



Sammanfattning

I Skagerrak och Kattegatt var diversiteten av växtplankton låg och klorofyllhalterna normala. Vårblomningen var i sitt sista skede med rätt mycket *Guinardia delicatula* och ett fåtal kedjor av *Skeletonema marinoi*. Dessutom var det flagellater, såsom flera arter av *Pyramimonas* spp., som uppvisade högt cellantal. I norra Skagerrak, på Å17, hade kalkflagellaten *Emiliania huxleyi* högst cellantal. Även i Kattegatt dominerade *Guinardia delicatula*, men det fanns även dinoflagellater såsom *Dinophysis acuminata** och ciliater. Det var många arter av små flagellater. Klorofyllhalterna vid alla stationer var normala för mars månad, förutom vid Fladen 0-20 m där de var något högre än normalt.

Det fanns tecken till vårblomning vid alla växtplanktonstationer i Östersjön med tanke på observerade arter av kiselalger, ciliaten *Mesodinium rubrum* och dinoflagellaten *Peridiniella catenata*. Mest påtaglig var blomningen vid BY5 och Ref M1V1 i södra Egentliga Östersjön, där både klorofyllhalter och cellantal var förhöjda. Vid BY5, Ref M1V1, BY32 och BY38 var de integrerade klorofyllhalterna (0-20 m) över det normala för denna månaden.



Abstract

In the Skagerrak and the Kattegat the biodiversity in the phytoplankton community was low and the chlorophyll concentrations were normal. The spring bloom was in its final days with quite high amounts of *Guinardia delicatula* and a few chains of *Skeletonema marinoi*. Furthermore, flagellates, such as several species of *Pyramimonas* spp. were found in high cell numbers. In the northern Skagerrak, Å17 displayed the highest cell number of *Emiliania huxleyi*. In the Kattegat *Guinardia delicatula* dominated, but there were also dinoflagellates such as *Dinophysis acuminata** and ciliates. The flagellate community showed quite high diversity. The chlorophyll concentrations were normal for March at all stations, except at Fladen 0-20 m where it was slightly higher than normal.

Signs of spring bloom were found at all phytoplankton stations in the Baltic, considering the observed species of diatoms, the ciliate *Mesodinium rubrum* and the dinoflagellate *Peridiniella catenata*. The bloom was the most intense at BY5 and Ref M1V1 in the southern Baltic Proper where both chlorophyll concentrations and cell numbers were high. At BY5, Ref M1V1, BY32 and BY38, the integrated chlorophyll concentrations (0-20 m) were above normal for this month.

Below follows a more detailed information on species composition and abundance. Species marked with * are potentially toxic or harmful.

The Skagerrak

Å17 (open Skagerrak) 18th of March

The phytoplankton diversity was relatively low but some groups were dominant and found in high cell numbers. Among the diatoms *Guinardia delicatula* dominated over *Skeletonema marinoi*. There was a high concentration of flagellates, where *Pyramimonas* spp. was conspicuous. Some ciliates and the dinoflagellate *Karenia mikimotoi** were also present in relatively high cell numbers. The coccolithophorid *Emiliania huxleyi* were also present in quite high numbers. The chlorophyll concentrations were normal for this month at Å17 and Å15. Å13 was not sampled this month.

Släggö (Skagerrak coast) 19th of March

The phytoplankton diversity and the total cell numbers were low. The cell numbers in the sample were dominated by small flagellates and *Guinardia delicatula*. The chlorophyll concentrations were not available at the time of writing, but at station P2 the chlorophyll was high but within the normal range.



Photo 1: The photos display the differences in the phytoplankton community at Anholt E on the two sampling occasions. At the first visit (left picture), the community was dominated by *Guinardia delicatula*, with *Pseudochattonella* sp.* and ciliates. At the second visit, there were *G. delicatula* but also high amounts of *Dinophysis acuminata**. Both pictures are in 100x magnification. Photo: M. Karlberg.

The Kattegat

Anholt E 17th and 18th of March

The two sampling occasions at Anholt E differed quite a lot. On both occasions, the spring bloom was in its final days with high cell numbers of *Guinardia delicatula**, but only a few, if any, chains of *Skeletonema marinoi*. Among the dinoflagellates *Dinophysis acuminata** was common. Additionally, on the first sampling occasion, ciliates, *Pseudochattonella* sp.*, Cryptomonadales, *Leucocryptos marina*, *Pyramimonas* spp. and other smaller flagellates were all in relatively high numbers. On the second sampling occasion the ciliates and all flagellates had reduced in numbers significantly. The chlorophyll concentration was normal for the month on both sampling occasions, but slightly higher on the first occasion in the upper 5 meters in the water column. At station W Landskrona chlorophyll concentration was low but within the normal range.

N14 Falkenberg 17th of March

The phytoplankton diversity was relatively low but some groups were dominant and found in high cell numbers. The diatom *Guinardia delicatula* and ciliates dominated the sample, but *Skeletonema marinoi*, *Dinophysis acuminata*, *Gyrodinium spirale*, *Pseudochattonella* sp. and flagellates as well as *Leucocryptos marina* were present in quite high cell numbers. The integrated chlorophyll concentrations were low but normal for this month. At station Fladen chlorophyll concentration was high but within the normal range at 0-10 m but above normal concentrations in the integrated 0-20 m sample.

The Baltic Sea

BY2 16th and BY5 19th of March

Spring bloom had started with high cell numbers of the diatoms *Skeletonema marinoi*, *Thalassiosira* spp. and the ciliate *Mesodinium rubrum*. The species variety was rich, both diatoms and dinoflagellates as well as other algae groups were represented. The integrated (0-20 m) chlorophyll concentrations were within normal for this month at BY2 and BY5.

BCSIII-10 19th and BY15 20th of March

The tendencies of spring bloom were present considering the high cell numbers of *Skeletonema marinoi* and *Mesodinium rubrum*, at BY15 especially. The integrated chlorophyll concentrations were within normal, although somewhat elevated at BY15, where the highest concentration was found at 20 meters depth.

Ref M1V1 16th of March

Spring bloom was ongoing. The species diversity was low, but the diatoms *Skeletonema marinoi* and *Thalassiosira* spp. and the ciliate *Mesodinium rubrum* were found in high cell numbers. The integrated (0-20 m) chlorophyll concentration was above normal for this month, being high from the surface to the bottom at this shallow station.

BY38 15th of March

The chlorophyll concentrations were a lot lower than at Ref M1V1 although the integrated concentration was above normal at BY38 as well. The species diversity was higher at BY38 and high cell numbers were noted of the diatom *Skeletonema marinoi*, the dinoflagellate *Peridiniella catenata* and the flagellate *Eutreptiella* sp.



Photo 3-5: The ciliate Mesodinium rubrum and the cyanobacterium Aphanocapsa sp.(left), the diatom Chaetoceros castracanei (middle) and Peridiniella catenata were found at most of the Baltic stations. Photos: A-T Skjevik

Phytoplankton analysis and text: Maria Karlberg and Ann-Turi Skjevik

Selection of observed species	Anholt E	Anholt E	N14 Falkenberg	Släggö	Å17
Red=potentially toxic species	17/3	18/3	17/3	19/3	18/3
Hose 0-10 m	presence	presence	presence	presence	presence
Cerataulina pelagica				present	
Chaetoceros pseudobrevis					present
Coscinodiscus radiatus			present		
Cylindrotheca closterium			present	present	present
Dactyliosolen fragilissimus	present				
Ditylum brightwellii					present
Entomoneis spp					present
Guinardia delicatula	very common	very common	very common	common	very common
Navicula spp		present		present	
Nitzschia spp				present	
Nitzschia longissima	present	present	present		present
Proboscia alata	present			present	
Pseudo-nitzschia spp					present
Skeletonema marinoi		present	common	present	common
Thalassiosira angulata				present	
Thalassiosira rotula				present	present
Amphidinium spp	present	present	present		present
Ceratium fusus		present			
Ceratium horridum		present		present	
Ceratium lineatum					present
Ceratium longipes	present		present		
Ceratium tripos	present	present	present	present	
Dinophyceae	present	present	present		present
Dinophysis acuminata	common	common	common	present	present
Dinophysis norvegica		present	present		
Gymnodiniales	present	common	present	present	present
Gyrodinium spp	present	present			present
Gyrodinium spirale	present		common		
Heterocapsa rotundata	present		present		
Karenia mikimotoi	present			present	common
Katodinium glaucum	present	present			
Phalacroma rotundatum	present				
Protoperidinium spp	present				
Protoperidinium bipes	present	present	present		
Protoperidinium brevipes	present				
Protoperidinium depressum	present		present		
Protoperidinium pellucidum	present	present	present	present	
Protoperidinium steinii		present			
Scrippsiella complex	present	present	present	present	present
Cryptomonadales	present	common	present	present	present
Dinobryon faculiferum	present	present			
Pseudanabaena spp			present		
Apedinella radians		present			present
Dictyocha speculum				present	
Emiliania huxleyi	present	present	present	present	present
Pseudochattonella spp	common		common		
Heterosigma spp		present			
Euglena spp	present			present	common
Pterosperma spp				present	
Pyramimonas spp	very common	present	common	present	very common
Ebria tripartita		present			
Leucocryptos marina	common	common	common	present	present
Telonema spp			present		
Telonema subtile					present
Flagellates	very common	common	common	common	very common
Bicosta minor		present			
Ciliophora	very common	present	very common	present	common
Laboea strobila	present	present	present	present	present
Mesodinium rubrum	present	present	present		present

Selection of observed species	BY2	BY5	BCSIII-10	BY15	BY38	Ref M1V1
Red=potentially toxic species	16/3	19/3	19/3	20/3	15/3	16/3
Hose 0-10 m	presence	presence	presence	presence	presence	presence
Attheya septentrionalis		present			present	
Chaetoceros spp			present	present	present	
Chaetoceros castracanei	present	present			present	
Chaetoceros danicus	present		present	present		
Chaetoceros similis	present	present		present	present	
Chaetoceros subtilis		present	present		present	
Chaetoceros wighamii					present	
Coscinodiscus spp		present				present
Melosira nummuloides	present				present	
Nitzschia longissima		present			present	present
Skeletonema marinoi	common	very common	common	common	common	very common
Thalassiosira spp	common	present		present	present	common
Amphidinium spp	present					
Amylax triacantha				present		
Dinophysis norvegica					present	
Gymnodiniales		present				present
Gyrodinium spp		present				
Gyrodinium spirale					present	
Heterocapsa spp	present	present	present	present	present	
Heterocapsa rotundata		present		present		present
Karlodinium veneficum				present		
Katodinium glaucum	present	present		present	present	
Peridiniella catenata	present	present	present	present	common	present
Peridiniella danica					present	
Protoperidinium bipes				present	present	present
Cryptomonadales	present	present	present	present	present	present
Prymnesiales		present		present		
Aphanocapsa spp	present	present		present		
Aphanothece paralleliformis			present			
Lemmermanniella spp		present				
Snowella spp	present	present	present	present	present	
Planctonema lauterbornii	present	present	present	present	present	
Pseudopedinella spp		present			present	
Eutreptiella spp	common	common	present	present	common	present
Ebria tripartita	present	common		present	present	present
Leucocryptos marina			present			
Choanoflagellatea	present	present				
Oocystis spp	present	present	present	present	present	
Pterosperma spp			present			
Pyramimonas spp		present		present	present	
Mesodinium rubrum	common	common	present	common	present	common
Strombidium spp		present		present		present
Ciliophora	present	common	present	common	present	present

The Skagerrak



No permission was granted to sample at Släggö close to the Skagerrak coast due to using the foreign vessel R/V Aranda. Släggö was visited later with another ship and the results were not ready to be used in this diagram. Å13 was not visited due to bad weather conditions.

The Kattegat and The Sound



The Southern Baltic



The Western Baltic



Om klorofylldiagrammen

Klorofyll *a* är ett mått på mängden växtplankton. Prover tas från ett antal djup. Data presenteras både från de fasta djupen och som medelvärden 0-20 m. Utöver resultaten från laboratorieanalyserna av vattenprover mäts klorofyll *a* som fluorescens från ett automatiskt instrument som sänks ned från fartyget. På så sätt kan djupt liggande, ibland tunna lager av växtplankton observeras.

About the chlorophyll graphs

Chlorophyll *a* is sampled from several depths. Data are presented both from the discrete depths and as an average 0-20 m. In addition to the laboratory analysis from the water samples chlorophyll fluorescence is measured in continuous depth profiles from the ship. This is a way to observe thin layers of phytoplankton occuring below the surface.

Om AlgAware

SMHI genomför månatliga expeditioner i Östersjön och Västerhavet. Resultat baserade på semikvantitativ mikroskopanalys av planktonprover samt klorofyllmätningar presenteras kortfattat i denna rapport. Information från SMHIs satellitövervakning av algblomningar finns under perioden juni-augusti på www.smhi.se. Resultat från provtagningarna kan hämtas från SMHI:s databas på sharkweb.smhi.se. Hydrografidata läggs ut varje månad, växtplanktondata läggs ut en gång per år.

About AlgAware

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 SMHIs satellite monitoring of algal blooms is found on www.smhi.se during the period June-August. Results from the expeditions are found in the SMHI database, sharkweb.smhi.se. Data are published monthly, phytoplankton data however, are published once a year.

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

Kartan på framsidan visar viktat medelvärde för klorofyll *a*, μ g/l (0-10 m) vid de olika stationerna. Pil upp eller ned indikerar om resultatet är över eller under en standardavvikelse från medel. Medel är beräknat utifrån aktuell månad under perioden 2001-2015. Förekomst av skadliga alger vid stationer där arter analyseras markeras med symbol.

The map on the front page shows weighted mean of chlorophyll a, $\mu g/l$ (0-10 m) at sampling stations. The arrow up or down indicate whether the result is above or below one standard deviation from mean. The mean value is calculated using results from the actual month during the period 2001-2015. Presence of harmful algae at stations where species analysis is performed is shown with a symbol.



Havs och Vatten myndigheten