Supplementary

Cyanotoxin occurrence and diversity in 98 cyanobacterial blooms from Swedish lakes and the Baltic Sea

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Table S1. Reference standards of cyanotoxins used in LC-MS/MS analysis. a, b Toxins detected in pair. \* Saxitoxins standards were in a separate mixture used for sample analysis with HILIC-MS/MS.

|  |  |  |
| --- | --- | --- |
| Compound name | Standard mix | Source |
| Anatoxin-a | A | Teknolab Sverige AB |
| Homoanatoxin-a | A | Teknolab Sverige AB |
| Cylindrospermopsin | A | Teknolab Sverige AB |
| Nodularin | A | Biosense Laboratories A/S |
| Microcystin-RR | A | AH Diagnostics AB |
| Microcystin-HtyR | A | AH Diagnostics AB |
| aMicrocystin-[D-Asp3]-LR | A | AH Diagnostics AB |
| bMicrocystin-[D-Asp3]-RR | A | Enzo Life Sciences (Lausen, Switzerland) |
| Microcystin-LA | B | AH Diagnostics AB |
| Microcystin-LF | B | Teknolab Sverige AB |
| Microcystin-LW | B | Teknolab Sverige AB |
| Microcystin-LY | B | AH Diagnostics AB |
| Microcystin-YR | B | Teknolab Sverige AB |
| Microcystin-LR | B | AH Diagnostics AB |
| Microcystin-WR | C | AH Diagnostics AB |
| Microcystin-HilR | C | AH Diagnostics AB |
| Microcystin-(N-methyl-L)-R | C | Marbionc (Wilmington, NC, USA) |
| Microcystin-[D-Asp3, (E)-Dhb7]-HphR | C | Marbionc (Wilmington, NC, USA) |
| Microcystin-[D-Asp3, (E)-Dhb7]-HtyR | C | Marbionc (Wilmington, NC, USA) |
| aMicrocystin-[Dha7]-LR | C | Teknolab Sverige AB |
| bMicrocystin-[D-Asp3, (E)-Dhb7]-RR | C | Teknolab Sverige AB |
| STX | \* | National Research Council, Halifax, Canada |
| dcSTX | \* | National Research Council, Halifax, Canada |
| dcNEO | \* | National Research Council, Halifax, Canada |

**Table S2**. Toxin findings in samples from 98 individual sampling sites (cyanoblooms). Each value represents toxin´s average quantity in µg/L of toxin contents in samples taken at three separate locations in a cyanobloom. In cases where toxins were detected below the LOQ of the method (0.1 µg/L) for all three locations in the cyanobloom are presented as <LOQ for the entire cyanobloom. In situations where toxins could be quantified above the LOQ of the method in one or two out of three locations at the same sampling site the average of the toxin concentrations was calculated applying “0” for the locations in which the toxin was not detected. In this way exclusion of single positive sample replicates of a cyanobloom that are still relevant to visualize in the study was avoided and a more representative toxin concentration data was obtained. Consequently, some of the average quantities fell below the LOQ of the method, which are presented with two decimals in blue. Right-hand column shows the toxin groups detected at each of the sampling sites. hATX was detected at five sampling sites and always at levels ≤LOQ of the method. \*, no toxins were detected at LOQ≥0.1 µg/L for the method at any of the three sampling locations of the cyanobloom. na, sample is not analysed for this toxin.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sample name** | **Sampling site (cyanobloom)** | **Sampling Date** | **MCs**  **(free)** | **MCs**  **(tot)** | **NOD**  **(free)** | **NOD**  **(tot)** | **ATXs**  **(free)** | **ATXs**  **(tot)** | **CYN**  **(free)** | **CYN**  **(tot)** | **STXs**  **(free)** | **STXs**  **(tot)** | **Toxin groups identified in sample** |
| BS1 | Badplatsstämmorna, Mullsjön, Västergötland | 2016-09-01 | 0.03 | 0.2 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | na | <LOQ | MCs |
| BR1 | Bastås råvattenpumpstation, Arboga | 2016-09-20 | <LOQ | 2.4 | <LOQ | <LOQ | <LOQ | 0.1 | 0.07 | 0.2 | na | <LOQ | MCs, ATXs, hATX, CYN |
| ES1 | Edasjön, Uppland | 2016-08-24 | na | 0.3 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | na | <LOQ | MCs |
| FnB1 | Fjällnorabadet, Trehörningen, Uppland | 2016-08-24 | na | 0.8 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | na | 1.3 | MCs, STXs |
| FS1 | Funbosjön, Uppland | 2016-08-24 | na | 0.3 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | na | <LOQ | MCs |
| GåV1 | Gumåsviken, Kramfors | 2016-10-17 | <LOQ | 0.6 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | na | <LOQ | MCs |
| GV1 | Görväln, Mälaren | 2016-10-17 | <LOQ | 0.1 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | na | <LOQ | MCs |
| KS1 | Kottalsjön, Lidingö | 2016-09-09 | na | 28.6 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | na | <LOQ | MCs |
| KH1 | Kråkö hamn, Hälsingland | 2016-08-24 | na | 6.0 | <LOQ | 285.0 | <LOQ | 1.5 | <LOQ | <LOQ | na | <LOQ | MCs, NOD, ATXs |
| LT1 | Lojsta träsk, Gotland | 2016-07-27 | <LOQ | 0.2 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | na | 1.0 | MCs, STXs |
| LäB1 | Lyssnaängsbadet, Ekoln, Uppland | 2016-08-24 | na | 0.4 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | na | <LOQ | MCs |
| Lu1 | Lövudden, Mälaren | 2016-09-25 | 0.2 | 37.1 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | na | 0.3 | MCs, STXs |
| Fnp 1 | Pålsund, Trehörningen, Uppland | 2016-08-24 | na | 4.6 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | na | 10.5 | MCs, STXs |
| GL1 | Gravlången, Trollhättan | 2016-09-21 | <LOQ | 3.8 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | na | <LOQ | MCs |
| Su1 | Stenungssund, Kraftmarksvägen 44432 | 2016-10-14 | <LOQ | 6.8 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | na | 6.2 | MCs, STXs |
| SH1 | Storahästefjorden, Rotenäs 114 | 2016-09-20 | 0.1 | 10.2 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | na | <LOQ | MCs |
| St1 | Sundstatjärn | 2016-09-07 | 0.03 | 0.2 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | na | 23.0 | MCs, STXs |
| SB1 | Sunnerstabadet, Ekoln, Uppland | 2016-08-24 | na | 1.1 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | na | <LOQ | MCs |
| SD1 | Svandammen, Uppland | 2016-09-26 | na | 0.4 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | na | <LOQ | MCs |
| Så1 | Svartån, Västerås, Västmanland | 2016-09-27 | na | 26032.0 | na | na | na | 4.2 | na | na | na | 3.1 | MCs, ATXs, STXs |
| Hå1 | Utanför Lomma/Höjeån, Skåne | 2016-08-28 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | na | 11.9 | STXs |
| VB1 | Vombsjön, båtplatsen, Skåne | 2016-08-31 | 7.3 | 63.9 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | na | 0.2 | MCs, STXs |
| VS1 | Vombsjön, Västra sidan | 2016-09-20 | 0.03 | 10.5 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | na | <LOQ | MCs |
| VSB1 | Vårdsätrabadet, Ekoln, Uppland | 2016-08-28 | na | 556.0 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | na | <LOQ | MCs |
| 17-02 | Stenholmen, Dalarö | 2017-06-23 | <LOQ | <LOQ | <LOQ | 1.1 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | NOD |
| 17-03 | Hammarskogsbadet, Ekoln, Uppland | 2017-07-12 | 0.5 | 1.6 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-04 | Rännavägen, Gävle | 2017-07-11 | 1.0 | 1.06 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-05 | Krönbadet, Vimmerby | 2017-07-13 | 0.4 | 1.7 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-06 | Ringsjön, Östra, Gamlabo | 2017-07-13 | <LOQ | 7.3 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-07 | Rörbacks Hamn | 2017-07-12 | 2.9 | 2.9 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-08 | Herrö Pålsbo, Svegssjön, Sveg | 2017-07-15 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | 1.7 | <LOQ | STXs |
| 17-09 | Strömsborgsvägen 72, Norrtälje | 2017-07-20 | 0.2 | 0.4 | 4.1 | 16.1 | <LOQ | <LOQ | <LOQ | <LOQ | 0.1 | 0.2 | MCs, NOD, STXs |
| 17-10 | Hargsjön, Mjölby | 2017-07-20 | <LOQ | 2.4 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | 0.4 | 0.6 | MCs, STXs |
| 17-11 | Svegsjön, Herrö | 2017-07-20 | <LOQ | <LOQ | <LOQ | <LOQ | 0.2 | 0.2 | <LOQ | <LOQ | 2.8 | 4.5 | ATXs, hATX, STXs |
| 17-12 | Ruggen, Åkersberga | 2017-07-23 | 0.41 | 6.4 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | 1.6 | 3.2 | MCs, STXs |
| 17-13 | Dämstasjön, Kramfors | 2017-07-26 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | 0.1 | 0.3 | STXs |
| 17-14 | Bergsbadet, Linköping | 2017-07-28 | <LOQ | 0.4 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | 14.7 | 14.7 | MCs, STXs |
| 17-15 | Sandvik, Linköping | 2017-07-28 | <LOQ | 0.2 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-16 | Granön, Båtskärsnäs | 2017-07-27 | 0.2 | 0.3 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | 11.3 | 12.1 | MCs, STXs, dcSTX |
| 17-17 | Staka kraftverk, Flian | 2017-07-28 | 172.5 | 301.3 | <LOQ | <LOQ | 0.2 | 0.2 | <LOQ | <LOQ | <LOQ | <LOQ | MCs, ATXs, hATX |
| 17-18 | Gamla Lövöns kraftverk, Fångsjön | 2017-07-26 | na | <LOQ | na | <LOQ | na | <LOQ | na | <LOQ | 1.0 | 1.9 | STXs |
| 17-19 | Hålsjön, Alafors | 2017-08-02 | <LOQ | 5.3 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-20 | Vimmesjöns badplats, Alafors | 2017-08-02 | <LOQ | 0.3 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-21 | Sjon Anten, Alsingsås | 2017-08-01 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | 37.5 | 62.7 | STXs |
| 17-22 | Rånnavägs badplats, Surströmmasjön, Ulricehamn | 2017-08-03 | <LOQ | 37.5 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | 223.7 | 424.4 | MCs, STXs, dcSTX |
| 17-23 | Lofthammar, Västervik | 2017-08-04 | 1382.1 | 5119.0 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-24 | Svanbergabadet, Norrtälje (Erken) | 2017-08-08 | 0.1 | 1.2 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-25 | Råvattenintaget till Rottne Vattenverk | 2017-08-08 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ |
| 17-26 | Öved, Vombsjön | 2017-08-07 | <LOQ | 1.2 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-27 | Lammhults vattenverk, råvattenintaget, Stora Värmen | 2017-08-08 | <LOQ | 0.3 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-28 | Ågesta, Stockholm, Magelungen | 2017-08-08 | 0.5 | 1.3 | <LOQ | <LOQ | 1.8 | 1.8 | <LOQ | <LOQ | <LOQ | <LOQ | MCs, ATXs |
| 17-29 | Svinstadsjöns badplats, Linköping | 2017-08-09 | <LOQ | 4.5 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-30 | Glaningen sjö, Ludvika | 2017-08-09 | na | <LOQ | na | <LOQ | na | <LOQ | na | <LOQ | <LOQ | <LOQ | \*No toxins quantities ≥ LOQ |
| 17-31 | Växjösjön, Växjö | 2017-08-14 | <LOQ | 0.3 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-32 | Södra Bergundasjön | 2017-08-14 | <LOQ | 11.0 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-33 | Övden, Alvesta kommun | 2017-08-08 | 0.3 | 2.2 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | 1642.3 | 1891.0 | MCs, STXs, dcSTX |
| 17-34 | Trummen, Vaxsjö | 2017-08-14 | <LOQ | 0.4 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-35 | Tisarens utlopp, Hallsberg | 2017-08-15 | <LOQ | 2.1 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | 0.04 | 0.08 | MCs, STXs |
| 17-36 | Virens utlopp, Katrineholm | 2017-08-15 | 0.3 | 1.9 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | 0.06 | 0.1 | MCs, STXs |
| 17-37 | Ellestadssjön, Sjöbo | 2017-08-16 | <LOQ | 1.4 | <LOQ | <LOQ | <LOQ | <LOQ | 8.2 | 9.5 | 4.4 | 8.8 | MCs, CYN, STXs, dcSTX |
| 17-38 | Dånviken, Rönninge | 2017-08-17 | 0.1 | 41.8 | <LOQ | <LOQ | 0.1 | 0.1 | <LOQ | <LOQ | 2.5 | 4.9 | MCs, ATXs, hATX, STXs |
| 17-39 | Yngaren, Nyköping | 2017-08-17 | 0.5 | 222.4 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-40 | Runnviken | 2017-08-17 | <LOQ | 0.7 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-41 | Stehags badplats, Västra Ringsjön | 2017-08-18 | <LOQ | 0.7 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-42 | Roxen, Linköping | 2017-08-18 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | 6.7 | 7.6 | STXs |
| 17-43 | Regnaren, Nyköping | 2017-08-22 | 0.07 | 0.6 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | 1.7 | 3.4 | MCs, STXs |
| 17-44 | Börringesjön, Svedala | 2017-08-22 | <LOQ | 0.2 | <LOQ | <LOQ | <LOQ | <LOQ | 0.04 | 0.07 | 0.8 | 1.7 | MCs, CYN, STXs |
| 17-45 | Finjasjön, Skåne | 2017-08-22 | <LOQ | 0.5 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-46 | Hallbosjön, Nyköping | 2017-08-22 | <LOQ | 0.6 | <LOQ | <LOQ | <LOQ | <LOQ | 0.1 | 0.1 | <LOQ | <LOQ | MCs, CYN |
| 17-47 | Fjällfotasjön | 2017-08-22 | <LOQ | 0.7 | <LOQ | <LOQ | <LOQ | <LOQ | 0.4 | 0.4 | 0.04 | 0.08 | MCs, CYN, STXs |
| 17-48 | Arkelstorpsviken, Skåne | 2017-08-22 | <LOQ | 2.9 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-49 | Hornsundssjön, Flen | 2017-08-22 | 0.1 | 18.2 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-50 | Hjälmaren | 2017-08-22 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | \*No toxins quantities ≥ LOQ |
| 17-51 | Vombsjön | 2017-08-23 | <LOQ | 8.3 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-52 | Väsbyviken, Torshälla | 2017-08-22 | <LOQ | 0.9 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-53 | Västeråsfjärden, Mälaren | 2017-08-23 | 0.5 | 37.8 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-54 | Havgårdssjön, Dävelstorp | 2017-08-23 | <LOQ | 21.4 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | 6.5 | 9.7 | MCs, STXs |
| 17-55 | Krageholmssjön rastplats (Hästhagsv.) | 2017-08-23 | 8.4 | 88.4 | <LOQ | <LOQ | <LOQ | <LOQ | 0.1 | 0.2 | 0.03 | 0.05 | MCs, CYN, STXs |
| 17-56 | Näsbyholmssjön, Skåne | 2017-08-23 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | \*No toxins quantities ≥ LOQ |
| 17-57 | Östra Ringsjön, Skåne | 2017-08-23 | <LOQ | 0.7 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-58 | Råbelövssjön, Ekestad | 2017-08-22 | 0.3 | 42.1 | <LOQ | <LOQ | <LOQ | <LOQ | 0.2 | 0.2 | 0.7 | 1.5 | MCs, CYN, STXs |
| 17-59 | Vadsbrosjön, Nyköping | 2017-08-23 | 1.1 | 149.5 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | 2.4 | 4.7 | MCs, STXs |
| 17-60 | Fält Danviken, Salems kommun | 2017-08-24 | 52.1 | 352.8 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-62 | Danviken, Salems kommun | 2017-09-02 | 1.3 | 51.8 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-63 | Storsjön, Gåsnäs, Kramfors | 2017-09-04 | <LOQ | 2.2 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-64 | Hjorten, Västervik | 2017-08-28 | 0.5 | 4.9 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-65 | Hjorten, Västervik | 2017-08-31 | 0.7 | 1.1 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-66 | Vombsjön, Östra Vombs badplats, Skåne | 2017-09-06 | 0.2 | 4.5 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-67 | Finjasjön, Björkviken, Tormstorp | 2017-09-06 | 0.5 | 4.9 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | 1.0 | 2.0 | MCs, STXs |
| 17-68 | Östra Ringsjön, Skåne | 2017-09-06 | 0.1 | 1.7 | <LOQ | <LOQ | <LOQ | <LOQ | 0.09 | 0.3 | <LOQ | <LOQ | MCs, CYN |
| 17-69 | Ringsjö | 2017-09-11 | 0.10 | 2.0 | <LOQ | <LOQ | <LOQ | 0.15 | <LOQ | <LOQ | <LOQ | <LOQ | MCs, ATXs |
| 17-70 | Långhalsen | 2017-09-11 | <LOQ | 0.4 | <LOQ | <LOQ | <LOQ | <LOQ | 0.2 | 0.2 | <LOQ | <LOQ | MCs, CYN |
| 17-71 | Dånviken, Rönningen | 2017-09-08 | 1.6 | 127.3 | <LOQ | <LOQ | 0.2 | 0.2 | <LOQ | <LOQ | <LOQ | <LOQ | MCs, ATXs, hATX |
| 17-72 | Västerås gästhamn | 2017-09-13 | 0.20 | 244.0 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-73 | Linnéasjön, Nybro | 2017-09-18 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | 0.6 | 1.2 | STXs |
| 17-74 | Sövdesjön, Sjöbo | 2017-09-18 | 0.7 | 56.5 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | MCs |
| 17-75 | Fiskekroken, Härnösand | 2017-09-28 | <LOQ | <LOQ | 132.6 | 1514.2 | <LOQ | 3.0 | <LOQ | <LOQ | 0.6 | 1.2 | NOD, ATXs, STXs |
| 17-76 | Sträsundsviken, Köpmannaholmen | 2017-10-02 | <LOQ | <LOQ | <LOQ | 1.4 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | NOD |

**Table S3**. Morphological characterization of cyanobacteria from 98 sampling sites sampled during 2016 and 2017 during bloom conditions. For simplification only genera level is shown. Genera names are sorted based on how many samples there where present in. +++, high abundance; ++, medium abundance; + low abundance; and na (in Comment), sample not available for morphological identification of cyanobacteria.

| **Sample name** | **Sampling site** | **Sampling Date** | Dolichospermum | Microcystis | Aphanizomenon | Woronichinia | Planktolyngbya | Planktothrix | Cuspidothrix | Limnothrix | Gloeotrichia | Pseudanabaena | Snowella | Chroococcus | Nodularia | Radiocystis | Anabaenopsis | Merismopedia | Geitlerinema | Oscillatoria | Romeria | **Comment** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| BS1 | Badplatsstämmorna, Mullsjön, Västergötaland | 2016-09-01 |  | ++ |  | +++ |  |  |  |  |  |  | ++ |  |  |  |  |  |  |  |  | No cyanobacterial dominance. High abundance of green algae and diatoms. |
| BR1 | Bastås råvattenpumpstation, Arboga | 2016-09-20 | ++ |  | ++ |  | ++ |  |  | +++ |  | ++ |  |  |  |  |  |  |  |  |  | High abundance of diatoms |
| ES1 | Edasjön, Uppland | 2016-08-24 | ++ |  | +++ | ++ | ++ | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  | Total dominance of cyanobacteria. |
| FnB1 | Fjällnorabadet, Trehörningen, Uppland | 2016-08-24 | +++ | ++ |  | ++ | ++ |  |  | ++ |  | ++ |  |  |  |  |  |  |  |  |  |  |
| FS1 | Funbosjön, Uppland | 2016-08-24 | +++ | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| GåV1 | Gumåsviken, Kramfors | 2016-10-17 |  |  |  |  |  | +++ |  |  |  |  |  |  |  |  |  |  |  |  |  | Also Closterium, a desmid |
| GV1 | Görväln, Mälaren | 2016-10-17 |  | + | + |  |  | ++ |  | + |  | +++ |  |  |  |  |  |  |  |  |  | Also several diatoms and cryptophytes |
| KS1 | Kottalasjön, Lidingö | 2016-09-09 | ++ | ++ | + | +++ |  |  | + |  |  |  |  |  |  |  |  |  |  |  |  |  |
| KH1 | Kråkö hamn, Hälsingland | 2016-08-24 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | na |
| LT1 | Lojsta träsk, Gotland | 2016-07-27 | + | + |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Almost no cyanobacteria |
| LäB1 | Lyssnaängsbadet, Ekoln, Uppland | 2016-08-24 | ++ | ++ |  |  |  |  |  | +++ |  | ++ |  |  |  |  |  |  |  |  | ++ | No dominance of cyanobacteria. More diatoms and cryptophytes. |
| Lu1 | Lövudden, Mälaren | 2016-09-25 | ++ | +++ | ++ | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Fnp 1 | Pålsund, Trehörningen, Uppland | 2016-08-24 | +++ | ++ | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| GL1 | Gravlången, Trollhättan | 2016-09-21 | +++ | ++ |  | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Su1 | Stenungssund, Kraftmarksvägen 44432 | 2016-10-14 |  |  |  | +++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SH1 | Storahästefjorden, Rotenäs 114 | 2016-09-20 | + | ++ | +++ | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| St1 | Sundstatjärn | 2016-09-07 | +++ |  |  | ++ |  |  |  |  |  |  | ++ |  |  |  |  |  |  |  |  | More desmids than cyanobacteria |
| SB1 | Sunnerstabadet, Ekoln, Uppland | 2016-08-24 | ++ | +++ | ++ |  | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SD1 | Svandammen, Uppland | 2016-09-26 |  |  |  |  |  | + |  |  |  |  |  |  |  |  |  |  |  |  |  | Dominance of green algae |
| Så1 | Svartån, Västerås, Västmanland | 2016-09-27 |  | +++ |  | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Hå1 | Utanför Lomma/Höje ån, Skåne | 2016-08-28 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | No cyanobacteria. Only *Eutreptiella sp.* an euglenophyte. |
| VB1 | Vombsjön båtplatsen, Skåne | 2016-08-31 | ++ | +++ | + | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| VS1 | Vombsjön, Västra sidan | 2016-09-20 |  | +++ |  | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | High abundance of cryptophytes and bentic diatoms. |
| VSB1 | Vårdsätrabadet, Ekoln, Mälaren | 2016-08-28 |  | +++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-02 | Stenholmen, Dalarö | 2017-06-23 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Only pine pollen and diatoms |
| 17-03 | Hammarskogsbadet, Ekoln, Mälaren | 2017-07-12 | **++** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | +++ |  |  |
| 17-04 | Rännavägen, Gävle | 2017-07-11 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Only marine dinoflagellate Heterocapsa found |
| 17-05 | Krönbadet, Vimmerby | 2017-07-13 | +++ | ++ |  | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-06 | Ringsjön, Östra, Gamlabo | 2017-07-13 | ++ | +++ | ++ |  |  |  |  |  |  |  |  | + |  |  |  |  |  |  |  |  |
| 17-07 | Rörbacks Hamn | 2017-07-12 | +++ |  |  |  |  | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  | High abundance of akinetes |
| 17-08 | Herrö Pålsbo, Svegssjön, Sveg | 2017-07-15 | +++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | High abundance of akinetes |
| 17-09 | Strömsborgsvägen 72, Norrtälje | 2017-07-20 | +++ |  | +++ |  |  |  |  |  |  |  |  |  | ++ |  |  |  |  |  |  |  |
| 17-10 | Hargsjön, Mjölby | 2017-07-20 | +++ | ++ | ++ |  |  |  | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-11 | Svegsjön, Herrö | 2017-07-20 | +++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | High abundance of akinetes |
| 17-12 | Ruggen, Åkersberga | 2017-07-23 | +++ |  |  | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-13 | Dämstasjön, Kramfors | 2017-07-26 | +++ |  |  | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-14 | Bergsbadet, Linköping | 2017-07-28 |  |  |  |  |  |  |  |  | +++ |  |  |  |  |  |  |  |  |  |  |  |
| 17-15 | Sandvik, Linköping | 2017-07-28 | ++ | ++ | ++ |  |  |  |  |  | +++ |  |  |  |  |  |  |  |  |  |  | more green algae and diatoms than cyanobacteria |
| 17-16 | Granön, Båtskärsnäs | 2017-07-27 | +++ |  |  | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | High abundance of diatoms |
| 17-17 | Staka kraftverk, Flian | 2017-07-28 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | na |
| 17-18 | Gamla Lövöns kraftverk, Fångsjön | 2017-07-26 | + |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | High abundance of green algae Botryococcus |
| 17-19 | Hålsjön, Alafors | 2017-08-02 | + | +++ |  | +++ |  |  |  |  |  |  |  | + |  |  |  |  |  |  |  | High abundance of green algae, diatoms and cryptophytes |
| 17-20 | Vimmesjöns badplats, Alafors | 2017-08-02 | ++ | ++ | +++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-21 | Sjön Anten, Alsingsås | 2017-08-01 | +++ |  | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-22 | Rånnavägs badplats, Surströmmasjön, Ulricehamn | 2017-08-03 | +++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-23 | Lofthammar, Västervik | 2017-08-04 |  |  |  |  |  |  |  |  | +++ |  |  |  |  |  |  |  |  |  |  | Cells decomposed |
| 17-24 | Svanbergabadet, Norrtälje (Erken) | 2017-08-08 | + | + |  |  |  |  |  |  | +++ |  |  |  |  |  |  |  |  |  |  |  |
| 17-25 | Råvattenintaget till Rottne Vattenverk | 2017-08-08 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | No cyanobacteria.  High abundance of diatoms |
| 17-26 | Öved, Vombsjön | 2017-08-07 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | No cyanobacteria.  High abundance of diatoms. |
| 17-27 | Lammhults vattenverk, råvattenintaget, Stora Värmen | 2017-08-08 |  |  |  | + |  | + |  |  |  |  |  |  |  |  |  |  |  |  |  | High abundance of cryptophytes and diatoms. |
| 17-28 | Ågesta, Stockholm, Magelungen | 2017-08-08 | ++ | ++ | +++ | ++ |  | + | ++ |  |  |  | + | + |  |  |  |  |  |  |  |  |
| 17-29 | Svinstadsjöns badplats, Linköping | 2017-08-09 | ++ | +++ | ++ | ++ | + |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-30 | Glaningen sjö, Ludvika | 2017-08-09 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Sample decoposed, not possible to identify cells. |
| 17-31 | Växjösjön, Växjö | 2017-08-14 | ++ |  | +++ | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | No dominance of cyanobacteria. More diatoms and cryptophytes. Also dinoflagellates, chrysophytes and green algae. |
| 17-32 | Södra Bergundasjön | 2017-08-14 |  | +++ |  | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-33 | Övden, Alvesta kommun | 2017-08-08 | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Decomposed cells.  Cyanobacteria with akinetes. |
| 17-34 | Trummen, Vaxsjö | 2017-08-14 | ++ | ++ |  | +++ |  |  |  |  |  |  | +++ |  |  | ++ |  |  |  |  |  | No dominance of cyanobacteria. Diatoms more common. |
| 17-35 | Tisarens utlopp, Hallsberg | 2017-08-15 | ++ | ++ | +++ | ++ |  | + |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-36 | Virens utlopp, Katrineholm | 2017-08-15 | ++ | ++ | +++ | ++ | + | ++ |  | + |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-37 | Ellestadssjön, Sjöbo | 2017-08-16 | + | + | +++ |  |  |  | + |  |  |  |  |  |  |  | + |  |  |  |  |  |
| 17-38 | Dånviken, Rönninge | 2017-08-17 | ++ | ++ | ++ | ++ | + |  |  |  |  |  |  | + |  |  |  |  |  |  |  |  |
| 17-39 | Yngaren, Nyköping | 2017-08-17 | ++ | ++ | +++ | ++ |  | + |  |  | ++ |  |  | + |  |  |  |  |  |  |  |  |
| 17-40 | Runnviken | 2017-08-17 | ++ | ++ | +++ | ++ |  | ++ | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-41 | Stehags badplats, Västra Ringsjön | 2017-08-18 | ++ | ++ |  | ++ | + | +++ | ++ |  |  |  | + |  |  |  |  |  |  |  |  |  |
| 17-42 | Roxen, Linköping | 2017-08-18 |  |  |  |  |  |  |  |  | +++ |  |  |  |  |  |  |  |  |  |  |  |
| 17-43 | Regnaren, Nyköping | 2017-08-22 | +++ | ++ | ++ | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-44 | Börringesjön, Svedala | 2017-08-22 |  |  | ++ |  | +++ | ++ | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-45 | Finjasjön, Skåne | 2017-08-22 |  | + | +++ | + |  | + |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-46 | Hallbosjön, Nyköping | 2017-08-22 | ++ | ++ | ++ | ++ | + |  |  | + | +++ |  |  |  |  |  |  |  |  |  |  | Gloeotrichia only filaments, not whole colonies |
| 17-47 | Fjällfotasjön | 2017-08-22 | + | + | ++ |  | +++ |  |  | + |  |  |  |  |  | + |  |  |  |  |  |  |
| 17-48 | Arkelstorpsviken, Skåne | 2017-08-22 | +++ | ++ |  |  | + |  |  |  |  |  | + |  |  |  |  |  |  |  |  |  |
| 17-49 | Hornsundssjön, Flen | 2017-08-22 | +++ | ++ | ++ | ++ | + | ++ |  | + |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-50 | Hjälmaren | 2017-08-22 |  |  | ++ |  | ++ |  |  | +++ |  |  |  |  |  |  |  |  | ++ |  |  |  |
| 17-51 | Vombsjön | 2017-08-23 | ++ | +++ | ++ | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-52 | Väsbyviken, Torshälla | 2017-08-22 | ++ | ++ | +++ | ++ | + | + | ++ | + |  | + |  |  |  |  | ++ |  |  |  |  | High abundance of dinoflagellates and diatoms |
| 17-53 | Västeråsfjärden, Mälaren | 2017-08-23 | ++ | +++ | ++ | ++ |  |  |  |  |  |  |  | + |  |  |  |  |  |  |  |  |
| 17-54 | Havgårdssjön, Dävelstorp | 2017-08-23 | +++ | ++ | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-55 | Krageholmssjön rastplats (Hästhagsv.) | 2017-08-23 | +++ | ++ | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-56 | Näsbyholmssjön, Skåne | 2017-08-23 | + |  | +++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | High abundance of akinetes |
| 17-57 | Östra Ringsjön, Skåne | 2017-08-23 | ++ | ++ | ++ | ++ | + | ++ | ++ |  |  |  | + |  |  |  |  |  |  |  |  | High abundance of diatoms and green algae |
| 17-58 | Råbelövssjön, Ekestad | 2017-08-22 | +++ | +++ | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Cells decomposed |
| 17-59 | Vadsbrosjön, Nyköping | 2017-08-23 | +++ | ++ | +++ | ++ |  |  | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-60 | Fält Danviken, Salems kommun | 2017-08-24 | +++ | ++ | ++ | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-62 | Danviken, Salems kommun | 2017-09-02 | +++ | ++ | ++ | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-63 | Storsjön, Gåsnäs, Kramfors | 2017-09-04 | +++ |  |  |  |  |  |  |  |  |  |  |  |  | + |  |  |  |  |  |  |
| 17-64 | Hjorten, Västervik | 2017-08-28 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | na |
| 17-65 | Hjorten, Västervik | 2017-08-31 | ++ | ++ |  |  |  |  |  |  | +++ |  |  |  |  |  |  |  |  |  |  |  |
| 17-66 | Vombsjön, Östra Vombs badplats, Skåne | 2017-09-06 |  | +++ | + |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-67 | Finjasjön, Björkviken, Tormstorp | 2017-09-06 |  |  | +++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-68 | Östra Ringsjön, Skåne | 2017-09-06 | ++ |  | +++ | ++ |  | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-69 | Ringsjö | 2017-09-11 | ++ | ++ | +++ | ++ |  | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  | No cyanobacterial dominance. Leaves of *Lemna* in the bottle |
| 17-70 | Långhalsen | 2017-09-11 | ++ | ++ | +++ | ++ | + |  | ++ | + |  | + |  |  |  |  |  |  |  |  |  |  |
| 17-71 | Dånviken, Rönningen | 2017-09-08 | +++ | ++ | ++ | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-72 | Västerås gästhamn, Mälaren | 2017-09-13 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | na |
| 17-73 | Linnéasjön, Nybro | 2017-09-18 | +++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Colonies attach to larger plant material |
| 17-74 | Sövdesjön, Sjöbo | 2017-09-18 | +++ | ++ | ++ | ++ |  | ++ | ++ |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17-75 | Fiskekroken, Härnösand | 2017-09-28 |  |  | +++ |  |  |  |  |  |  |  |  |  | +++ |  |  |  |  |  |  | Cells decomposed |
| 17-76 | Sträsundsviken, Köpmannaholmen | 2017-10-02 |  |  |  |  |  |  |  |  |  |  |  |  | +++ |  |  |  |  |  |  | Cells decomposed. High abundance of diatoms. |