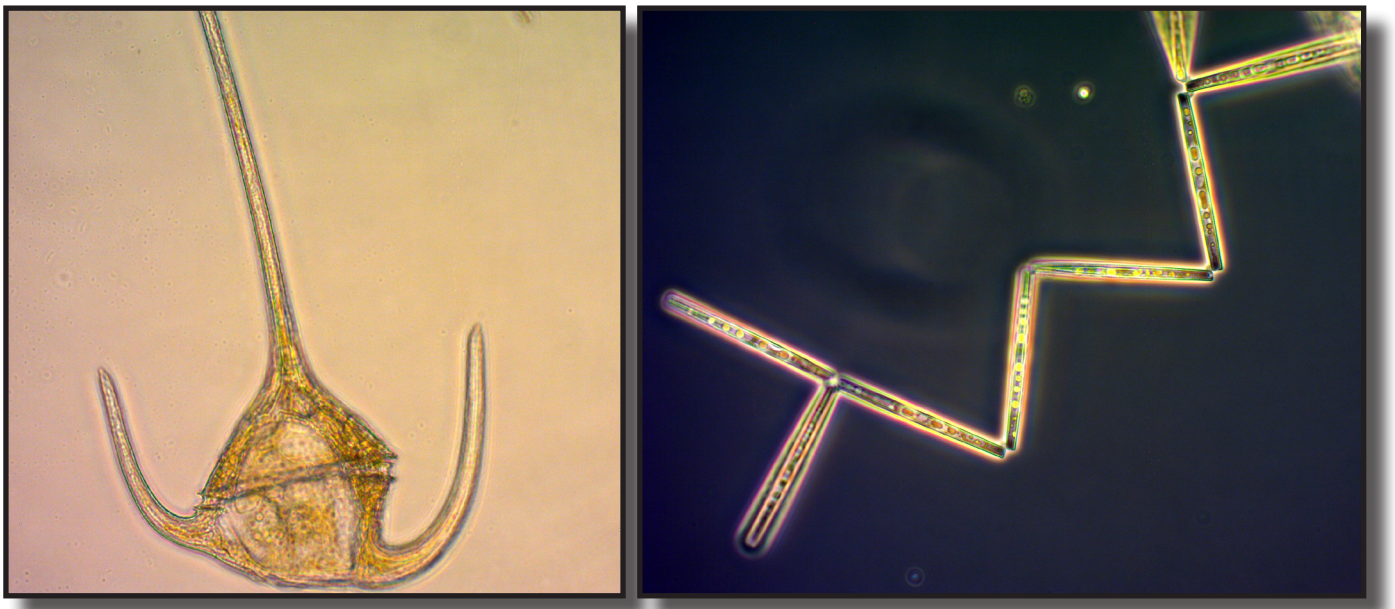
Small species were not analysed on board. Results of chlorophyll *a*, which will be analysed on land, will not be included in this report.

The Skagerrak

P2 (coast) 9th of July
Despite the great secchi depth (12 m), phytoplankton were abundant. The dinoflagellates *Ceratium tripos*, *Ceratium fusus* and the cyanobacterium *Anabaena* sp. were the most numerous species.

Släggö (coast) 9th of July
The dinoflagellate *Ceratium tripos* was quite abundant, otherwise cell numbers were low although the number of species was rather high. A few clusters of the flagellate *Emiliania huxleyi* were observed. The dinoflagellate *Alexandrium** was present.

Å17 **(open sea) 10th of July**
The phytoplankton diversity was low and consequently the chlorophyll fluorescense profile was low. A few *Ceratium* and *Alexandrium** cells were found and the diatom *Proboscia alata* was present with low cell numbers.



The dinoflagellate *Ceratium tripos* (left) was abundant in the Skagerrak and the Kattegat samples. The diatom *Thalassionema nitzschioides* was present at N14 Falkenberg.

The Kattegat

N14 Falkenberg 10th of July
The diatom *Dactyliosolen fragilissimus* was present with the highest cell numbers, the dinoflagellate *Ceratium tripos* and the cyanobacterium *Anabaena* sp. were common. Diatoms dominated over dinoflagellate species.

Anholt E 10th and 14th of July
At both visits the filamentous cyanobacterium *Anabaena* sp. was the most common species, and *Nodularia spumigena**, from the same group, was present. The dinoflagellate *Ceratium tripos* was common.

The Baltic Sea

At the station Hanö Bight, small cyanobacteria flakes were visible in the water. Leaving the station and heading north, streaks of surface accumulations were observed.

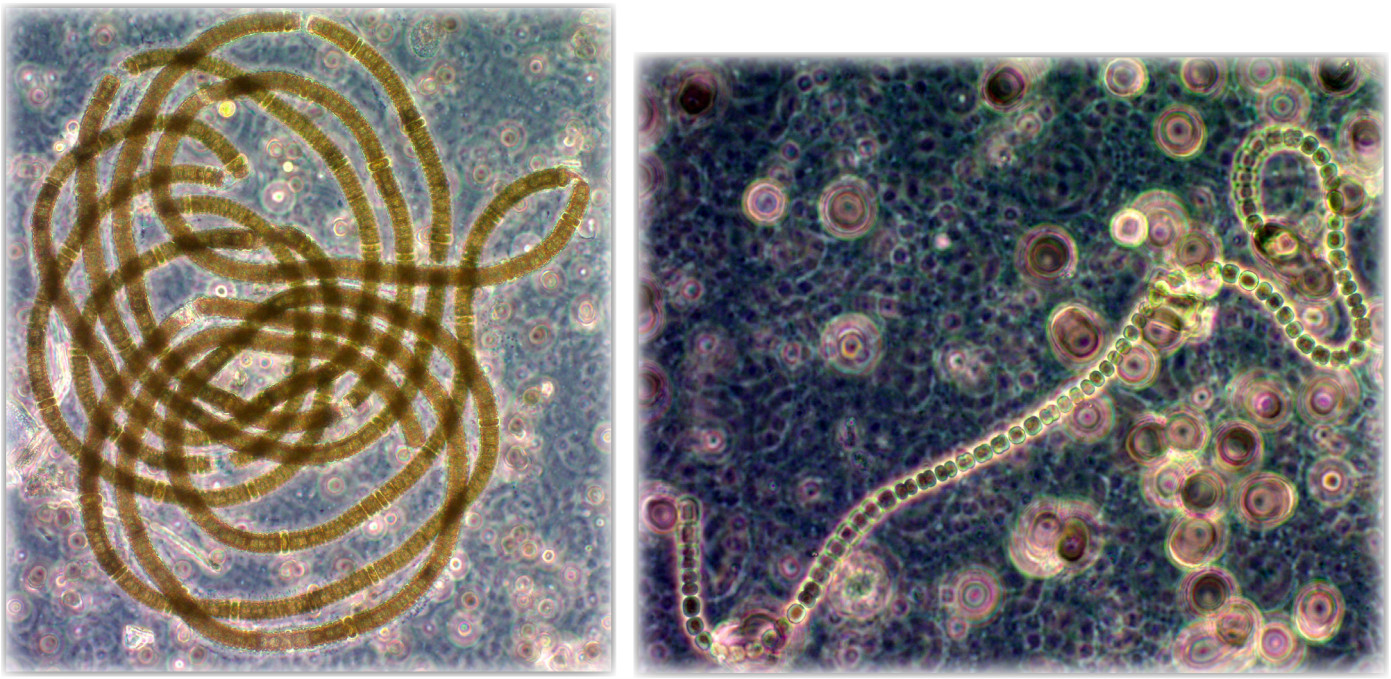
Cyanobacteria flakes were visible in the water at BY32.

Subsurface blooms were ongoing from the Hanö Bight, throughout the western Gotland Basin. East of Gotland, southwards and in the southeastern Baltic no bloom was observed, but the cyanobacteria species were present in low amounts.

Results from the integrated (0-10 m) phytoplankton samples, and chlorophyll fluorescence peaks:

The Hanö Bight 11th of July
Small cyanobacteria flakes were visible in the water and a surface sample revealed that the filamentous cyanobacterium *Nodularia spumigena** was quite common, and *Aphanizomenon* sp. and *Anabaena* sp. were present in low amounts. The green algae *Planctonema lauterbornii* and pico cyanobacteria colonies dominated the cell counts.

A chlorophyll fluorescence peak at about 15 meters depth was primarily caused by pico cyanobacteria colonies and the chlorophyte *Planctonema lauterbornii*, but the filamentous cyanobacterium *Nodularia spumigena** was indeed present.



The filamentous cyanobacteria *Nodularia spumigena* (left) and *Anabaena* sp.

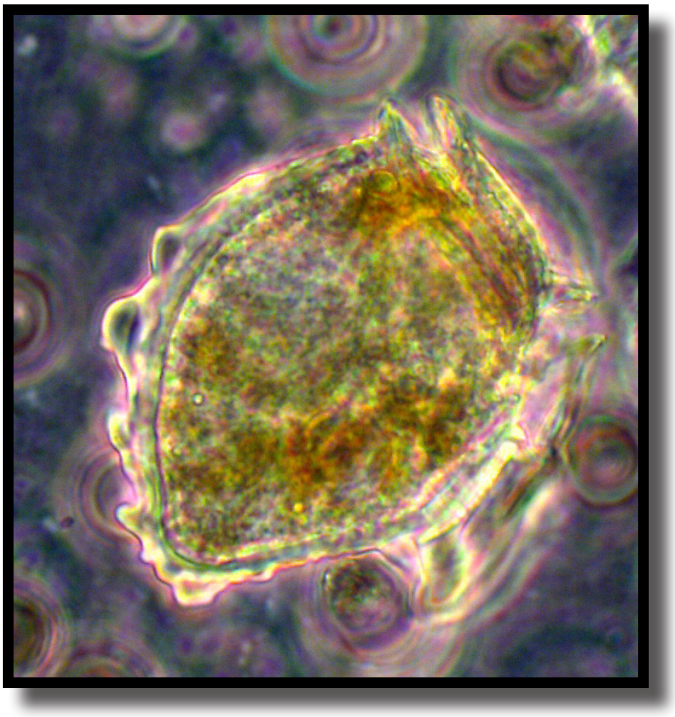
BY2 Arkona Basin 11th of July
The phytoplankton sample was dominated by the chlorophyte *Planctonema lauterbornii*, the filamentous cyanobacteria *Anabaena* sp. and *Nodularia spumigena** and pico cyanobacteria colonies like *Aphanothece* sp. and *Woronichinia* sp. The heterotrophic flagellate *Ebria tripartita* was common.

Ref. M1V1 Kalmar Sound 11th of July
Moderate amounts of filamentous cyanobacteria were found, and the most common was *Anabaena* sp., and *Aphanizomenon* sp. was second. *Nodularia spumigena** was present in low amounts. Pico cyanobacteria colonies were numerous.

BY38 Western Gotland Basin and BY32 Norrköping Deep 12th of July
Cyanobacteria were visible as flakes in the water. Among the filamentous cyanobacteria, *Aphanizomenon* sp. was the most abundant, *Anabaena* sp. was very common and *Nodularia spumigena** was common. The chlorophyte *Planctonema lauterbornii* was found with high cell numbers. The dinoflagellate *Dinophysis norvegica** was present with quite high cell numbers and pico cyanobacteria colonies were a substantial part of the total phytoplankton cell counts.

BY20 Fårö Deep 12th of July
No cyanobacteria flakes were observed, otherwise the phytoplankton situation was very much the same as at BY32 and BY38.

BY15 Eastern Gotland Basin 13th of July
The filamentous cyanobacteria *Aphanizomenon* sp. and *Nodularia spumigena** were both very common and were found with approximately the same amounts. Pico cyanobacteria colonies however clearly dominated the cell counts even though their biomass is just a fraction of the larger cyanobacteria filamentous species. The chlorophyte *Planctonema lauterbornii* and the filamentous cyanobacterium *Anabaena* sp. were very common. The dinoflagellate *Dinophysis norvegica** and the diatoms *Chaetoceros impressus* and *Chaetoceros danicus* were present.



The dinoflagellate *Dinophysis norvegica* *

BY10 East of Gotland and BCS III-10 Southeast Baltic 13th of July
The amount of filamentous cyanobacteria was very low, although all of the three species most common during the summer blooms were present. Pico cyanobacteria colonies were numerous. The dinoflagellate *Dinophysis norvegica** was common and the diatom *Chaetoceros impressus* was present.

BY4 and BY5 Bornholm Basin 13th of July
Moderate amounts of the filamentous cyanobacterium *Nodularia spumigena* was found and *Aphanizomenon* sp. and *Anabaena* sp. were present in low amounts. The chlorophyte *Planctonema lauterbornii* was abundant but the most numerous plankton group was pico cyanobacteria colonies.

Phytoplankton analysis and text by:
Ann-Turi Skjevik

Selection of observed species	P2	Å17	Släggö	N14	Anholt E	Anholt E
Red=potentially toxic species	9/7	9/7	9/7	10/7	10/7	14/7
Hose 0-10 m	cells/l	cells/l	cells/l	cells/l	cells/l	cells/l
Cerataulina pelagica	present		present			present
Chaeotoceros curvisetus			present	present	common	common
Chaetoceros danicus	present			present		
Cylindrotheca closterium						present
Dactyliosolen fragilissimus			present	common		present
Guinardia delicatula	present		present			
Leptocylindrus danicus			present			
Nitzschia longissima	present		present	present	present	present
Proboscia alata		present	present	present		present
Pseudo-nitzschia spp.	present		present			
Rhizosolenia hebetata				present		present
Skeletonema marinoi				present		present
Thalassionema nitzschioides	present			present		present
Alexandrium sp.	present	present	present	present	present	present
Ceratium fusus	1000	present	present	present	present	present
Ceratium longipes	present	present	present			present
Ceratium macroceros	present					
Ceratium tripos	1100	present	1000	common	common	common
Dinophysis acuminata	present					
Dinophysis rotundata		present				
Gymnodinium simplex	present					
Gymnodiniales spp.		present				
Peridiniella danica						present
Prorocentrum micans			present			
Prorocentrum minimum					present	
Protoceratium reticulatum					present	present
Protoperidinium cf. *crassipes*			present			
Protoperidinium oblongum				present		
Scrippsiella complex	present		present			
Dictyocha speculum	present					
Emiliania huxleyi			present			
Anabaena sp.	1800		present	present	5400	very common
Nodularia spumigena					present	

Selection of observed species	BY2	BY4	BY5	BCS III-10	BY10	BY15	BY20	BY32	BY38	Ref. M1-V1
Red=potentially toxic species	11/7	14/7	13/7	13/7	13/7	13/7	12/7	12/7	12/7	11/7
Hose 0-10 m	cells/l	cells/l	cells/l	cells/l	cells/l	cells/l	cells/l	cells/l	cells/l	cells/l
Chaetoceros danicus	present		present	present	present	present				
Chaetoceros impressus			present	present	present	present	present			
Ceratium tripos	present									
Dinophysis acuminata										present
Dinophysis norvegica	present	present	present	common	2100	common	common	6800	common	present
Karlodinium veneficum			present							
Prorocentrum minimum	present		present							
Planctonema lauterbornii	very common	present	very common	very common	very common	very common	very common	very common	very common	
Chlorophyceae	present							present		
Eutreptiella sp.										present
Ebria tripartita	present	present	present	present	present		present			present
pico cyanobacteria colonies	very common	very common	very common	very common	very common	very common	very common	very common	very common	very common
Aphanothece parallelliformis		very common	present	very common	very common	very common	very common			
Aphanothece spp.	very common						present	very common	present	present
Anabaena sp.	very common	very common	present	present	present	very common	very common	very common	very common	common
Aphanizomenon sp.	present	present	present	present	present	14000	21000	26000	51400	8200
Nodularia spumigena	very common	common	common	present	present	11000	2300	6400	4800	present

Om AlgAware

SMHI genomför ca en gång per månad expeditioner i Östersjön och Västerhavet. Resultat baserade på semikvantitativ mikroskopanalys av planktonprover samt klorofyllmätningar presenteras kortfattat i denna rapport. Information från SMHI:s satellitövervakning av algblomningar finns på www.smhi.se.

About AlgAware

The SMHI carries out monthly cruises in the Baltic and the Kattegat/Skagerrak. Results from semi quantitative microscopic analysis of phytoplankton samples as well as chlorophyll measurements are presented in brief in this report. Information from SMHI:s satellite monitoring of algal blooms is found on www.smhi.se.

Art / Species	Gift / Toxin	Eventuella symptom	Clinical symptoms
Alexandrium spp.	Paralytic shellfish poisoning (PSP)	**Milda symptom:** Inom 30 min.: Stickningar eller en känsla av bedövning runt läpparna, som sprids gradvis till ansiktet och nacken; stickningar i fingertoppar och tår; Huvudvärk; yrsel, illamående, kräkningar, diarré **Extrema symptom:** Muskelförlamning; andningssvårigheter; känsla av att kvävas; Man kan vara död inom 2-24 timmar efter att ha fått i sig giftet, på grund av att andningsmuskulaturen förlamas.	**Mild case:** Within 30 min: tingling sensation or numbness around lips, gradually spreading to face and neck; prickly sensation in fingertips and toes; headake, dizziness, nausea, vomiting, diarrhoea. **Extreme case** Muscular paralysis; pronounced respiratory difficulty; choking sensation; death trough respiratory paralysis may occur within 2-24 hours after ingestion.
Dinophysis spp.	Diarrehetic shellfish poisoning (DSP)	**Milda symptom:** Efter cirka 30 minuter till några timmar: yrsel, illamående, kräkningar, diarré, magont **Extrema symptom:** Upprepad exponering kan orsaka cancer	**Mild case:** Within 30 min-a few hours: dizziness, nausea, vomiting, diarrhoea, abdominal pain. **Extreme case:** Repeated exposure may cause cancer.
Pseudo- niztschia spp.	Amnesic shellfish poisoning (ASP)	**Milda symptom:** Efter 3-5 timmar: yrsel, illamående, kräkningar, diarré, magkramper **Extrema symptom:** Yrsel, hallucinationationer, förvirring, förlust av korttidsminnet, kramper	**Mild case:** Within 3-5 hours: dizziness, nausea, vomiting, diarrhoea, abdominal cramps. **Extreme case:** dizziness, hallucinations, confusion, loss of memory, cramps.
Chaetoceros concavicornis/ C.convolutus	Mechanical damage through hooks on setae	**Låg celltäthet:** Ingen påverkan. **Hög celltäthet:** Fiskens gälar skadas, fisken dör.	**Low cell numbers:** No effect on fish. **High cell numbers:** Fish death due to gill damage.
Pseudochattonella spp.	Fish toxin	**Låg celltäthet:** Ingen påverkan. **Hög celltäthet:** Fiskens gälar skadas, fisken dör.	**Low cell numbers:** No effect on fish. **High cell numbers:** Fish death due to gill damage.

Översikt över några potentiellt skadliga alger och det aktuella giftets effekt. Overview of potentially harmful algae and effects of toxins. Manual on harmful marine microalgae (2003 - UNESCO Publishing).

Photo: Philip Axe

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www.smhi.se