SMHI
Oceanographic Unit
No 8, 19 – 24 July 2010

AlgAware

ALGAL SITUATION IN MARINE WATERS SURROUNDING SWEDEN

Abstract

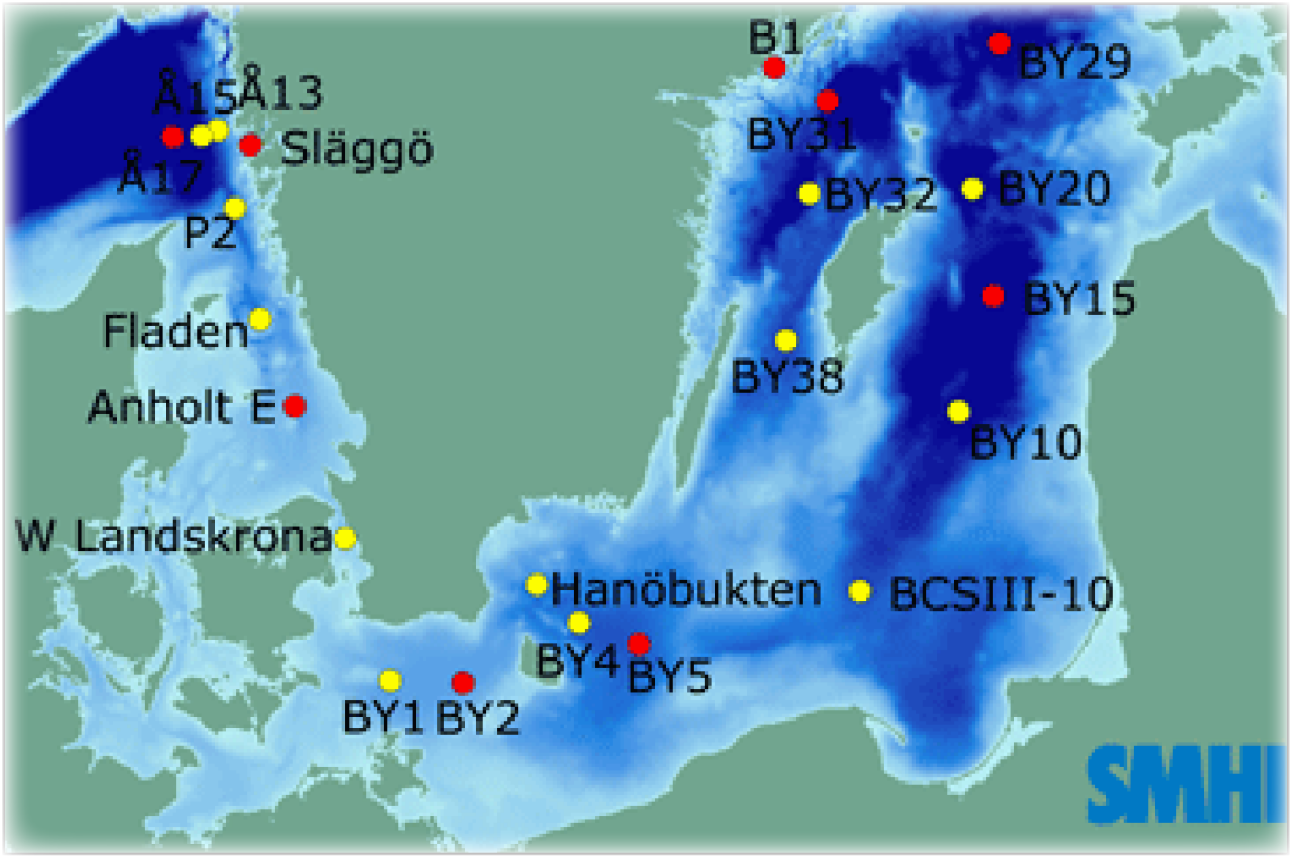
The phytoplankton situation in the Skagerrak and Kattegat areas was relatively stable compared to the sampling three weeks earlier. However, there were no chlorophyll fluorescence peaks to speak of. Only at W Landskrona on the edge of the Sound an extra phytoplankton sampling was done at 15 meters because of a chlorophyll fluorsecence peak.

In the Baltic, the cyanobacteria were abundant at all stations. In the southern Baltic, scattered surface accumulations were observed that grew and became more cohesive eastwards towards BCSIII-10. At all of the Baltic stations analysis showed that cyanobacteria were present in large amounts both at the surface and further down in the water. *Nodularia spumigena** dominated. Chlorophyll fluorescence peaks, which were associated with the thermocline, were mainly caused by the dinoflagellate *Dinophysis norvegica** and the chlorophyte *Planctonema lauterbornii*.

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

The phytoplankton samples were filtered through 10 µm polycarbonate filters before being analysed using a light microscope. Potentially toxic species are marked with *. To observe which of the cyanobacteria species were dominating the surface accumulations, bucket sampling was performed at most of the Baltic stations, and are listed on page 5.

It was impossible to analyse small species on board. Chlorophyll *a* will be analysed on land and is not reported here.



Map showing sampling stations. The red are part of the national programme (by Stockholm marine research center and SMHI), the yellow are part of the SMHI off shore programme.

More detailed information on species composition and abundance.

The Skagerrak

Å17 19/7

The Dinoflagellate genus *Ceratium* was the most common and *C. longipes* was the most numerous. The diatom *Proboscia alata* was very common.

The dinoflagellates *Ceratium tripos* (left) and *C. macroceros.*

Släggö 19/7

The dinoflagellate *Dinophysis norvegica** was present with cell numbers beyond its critical limit and species from the dinoflagellate genus *Ceratium* were very common. The diatom *Proboscia alata* was numerous and a few threads of the cyanobacterium *Anabaena* sp. were observed.

The Kattegat

N14 Falkenberg 20/7

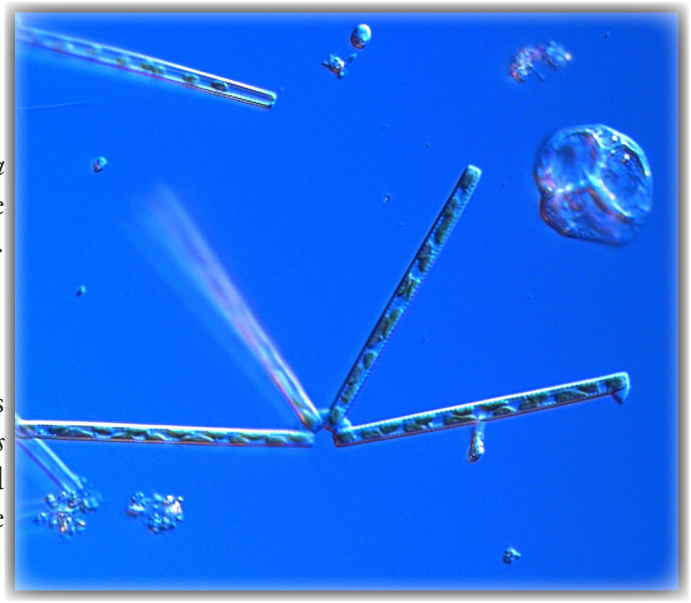
The diatoms *Dactyliosolen fragilissimus* and *Proboscia alata* and the dinoflagellate *Ceratium fusus* were common. The cyanobacterium *Anabaena* sp. was relatively common. The species is one of the three cyanobacteria species that dominate the surface accumulations in the Baltic during summers.

Anholt E 20/7 and 24/7

The diatoms *Dactyliosolen fragilissimus* and *Proboscia alata* and the dinoflagellate *Ceratium fusus* dominated the phytoplankton sample. The cyanobacterium *Anabaena* sp. was obseved in rather large amounts.

W Landskrona 20/7

A chlorophyll fluorescence peak at 15 m depth was dominated by the diatoms *Thalassionema nitzschioides* och *Chaetoceros danicus. Proboscia alata* was common and a few threads of the cyanobacterium *Anabaena* sp. were observed.



The diatom *Thalassionema nitzschioides,* the cell to the right is the flagellate *Ebria tripartita.*

The Baltic Sea

Summary of visually observed surface accumulations.

The first cyanobacteria surface accumulations were observed at station BY5. The accumulations increased eastwards towards BCS III-10 and cyanabacteria were abundant around the sampling site. Scattered surface accumulations were frequently seen in the eastern Gotland Basin. On our way back to the southern Baltic, in the Hanö bight and along the south coast, dense surface accumulations were observed.

When cyanobacteria aggregate in the surface, they start bleaching due to pigment loss and eventually they die. When bleached aggregations have been observed in the microscope, at BY5, BCSIII-10, BY10, BY15, BY20 and in the Hanö bight it is obvious that the cyanobacteria form a mat that serves as the home of whole societies of other organisms. The most common species is the diatom *Nitzschia* sp., but many species of diatoms, dinoflagellates, ciliates, cysts and zoo plankton can be found.

Results from the integrated (0-10 m) phytoplankton samples and chlorophyll fluorescense peak samples.

Arkona Basin BY2 20/7
Aphanizomenon sp. threads and *Nodularia spumigena** aggregations (colonies) dominated the phytoplankton sample. The diatom *Chaetoceros impressus* and the flagellate *Leucocryptos marina* were observed.

Bornholm Basin BY5 21/7
Colonies of *Aphanizomenon* sp. and partly bleached *Nodularia spumigena** were common. A chlorophyll fluorescence peak at 15 m depth was mainly caused by the chlorophyte *Planctonema lauterbornii*.

Southeastern Baltic BCS III-10 21/7
Both *Aphanizomenon* sp. and *Nodularia spumigena** were very common, but aggregations of bleached *N. spumigena* and *Anabaena* sp. were the most common in the integrated sample (0-10 m). A fluorescence peak at 15 m depth was dominated by *P. lauterbornii*, *Anabaena* sp. and *Aphanizomenon* sp. and the dinoflagellate *Dinophysis norvegica**.

Eastern Gotland Basin BY10 21/7
A fluorescence peak at 10 m depth was dominated by threads of *Aphanizomenon* sp. and *Nodularia spumigena** as well as colonies of the same species.The chlorophyte *Planctonema lauterbornii* was very common and a few cells of the dinoflagellate *Dinophysis acuminata** and the flagellate *Ebria tripartita* were found.

Eastern Gotland Basin BY15 22/7
The chlorophyte *Planctonema lauterbornii* dominated the phytoplankton sample and the three cyanobacteria *Anabaena* sp., *Aphanizomenon* sp. and *N. spumigena** were common in approximately equal amounts. A fluorescence peak at 10 m depth, at the thermocline, was dominated by *P. lauterbornii* and the dinoflagellate *Dinophysis norvegica**. All three cyanobacteria species were common at the peak.

Fårö Deep BY20 and Norrköping Deep BY32 22/7
Fluorescence peaks at 15 m depth revealed small populations of the dinoflagellates *Dinophysis norvegica** and *D. acuminata** like it did at the previous expedition. What differed was aggregations of cyanobacteria, mostly *Aphanizomenon* sp. and the ciliate *Mesodinium rubrum*.

Westwern Gotland Basin BY 38 22/7
*N. spumigena** threads and aggregations dominated the phytoplankton sample and *Aphanizomenon* sp. and *Anabaena* sp. were common.

Blå Jungfrun Northern Kalmar Sound 23/7
Healthy threads full of pigmentation of all of the three cyanobacteria species were common. A few cells of the diatom genus *Chaetoceros* and the dinoflagellate *Heterocapsa triquetra* were present.

Kalmar Sound Ref. M1-V1 23/7
Aggregations of the cyanobacteria *Aphanizomenon* sp., partly bleached *Anabaena* sp. and *N. spumigena** were common. The diatom *Chaetoceros wighamii* was very common and a few other diatom species and dinoflagellates were present in low cell numbers.

Phytoplankton analysis and text by:
Ann-Turi Skjevik

Selection of observed species	Å17	Släggö	N14	Anholt E	Anholt E
Red=potentially toxic species	19/7	19/7	20/7	20/7	24/7
Hose 0-10 m	cells/l	cells/l	cells/l	cells/l	cells/l
Cerataulina pelagica				present	
Dactyliosolen fragilissimus	present	present	very common	dominating	dominating
Nitzschia longissima		present			
Proboscia alata	very common	very common	dominating	dominating	dominating
Pseudo-nitzschia delicatissima-gruppen		present			
Skeletonema marinoi		present			
Ceratium furca		present			
Ceratium fusus	common	very common	common	very common	very common
Ceratium lineatum		common			
Ceratium longipes	common	common			present
Ceratium macroceros		present			
Ceratium tripos	common	common	common	common	common
Dinophysis acuminata		present			
Dinophysis norvegica	present	14 500		present	present
Dinophysis rotundata	present	present			
Gonyaulax sp.					present
Heterocapsa sp.			present	present	present
Katodinium glaucum		present	present		
Lingulodinium polyedrum		present			present
Prorocentrum micans		common			
Protoperidinium spp.	present	common	present	present	
Scrippsiella complex	present				
Emiliania huxleyi				present	present
Dinobryon balticum				present	present
Anabaena sp.		present	very common	very common	common
Aphanizomenon sp.				present	
Nodularia spumigena		present	present	present	present
Leucocryptos marina				present	

Selection of observed species	BY2	BY5	BCS III-10	BY15	BY38	Ref. M1-V1
Red=potentially toxic species	20/7	21/7	21/7	21/7	22/7	23/7
Hose 0-10 m. [1]fluorescence peak	cells/l	cells/l	cells/l	cells/l	cells/l	cells/l
Chaetoceros impressus	present		present			
Chaetoceros wighamii						very common
Nitzschia sp.			present			
Amphidinium crassum				present		
Dinophysis acuminata			present	present	present	present
Dinophysis norvegica		present		11500 [1]		common
Dinophysis rotundata					present	
Heterocapsa triquetra						present
Planctonema lauterbornii	present	very common	very common	dominating	present	present
Anabaena sp.			very common	very common	common	very common
Aphanizomenon sp.	dominating	very common	very common	very common	common	common
Nodularia spumigena	dominating	dominating	dominating	very common	dominating	common
Ebria tripartita						present
Leucocryptos marina	present					

Surface sampling with a bucket	Observations of the following filamentous cyanobacteria:		
Station:	Aphanizomenon sp.	Nodularia spumigena*	Anabaena sp.
BY1	very common	dominating	
BY2	very common	dominating	
BY4	common	very common	
BY5	very common	very common (partly bleached)	
BCSIII-10	common	dominating (partly bleached)	very common (partly bleached)
BY10	common	dominating (partly bleached)	very common (partly bleached)
BY15	common	dominating (partly bleached)	very common (partly bleached)
BY20	common	dominating (partly bleached)	very common (partly bleached)
BY32	common	dominating (partly bleached)	very common (partly bleached)
BY38	common	dominating	common
Ref M1 V1	common	common	common (partly bleached)
Northeast of station Hanö bight	very common (partly bleached)	very common (partly bleached)	very common (partly bleached)
Hanö bight	common	very common (partly bleached)	very common (partly bleached)

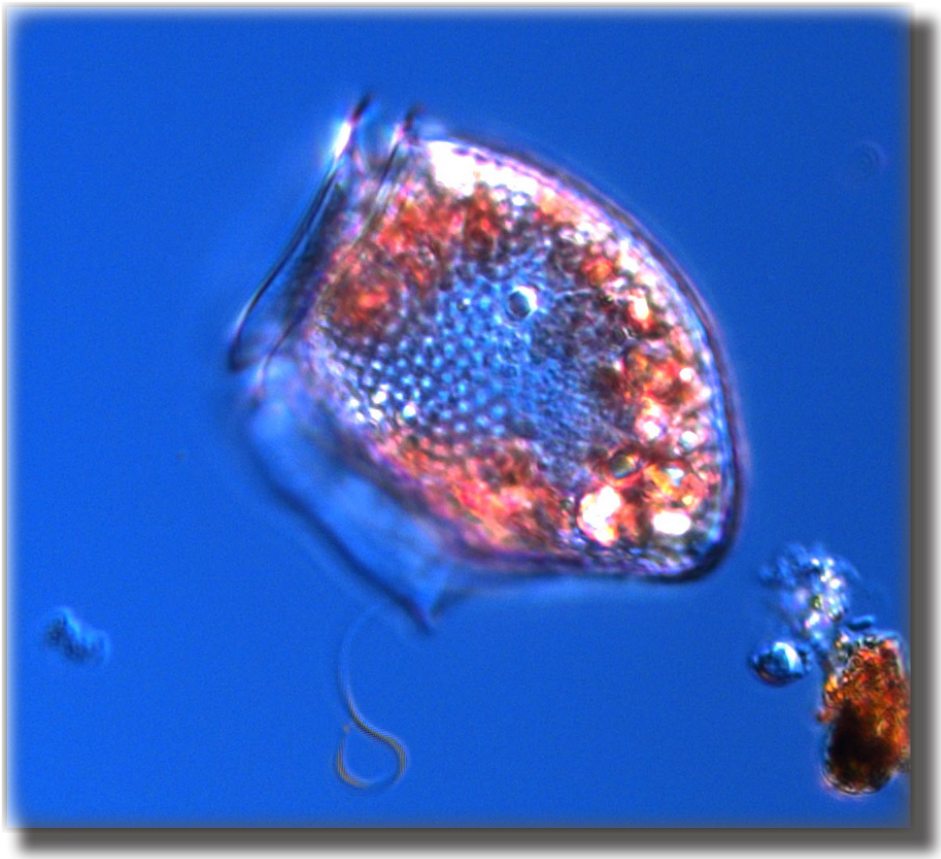
NB! The amounts of cyanobacteria in the surface vary due to diurnal rhythms.

About AlgAware

SMHI carries out monthly cruises with R/V Argos 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 ro 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.
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.
Pseudo- nitzschia 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.

Overview of potentially harmful algae and effects of toxins. Manual on harmful marine microalgae (2003 - UNESCO Publishing).



The dinoflagellate *Dinophysis norvegica** can produce diarrhoea toxins which can cause mussles to become poisonous to eat.