

# Metadata compilation for the MIDI-CHIP dataset

*Yannick Lara, Annick Wilmotte, Karina Sivonen, Gianluca De Bellis, Pirjo Kuuppo, Stefano Ventura, Beatrice Montarani, Peter Henderson, Lucien Hoffmann, Maciej Zalewski & Jiri Komárek*





## Metadata compilation for the MIDI-CHIP dataset

Yannick Lara<sup>1</sup>, Annick Wilmotte<sup>2</sup>, Karina Sivonen<sup>3</sup>, Gianluca De Bellis<sup>4</sup>, Pirjo Kuuppo<sup>5</sup>, Stefano Ventura<sup>6</sup>, Beatrice Montarani<sup>7</sup>, Peter Henderson<sup>8</sup>, Lucien Hoffmann<sup>9</sup>, Maciej Zalewski<sup>10</sup> & Jiri Komárek<sup>11</sup>

<sup>1</sup> Early Life Traces & Evolution-Astrobiology, University of Liège, Liège, Belgium

<sup>2</sup> InBioS-CIP/ BCCM-ULC, University of Liège, Liège, Belgium

<sup>3</sup> University of Helsinki, Helsinki, Finland

<sup>4</sup> CNR-ITB, Segrate, Italy

<sup>5</sup> Finnish Environment Institute, Helsinki, Finland

<sup>6</sup> CNR-ISE, Italy

<sup>7</sup> Hera S.p.A., Italy

<sup>8</sup> PISCES Conservation Ltd, Lymington, United Kingdom

<sup>9</sup> CRP-Gabriel Lippmann, Luxembourg, Luxembourg

<sup>10</sup> University of Lodz, Lodz, Poland

<sup>11</sup> University of South Bohemia, Trebon, Czech Republic

Please cite this paper as follows: Lara, Y., Wilmotte, A., Sivonen, K., De Bellis, G., Kuuppo, P., Ventura, S., Montarani, B., Henderson, P., Hoffmann, L., Zalewski, M. & Komárek, J., 2018. Metadata compilation for the MIDI-CHIP dataset. *Freshwater Metadata Journal* 37: 1-8. <https://doi.org/10.15504/fmj.2018.37>

Received: 2018-09-28 / Published: 2018-10-17

### Keywords

cyanobacteria, lakes, microcystins, diversity, European, taxonomy

### Short description of the dataset/summary

In order to be protected, biodiversity must be evaluated. For cyanobacteria, the traditional morphological measures of biodiversity are unsatisfactory.

We utilize molecular markers (like SSU rRNA) to define taxa on the basis of phylogeny. In freshwater ecosystems huge populations of cyanobacteria can occur. These blooms may release toxins that make the water poisonous. A second part of the study is to compare the temporal dynamics of biodiversity in both natural and disturbed lakes. This comparative analysis requires the use of ecological indexes to summarise the diversity of the samples and allow inferences about the ecosystem to be made.

Further information:

[https://cordis.europa.eu/result/rcn/32069\\_en.html](https://cordis.europa.eu/result/rcn/32069_en.html)

Molecular dataset:

<http://hdl.handle.net/2268/228148>

## General information

|   |  |
|---|--|
| dataset entry ID:   | SF_5   |
| <b>name of the dataset:</b>                                       |  |
| full name of the dataset:   | MIcrobial DIversity CHIP   |
| dataset short name:   | MIDI-CHIP  |
| <b>type of dataset:</b>   | species distribution data  |
| data type:  | point data/observation data  |
| <b>science keywords according to <a href="#">GCMD</a>:</b>        |  |
| topic:  | Biosphere, Biological Classification, Terrestrial Hydrosphere  |
| <b>ISO topic category according to <a href="#">ISO 19115</a>:</b> |  |
|   | Environment, Health, Inland Waters   |
| <b>INSPIRE keywords according to <a href="#">GEMET</a>:</b>       |  |
|   | Species distribution   |
| own science keywords:   | cyanobacteria, microcystins, bloom, toxin, molecular   |
| <b>related project:</b>   | Design and testing of dna microarrays to monitor microbial diversity with adequate biodiversity indexes, using cyanobacteria in freshwater as a model system |
| <b>funding:</b>   | EVK2-CT-1999-00026   |

## Technical and administrative specifications

|  |   |
|--|---|
| <b>data format:</b>  | Access  |
| <b>operating system:</b>   | all Windows systems   |
| <b>data language:</b>  | English   |
| <b>current access level:</b>   | web (public)  |
| web address:   | <a href="http://hdl.handle.net/2268/228149">http://hdl.handle.net/2268/228149</a> |
| currently available through <a href="#">GBIF</a> :                                 | no  |
| exchange planned:  | no  |
| data in data repository:   | yes   |
| specify repository:  | <a href="http://hdl.handle.net/2268/228149">http://hdl.handle.net/2268/228149</a> |
| <b>Do you plan to publish the data on the Freshwater Biodiversity Data Portal:</b> | no  |
| <b>update level:</b>   | completed   |
| <b>documentation:</b>  |   |
| type:  | scientific paper  |
| language:  | English   |
| <b>contact details:</b>  |   |
| metadata contact person:   |   |
| first, last name:  | Yannick Lara  |
| phone:   | 003243663387  |
| email:   | <a href="mailto:ylara@ulg.ac.be">ylara@ulg.ac.be</a>                              |
| institution:   | University of Liège   |
| address:   | Quartier Agora B6a  |
| postal code, city:   | 4000 Liège  |
| country:   | Belgium   |
| technical contact person:  |   |
| first, last name:  | Yannick Lara  |
| phone:   | 003243663387  |

email: ylara@ulg.ac.be  
 scientific contact person:  
 first, last name: Yannick Lara  
 phone: 003243663387  
 email: ylara@ulg.ac.be

## Intellectual property rights and citation

### dataset creator (data compiler):

contact name: Yannick Lara  
 contact email: ylara@uliege.be  
 contact institution: University of Liège

### data contributors to/owners of this dataset:

multiple  
 number: 10

### data contributor/owner 1:

contact name: Annick Wilmotte  
 contact email: awilmotte@ulg.ac.be  
 contact institute: University of Liège  
 criteria for using this part of the dataset:

The dataset is publicly available (data portal, data archive) and can be used without restrictions, but dataset creator/data contributors must be informed prior to publication. Data must be acknowledged and cited correctly.

### data contributor/owner 2:

contact name: Kaarina Sivonen  
 contact email: Kaarina.Sivonen@helsinki.fi  
 contact institute: University of Helsinki  
 criteria for using this part of the dataset:

The dataset is publicly available (data portal, data archive) and can be used without restrictions, but dataset creator/data contributors must be informed prior to publication. Data must be acknowledged and cited correctly.

### data contributor/owner 3:

contact name: Gianluca De Bellis  
 contact email: gianluca.debellis@itb.cnr.it  
 contact institute: CNR-ITB  
 criteria for using this part of the dataset:

The dataset is publicly available (data portal, data archive) and can be used without restrictions, but dataset creator/data contributors must be informed prior to publication. Data must be acknowledged and cited correctly.

### data contributor/owner 4:

contact name: Pirjo Kuuppo  
 contact email: pirjo.kuuppo@ymparisto.fi  
 contact institute: Finnish Environment Institute  
 criteria for using this part of the dataset:

The dataset is publicly available (data portal, data archive) and can be used without restrictions, but dataset creator/data contributors must be informed prior to publication. Data must be acknowledged and cited correctly.

### data contributor/owner 5:

contact name: Stefano Ventura

contact email: stefano.ventura@ise.cnr.it  
contact institute: CNR-ISE  
criteria for using this part of the dataset:

The dataset is publicly available (data portal, data archive) and can be used without restrictions, but dataset creator/data contributors must be informed prior to publication. Data must be acknowledged and cited correctly.

**data contributor/owner 6:**

contact name: Beatrice Montanari  
contact email: b.montanari@unica-spa.it  
contact institute: Hera S.p.A.  
criteria for using this part of the dataset:

The dataset is publicly available (data portal, data archive) and can be used without restrictions, but dataset creator/data contributors must be informed prior to publication. Data must be acknowledged and cited correctly.

**data contributor/owner 7:**

contact name: Peter Henderson  
contact email: peter@irchouse.demon.co.uk  
contact institute: PISCES Conservation Ltd  
criteria for using this part of the dataset:

The dataset is publicly available (data portal, data archive) and can be used without restrictions, but dataset creator/data contributors must be informed prior to publication. Data must be acknowledged and cited correctly.

**data contributor/owner 8:**

contact name: Lucien Hoffmann  
contact email: hoffmann@crppl.lu  
contact institute: CRP-Gabriel Lippmann  
criteria for using this part of the dataset:

The dataset is publicly available (data portal, data archive) and can be used without restrictions, but dataset creator/data contributors must be informed prior to publication. Data must be acknowledged and cited correctly.

**data contributor/owner 9:**

contact name: Jiri Komarek  
contact email: Komarek@butbn.cas.cz  
contact institute: University of South Bohemia  
criteria for using this part of the dataset:

The dataset is publicly available (data portal, data archive) and can be used without restrictions, but dataset creator/data contributors must be informed prior to publication. Data must be acknowledged and cited correctly.

**data contributor/owner 10:**

contact name: Zalewski Maciej  
contact email: mzal@biol.uni.lodz.pl  
contact institute: University of Lodz  
criteria for using this part of the dataset:

The dataset is publicly available (data portal, data archive) and can be used without restrictions, but dataset creator/data contributors must be informed prior to publication. Data must be acknowledged and cited correctly.

**citation of this dataset:**

author(s): Lara, Y., Wilmotte, A., Boutte, C., Grubisic, S., Balthasart, P., De Bellis, G., Castiglioni, B., Rizzi, E., Frosini, A., Sivonen, K., Rajaniemi, P., Rantala, A., Kuuppo, P., Lepistö, L., Ventura, S., Mugnai, M.A., Turichia, S., Tedioli, G., Henderson, P., Seaby, R., Hoffmann, L., Willame, R., Komarek, J., Komárková,

J., Hrouzek, P., Zalewski, M., Tarczynska, M., Mankiewicz, J., Zydorczyk, K. & Jurczak, T.

title and journal (name, number, pages):

MIcrobial DIversity CHIP database

**citation of the metadata:**

author(s):

Lara Y., Wilmotte A., Sivonen K., De Bellis G., Kuuppo P., Ventura S., Montarani B., Henderson P., Hoffmann L., Zalewski M. & Komárek J.

title and journal (name, number, pages):

Metadata compilation for the MIDI-CHIP dataset. *Freshwater Metadata Journal* 37: 1-8

year:

2018

doi:

<https://doi.org/10.15504/fmj.2018.37>

**dataset related references:**

reference 1:

author(s):

Boutte, C., Mankiewicz-Boczek, J., Komarkova, J., Grubisic, S., Izydorczyk, K., Wautelet, F., Jurczak, T., Zalewski, M. & Wilmotte, A.

title:

Diversity of planktonic cyanobacteria and microcystin occurrence in Polish water bodies investigated using a polyphasic approach. *Aquatic Microbial Ecology* 51: 223-236.

year:

2008

reference 2:

author(s):

Boutte, C., Grubisic, S., Balthasart, P. & Wilmotte, A.

title:

Testing of primers for the study of cyanobacterial molecular diversity by DGGE. *Journal of Microbiological Methods* 65(3): 542-550.

year:

2006

reference 3:

author(s):

Boutte, C., Komarkova, J., Grubisic, S., Znachor, P., Bataille, A., Zapomelova, E., Gullukaya, A., Jezberova, J. & Wilmotte, A.

title:

A polyphasic approach to assess the cyanobacterial diversity of summer samples from Czech reservoirs. *Algological Studies* 117: 177-195.

year:

2005

reference 4:

author(s):

Castiglioni, B., Rizzi, E., Frosini, A., Sivonen, K., Rajaniemi, P., Rantala, A., Mugnai, M.A., Ventura, S., Wilmotte, A., Boutte, C., Grubisic, S., Balthasart, P., Consolandi, C., Bordoni, R., Mezzelani, A., Battaglia, C. & De Bellis, G.

title:

Development of a universal microarray based on the ligation detection reaction and 16S rRNA gene polymorphism to target diversity of cyanobacteria. *Applied and Environmental Microbiology* 70(12): 7161-7172.

year:

2004

reference 5:

author(s):

Rajaniemi-Wacklin, P., Rantala, A., Mugnai, M.A., Turicchia, S. & Sivonen, K.

title:

Correspondence between phylogeny and morphology of *Snowella* spp. and *Woronichinia naegeliana*, cyanobacteria commonly occurring in lakes. *Journal of Phycology* 42: 226-232.

year:

2006

reference 6:

author(s):

Rantala, A., Fewer, D.P., Hisbergues, M., Rouhiainen, L., Vaitomaa, J., Börner, T. & Sivonen, K.

title:

Phylogenetic evidence for the early evolution of microcystin synthesis. *Proceedings of the National Academy of Sciences of the United States of America* 101: 568-573.

|              |   |
|--------------|---|
| year:        | 2004  |
| reference 7: |   |
| author(s):   | Via-Ordorika, L., Fastner, J., Kurmayer, R., Hisbergues, M., Dittmann, E., Komarek, J., Erhard, M. & Chorus, I.   |
| title:       | Distribution of microcystin-producing and non-microcystin-producing <i>Microcystis</i> sp. in European freshwater bodies: detection of microcystins and microcystin genes in individual colonies. <i>Systematic and Applied Microbiology</i> 27: 592-602. |
| year:        | 2004  |
| reference 8: |   |
| author(s):   | Willame, R., Boutte, C., Grubisic, S., Balthasart, P., Wilmotte, A. & Hoffmann, L.  |
| title:       | Seasonal cyanobacterial dynamics in a mesoeutrophic reservoir: microscopic counts and DGGE (Denaturing Gradient Gel Electrophoresis). <i>Algological Studies</i> 129: 71-94.  |
| year:        | 2009  |

## General data specifications

### regional coverage of the dataset:

|                                |   |
|--------------------------------|---|
| spatial extent of the dataset: | continental   |
| continents:                    | Europe  |
| countries:                     | Europe: Belgium, Czech Republic, Finland, France, Italy, Luxembourg, Poland |

### world climatic regions according to [Köppen](#):

Group C: temperate/mesothermal climates  
 Group D: continental/microthermal climate

### freshwater ecoregions of the world (FEOW) according to [WWF](#):

Europe: Central & Western Europe

### European ecoregions according to [Illies \(WFD\)](#):

Italy, Corsica and Malta (ER3), Western Plains (ER13), Baltic Province (ER15), Fenno-Scandian Shield (ER22)

|                    |             |
|--------------------|-------------|
| ecosystem type:    | lakes/ponds |
| covered timeframe: | 2000 - 2004 |

## Site specifications

### coordinate system/grid data:

|                      |   |
|----------------------|---|
| grid data available: | no  |
| comments:            | Note that there are no coordinate data available for the sites, only local names. |

|                        |            |
|------------------------|------------|
| number of sites:       | 100 - 1000 |
| exact number of sites: | 197        |

## Biological data

|                           |                                     |
|---------------------------|-------------------------------------|
| biological data origin:   | from sampling,<br>MIDI-CHIP project |
| organism group addressed: | other group(s): cyanobacteria       |

comments: We only study the diversity of cyanobacteria.

## Sample resolution

### other group(s):

#### taxonomic resolution:

level: order, genus, species

percentage of species level data: 60

comments: *Anabaena compacta*, *Anabaena cf. affinis*, *Anabaena cf. circinalis macrospora*, *Anabaena cf. crassa*, *Anabaena cf. oscillarioides*, *Anabaena cf. spiroides*, *Anabaena circinalis*, *Anabaena compacta*, *Anabaena crassa*, *Anabaena flos-aquae*, *Anabaena lemmermannii*, *Anabaena mendotae*, *Anabaena mucosa*, *Anabaena planktonica*, *Anabaena sigmoidea*, *Anabaena solitaria*, *Anabaena spiroides*, *Anabaena vigueri*, *Anabaenopsis nadsonii*, *Anabaenopsis sp.*, *Anabaena sp.*, *Aphanizomenon aphanizomenoides*, *Aphanizomenon cf. flexuosum*, *Aphanizomenon flos-aquae*, *Aphanizomenon gracile*, *Aphanizomenon issatschenkoi*, *Aphanizomenon ovalisporum*, *Aphanizomenon sp.*, *Aphanocapsa holsatica*, *Aphanocapsa incerta*, *Aphanocapsa sp.*, *Aphanotheca minutissima (cf.)*, *Aphanotheca brevis*, *Aphanotheca microscopica*, *Aphanotheca sp.*, *Aphanotheca stagnina*, *Calothrix sp.*, *Chroococcales*, *Chroococcus sp.*, *Cyanobacterium cf. plankticum*, *Cyanobium cf. plankticum*, *Cyanobium sp.*, *Cyanodictyon imperfectum*, *Cyanosarcina sp.*, *Cyanotheca sp.*, *Cylindrospermopsis raciborskii*, *Geitleribactron pertificum*, *Geitleribactron sp.*, *Aphanocapsa*, *Geitlerinema sp.*, *Geitlerinema splendida*, *Geitlerinema splendidum*, *Gloeotrichia sp.*, *Komvophoron sp.*, *Leptolyngbya sp.*, *Limnothrix planktonica*, *Lyngbya sp.*, *Merismopedia sp.*, *Microcystis viridis*, *Microcystis aeruginosa*, *Microcystis botrys*, *Microcystis flos-aquae*, *Microcystis ichtyoblabe*, *Microcystis sp.*, *Microcystis viridis*, *Nostoc sp.*, *Nostocales*, *Oscillatoria and Spirulina*, *Oscillatoria sp.*, *Phormidium autumnale*, *Phormidium cf. autumnale*, *Phormidium sp.*, *Planktolyngbya breviarticulata*, *Planktolyngbya sp.*, *Planktothrix agardhii*, *Planktothrix sp.*, *Planktotrix rubescens*, *Plectonema sp.*, *Pleurocapsales*, *Pseudanabaena limnetica*, *Pseudanabaena mucicola*, *Pseudanabaena woronichnia*, *Pseudoanabaena galeata*, *Pseudoanabaena sp.*, *Snowella litoralis*, *Spirulina major*, *Synechocystis sp.*, *Synechococcus cf. nidulans*, *Synechococcus sp.*, *Synechococcus sp. (Aphanocapsa holsatica?)*, *Synechococcus/Cyanobium*, *Synechocystis sp.*, *Tolypothrix sp.*, *Woronichinia naegeliana*

#### taxonomic coding:

taxalist according to:

reference(s):

Komárek, J. & Anagnostidis, K. (1998)

Komárek, J. & Anagnostidis, K. (1998): *Cyanoprokaryota 1. Teil:*

*Chroococcales*. - In: Ettl, H., Gärtner, G., Heynig, H. & Mollenhauer, D. (eds):

*Süßwasserflora von Mitteleuropa 19/1*, Gustav Fischer,

Jena-Stuttgart-Lübeck-Ulm, 548 pp.

#### sample specifications:

## Other specifications

### GIS layers, shape files related to the dataset:

no data available

### availability of photos:

no

**availability of maps:** no

**quality control procedures:**

Were any quality control procedures applied to your dataset?

no

## Acknowledgements

The authors thank the Belgian Science Policy (Belspo) for funding the SAFRED project (Saving freshwater biodiversity research data) that allowed processing and publishing this data.

## References

- Boutte, C., Grubisic, S., Balthasart, P. & Wilmotte, A., 2006. Testing of primers for the study of cyanobacterial molecular diversity by DGGE. *Journal of Microbiological Methods* 65(3): 542-550.
- Boutte, C., Komarkova, J., Grubisic, S., Znachor, P., Bataille, A., Zapomelova, E., Gullukaya, A., Jezberova, J. & Wilmotte, A., 2005. A polyphasic approach to assess the cyanobacterial diversity of summer samples from Czech reservoirs. *Algological Studies* 117: 177-195.
- Boutte, C., Mankiewicz-Boczek, J., Komarkova, J., Grubisic, S., Izydorczyk, K., Wautelet, F., Jurczak, T., Zalewski, M. & Wilmotte, A., 2008. Diversity of planktonic cyanobacteria and microcystin occurrence in Polish water bodies investigated using a polyphasic approach. *Aquatic Microbial Ecology* 51: 223-236.
- Castiglioni, B., Rizzi, E., Frosini, A., Sivonen, K., Rajaniemi, P., Rantala, A., Mugnai, M.A., Ventura, S., Wilmotte, A., Boutte, C., Grubisic, S., Balthasart, P., Consolandi, C., Bordoni, R., Mezzelani, A., Battaglia, C. & De Bellis, G., 2004. Development of a universal microarray based on the ligation detection reaction and 16S rRNA gene polymorphism to target diversity of cyanobacteria. *Applied and Environmental Microbiology* 70(12): 7161-7172.
- Rajaniemi-Wacklin, P., Rantala, A., Mugnai, M.A., Turicchia, S. & Sivonen, K., 2006. Correspondence between phylogeny and morphology of *Snowella* spp. and *Woronichinia naegeliana*, cyanobacteria commonly occurring in lakes. *Journal of Phycology* 42: 226-232.
- Rantala, A., Fewer, D.P., Hisbergues, M., Rouhiainen, L., Vaitomaa, J., Börner, T. & Sivonen, K., 2004. Phylogenetic evidence for the early evolution of microcystin synthesis. *Proceedings of the National Academy of Sciences of the United States of America* 101: 568-573.
- Via-Ordorika, L., Fastner, J., Kurmayer, R., Hisbergues, M., Dittmann, E., Komarek, J., Erhard, M. & Chorus, I., 2004. Distribution of microcystin-producing and non-microcystin-producing *Microcystis* sp. in European freshwater bodies: detection of microcystins and microcystin genes in individual colonies. *Systematic and Applied Microbiology* 27: 592-602.
- Willame, R., Boutte, C., Grubisic, S., Balthasart, P., Wilmotte, A. & Hoffmann, L., 2009. Seasonal cyanobacterial dynamics in a mesoeutrophic reservoir: microscopic counts and DGGE (Denaturing Gradient Gel Electrophoresis). *Algological Studies* 129: 71-94.