SMHI

AlgAware

Oceanographic Unit
No 6, June 2016

Algal situation in
Marine Waters surrounding Sweden

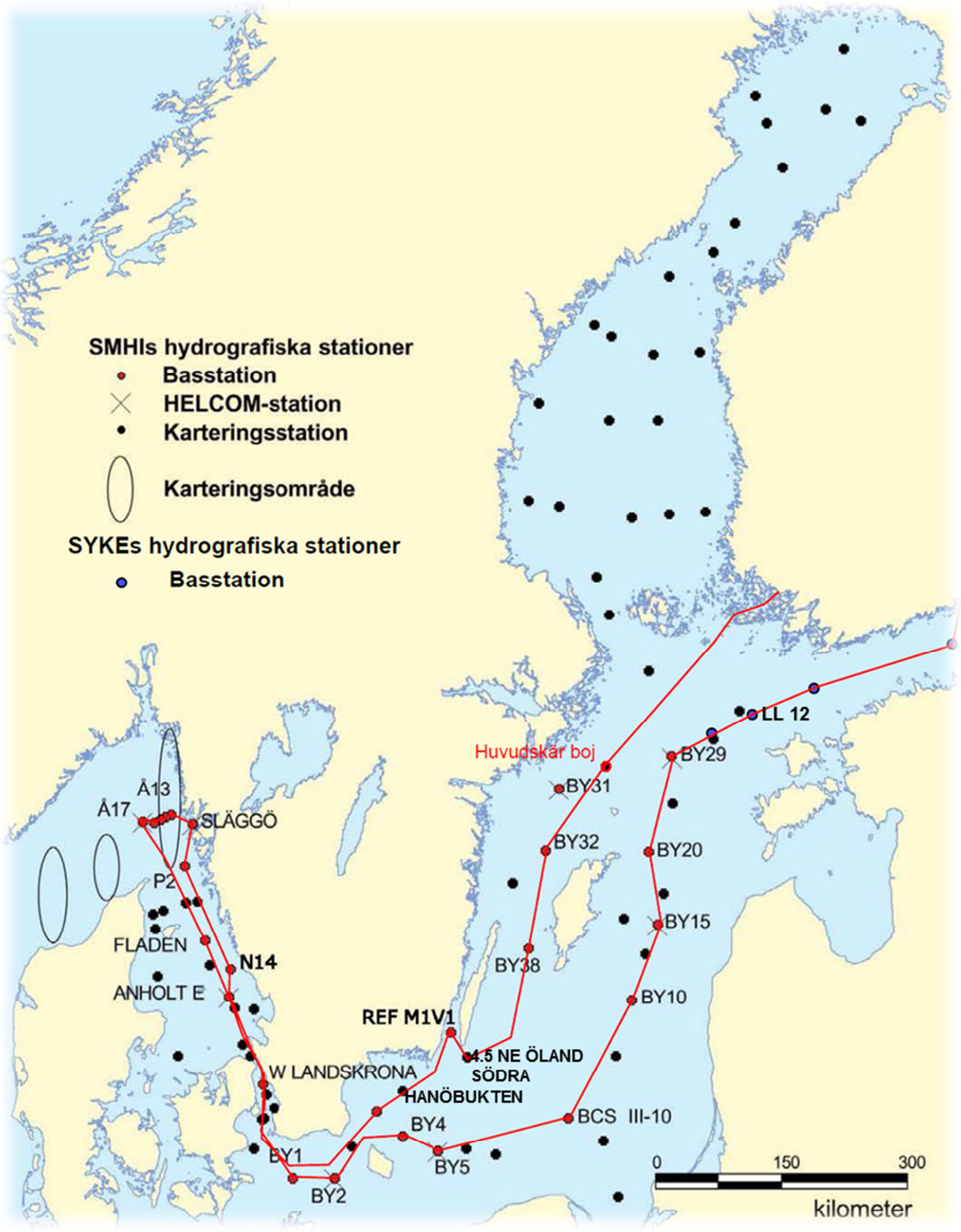

Fig. 1. Sampling stations June 2016

Sammanfattning

I Skagerrak var artdiversiteten stor bland dinoflagellaterna, men det var kiselalgen *Proboscia alata* som dominerade växtplanktonsamhället.

Kiselalger var mycket vanliga i Kattegatt och även här var det *Proboscia alata* som var flest till antal med undantag av Anholt E. Där var även *Dactyliosolen fragilissimus* och *Guinardia flaccida* mycket vanliga.

Det var inga synliga ytansamlingar under juniexpedition i Östersjön. Aggregeringar avfilamentösa cyanobakterier var dock synliga i vattnet för ögat på alla stationer från Finskaviken till sydöst om Gotland, runt Bornholm tillbaka via Hanöbukten, Karlsödjupet och slutligen vid BY32. Vid närmare analys av både yt- och integrerade prover (0-10m) var det främst stora mängder av *Aphanizomenon flos-aquae*. Den giftiga arten *Nodularia spumigena* fanns i alla prover men var inte dominerande till antal. Det skulle snabbt kunna uppkomma ytansamlingar om vädret tillåter; ingen vind och högre temperatur i vattnet.

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

Fig. 1. Sunset in the Kattegat, in June 2016

Abstract

The species diversity among the dinoflagellates was high in the Skagerrak but it was the diatom species *Proboscia alata* that dominated the phytoplankton community. The Kattegat was dominated by chain forming diatom species. *Proboscia alata* were among the most abundant all over Kattegat with the exception at Anholt Ewhere *Dactyliosolen fragilissimus* and *Guinardia flaccida* were very common.

There were no surface accumulations in the Baltic Sea. Filamentous cyanobacteria dominated the phytoplankton community from the entrance of Gulf of Finland at LL12 through the eastern to the south of Gotland at BCS-III. The situation looked the same in the Kalmar Sound, the Karlsö Deep up to BY32 outside Norrköping. Aggregates of *Aphanizomenon flos-aquae* were visible at all stations visited in The Baltic Sea and were very common in all samples analysed. Filaments of toxin producing *Nodularia spumigena* were common or present at all stations visited. Surface accumulations may develop very fast if the weather conditions are favourable.

Please follow the link below to see interpretations of blooms from satellite images in the Baltic
http://www.smhi.se/vadret/hav-och-kust/algsituationen

The Skagerrak

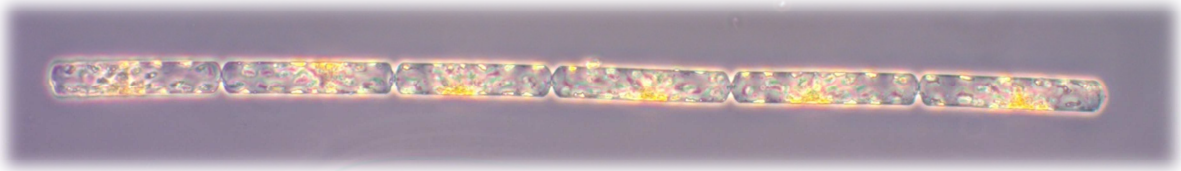

Fig.3 Diatom species dominated the phytoplankton community and Dactyliosolen fragilissimus was found in all samples from the Skagerrak.

Å17 17th of June

The majority of cells at Å17 were species belonging to the microalgae group dinoflagellates, but the diatom species *Proboscia alata* was very common. Several species from the dinoflagellate genus *Ceratium* were common and there were large amounts of zooplankton and ciliates in the plankton community. There was a chlorophyll peak at 25m and the sample consisted almost exclusively of cells from the potentially toxic diatom genus *Pseudo-nitzschia*

Å13, Å15 and P2 17th of June

The surface sample was dominated by the diatom species *P. alata* and *Dactyliosolen fragilissimus* (Fig.3). There was a chlorophyll peak at 25m at Å13 and 17m at Å15. Both samples consisted almost exclusively of cells from the potentially toxic diatom genus *Pseudo-nitzschia.*

Släggö (Skagerrak coast) 17th of June

The diatom P. alata dominated the phytoplankton community and the species diversity among the diatoms was higher compared to the sample from Å17. The dinoflagellate cells had high species diversity but a much lower cell concentration compared to the diatom cells. There were potentially toxic species present; *Pseudo-nitzschia* spp, cf. *Alexandrium* spp., *Dinophysis acuminata, Dinophysis norvegica, Lingulodinium polyedrum* and *Protoceratium reticulatum.*

The Kattegat

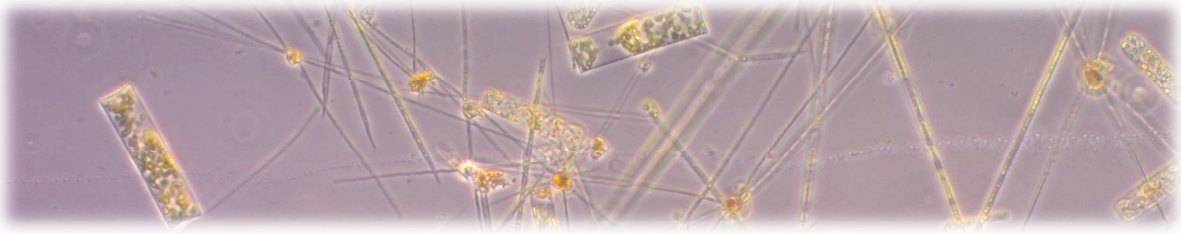

Fig.4. The Kattegat was dominated by chain forming diatom species

W Landskrona 16th of June

The surface sample did not contain much phytoplankton cells and the species diversity was very low. *Aphanizomenon flos-aquae* was common and there were few filaments of *N. spumigena.* The diatoms were represented by the centric species *P. alata* and *Actinocyclus* spp.

The chlorophyll peak at 12 m depth consisted exclusively of diatoms (Fig. 4). Abundant species were *P. alata, Rhizosolenia setigera, Cerataulina pelagica, Guinardia flaccida* and *Chaetoceros densus.*

Anholt E and Anholt E 16 and 17th of June

On the return to Anholt the 17th there was no particular change in the phytoplankton community.Diatom species dominated the phytoplankton community (Fig. 4) at Anholt on the 16th of June. *P. alata* and *D. fragilissimus* (Fig. 3) were among the most abundant in all samples, both integrated- (0-10m) and at the surface. There were chlorophyll peaks at 17m and 22m and the most abundant species were numerous cells of the flagellate *Dictyocha speculum, P. alata* and the dinoflagellate *Protoceratium reticulatum.* It was the same species composition at 22m with the addition of two diatom species *Guinardia flaccida* and *Rhizosolenia styliformis.*

Fladen 16th of June and N14 Falkenberg 16th of June

P. alata and *D. fragilissimus* (Fig. 3) dominated the phytoplankton community in the surface water at both Fladen and at N14 the day after. The species community was similar at both stationsThe chlorophyll peak at 16 m consisted of the same species as the peak at 17m at Anholt the day before; *P. alata, D. speculum* and *P. reticulatum.*

The Baltic Sea

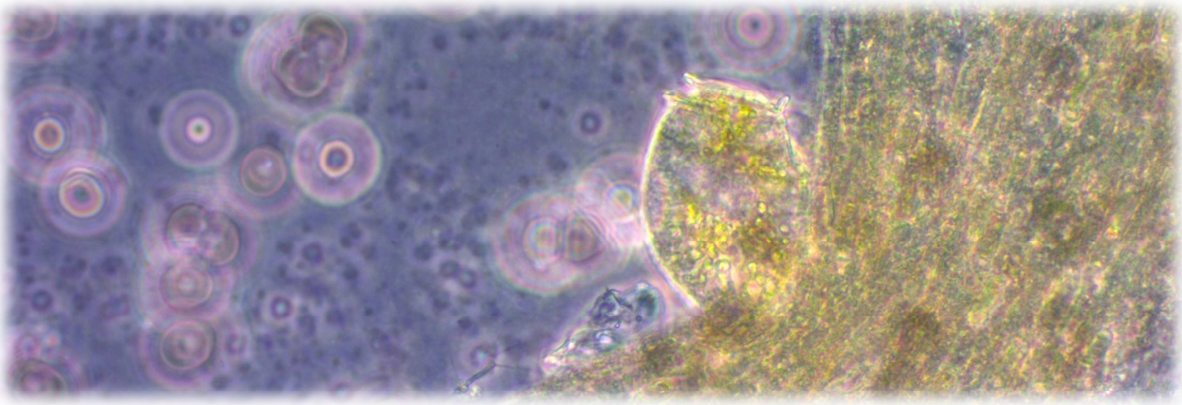

Fig.5 At the entrance of Gulf of Finland aggregates of Aphanizomenon flos-aquae dominated the phytoplankton community. Dinophysis norvegica, embedded in the filaments, was common.

LL12 13th of June

At the entrance of the Finnish Bay there was a chlorophyll fluorescence peak at 10 m depth. A closer look in the microscope revealed large amounts of bundles of *A. flos-aquae* and numerous cells from of the dinoflagellate *Dinophysis acuminata* (Fig. 5). Diatoms were also present in large amounts; *Chaetoceros wighamii, Thalassiosira delicatula* and *Skeletonema marinoi*. The ciliat *Mesodinium rubrum* and *Protoperidinium brevipes* were common.

BY20 Fårö Deep 14th of June

At the Eastern part of the Gotland Deep the CTD and the water sampler were broken. In the surface sample there was a high concentration of *A. flos-aquae* and the dinoflagellate genus *Dinophysis*, both *D. norvegica* and *D. acuminate.* Species from the class Prymnesiales (Fig. 6) and small naked dinoflagellates were very common here. The diatom *Cerataulina pelagica*, the dinoflagellate *P. brevipes* and the cyanobacterial genus *Snowella* were present. The secchi depth was 4 m and if the weather will be favourable it will result in surface accumulation in this area.

Fig. 6 Fish killing species from the class Prymnesiales were very common in the samples from BY20 and BY15.

BY15 Gotlands Deep and BY10 14th of June

The phytoplankton community was similar at both stations. The surface samples were dominated by bundles of *A. flos-aquae* and filaments of *Dolichospermum* spp. The species diversity was high in the integrated sample (0-10m). Species from the classes Prymnesiales and Gymnodiniales were very common and *Mesodinium rubrum*, *D. norvegica* and *P. brevipes* were common

BCS-III South East of Gotland and Öland 15th of June

The aggregates of cyanobacteria *A. flos-aquae* dominated the phytoplankton community. *Nodularia spumigena* was common (Fig. 6) and filaments from the genus *Dolichospermum* were abundant. Species from the cyanobacterial genus *Snowella* was very common as well as other colony forming small cyanobacteria. The integrated sample (0-10m) consisted of a quite diverse community as in BY15 and BY10.

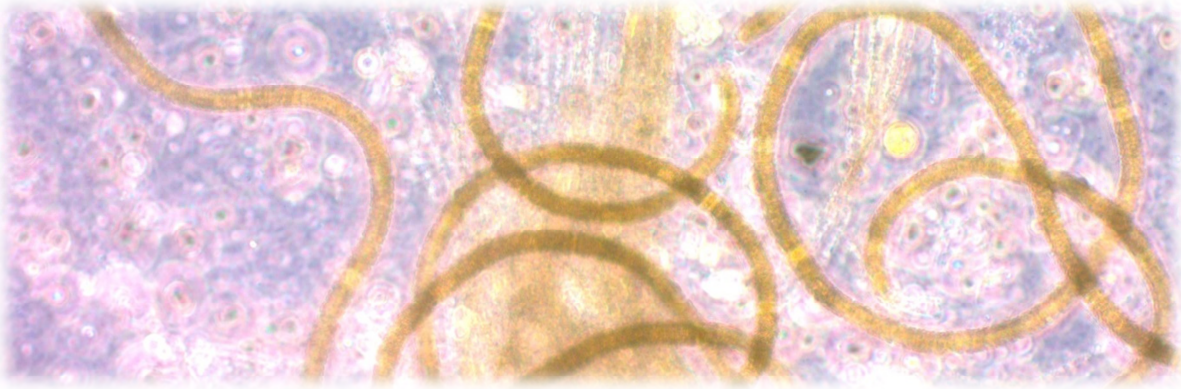

Fig.7. Filamentous cyanobacteria dominated the phytoplankton community south of Gotland at BCS-III. Surface accumulations may develop fast if the weather conditions are favourable.

BY5 Bornholms Deep and BY4 Christiansö 15th of June

The cell density was lower in this part of the Baltic Sea and the integrated sample (0-10m) consisted of a less diverse plankton community compared to the eastern part of the Baltic Sea. The dinoflagellate *Dinophysis norvegica* and *Ebria tripartita* were quite common at both stations. There were large amounts of beautiful zooplankton at BY5 (Fig. 8).

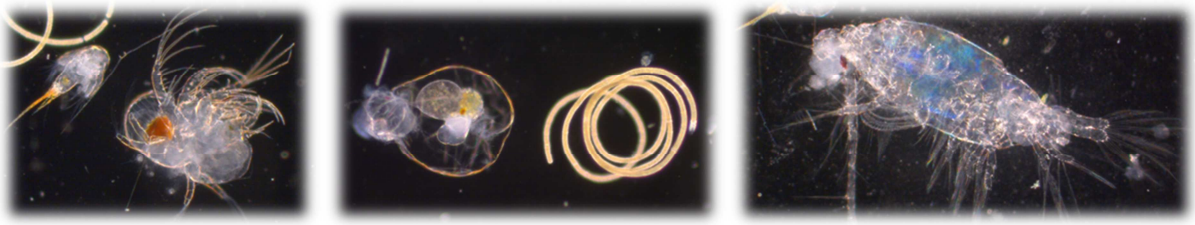

Fig. 8. Zooplankton at BY5

BY2 Arkona 15th of June

The phytoplankton community consisted mainly of aggregates of the filamentous cyanobacteria *A. flos-aquae* but *N. spumigena* was quite common too. *P. alata* and *C. pelagica* were the most common diatoms and the silica flagellate *Ebria tripartita* was very common.

BY1 16th of June

Small grains of cyanobacteria were found in the water but at lower concentrations than before. Equal amounts of *N. spumigena* and *A. flos-aqua* was found and small amounts of *Dolichospermum* spp.

Hanöbukten 18th of June

Aggregates of the filamentous cyanobacteria *A. flos-aquae* w and *N. spumigena* was common but the diatom *P. alata* and *C. pelagica* were the dominant species in the surface sample. There were large amounts of heterotrophic cells from the dinoflagellate class *Gymnodiniales* and the silica flagellate *E. tripartita* was very common.

REF M1V1 and 4.5 NE Ölands Södra 18th of June

There was low species diversity but high cell density and aggregates of *A. flos-aquae* dominated the phytoplankton community. *N. spumigena* and *Dolichospermum* were present in small amounts. The dinoflagellate *Heterocapsa triquetra* and the silicaflagellate *E. tripartita* were common.

BY38 Karlsö Deep and BY32 Norrköping 19th of June

These two stations were completely dominated by the filamentous cyanobacteria *A. flos-aquae*. Filaments of *N. spumigena* was also present but in small amounts. There were only few dinoflagellate species in the samples and no diatoms present.

Surface samples, bucket	The following filamentous cyanobacteria were observed:		
Station:	Aggregations of *Aphanizomenon flos-aque*	*Nodularia spumi-gena**	Dolichospermum spp.
Hanöbukten 18/6	Common	Present	Present
REF M1V1 18/6	Very common	Present	Present
Ölands södra udde 18/6	Very common	Present	Present
BY32 19/6	Very common	Present	Present
BY38 19/6	Very common	Present	Present
W Landskrona 16/6	Common	Present	-
BY1 16/6	Common	Common	Present
BY2 15/6	Very common	Common	Present
BY4 15/6	Very common	Present	Present
BY5 15/6	Common	Present	Present
BCSIII-10 15/6	Very common	Common	Present
BY10 14/6	Very common	Present	Common
BY15 14/6	Very common	Present	Common
BY20 14/6	Very common	Present	-
LL12 13/6	Common	-	-

Selection of observed species	Anholt E	Anholt E	N14 Falkenberg	Släggö	Å17
Red=potentially toxic species	2016-06-16	2016-06-17	2016-06-16	2016-06-17	2016-06-17
Hose 0-10 m	presence	presence	presence	presence	presence
Cerataulina pelagica	Present	Present	Present	Present	Common
Chaetoceros curvisetus				Present	
Chaetoceros danicus	Present	Present			
Chaetoceros spp			Present	Present	
Coscinodiscus radiatus	Present	Present			
Dactyliosolen fragilissimus	Very common	Very common	Very common	Common	Common
Guinardia delicatula				Common	
Guinardia flaccida	Very common	Common	Present		
Proboscia alata	Very common	Very common	Very common	Very common	Very common
Pseudo-nitzschia spp	Common	Common		Common	Present
Skeletonema marinoi		Present	Present		
Alexandrium pseudogonyaulax				Present	
cf. Alexandrium spp			Present	Present	Present
Ceratium fusus	Present	Present	Present	Common	Common
Ceratium longipes		Present		Common	Common
Ceratium tripos	Present	Present	Present	Very common	Very common
Dinophysis norvegica		Present		Present	
Diplopsalis cpx				Present	Present
Gonyaulax spp				Present	Present
Gymnodiniales				Present	Present
Heterocapsa rotundata				Present	Present
Heterocapsa triquetra				Present	Present
Lingulodinium polyedrum				Present	
Peridiniales				Present	Present
Peridiniella danica	Present	Present		Present	Present
Prorocentrum micans				Present	
Protoceratium reticulatum		Present	Present	Present	Present
Protoperidinium depressum	Present	Present	Present		
Protoperidinium pellucidum			Present	Present	Present
Protoperidinium oblongum	Present	Present	Present	Present	Present
Protoperidinium spp		Present	Present	Present	Present
Scrippsiella cpx				Present	Present
Dictyocha speculum		Present	Present		
Cryptomonadales				Common	Common
Mesodinium rubrum				Common	Common

Selection of observed species	BCS III-10	BY2 Arkona	BY5 Bornholmsdj	BY15 Gotlandsdj	BY38 Karlsödj	REF M1-V1
Red=potentially toxic species	2016-06-15	2016-06-15	2016-06-15	2016-06-14	2016-06-19	2016-06-18
Hose 0-10m	presence	presence	presence	presence	presence	presence
Actinocyclus spp		Common				
Cerataulina pelagica		Present				
Chaetoceros impressus		Common	Common	Present	Present	
Chaetoceros spp		Present			Present	
Chaetoceros subtilis		Present		Present		
Skeletonema marinoi		Present	Present	Present	Present	
Thalassiosira spp		Present	Present			
cf. Diplopsalis spp	Common					
Dinophysis acuminata		Present		Present		
Dinophysis norvegica	Common	resent	Common	Common	Present	Present
Dinophysis rotundata	Present			Present	Present	Present
Gonyaulax spp				Present		
Gymnodiniales	Common			Very common	Present	
Heterocapsa triquetra	Present			Present	Common	Common
Peridiniales	Present	Present	Present	Present	Present	
Proboscia alata		Common				
Protoceratium reticulatum				Present		Present
Protoperidinium spp	Common			Present		
Protoperidinium brevipes	Present			Common	Present	Present
Aphanizomenon flos-aquae	Very common	Very common	Common	Very common	Very common	Very common
Aphanothece spp	Present					
Cyanodictyon spp		Present		Present		
Dolichospermum spp.	Present		Present	Common	Present	Present
Microcystis spp				Present		
Nodularia spumigena	Common	Common	Present	Present	Present	Present
Pseudoanabaena spp				Present		
Snowella spp	Very common	Present	Present	Present	Present	
Woronichinia spp	Common	Present		Present	Present	
Ebria tripartita		Very common	Present		Present	Common
Eutreptiella				Present		
Oocystis spp		Present				
Planctonema lauterbornii	Present					
Prymnesiales	Present		Present	Very common		
Dinobryon spp	Common			Present		
Cryptomonadales	Present		Present	Present		
CiliophoraCommon				Present		
Mesodinium rubrum	Present			Present		