SMHI
Oceanographic Unit
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AlgAware
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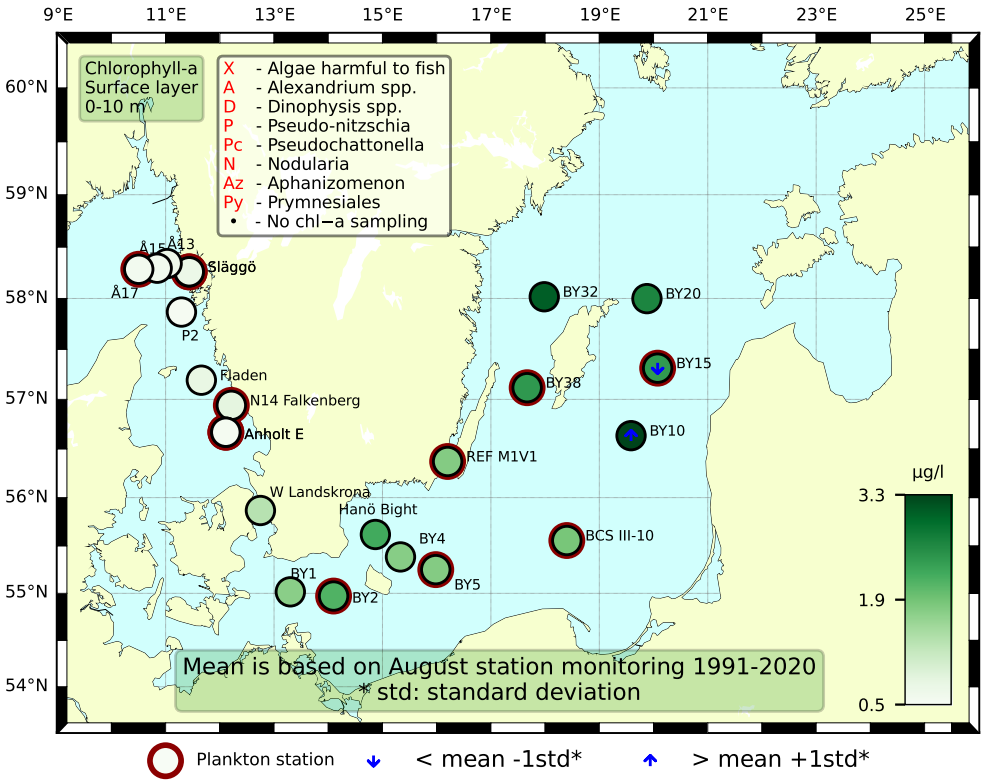
ALGAL SITUATION IN
MARINE WATERS SURROUNDING SWEDEN

Sammanfattning

Diversiteten av växtplankton och totala cellantal var låga i Västerhavet, förutom vid Släggö där diversiteten var något högre. Den giftiga arten *Dinophysis acuta** återfanns i relativt höga celltätheter vid Släggö. Kiselalgen *Proboscia alata* var annars vanligast förekommande bland de större cellerna vid samtliga stationer. Vid Anholt E återfanns relativt höga antal av kalkalgen *Emilia huxleyi* vid båda provtagningstillfällena. Samtliga integrerade klorofyllvärden var låga men inom det normala för månaden.

Diversiteten och cellantal av växtplankton var höga i de sydvästra delarna av Östersjön, vid BY2 och BY5, samt vid den kustnära stationen REFM1V1. Vid de övriga stationerna var cellantalen och diversiteten lägre. Cyanobakterien *Aphanizomenon flosaquae* återfanns vid samtliga stationer, ibland i höga cellantal (BY2, BY5 och BY38), medan *Dolichospermum* sp. hade höga cellantal vid REFM1V1, BY2 och BY15. *Nodularia spumigena** var det bara enstaka filament av vid de flesta stationerna. BY2 och BY5 hade högt cellantal av kiselalgen *Dactyliosolen fragilissimus*. Vid BY2 fanns även flertalet *Dinophysis acuminata** och celler av ordern *Prymnesiales**. De integrerade klorofyllvärdena (0–10 m) var under det normala vid BY15, i övrigt inom det normala för månaden.



Abstract

The phytoplankton diversity and total cell counts were low in the Kattegat and Skagerrak areas, except at Släggö where the diversity was a bit higher. The toxic species *Dinophysis acuta** was found in relatively high cell numbers at Släggö. The diatom *Proboscia alata* was common at all stations along the Swedish west coast. At Anholt E quite a few of the coccolithophore *Emiliania huxleyi* on both sampling occasions. The integrated chlorophyll concentrations (0-10m and 0-20 m) were low at all stations but within normal for the month.

Diversity and cell abundance of phytoplankton were high in the south-western parts of the Baltic, at BY2 and BY5, and at the coastal station REFM1V1. At the other stations both numbers and diversity were lower. The cyanobacterium *Aphanizomenon flosaquae* was present at all stations, sometimes in high cell numbers (BY2, BY5 and BY38), while *Dolichospermum* sp. had high cell numbers at REFM1V1, BY2 and BY15. *Nodularia spumigena** was only present with a few filaments at most stations. At BY2 and BY5, the diatom *Dactyliosolen fragilissimus* was present in high cell numbers. At BY2 there were also several *Dinophysis acuminata** and cells of the order *Prymnesiales**. The integrated (0-10 m) chlorophyll concentration was below normal at BY15, otherwise concentrations were within the normal range for this month.

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

Å17 (open Skagerrak) 12th of August
The phytoplankton diversity and the total cell numbers were very low. The larger cells were dominated by a few *Proboscia alata*. Small naked dinoflagellates were most common among the smaller cells. The integrated chlorophyll concentration (0-10 m and 0-20 m) was low but within normal for this month.

Släggö (Skagerrak coast) 12th of August
The phytoplankton diversity was moderate but total cell numbers was low. Mostly smaller cells were found. Diatoms dominated in cell numbers and *Cerataulina pelagica* was found in highest cell numbers. Among the dinoflagellates quite a few cells of *Dinophysis acuta** was found. The smallest cells were dominated by cryptomonadales. The integrated chlorophyll concentrations (0-10 m and 0-20 m) were low but within normal for this month.

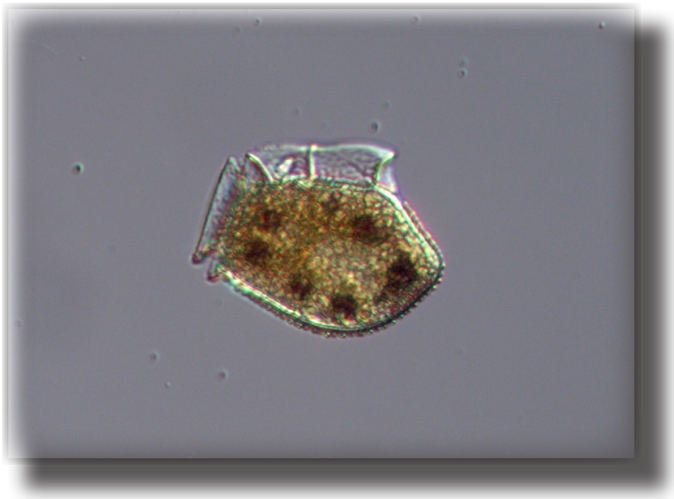


Fig 1. The potentially toxic dinoflagellate *Dinophysis acuta**, which is the most potent species of the genus, has been absent from the coast for many years. Several cells were found at station Släggö. Photo: M. Johansen.

The Kattegat

Anholt E 13th and 18th of August
Both the phytoplankton diversity and the total cell numbers were low on both occasions. Only a few larger cells were encountered and mainly *Proboscia alata* was found. Among the smaller cells several cells of *Emiliania huxleyi* were found. The integrated chlorophyll concentrations (0-10 m and 0-20 m) were low but within normal for this month.

N14 Falkenberg 13th of August
The number of phytoplankton species was quite low and with low total cell numbers. The most numerous species were small naked dinoflagellates. Only a few larger cells were found and mainly consisted of *Proboscia alata*. The integrated chlorophyll concentrations (0-10 m and 0-20 m) were low but within normal for this month.

The Baltic

BY2 14th of August

The cell abundance and diversity were quite high with many small species, *Gymnodiniales*, the diatom *Dactyliosolen fragilissimus* and the filamentous cyanobacteria *Aphanizomenon flosaquae* and *Dolichospermum* sp. in abundance. The toxic species *Nodularia spumigena**, *Dinophysis acuminata** and cells in the order *Prymnesiales** were present. The integrated (0-20 m) and (0-10 m) chlorophyll concentrations were within the normal range for this month.

BY5 14th of August

The cell abundance and diversity were quite high with many small species, *Gymnodiniales*, the diatom *D. fragilissimus* and the filamentous cyanobacteria *A. flosaquae* in abundance. The integrated (0-20 m) and (0-10 m) chlorophyll concentrations were within the normal range for this month.

BY15 15th of August

The phytoplankton diversity was low and abundance moderate. The cyanobacteria *A. flosaquae* and *Pseudanabaena* sp. were quite abundant, while *Dolichospermum* sp. and *N. spumigena** were present in lower amounts. Also, some smaller colony-forming cyanobacteria were present in high amounts. The integrated chlorophyll concentration (0-20 m) was within the normal range for this month, while concentrations at the surface (0-10 m) was lower than normal.

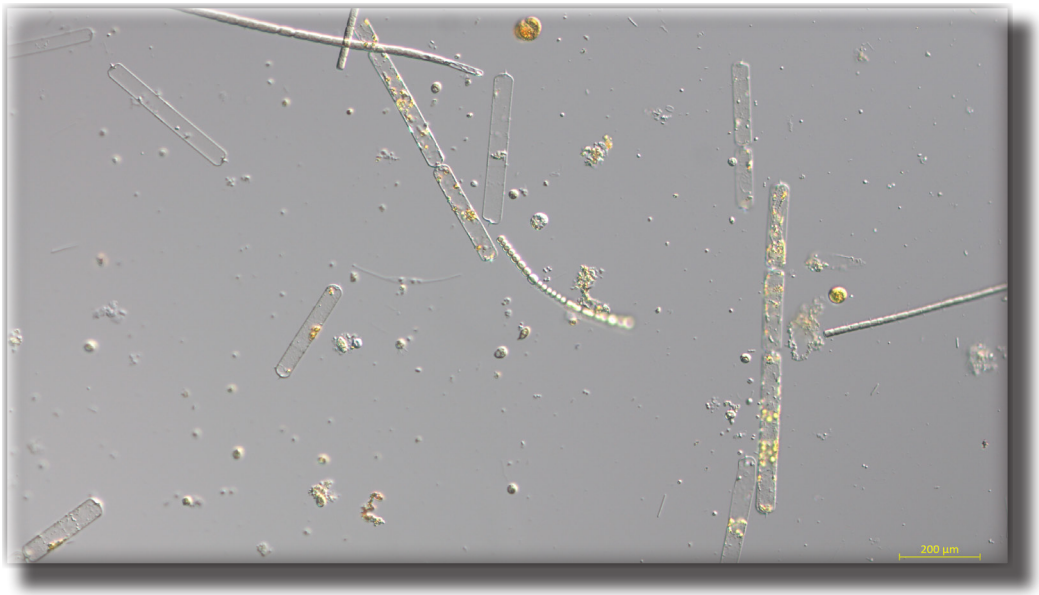


Fig 2. The diatom *Dactyliosolen fragilissimus*, various dinoflagellates in the order *Gymnodiniales* as well as filamentous cyanobacteria of *Dolichospermum* sp. and *Aphanizomenon flosaquae* were present in high amounts at BY2 in August. Photo: M. Karlberg.

BY38 16th of August

The phytoplankton diversity was low and the amounts of *A. flosaquae* was rather high. *N. spumigena** was also quite abundant. The tintinnid (ciliate within a shell) Heliocostomella subulata was quite abundant. The integrated (0-20 m) and (0-10 m) chlorophyll concentrations were within the normal range for this month.

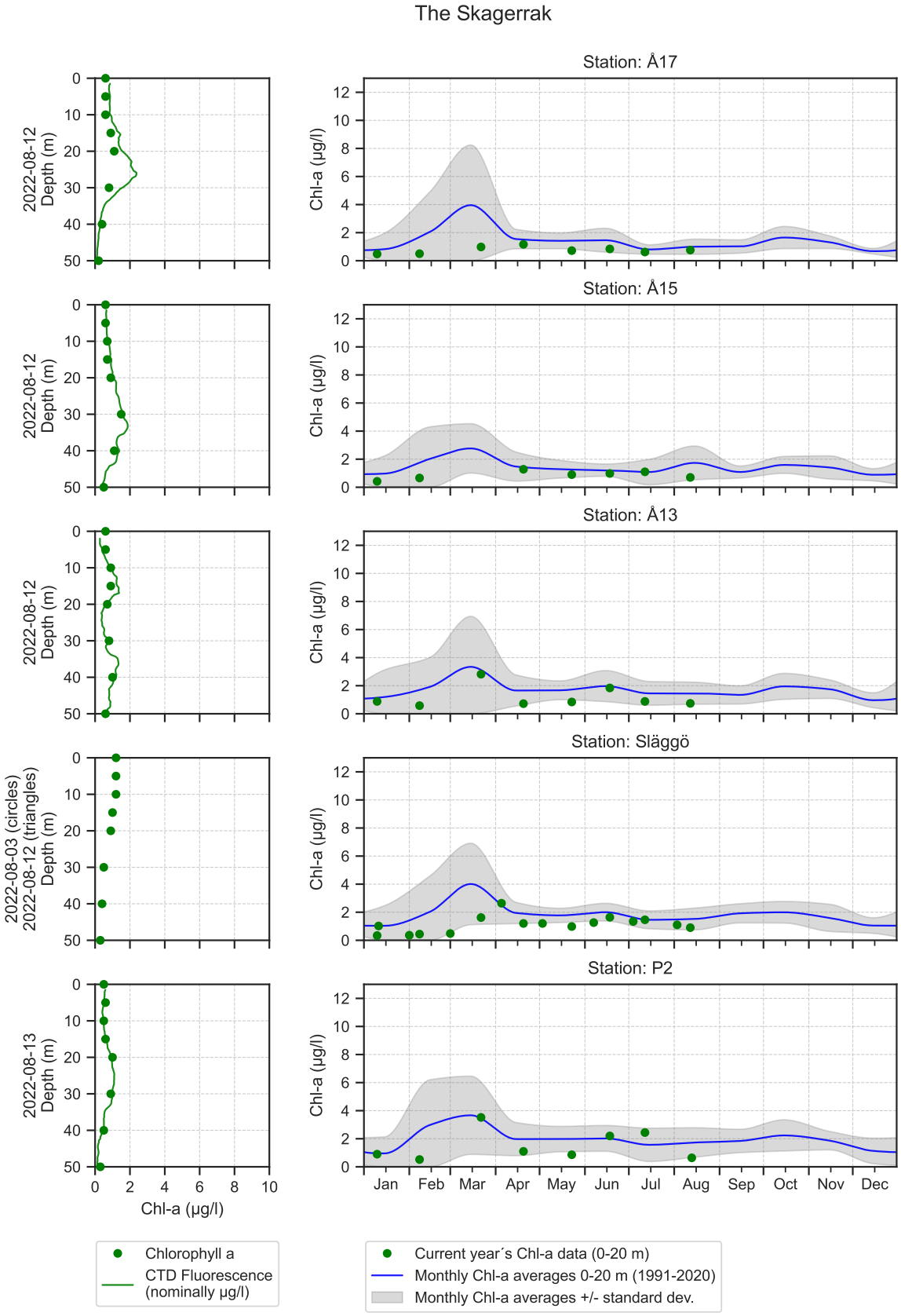
BCSIII-10 15th of August
The phytoplankton diversity and abundance were low with a few filaments of the cyanobacteria *A. flosaquae* and *N. spumigena** present. The integrated (0-20 m) and (0-10 m) chlorophyll concentrations were within the normal range for this month.

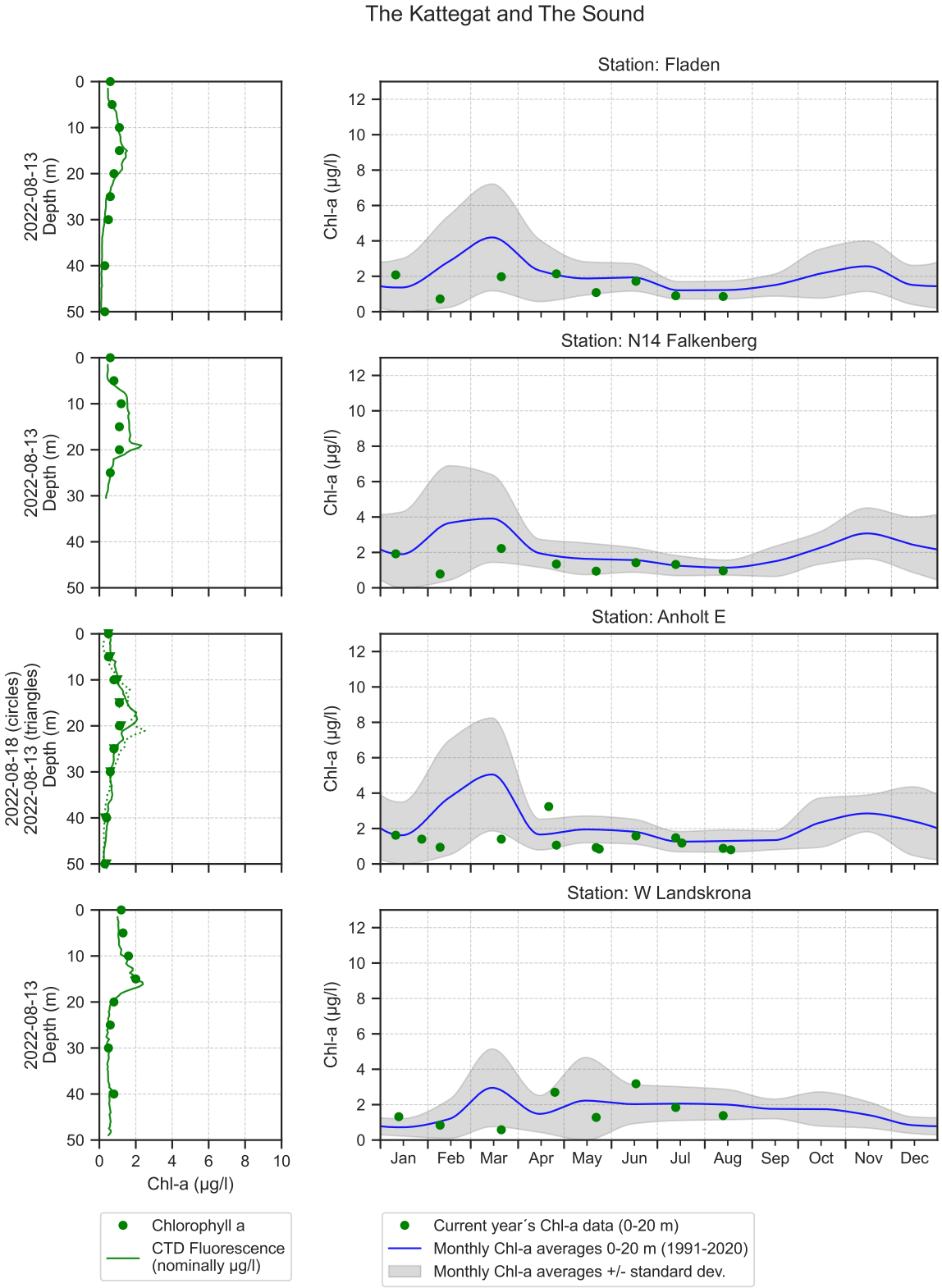
REFM1V1 17th of August
Both the phytoplankton diversity and abundance were high. The amount of the filamentous cyanobacteria *Dolichospermum* sp. was high, but there was also *Aphanizomenon* sp. and a few *N. spumigena**. Various cells of *Gymnodiniales* were abundant and *Dinophysis norvegica** was present. The integrated (0-20 m) and (0-10 m) chlorophyll concentrations were within the normal range for this month.

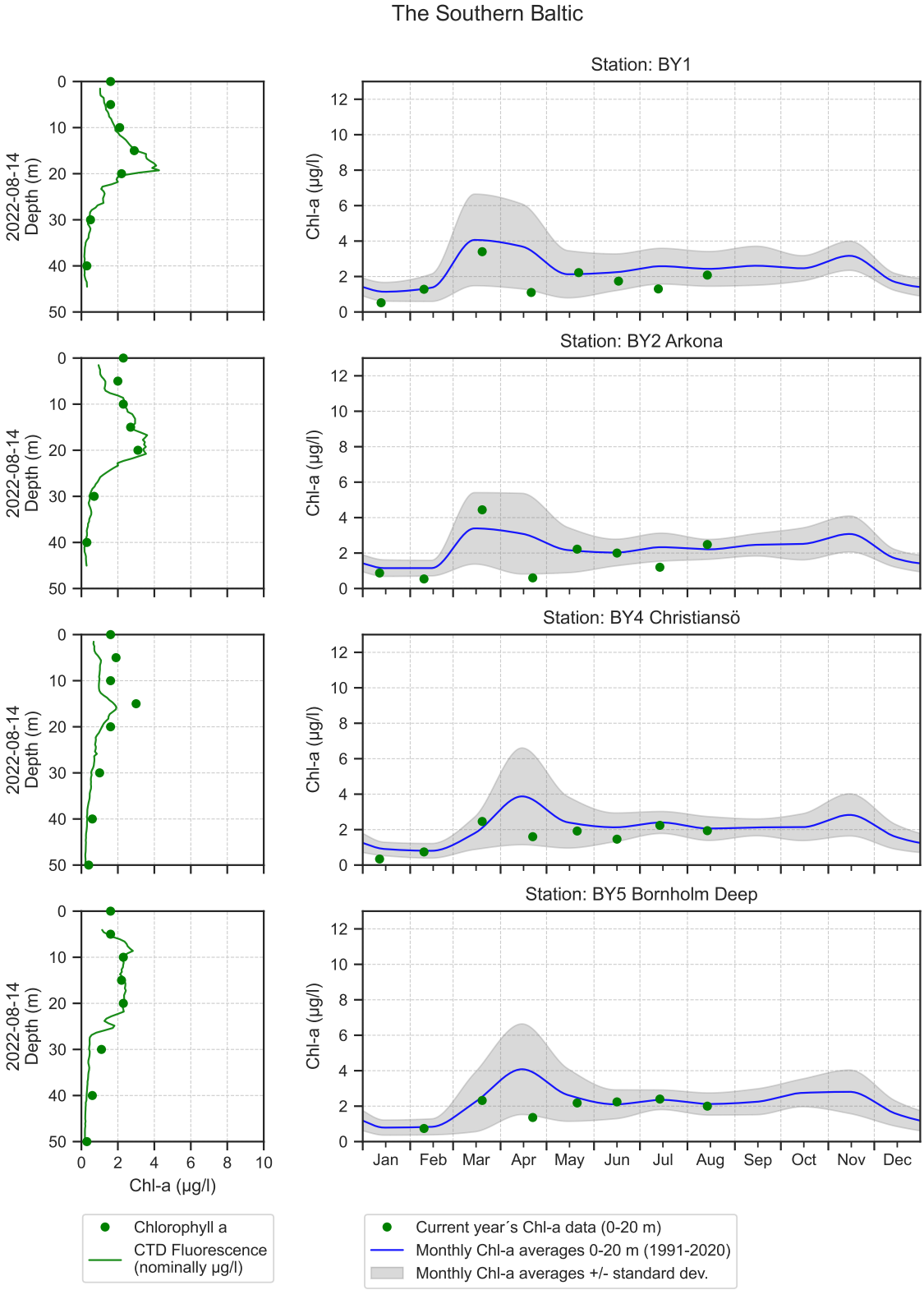
Phytoplankton analysis and text:
Marie Johansen and Maria Karlberg

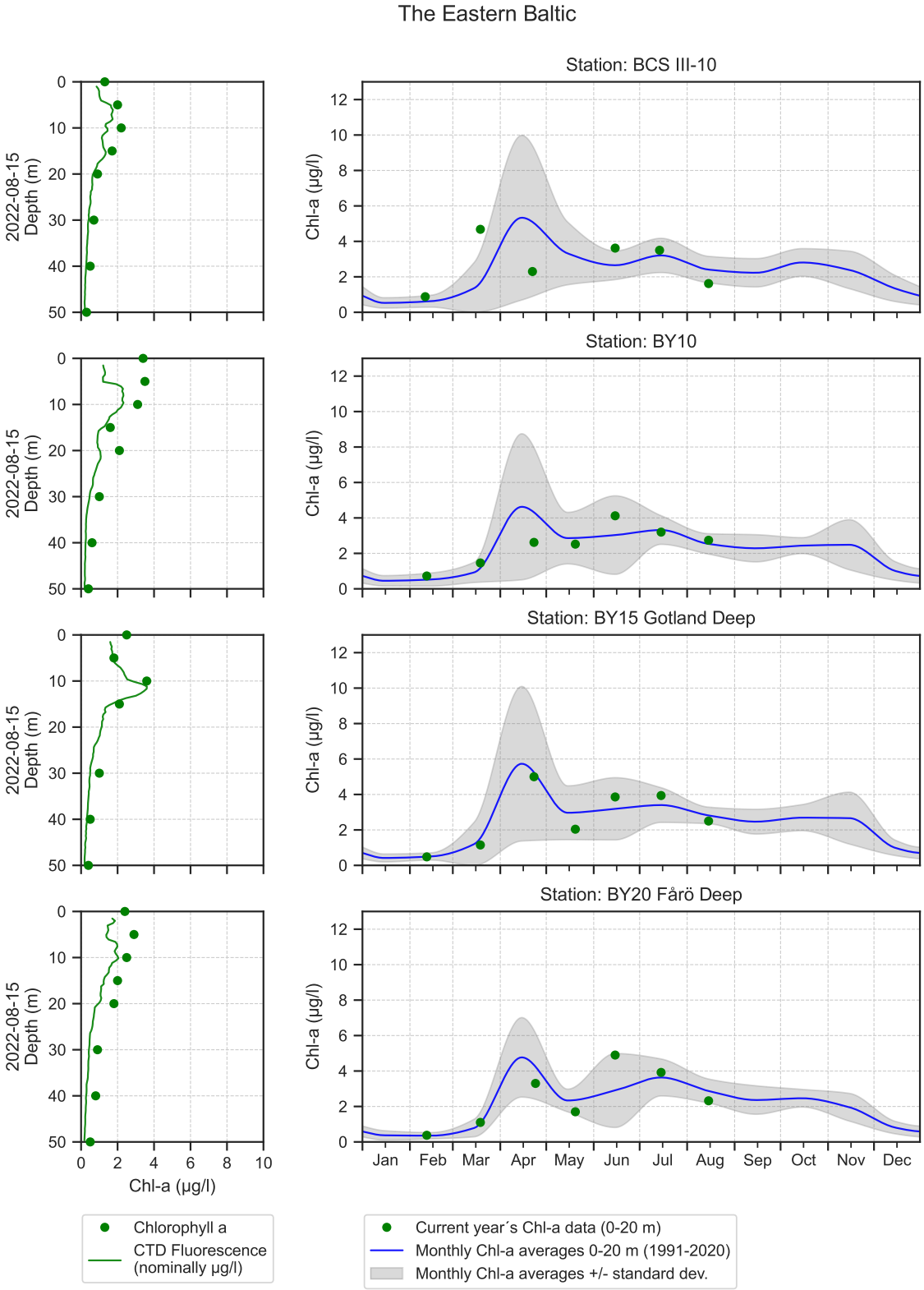
Selection of observed species	Anholt E	Anholt E	N14	Släggö	Å17
Red=potentially toxic species	13/8	18/8	12/6	12/8	12/8
Hose 0-10 m	presence	presence	presence	presence	presence
Cerataulina pelagica				very common	
Chaetoceros				present	
Chaetoceros affinis				present	
Chaetoceros socialis				present	
Cylindrotheca closterium		present	present		
Dactyliosolen fragilissimus	present	present	present	common	present
Guinardia delicatula				present	
Guinardia flaccida	present	present	present	present	
Leptocylindrus danicus				present	present
Proboscia alata	common	common	common	common	common
Pseudo-nitzschia				present	present
Skeletonema marinoi				present	
Dinophysis acuminata				present	
Dinophysis acuta				common	
Gymnodiniales	common	common	common	present	very common
Gyrodinium flagellare			present		present
Katodinium glaucum					present
Peridiniales					present
Phalacroma rotundatum				present	
Prorocentrum micans	common	present	present	common	
Protoperidinium			present		
Protoperidinium pellucidum				present	
Protoperidinium steinii		present			
Scrippsiella					present
Torodinium			present		
Tripos furca	present		present		
Tripos fusus			present	present	
Tripos lineatus				present	
Tripos muelleri	present		present	present	
Emiliania huxleyi	common	common	present	present	present
Pterosperma			present		
Pyramimonas				present	
Cryptomonadales	common	present	common	common	present
Telonema subtile				present	
Dolichospermum	present	present	present		
Ebria tripartita		present			
Ciliophora		present		present	present

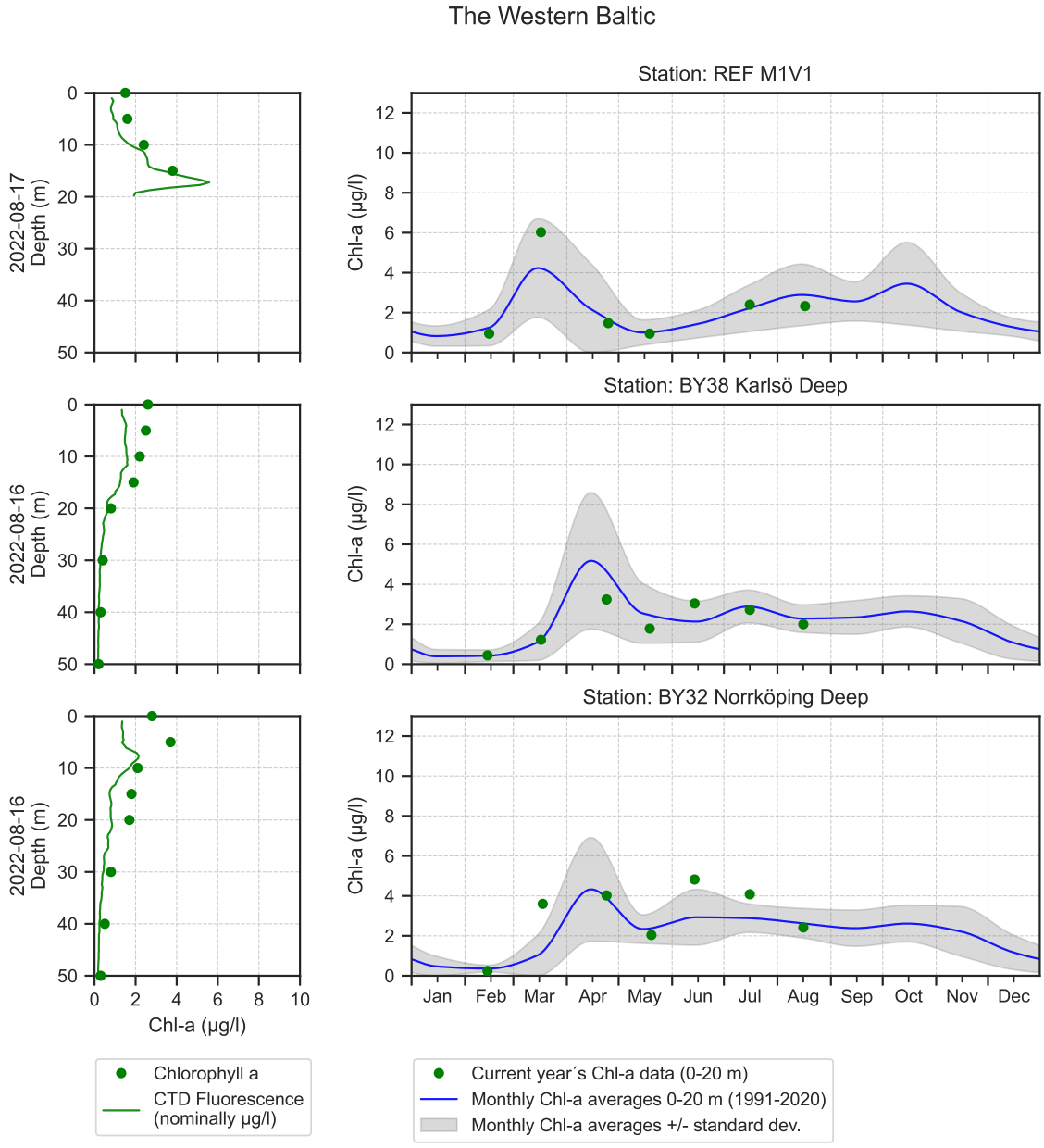
Selection of observed species	BY15	BY2	BY38	BY5	BCSIII-10	REFM1V1
Red=potentially toxic species	15/8	14/8	16/8	14/8	15/8	17/8
Hose 0-10 m	presence	presence	presence	presence	presence	presence
Chaetoceros castracanei			present	present		
Chaetoceros throndsenii		present		present		common
Chaetoceros wighamii						present
Cylindrotheca closterium		present		present		
Dactyliosolen fragilissimus		very common		very common		
Nitzschia longissima		present		present		
Dinophysis acuminata		present				
Dinophysis norvegica						present
Gymnodiniales	common	very common	common	very common	common	very common
Gymnodinium verruculosum		present		present		present
Heterocapsa rotundata			present			common
Karlodinium veneficum	present	present		present		present
Peridiniales				present		present
Prorocentrum cordatum		present		present		
Prorocentrum micans						present
Scrippsiella				present		
Tripos muelleri		present		common		
Dinobryon faculiferum		present		present		present
Prymnesiales		present				
Monoraphidium			present	present		present
Oocystis	present	present	common	present	present	
Binuclearia lauterbornii	present					
Pyramimonas	common	present	common	common	common	common
Cryptomonadales	present	common	common	common	common	common
Pseudopedinella				common		present
Aphanizomenon	common	common	present	present	present	present
Aphanizomenon flosaquae	very common	very common	very common	very common	present	common
Aphanocapsa	common					
Aphanothece	very common		present			
Dolichospermum	common	very common				very common
Nodularia spumigena	present	present	common		present	present
Pseudanabaena	very common		common		common	common
Snowella	present					present
Choanoflagellatea						present
Ebria tripartita			common	present		present
Ciliophora	common	common	common	common	common	common
Mesodinium rubrum			present	present		present
Helicostomella subulata			common			


The Skagerrak
Station: Å17
Station: Å15
Station: Å13
Station: Släggö
Station: P2
2022-08-12
Depth (m)
2022-08-03 (circles)
2022-08-12 (triangles)
Depth (m)
2022-08-13
Depth (m)
Chl-a (µg/l)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Chlorophyll a
CTD Fluorescence
(nominally µg/l)
Current year´s Chl-a data (0-20 m)
Monthly Chl-a averages 0-20 m (1991-2020)
Monthly Chl-a averages +/- standard dev.


The Kattegat and The Sound
Station: Fladen
Station: N14 Falkenberg
Station: Anholt E
Station: W Landskrona
2022-08-13
Depth (m)
2022-08-18 (circles)
2022-08-13 (triangles)
Chl-a (µg/l)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Chlorophyll a
CTD Fluorescence (nominally µg/l)
Current year´s Chl-a data (0-20 m)
Monthly Chl-a averages 0-20 m (1991-2020)
Monthly Chl-a averages +/- standard dev.


The Southern Baltic
Station: BY1
Station: BY2 Arkona
Station: BY4 Christiansö
Station: BY5 Bornholm Deep
2022-08-14
Depth (m)
Chl-a (µg/l)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Chlorophyll a
CTD Fluorescence (nominally µg/l)
Current year´s Chl-a data (0-20 m)
Monthly Chl-a averages 0-20 m (1991-2020)
Monthly Chl-a averages +/- standard dev.


The Eastern Baltic
Station: BCS III-10
Station: BY10
Station: BY15 Gotland Deep
Station: BY20 Fårö Deep
2022-08-15
Depth (m)
Chl-a (µg/l)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Chlorophyll a
CTD Fluorescence (nominally µg/l)
Current year´s Chl-a data (0-20 m)
Monthly Chl-a averages 0-20 m (1991-2020)
Monthly Chl-a averages +/- standard dev.



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 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, hallucinationer, 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).

Kartan på framsidan visar viktat medelvärde för klorofyll *a,* µg/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*, µg/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.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