Periphytic and planktonic algae records from the upper Paraná river floodplain, Brazil: an update

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ABSTRACT - (Periphytic and planktonic algae records from the upper Paraná river floodplain, Brazil: an update). The upper Paraná river floodplain is a strategic area for the Brazilian biological and environmental patrimony and contains several conservation units. We aimed to record the occurrence and the geographic distribution of microalgae in this floodplain during 30 years of research carried out by the Center for Research in Limnology, Ichthyology and Aquaculture - State University of Maringá. We consulted 80 publications (national and international journals and books published from 1986 to 2016). We considered only published works that referenced algae at the generic and infrageneric levels. The results indicated 938 species of algae (562 periphytic, 482 planktonic), which 103 co-occur in the two habitats. *Cosmarium* was the richest genera for periphyton and *Traquelomonas* for phytoplankton. This study increased the knowledge of microalgae biodiversity in Brazil and provided data for future ecological and biogeographic studies.
Keywords: freshwater, inventory, microalgae, phycologia, phytoplankton

RESUMO - (Registros de algas perifíticas e planctônicas da planície de inundação do alto rio Paraná, Brasil: uma atualização). A planície de inundação do alto rio Paraná é uma área estratégica para o patrimônio biológico brasileiro por conter várias unidades de conservação. Objetivamos registrar a ocorrência e a distribuição geográfica das microalgas ocorrentes nesta planície durante 30 anos de pesquisas realizadas na região pelo Núcleo de Pesquisas em Limnologia, Ictiologia e Aquicultura da Universidade Estadual de Maringá. Foram consultadas 80 publicações (periódicos nacionais e internacionais, e livros publicados desde 1994 até 2016), das quais foram consideradas apenas publicações que referenciam algas no nível genérico e infragenérico. Os resultados indicaram 938 espécies de algas (562 perifíticas e 482 planctônicas), das quais 103 coocorrem nos dois habitats. *Cosmarium* foi o gênero com maior número de espécies no perifíton e *Traquelomonas* para o fitoplâncton. Este estudo ampliou o conhecimento da biodiversidade de microalgas no Brasil e forneceu dados para futuros estudos ecológicos e biogeográficos.
Palavras-chave: água doce, ficoperifíton, fitoplâncton, inventário, microalgas

Introduction

Regarding the flora of aquatic organisms, algae are important contributors to overall primary productivity. They comprise a polyphyletic grouping of both prokaryotic and eukaryotic producers (autotrophic or heterotrophic protists), important on the trophic webs to act on primary productivity and as food for various herbivores. They can be defined as single-celled organisms, which do not have reproductive organs involved by sterile cell layers, with a wide variety of forms, functions and strategies (Bicudo & Menezes 2010).

Brazil has an extensive hydrographic network, rich in natural rivers, lagoons and canals, and yet, proportionally, there is scarce knowledge about

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the biodiversity and the dynamics of microalgae (Agostinho *et al*. 2004, Menezes *et al*. 2015). The continental dimensions of this country, the high diversity, lack of laboratory facilities and the high logistic cost make the records of occurrence restricted to the geographic areas of activity of the few research groups (Bicudo & Menezes 2010, Grieneisen *et al*. 2014, Menezes *et al*. 2015). Until now, the species distribution among the Brazilian states and the geopolitical regions are considered heterogeneous with predominance in southeast and south regions (Menezes *et al*. 2015).

Some surveys have been carried out to demonstrate the documented flora of these microorganisms in Brazil. Currently, Menezes *et al*. (2015) have compiled data to update the list of algae and cyanobacteria from Brazil previously published by Bicudo & Menezes (2010) in the Catalog of Plants and Fungi from Brazil (Forzza *et al*. 2010). This update showed that there are 4,747 species registered in different environments and biomes in Brazil. However, the same update also indicated that this estimate is far from the actual algal diversity present in Brazil, due to the extensive geographical area represented by this country and the gaps in scientific research.

The Brazilian southern region houses one of the main floodplains of the country, the upper Paraná river floodplain (54º20'-53º30'/24º00'-22º50'). It is located on the right margin of the last stretch of this river that is free of reservoirs in the Brazilian territory, located between the reservoirs of Porto Primavera and Itaipu. This region has a recognized strategic area for the Brazilian biological and environmental patrimony, with two federal conservation units (Ilha Grande National Park and APA of the Islands and Várzeas of the Paraná River) and one state park (Ivinheima State Park). The upper Paraná river floodplain was incorporated into the Biosphere Reserve of the Atlantic Forest-t MAB/UNESCO (Agostinho *et al*. 2004, Takemoto & Lizama 2010).

Studies in this region have been developed since 1986 by researchers from Nupélia (Center for Research in Limnology, Ichthyology and Aquaculture - State University of Maringá), who are responsible for one of the most important databases on Freshwater biology and ecology in Latin America. Plenty of information about the characteristics of the environment, fauna and flora is contained in scientific papers, technical reports (available at http://www.peld.uem.br/), and papers of diffusion, theses and dissertations of the Program of Postgraduate in Ecology of Continental Aquatic Environments of the State University of Maringá. Some researches have indicated that the freshwater microalgae of this area represent 8% of the total microalgae found in Brazilian territory (Train & Rodrigues 2004, Agostinho *et al*. 2004). Indeed, despite the number of already developed taxonomic and ecological, observational and/or experimental studies, there are still background gaps in the biodiversity of microalgae in this area. In this way, this work aimed to record and disseminate information of the microalgae (periphytic and planktonic) occurring in the upper Paraná river floodplain based on scientific papers published since 1986.

Materials and methods

Study area - The study area covers a variety of lakes with different degrees of connectivity with the Paraná River and its main tributaries (Ivinhema River and Baia River) in the upper Paraná river floodplain (54º20'-53º30'/24º00'-22º50', figure 1). The researches used in this survey include three rivers (Paraná, Ivinhema and Baia) and 20 lakes (six associated to the Paraná River- Garças, Pombas, Osmar, Clara, Carioca and Pousada; seven to Baía River- Guaraná, Maria Luiza, Porcos, Fechada, Aurélio, Pousada das Garças and Gavião; seven to Ivinheima River- Patos, Finado Raimundo, Ipoitã, Capivara, Jacaré, Peroba and Ventura).

Review of articles - To create a catalog of species and respective articles in which they are cited we use papers and books published nationally and internationally. We consult the basis of Scielo, Web of Science, Lattes platform, the library of the Program

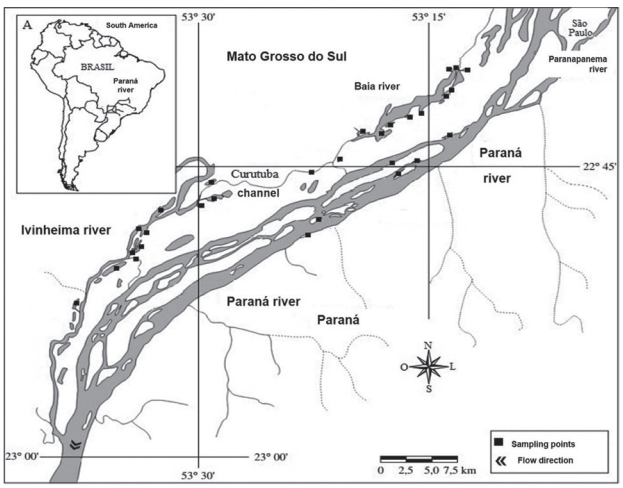

Figure 1. The upper Paraná River floodplain and environments sampled over the years until 2006.

of Postgraduate in Ecology of Continental Aquatic Environments of the State University of Maringá and Nupelia, and teachers' personal collection to do this survey.

As the goal was to look for scientific papers published since 1986, we noted that the first published works date of the year 1994. Thus, we use data from 1994 to 2016. We considered only works that referenced algae at the generic and infrageneric level (excluding studies referring only to large groups or algal biomass). Species richness was considered as the sum of specific and infraspecific taxonomic units (even if cited for more than one environment) recorded in the floodplain. We consider also the number of species registers counting the number of studies in which they are registered.

The species are presented and organized by classes, both species and classes in alphabetical order. The classification system adopted was Round (1971) for all algae classes. The species in the catalog are presented with the respective articles in which they were cited. We present the updated species name based on Algaebase (http://www.algaebase.org/) including as synonymous (=) the species name cited in each work we consulted. We also included species cited as *conferatum,* and the variety of species when were cited in the papers.

Results and Discussion

From the 80 national and international papers published in scientific journals and book chapters (taxonomic studies, ecological, experimental and observational studies) published from 1994 to 2016, we used 41 because lots of them only referring to large algae groups or algal biomass. These works encompassed 28 papers of periphytic algae and 13 of planktonic algae. The scientific published studies used are shown in table 1.

The results of the survey indicated 938 species of algae occurring in the upper Paraná river floodplain, of which 103 co-occur in both periphytic and planktonic habitats (table 2). The Chlorophyceae class was the richest one (199 taxa) followed by Zygnemaphyceae (196) (table 2). In the periphytic habitat Bacillariophyceae, Cyanophyceae and Zygnemaphyceae (figure 2) were predominant, and Chlorophyceae and Euglenophyceae in phytoplankton (figure 2).

Periphyton - The upper Paraná river floodplain of presented 562 taxa of periphytic algae (table 2) distributed into 10 classes (Bacillariophyceae, Cyanophyceae, Chlorophyceae, Chrysophyceae, Euglenophyceae, Cryptophyceae, Oedogoniophyceae, Rhodophyceae, Zygnemaphyceae and Xanthophyceae). Bacillariophyceae was the richest class (150 taxa) followed by Cyanophyceae (149 taxa) and Zygnemaphyceae (128 taxa). The richest genera were *Cosmarium* (40 species) followed by *Eunotia* (22 species) and *Staurastrum* (22 species) (table 2).

The species with the largest number of registers were *Achnanthidium minutissimun* Kützing (12 researchs), *Fragilaria capucina* Desmazières (11 researchs), *Gomphonema gracile* Ehrenberg (11 researchs), *Gomphonema parvulum* (Kützing) Kützing (10 researchs), *Leptolyngbya perelegans* (Lemmermann) Anagnostidis & Komárek = *Lyngbya perelegans* Lemmermann (10 researchs) and *Ulnaria ulna* (Nitzsch) Compère (nine researchs) (table 2).

Phytoplankton - The upper Paraná river floodplain presented 482 species of planktonic algae distributed into eight classes (Bacillariophyceae, Cyanophyceae, Chlorophyceae, Chrysophyceae, Euglenophyceae, Cryptophyceae, Zygnemaphyceae and Xanthophyceae). Chlorophyceae was the richest class (148) followed by Euglenophyceae (102) and Zygnemaphyceae (98). The richest genus was *Traquelomonas* (60), followed by *Staurastrum* (25) and *Phacus* (22) (table 2).

The species with the largest number of registers were *Aulacoseira granulata* var. *granulata* (Ehrenberg) Simonsen, *Dolichospermum circinalis* (Rabenhorst *ex* Bornet & Flahault) Wacklin, Hoffmann & Komárek (*Anabaena circinalis* Rabenhorst *ex* Bornet & Flahault) and *Trachelomonas volvocinopsis* Swirenko in six

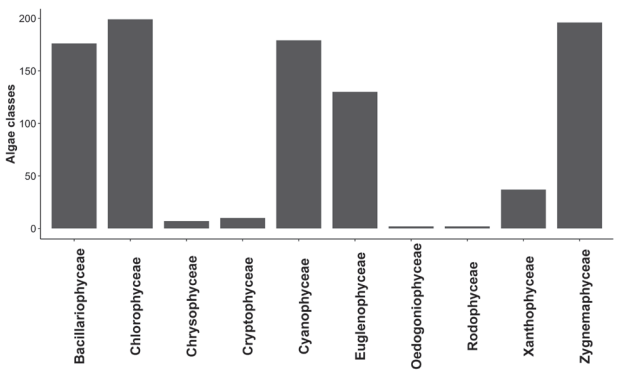

Figure 2. Proportion among taxonomic classes in the upper Paraná River floodplain.

Table 1. Periphytic and planktonic microalgae studies used in the compilation of taxa occurring in the floodplain from 1994 to 2016 (1-28: Periphytic habitat, in alphabetical order; 29-41: Planktonic habitat, in alphabetical order).

Reference	Citation	Habitat
1	Algarte & Rodrigues (2013)	Periphyton
2	Algarte *et al*. (2006)	Periphyton
3	Algarte *et al*. (2009)	Periphyton
4	Algarte *et al*. (2014)	Periphyton
5	Algarte *et al*. (2015)	Periphyton
6	Algarte *et al*. (2016)	Periphyton
7	Bichoff *et al*. (2016)	Periphyton
8	Biolo & Rodrigues (2010)	Periphyton
9	Biolo & Rodrigues (2011)	Periphyton
10	Biolo & Rodrigues (2013a)	Periphyton
11	Biolo & Rodrigues (2013b)	Periphyton
12	Biolo *et al*. (2015)	Periphyton
13	Cabral *et al*. (2014)	Periphyton
14	Dunck *et al*. (2013)	Periphyton / Phytoplankton
15	Dunck *et al*. (2015)	Periphyton
16	Dunck *et al*. (2016a)	Periphyton
17	Dunck *et al*. (2016b)	Periphyton
18	Ferreira *et al.* (2011)	Periphyton
19	Fonseca & Rodrigues (2004)	Periphyton
20	Fonseca & Rodrigues (2005)	Periphyton
21	Fonseca & Rodrigues (2007)	Periphyton
22	Mormul *et al*. (2010)	Periphyton
23	Murakami & Rodrigues (2009)	Periphyton
24	Neif *et al*. (2013)	Periphyton
25	Neif *et al*. (2014)	Periphyton
26	Osório *et al*. (2016)	Periphyton
27	Rodrigues & Bicudo (2001)	Periphyton
28	Rodrigues & Bicudo (2004)	Periphyton
29	Bortolini *et al*. (2014)	Phytoplankton
30	Bortolini *et al*. (2016)	Phytoplankton
31	Bovo-Scomparin *et al*. (2005)	Phytoplankton
32	Bovo-Scomparin *et al*. (2013)	Phytoplankton
33	Jati & Tain (1993)	Phytoplankton
34	Jati & Train (1994)	Phytoplankton
35	Moresco *et al*. (2015)	Phytoplankton
36	Oliveira *et al*. (1994)	Phytoplankton
37	Paula *et al*. (2014)	Phytoplankton
38	Rodrigues *et al*. (2009)	Phytoplankton
39	Train & Rodrigues (1998)	Phytoplankton
40	Train *et al*. (2004)	Phytoplankton
41	Train *et al*. (2000)	Phytoplankton

Table 2. Occurrence of periphytic and planktonic algae in the upper Paraná river floodplain and respective citations. The updated species name was based on Algaebase; equal symbol (=) indicates the species synonymous (heterotypic, taxonomic synonym) cited in the consulted work, and (≡) indicates the homotypic synonym (if cited in the work consulted); numerals (1 to 41) indicate the citation reference and habitat (1-28: periphytic habitat; 29-41: planktonic habitat) of the list in Table 1; asterisk (*) indicates the species common to both habitats.

Family/Species	Reference
Bacillariophyceae	
Acanthoceras magdeburgense Hongimann	40
Achnanthes inflata (Kützing) Grunow	27
Achnanthes lanceolata (Brébisson) Grunow	
≡ *Planothidium lanceolatum* (Brébisson *ex* Kützing) Lange-Bertalot	18, 27
Achnanthes rupestoides Hohn	18
Achnanthidium exiguum (Grunow) Czarnecki	
≡ *Achnanthes exigua* Grunow	2, 18, 27
Achnanthidium minutissimum (Kützing) Czarnecki	1, 2, 6, 7, 9, 10, 12, 14, 16, 18, 22, 23, 24, 27, 28*
≡ *Achnantes minutissima* Kützing	40
Amphipleura lindheimeri Grunow	7, 18, 27, 29, 40*
Amphora copulata (Kützing) Schoeman & Archibald	16, 18
Aulacoseira agassizii (Ostenfeld) Simonsen	39, 40
Aulacoseira alpigena (Grunow) Krammer	16, 18
Aulacoseira ambígua (Grunow) Simonsen	2,18,27
Aulacoseira ambigua var. *ambigua* (Grunow) Simonsen	29, 34, 39, 40
Aulacoseira ambigua var. *ambigua* f. *spiralis* (Skuja) Ludwig	40
Aulacoseira distans (Ehrenberg) Simonsen	16, 27, 29, 34, 39, 30, 40*
Aulacoseira granulata (Ehrenberg) Simonsen	2, 7, 16, 18, 23, 27, 28
Aulacoseira granulata (Ehrenberg) Simonsen var. *granulata*	29, 30, 34, 38, 39, 40
Aulacoseira granulata var. *angustissima* (Müller) Simonsen	16, 39, 40*
Aulacoseira granulata (Ehrenberg) Simonsen var. *angustissima* (Müller) Simonsen f. *curvata* Grunow	40, 41
Aulacoseira granulata (Ehrenberg) Simonsen var. *valida* (Hustedt) Simonsen	16
Aulacoseira herzogii (Lemmermann) Simonsen	15, 27, 40, 30*
Aulacoseira muzzanensis (Meister) Krammer	16, 29*
Aulacoseira pseudogranulata (Cleve-Euler) Simonsen	40
Brachysira vitrea (Grunow) Ross	
≡ *Anomoeoneis vitrea* (Grunow) Ross	23, 27
Cocconeis pediculus Ehrenberg	22
Cocconeis placentula Ehrenberg	9, 16, 18, 22, 24, 27
Craticula cuspidata (Kutzing) Mann	
≡ *Navicula cuspidata* (Kutzing) Kutzing	27
Cyclotella meneghiniana Kützing	2, 18, 23, 27, 40, 41*
Cymbella affinis Kützing	12, 18, 23, 27, 40, 41*
Cymbella gracilis (Ehrenberg) Kützing	1, 12, 23, 27
Cymbella tumida (Brébisson) Van Heurck	2, 27

continue

Table 2 (continuation)

Family/Species	Reference
Cymbopleura anglica (Lagerstedt) Krammer:	16
Diadesmis confervacea Kützing:	18
Diploneis elliptica (Kützing) Cleve:	27
Diploneis ovalis (Nielse) Cleve:	40
Diploneis subovalis Cleve: 2, 27	
Discostella stelligera (Cleve & Grunow) Holk & Klee	16, 38, 40
≡ *Cyclotella stelligera* (Cleve & Grunow) Van Heurck	22, 27, 30, 39, 41*
Encyonema angustecapitatum Krammer	16
Encyonema mesianum (Cholnoky) Mann	1, 2, 9, 10, 12, 24
≡ *Cymbella mesiana* Cholnoky	27
Encyonema minutum (Hilse) Mann	1, 2, 6, 18, 22, 23, 23, 40*
≡ *Cymbella minuta* Hilse	27, 28
Encyonema neogracile Krammer	16
Encyonema neomesianum Krammer	7, 16
Encyonema perpusillum (Cleve-Euler) Mann	18
Encyonema silesiacum (Bleisch) Mann	1, 2, 6, 7, 9, 10, 16, 18, 22, 23, 24, 40*
≡ *Cymbella silesiaca* Bleisch	27
Eunotia bilunaris (Ehrenberg) Schaarschmidt	16, 18, 23, 27
= *Eunotia curvata* (Kützing) Lagerstedt	2
Eunotia camelus Ehrenberg	16, 23, 27, 39, 40*
Eunotia cf. *serra* Ehrenberg	2
Eunotia didyma Grunow	2, 16
Eunotia didyma var. *didyma* Grunow	40
Eunotia excelsa (Krasske) Nörpel	
= *Eunotia rabenhorstii* Cleve *et* Grunow	2
Eunotia faba (Ehrenberg) Grunow	10
Eunotia flexuosa (Brébisson *ex* Kützing) Kützing	2, 9, 16, 23, 24, 27, 40*
Eunotia incisa Smith *ex* Gregory	16, 23, 27
Eunotia indica Grunow	6
Eunotia intermedia (Krasske *ex* Hustedt) Nörpel & Lange-Bertalot	10, 12
Eunotia lineolata Hustedt	2, 23, 27, 40*
Eunotia major (Smith) Rabenhorst	10
Eunotia minor (Kützing) Grunow	9, 18, 22, 23, 24, 27
Eunotia monodon Ehrenberg	18, 39, 40*
Eunotia neomundana Metzeltin & Lange-Bertalot	10
Eunotia nymanniana Grunow	2
Eunotia pectinalis (Kützing) Rabenhorst	10, 18, 23, 27
Eunotia praerupta Ehrenberg	18, 23, 27
Eunotia rabenhorstiana (Grunow) Hustedt	16
Eunotia sudetica Müller:	2, 7, 23, 27
Eunotia zygodon Ehrenberg	16
Fragilaria capucina Desmazières	2, 6, 7, 70, 10, 11, 14, 23, 24, 25, 27, 28, 39, 40*

continue

Table 2 (continuation)

Family/Species	Reference
Fragilaria goulardii (Brébisson *ex* Grunow) Lange-Bertalot	27
= *Synedra goulardii* Brébisson *ex* Cleve & Grunow	6, 7, 22, 25
Fragilaria gracilis Østrup	14
Fragilaria rumpens (Kützing) Carlson	22
Fragilaria tenera (Smith) Lange-Bertalot	10, 11, 25
Fragilaria ulna (Nitzsch) Lange-Bertalot	27
Fragilariforma javanica (Hustedt) Wetzel, Morales & Ector	
≡ *Fragilaria javanica* Hustedt:	14
Frustulia cf. *zizkae* Lange-Bertalot	6
Frustulia pumilio Lange-Bertalot & Rumrich	7
Frustulia rhomboides (Ehrenberg) De Toni	2, 23, 25, 27, 40, 41*
Frustulia saxonica Rabenhorst:	7, 14
Frustulia vulgaris (Thwaites) Toni	40
Gomphoneis clevei (Fricke) Gil	
≡ *Gomphonema clevei* Fricke	10, 23, 25
Gomphonema affine Kützing	2, 23, 24, 25, 26, 27
Gomphonema angustatum (Kützing) Rabenhorst	26
Gomphonema angustum Agardh	22, 27
Gomphonema augur Ehrenberg	2, 7, 14, 23, 25, 27, 40, 41*
Gomphonema brasiliense Grunow	1, 2, 7, 10, 11, 23, 25, 26
Gomphonema costei Metzeltin & Lange-Bertalot	26
Gomphonema gracile Ehrenberg	1, 2, 6, 7, 10, 11, 14, 22, 23, 24, 25, 27, 40*
Gomphonema insigne Gregory	7
Gomphonema lagenula Kützing	26
Gomphonema laticollum Reichardt	26
Gomphonema subclavatum (Grunow) Grunow var. *mexicanum* (Grunow) Patrick	
= *Gomphonema mexicanum* Grunow	7, 26
Gomphonema neonasutum Lange-Bertalot & Reichardt	26
Gomphonema parvulum (Kützing) Kützing:	2, 6, 7, 10, 14, 22, 23, 25, 26, 27, 28, 40*
Gomphonema pseudoaugur Lange-Bertalot	2
Gomphonema pumilum (Grunow) Reichardt & Lange-Bertalot	7, 24, 26
Gomphonema salae Lange-Bertalot & Reichardt	26
Gomphonema sphaerophorum Ehrenberg	26
Gomphonema subtile Ehrenberg	1, 2, 14, 23, 26, 27, 40*
Gomphonema truncatum Ehrenberg	10, 23, 25, 27, 40*
Gomphonema turris Ehrenberg:	7, 14
Gomphonema turris Ehrenberg var. *coarctata* (Frenguelli) Frenguelli	26
Gyrosigma cf. *spencerii* (Smith) Griffith & Henfrey	40
Gyrosigma sciotense (Sullivan & Wormley) Cleve	
= *Gyrosigma nodiferum* (Grunow) Reimer	27
Gyrosigma scalproides (Rabenhorst) Cleve	25

continue

Table 2 (continuation)

Family/Species	Reference
Hantzschia amphioxys (Ehrenberg) Grunow	27, 40*
Hippodonta capitata (Ehrenberg) Lange-Bertalot, Metzeltin & Witkowski	
≡ *Navicula capitata* Ehrenberg	27
Humidophila contenta (Grunow) Lowe, Kociolek, Johansen, Van de Vijver, Lange-Bertalot & Kopalová	
≡ *Navicula contenta* Grunow	27
Hydrosera whampoensis (Schwarz) Deby	24
Iconella delicatissima (Lewis) Ruck & Nakov	
≡ *Stenopterobia delicatissima* (Lewis) Brébisson *ex* Van Heurck	14
Iconella linearis (Smith) Ruck & Nakov	
≡ *Surirella linearis* Smith	24, 27
Iconella tenera (Gregory) Ruck & Nakov	
≡ *Surirella tenera* Gregory	14, 27
Luticola mutica (Kützing) Mann	
≡ *Navicula mutica* Kützing	27
Melosira varians Agardh	2, 7, 14, 25, 27, 28, 40*
Navicula cf. *capitatoradiata* Germain	25
Navicula cf. *cryptocephala* Kützing	23
Navicula cf. *reinhardtii* (Grunow) Grunow	40
Navicula cf. *trivialis* Lange-Bertalot	10
Navicula cryptocephala Kützing	2, 6, 14, 23, 24, 27, 40*
Navicula cryptotenella Lange-Bertalot	1, 7, 25
Navicula halophila (Grunow) Cleve	40
Navicula radiosa Kützing	27
Navicula schroeteri Meister	25, 27, 40*
Navicula viridula (Kützing) Ehrenberg	23, 25, 27
Neidium affine (Ehrenberg) Pfitzer	37
Neidium iridis (Ehrenberg) Cleve	40
Nitzschia acicularis (Kützing) Smith	27, 39, 40*
Nitzschia amphibia Grunow	2, 6, 10, 23, 24, 25, 27
Nitzschia clausii Hantzsch:	7, 27
Nitzschia filiformis (Smith) Van Heurck	40
Nitzschia gracilis Hantzsch	39, 40
Nitzschia ignorata Krasske	2, 25
Nitzschia linearis Smith	10, 11, 24, 25
Nitzschia palea (Kützing) Smith	2, 7, 10, 11, 14, 23, 25, 27, 28, 39, 40, 41*
Nitzschia sigma (Kützing) Smith	27
Nitzschia sigmoidea (Nitzsch) Smith	22
Pantocsekiella kuetzingiana (Thwaites) Kiss & Ács	
≡ *Cyclotella kuetzingiana* Thwaites	27
Pinnularia acrosphaeria Smith:	6, 14, 27, 41

continue

Table 2 (continuation)

Family/Species	Reference
Pinnularia cf. *doeringii* (Frenguelli) Mills	24
Pinnularia cf. *gibba* Ehrenberg	25
Pinnularia cf. *microstauron* (Ehrenberg) Cleve	40
Pinnularia brauniana (Grunow) Studnicka	
= *Pinnularia braunii* (Grunow) Cleve	23, 27, 41*
Pinnularia divergens Smith	27
Pinnularia gibba Ehrenberg:	27, 40, 41*
Pinnularia latarea Krammer	7
Pinnularia major (Kützing) Rabenhorst	40
Pinnularia mesolepta (Ehrenberg) Smith	2, 39, 40
Pinnularia microstauron (Ehrenberg) Cleve	2, 27
Pinnularia obscura Krasske	2
Pinnularia rupestris Hantzsch:	39, 40
Pinnularia subcapitata Gregory	40
Pinnularia termitina (Ehrenberg) Patrick	27
Placoneis constans (Hustedt) Cox	
≡ *Navicula constans* Hustedt	25, 27
Placoneis disparilis (Hustedt) Metzeltin & Lange-Bertalot	
≡ *Navicula disparilis* Hustedt	27
Pleurosira laevis (Ehrenberg) Compère	40
Pseudostaurosira elliptica (Schumann) Edlund, Morales & Spaulding	
≡ *Staurosira elliptica* (Schumann) Williams & Round	1
Sellaphora pupula (Kützing) Mereschkovsky	2, 23, 25, 27
≡ *Navicula pupula* Kützing	27
Stauroneis phoenicenteron (Nitzsch) Ehrenberg	27, 40*
Stenopterobia pelagica Hustedt	2
Surirella angusta Kützing	7, 14, 27
Surirella cf. *linearis* Smith	29, 39, 40
Surirella robusta Ehrenberg	14
Surirella tenera var. *nervosa* Schmidt	39, 40
Terpsinoë musica Ehrenberg	24
Thalassiosira weissflogii (Grunow) Fryxell & Hasle	39, 40, 41
Ulnaria delicatissima (Smith) Aboal & Silva	
≡ *Fragilaria delicatissima* (Smith) Lange-Bertalot	14
Ulnaria ulna (Nitzsch) Compère	1, 6, 7, 10, 11, 14, 22, 23, 24, 25*
≡ *Synedra ulna* (Nitzsch) Ehrenberg	2, 34, 40, 41
Urosolenia eriensis (Smith) Round & Crawford	29, 39, 40, 41
Urosolenia eriensis var. *morsa* (West & West)	39, 40
Urosolenia longiseta (Zacharias) Round & Crawford	39, 40, 41
Chlorophyceae	
Actinastrum aciculare Playfair	40
Actinastrum gracillimum Smith	39, 40

continue

Table 2 (continuation)

Family/Species	Reference
Actinastrum hantzschii Lagerheim	40, 41
Acutodesmus acuminatus (Lagerheim) Tsarenko	
= *Scenedesmus acuminatus* (Lagerheim) Chodat	40, 41
Ankistrodesmus acerosus Komárek & Comas González	40
Ankistrodesmus arcuatus Korshikov	
≡ *Monoraphidium arcuatum* (Korshikov) Hindák	14, 28
Ankistrodesmus bernardii Komárek	40
Ankistrodesmus bibraianus (Reinsch) Korshikov	40
Ankistrodesmus densus Korshikov	40
Ankistrodesmus falcatus (Corda) Ralfs	2, 9, 16, 40*
Ankistrodesmus fusiformis Corda:	2, 16, 23, 27, 39, 40*
Ankistrodesmus gracilis (Reinsch) Korshikov	
= *Selenastrum gracile* Reinsch	39, 40, 41
Ankistrodesmus spiralis (Turner) Lemmermman	40, 41
Ankistrodesmus tortus Komárek & Comas	40
Ankistrodesmus turneri (West & West) Komárek & Comas	40
Ankyra ancora (Smith) Fott	40
Ankyra judayi (Smith) Fott	1, 40*
Ankyra ocellata (Korshikov) Fott	40
Aphanochaete repens Braun	2, 16, 27
Bicuspidella sessilis Fott	1
Botryococcus braunii Kützing	40, 41
Botryococcus protuberans West & West	39, 40
Chaetophora elegans (Roth) Agardh	7, 27
Chaetosphaeridium cf. *globosum* (Nordstedt) Klebahn	2
Characiellopsis skujae (Fott) Komárek	2, 27
Characium ambiguum Hermann	2
Characium indicum Patel & Isabella	2
Characium ornithocephalum Braun	2, 9, 27
Chlorella vulgaris (Beyerinck) Beijerinck	16
Chloromonas bichlora Ettl	40
Chloromonas paradoxa Korshikov	23, 27, 28
Closteriopsis acicularis (Chodat) Belcher & Swale	40
Closteriopsis acicularis var. *africana* Hindák	39, 40
Closteriopsis cf. *scolia* Comas	30, 40, 41
Closteriopsis langerheimi Lemmermann	40
Closteriopsis longissima (Lemmermann) Lemmermann	2, 40*
Coelastrum astroideum De Notaris	40
Coelastrum cambricum Archer	7, 27, 40*
Coelastrum microporum Nägeli	9, 40*
Coelastrum pseudomicroporum Korshikov	40, 41
Coelastrum pulchrum Schmidle	40

continue

Table 2 (continuation)

Family/Species	Reference
Coelastrum reticulatum (Dangeard) Senn	40, 41
Coenochloris hindakii Komárek	40, 41
Coenochloris planconvexa Hindák	40
Coenocystis asymmetrica Komárek	18
Coleochaete cf. *orbicularis* Pringsheim	27
Coleochaete irregularis Pringsheim	1
Coleochaete orbicularis Pringsheim	2
Crucigenia fenestrata (Schmidle) Schmidle	40
Crucigenia quadrata Morren	40
Crucigenia tetrapedia (Kirchner) West & West	16, 27, 28, 40, 41*
Crucigeniella apiculata (Lemmermman) Komárek	40
Crucigeniella pulchra (West & West) Komárek	40, 41
Desmodesmus abundans (Kirchner) Hegewald	40
Desmodesmus armatus var. *armatus* (Chodat) Hegewald	40
Desmodesmus armatus var. *bicaudatus* (Guglielmetti) Hegewald ≡ *Scenedesmus bicaudatus* (Hansgirg) Chodat	40
Desmodesmus armatus var. *spinosus* (Fritsch & Rick) Hegewald	40
Desmodesmus brasiliensis (Bohlin) Hegewald	9, 12, 18
Desmodesmus cf. *lefevrei* (Deflandre) An, Friedl & Hegewald	40
Desmodesmus brevispina (Smith) Chodat = *Scenedesmus brevispina* (Smith) Chodat	39
Desmodesmus spinosus (Chodat) Hegewald ≡ *Scenedesmus* cf. *spinosus* Chodat	24
Desmodesmus communis (Hegewald) Hegewald =*Scenedesmus quadricauda* Corda	9 39, 40, 41
Desmodesmus denticulatus (Lagerheim) An, Friedl & Hegewald ≡ *Scenedesmus denticulatus* Lagerheim	9 2, 27
Desmodesmus denticulatus var. *denticulatus* (Lagerheim) An, Friedl & Hegewald ≡ *Scenedesmus denticulatus* Lagerheim	40, 41
Desmodesmus denticulatus var. *fenestratus* (Teiling) Hegewald	40
Desmodesmus denticulatus var. *linearis* (Hansgirg) Hegewald	40
Desmodesmus intermedius var. *intermedius* (Chodat) Hegewald	40
Desmodesmus maximus (West & West) Hegewald	40
Desmodesmus protuberans (Fritsch & Rich) Hegewald	40
Desmodesmus serratus (Corda) An, Friedl & Hegewald	40
Dictyosphaerium ehrenbergianum Nageli	2, 39, 40, 41*
Dictyosphaerium elegans Bachmann	39, 40, 41
Dictyosphaerium sphagnale Hindák	40
Dictyosphaerium tetrachotomum Printz	40
Dimorphococcus cordatus Wolle	40
Dimorphococcus lunatus Braun	2, 27, 40*

continue

Table 2 (continuation)

Family/Species	Reference
Drepanochloris uherkovichii Marvan, Komárek & Comas	
= *Drepanochloris uherkovichii* Marvan	28
Elakatothrix gelatinosa Wille	40
Elakatothrix viridis (Snow) Printz	40
Eudorina elegans Ehrenberg	40
Eutetramorus cf. *polycoccus* (Korshikov) Komárek	40
Eutetramorus fottii (Hindák) Komárek	40, 41
Eutetramorus globosus Walton	40
Eutetramorus planctonicus (Korshikov) Bourrelly	39, 40
Fusola cf. *viridis* Snow	2
Fusola viridis Snow	40
Gloeocystis cf. *vesiculosa* Nägeli	2, 25
Golenkinia paucispina West & West	40
Golenkinia radiata Chodat	40, 41
Hindakochloris insularis Comas	40
Kirchneriella contorta Schmidle Bohlin	40
Kirchneriella contorta var. *elongata* (Smith) Komárek	40
Kirchneriella cornuta Korshikov	40
Kirchneriella dianae (Bohlin) Comas	40
Kirchneriella irregularis (Smith) Korshikov	39, 40
Kirchneriella lunaris (Kirchner) Möbius	27, 40, 41*
Kirchneriella obese (West) West & West	2, 27, 39, 40*
Klebsormidium subtile (Kützing) Mikhailyuk, Glaser, Holzinger & Karsten	
≡ *Ulothrix subtilissima* Rabenhorst	27
Lagerheimia chodatii Bernard	40
Lagerheimia ciliata (Lagerheim) Chodat	40
Messastrum gracile (Reinsch) Garcia	
≡ *Ankistrodesmus gracilis* (Reinsch) Korshikov	2
≡ *Selenastrum gracile* Reinsch	2, 24
Micractinium bornhemiense (Conrad) Korshikov	40
Micractinium pusillum Fresenius	40, 41
Monactinus simplex (Meyen) Corda	
≡ *Pediastrum simplex* var. *simplex* Meyen	40
Monoraphidium arcuatum (Korshikov) Hindák	39, 40, 41
Monoraphidium caribeum Hindák	40
Monoraphidium cf. *contortum* (Thuret) Komárková-Legnerová	28
Monoraphidium cf. *griffithii* (Berkeley) Komárková-Legnerová	2
Monoraphidium circinale Nygaard	14, 40 *
Monoraphidium contortum (Thuret) Komárková-Legnerová	14, 30, 39, 40*
Monoraphidium convolutum (Corda) Komárková-Legnerová	30, 39, 40
Monoraphidium fontinali Hindák	39, 40
Monoraphidium griffithii (Berkeley) Komárková-Legnerová	14, 30, 40*

continue

Table 2 (continuation)

Family/Species	Reference
Monoraphidium irregulare (Smith) Komárková-Legnerová	39, 40, 41
Monoraphidium komarkovae Nygaard	39, 40
Monoraphidium minutum (Nägeli) Komárková-Legnerová	1, 39, 40*
Monoraphidium pusillum (Printz) Komárková-Legnorová	27, 40*
Monoraphidium tortile (West & West) Komárková-Legnerová	39, 40, 41
Mucidosphaerium pulchellum (Wood) Bock, Proschold & Krienitz	
≡ *Dictyosphaerium pulchellum* Wood	2, 9, 27, 39, 40, 41*
Nephrocytium limneticum (Smith) Smith	40
Oocystis borgei Snow	39, 40, 41
Oocystis lacustris Chodat	39, 40, 41
Oocystis solitaria Wittrock	40
= *Oocystis crassa* Wittrock	27
Pachycladella komarekii (Fott & Kovácik) Reymond	40
Pandorina morum (Muller) Bory	40, 41
Paradoxia multiseta Svirenko	40, 41
Pediastrum cf. *argentinense* Bourrelly & Tell	2
Pediastrum duplex var. *duplex* Meyen	40, 41
Pediastrum duplex Meyen	14, 16, 23, 27
Pediastrum obtusum Lucks	40
Phythelios viridis Frenzel	27
Pithophora oedogonia (Montagne) Wittrock	5
Pleudorina sphaerica Iyngar	40
Pseudobohlinia americana Bourrelly	40
Quadrigula closterioides (Bohlin) Printz	39, 40
Radiococcus planctonicus Lund	40
Raphidocelis contorta (Schmidle) Marvan, Komárek & Comas	40
Rhombocystis complanata Komárek	40
Scenedesmus acunae Comas	40
Scenedesmus alternans Reinsch	40
Scenedesmus arcuatus (Lemmermann) Lemmermann	1
Scenedesmus arcuatus var. *platydiscus* Smith	39, 40
Scenedesmus bernardii Smith.	40
Scenedesmus bicaudatus Dedusenko	2, 27
Scenedesmus bijugus (Turpin) Lagerheim	2, 7
Scenedesmus brevispina (Smith) Chodat	21
Scenedesmus ellipticus Corda	39, 40
Scenedesmus heteracanthus Guerra	40
Scenedesmus javanensis Chodat	40
Scenedesmus linearis Komárek	40
Scenedesmus microspina Chodat	40
Scenedesmus obtusus Meyen	
= *Scenedesmus ovalternus* Chodat	27, 40*

continue

Table 2 (continuation)

Family/Species	Reference
Scenedesmus quadricauda (Turpin) Brébisson	27
Scenedesmus rarciborskii Woloszynska	7
Scenedesmus seelyanum Wolle	24
Scenedesmus subspicatus Chodat	
= *Scenedesmus* cf. *gutwinskii* Chodat	24
Schroederia antillarum Komárková	40
Schroederia nitzschioides (West) Kors	40
Schroederia setigera (Schröder) Lemmermann	2, 39, 40*
Selenastrum bibraianum Reinsch	40
Selenodyctium brasiliense (Uherkovich & Schmidt) Comas & Komárek	
= *Kirchneriella roselata* Hindák	40
Sorastrum americanum (Bohlin) Schmidle	27
Sorastrum spinulosum Nägeli	40
Sphaerellopsis agloe Pascher	29, 40
Sphaerocystis schroeteri Chodat	1
Stauridium tetras (Ehrenberg) Hegewald	
≡ *Pediastrum tetras* (Ehrenberg) Ralfs	2, 7, 14, 27, 40, 41
Stigeoclonium farctum Berthold	27
Stigeoclonium tenue (Agardh) Kützing	27
Tetrachlorella alternans (Smith) Korshikov	40
Tetradesmus cf. *obliquus* (Turpin) Wynne	24
Tetradesmus dimorphus (Turpin) Wynne	
≡ *Scenedesmus dimorphus* (Turpin) Kützing	2
Tetradesmus lagerheimii Wynne & Guiry	
= *Scenedesmus acuminatus* (Lagerheim) Chodat	2, 27
Tetradesmus obliquus (Turpin) Wynne	
≡ *Scenedesmus obliquus* (Turpin) Kützing	2, 39, 40*
Tetraedron caudatum (Corda) Hansgirg	40
Tetraedron minimum (Braun) Hansgirg	23, 39, 40*
Tetraedron triangulare Korshikov	40
Tetrallantos lagerheimii Teiling	2, 40*
Tetrastrum elegans Playfair	40
Tetrastrum heteracanthum (Nordstedt) Chodat	40
Tetrastrum homoiacanthum (Hüber-Pestalozzi) Hindák	40
Tetrastrum komarekii Hindák	40
Tetrastrum triangulare (Chodat) Komárek	40
Thorakochloris nygardii Komárek	40, 41
Treubaria quadrispina (Smith) Fott & Kovácik	40
Treubaria schmidlei (Schröder) Fott & Kovácik	40
Treubaria setigera (Archer) Smith	40
Treubaria triappendiculata Bernard	40
Ulothrix aequalis Kützing	27

continue

Table 2 (continuation)

Family/Species	Reference
Uronema confervicola Lagerheim	1
Uronema intermedium Bourrelly	2, 27
Volvox aureus Ehrenberg	40
Westella botryoides (West) De Wild	40
Willea crucifera (Wolle) John, Wynne & Tsarenko	
≡ *Crucigeniella crucifera* (Wolle) Komárek	23, 27, 40*
Willea irregularis (Wille) Schmidle	40
Willea rectangularis (Braun) John, Wynne & Tsarenko	
≡ *Crucigeniella rectangularis* (Nägeli) Komárek	1, 39*
Chrysophyceae	
Bicosoeca synoica Skuja	2
Chromulina cf. *echinocystis* Conrad	39, 40
Dinobryon bavaricum Imhof	40
Dinobryon divergens Imhof	29, 39, 40
Dinobryon sertularia Ehrenberg	27, 39, 40, 41*
Salpingoeca marsonii Lemmermman	27
Synura uvella Ehrenberg	40
Cryptophyceae	
Chroomonas acuta Utermöhl	39, 40, 30
Chroomonas nordstedtii Hansgirg	39, 40
Cryptomonas brasiliensis Castro, Bicudo & Bicudo	30, 39, 40, 41
Cryptomonas cf. *tenuis* Pascher	10
Cryptomonas curvata Ehrenberg	39, 40
Cryptomonas erosa Ehrenberg	30
Cryptomonas marssonii Skuja	28, 30, 34, 38, 40*
Cryptomonas ovata Ehrenberg	40
Cryptomonas tenuis Pascher	9
Rhodomonas lacustris Pascher & Ruttner	39, 40
Cyanophyceae	
Anabaena cylindrica Lemmermann	2, 20, 21
= *Anabaena subcylindrica* Borge	21
Anabaena macrospora Klebahn	40
Anabaena sphaerica Bornet & Flahault	20, 21
Anabaena viguieri Denis & Frémy	40
Aphanizomenon flos-aquaea Ralfs *ex* Bornet & Flahault	
≡ *Aphanizomenon flosaquae* Ralfs *ex* Bornet & Flahault	21
Aphanizomenon gracile Lemmermann	40
Aphanocapsa cf. *grevillei* (Berkeley) Rabenhorst	23
Aphanocapsa delicatissima West & West	40
Aphanocapsa holsatica (Lemmermann) Cronberg & Komárek	26
Aphanocapsa incerta (Lemmermann) Cronberg & Komárek	18
Aphanocapsa koordersii Ström	
= *Aphanocapsa planctonica* (Smith) Komárek & Anagnostidis	40

continue

Table 2 (continuation)

Family/Species	Reference
Aphanocapsa parasitica (Kützing) Komárek & Anagnostidis	2, 9, 10, 12, 18, 20, 21
Aphanocapsa rivularis (Carmichael) Rabenhorst	2
Aphanothece clathrata West & West	40
Aphanothece microscopica Nägeli	18, 21
Borzia trilocularis Cohn (Gomont)	2, 18, 20, 21
Calothrix brevissima West	2, 16, 20, 21, 27
Calothrix cylindrica Frémy	21
Calothrix epiphytica West &West	2
Calothrix fusca Bornet & Flahault	27
Chamaesiphon investiens Skuja	9, 18
Chroococcus aphanocapsoides Skuja	16
Chroococcus cf. *major* Komarék & Komákova-Legnerová	21
Chroococcus disperses (Keissler) Lemmermann	1, 2, 18, 21, 36, 40*
Chroococcus minor (Kützing) Nägeli	9, 10, 18, 21
Chroococcus minutus (Kützing) Nägeli	9, 10, 18, 20, 21, 27, 28
Coelosphaerium confertum West & West	36, 40, 41
Cyanostylon microcystoides Geitler	18
Cylindrospermopsis raciborskii (Woloszynska) Seenayya & Subba Raju	
= *Cylindrospermopsis raciborskii* (Woloszynska)	2, 20, 21, 36, 40, 41*
Cylindrospermum muscicola Kützing *ex* Bornet & Flahault	20, 21, 27
Dasygloea lamyi (Gomont *ex* Gomont) Senna & Komárek	
≡ *Schizothrix lamyi* Gomont *ex* Gomont	2, 20, 21, 27
Desmonostoc muscorum (Agardh *ex* Bornet & Flahault) Hrouzek & Ventura	
≡ *Nostoc muscorum* Agardh *ex* Bornet & Flahault	20
= *Nostoc* cf. *muscorum* Agardh *ex* Bornet & Flahault	2
Dolichospermum affine (Lemmermann) Wacklin, Hoffmann & Komárek	
≡ *Anabaena affinis* (Lemmermann)	2, 20, 21
Dolichospermum circinalis (Rabenhorst *ex* Bornet & Flahault) Wacklin, Hoffmann & Komárek	
≡ *Anabaena circinalis* Rabenhorst *ex* Bornet & Flahault	30, 32, 34, 36, 40, 41
Dolichospermum planctonicum (Brunnthaler) Wacklin, Hoffmann & Komárek	
≡ *Anabaena planctonica* Brunnthaler	29, 34, 30, 40
Dolichospermum sigmoideum (Nygaard) Wacklin, Hoffmann & Komárek	
= *Anabaena circinalis* Rabenhorst *ex* Bornet & Flahault	27, 28
Dolichospermum solitarium (Klebahn) Wacklin, Hoffmann & Komárek	
≡ *Anabaena solitaria* Klebahn	27, 29, 32, 36, 40
Dolichospermum spiroides (Klebahn) Wacklin, Hoffmann & Komárek	
≡ *Anabaena spiroides* Klebahn	29, 32, 36, 40, 41
Geitleribactron periphyticum Komárek	25
Geitleribactron subaequale (Geitler) Komárek	24

continue

Table 2 (continuation)

Family/Species	Reference
Geitlerinema amphibium (Agardh *ex* Gomont) Anagnostidis	24
= *Phormidium amphibium* (Agardh *ex* Gomont) Anagnostidis & Komárek	21
= *Geitlerinema unigranulatum* (Singh) Komárek & Azevedo	21
= *Oscillatoria amphibia* Agardh *ex* Gomont:	20, 27
Geitlerinema splendidum (Greville *ex* Gomont) Anagnostidis*	
= *Geitlerinema splendidum* Anagnostidis	2, 20, 21
≡ *Oscillatoria splendida* Greville *ex* Gomont	20, 27, 41
Gloeocapsa gelatinosa Kützing	18
Gloeocapsa puntacta Nägeli	40
Gloeocapsa siderochlamys (Skuja) Starmach	2
Gloeotrichia echinulata Richter	25
Hapalosiphon arboreus West & West	2, 20, 21
Hapalosiphon cf. *hibernicus* West & West	2
Hapalosiphon luteolus West & West	2, 20
Heteroleibleinia kuetzingii (Schmidle) Compère	21
Heteroleibleinia pusilla (Hansgirg) Compère: 25	
Jaaginema cf. *subtilissimum* (Kützing *ex* Forti) Anagnostidis & Komárek	21
Jaaginema cf. *thermale* Anagnostidis	21
Jaaginema geminatum (Schwabe *ex* Gomont) Anagnostidis & Komárek	
≡ *Oscillatoria geminata* Schwabe *ex* Gomont:	20, 27
Jaaginema geminatum (Schwabe *ex* Gomont) Anagnostidis & Komárek	
= *Jaaginema geminatum* Anagnostidis & Komárek	20, 21, 23, 27
Jaaginema homogeneum (Frémy) Anagnostidis & Komárek	40
Jaaginema pseudogeminatum (Schmid) Anagnostidis & Komárek	21
Jaaginema quadripunctulatum (Brühl & Biswas) Anagnostidis & Komárek	2, 20, 21
Kamptonema proteus (Skuja) Strunecký, Komárek & Smarda	
≡ *Oscillatoria proteus* Skuja	21
Komvophoron crassum (Vozzhennikova) Anagnostidis & Komárek	21
Komvophoron schmidlei (Jaag) Anagnostidis & Komárek	20, 21
Leibleinia epiphytica (Hieronymus) Compère	
= *Leibleinia epiphytica* (Anagnostidis & Komárek)	9, 10, 11, 20, 21, 23, 24, 25
≡ *Lyngbya epiphytica* Hieronymus	27
Leibleinia subtilis (Holden) Anagnostidis & Komárek	21
Lemmermanniella obesa Azevedo, Souza & Menezes	
= *Leibleinia pellucida* (Umezaki)	2
Leptolyngbya angustissima (West &West) Anagnostidis & Komárek	10, 24
Leptolyngbya foveolara (Gomont) Anagnostidis & Komárek	9, 10, 24, 25
Leptolyngbya foveolarum (Gomont) Hansgirg	9, 10, 24, 25
Leptolyngbya fragilis (Gomont) Anagnostidis & Komárek	9, 21
≡ *Lyngbya fragilis* (Gomont) Compère	25

continue

Table 2 (continuation)

Family/Species	Reference
Leptolyngbya lagerheimii (Gomont *ex* Gomont) Anagnostidis & Komárek	25
≡ *Lyngbya lagerheimii* Gomont	21, 27
Leptolyngbya lurida (Gomont) Anagnostidis & Komárek	
≡ *Phormidium luridum* Gomont	25
= *Lyngbya gomontiana* Senna	21
Leptolyngbya perelegans (Lemmermann) Anagnostidis & Komárek	
= *Leptolyngbya perelegans* (Lemmermann)	1, 2, 9, 10, 11, 20, 21, 23, 24, 25
Leptolyngbya polysiphoniae (Frémy) Anagnostidis	
= *Lyngbya* cf. *polysiphonae* Frémy	20
Leptolyngbya purpurascens (Gomont) Anagnostidis & Komárek	21
Leptolyngbya ramosa (Petersen) Anagnostidis & Komárek	21
Leptolyngbya subtilis (West) Anagnostidis	25
Leptolyngbya tenuis (Gomont) Anagnostidis & Komárek	2, 25
= *Lyngbya comperei* Senna	21
Leptolyngbya thermalis Anagnostidis	
= *Leptolyngbya thermalis* (Lemmermann)	2, 20, 21, 40*
Leptolyngbya valderiana (Gomont) Anagnostidis & Komárek	21
Limnococcus limneticus (Lemmermann) Komárková, Jezberová, Komárek & Zapomelová)	
≡ *Chroococcus limneticus* Lemmermann	9, 18, 21, 36, 40*
Limnothrix mirabilis (Böcher) Anagnostidis	25
Lyngbya cf. *diguetii* Gomont	2
Lyngbya limnetica Lemmermann	39
Lyngbya martensiana Meneghini *ex* Gomont	27, 36*
≡ *Porphyrosiphon martensianus* (Meneghini *ex* Gomont) Anagnostidis & Komárek	9, 10, 21, 24, 25*
Lyngbya natans Hansgirg	
= *Phormidium natans* (Gomont) Senna & Compère	21
Lyngbya nigra Agardh *ex* Gomont	
= *Lyngbya nigra* (Agardh)	2, 20
Lyngbya nordgaardii Wille	27
Lyngbya pellucida Umezaki	27
Merismopedia cf. *minima* Beck	21
Merismopedia convoluta Brébisson	36, 40
Merismopedia duplex Playfair	2, 21, 27
Merismopedia glauca (Ehrenberg) Kützing	2, 21, 27, 36, 40, 41*
Merismopedia punctata Meyen	2, 20, 23, 27, 36, 40*
Merismopedia tenuissima Lemmermann	14, 21, 27, 36, 40*
Microchaete tenera Thuret *ex* Bornet & Flahault	21
Microcoleus autumnalis (Gomont) Strunecky, Komárek & Johansen	
≡ *Phormidium autumnale* Gomont	21

continue

Table 2 (continuation)

Family/Species	Reference
Microcoleus brasiliensis Borge	20, 27
Microcystis aeruginosa Kützing	14, 21, 27, 29, 32, 40, 41*
Microcystis cf. *panniformis* Komárek, Komárková-Legnerová, Sant'Anna, Azevedo & Senna	25
Microcystis smithii Komárek & Anagnostidis	40
= *Aphanocapsa pulchra* (Kützing) Rabenhorst	2, 27
Nostoc cf. *commune* Vaucher	20, 27
Nostoc cf. *spongiaeforme* Agardh *ex* Bornet & Flahault	40
Oscillatoria annae Goor	2, 20, 21, 25, 27
Oscillatoria cf. *perornata* Skuja	25
Oscillatoria limosa Agardh *ex* Gomont	20, 21, 27
Oscillatoria princeps Vaucher *ex* Gomont	
= *Oscillatoria princeps* (Vaucher)	20, 21, 25
Oscillatoria rupicola (Hansgirg) Hansgirg *ex* Forti	21
Oscillatoria sancta Kützing *ex* Gomont	2, 9, 21, 23, 24, 25, 27, 40*
Oscillatoria simplicissima Gomont	
≡ *Phormidium simplicissimum* (Gomont) Anagnostidis & Komárek	21
= *Phormidium* cf. *simplicissimum* (Gomont) Anagnostidis & Komárek	21
Oscillatoria subbrevis Schmidle	2, 20, 21, 25, 27
Oscillatoria subtilissima (Kützing) Gomont	27
Oscillatoria trichoides Szafer	21
Phormidesmis molle (Gomont) Turicchia, Ventura, Komárková & Komárek)	
≡ *Phormidium molle* Gomont	9, 10, 21, 24, 25
Phormidium cf. *favosum* Gomont	21
Phormidium cf. *willei* (Gardner)	20
Phormidium foreaui (Frémy) Umezaki & Watanabe	23
≡ *Oscillatoria foreaui* Frémy	27
Phormidium formosum (Bory *ex* Gomont) Anagnostidis & Komárek	40
Phormidium granulatum (Gardner) Anagnostidis	
= *Phormidium granulatum* (Gardner)	20, 25
≡ *Tychonema granulatum* (Gardner) Anagnostidis & Komárek	21
Phormidium irriguum (Kützing *ex* Gomont) Anagnostidis & Komárek	21
Phormidium jadinianum Gomont	21
Phormidium prolifica Gomont *ex* Gomon	21
Phormidium retzii Kützing *ex* Gomont	21
Phormidium tenue Gomont	40
Phormidium willei (Gardner) Anagnostidis & Komárek	21, 40*
Planktolyngbya tallingii Komárek & Kling	21
Planktothrix agardhii (Gomont) Anagnostidis & Komárek	21, 40*
Planktothrix mucicola Hübber-Pestalozzi & Naum	40
Planktothrix prolifica (Gomont) Anagnostidis & Komárek	
= *Planktothrix prolifica* (Gomont)	21

continue

Table 2 (continuation)

Family/Species	Reference
Porphyrosiphon cf. *versicolor* (Gomont) Anagnostidis & Komárek	24
Porphyrosiphon martensianus (Meneghini *ex* Gomont) Anagnostidis & Komárek	40
Pseudanabaena catenata Lauterborn	2, 7, 14, 21, 23
Pseudanabaena cf. *moniliformis* Komárek & Kling	28
Pseudanabaena galeata Böcher	21
Pseudanabaena limnetica (Lemmermann) Komárek	14
Pseudanabaena minima (An) Anagnostidis	25
Pseudanabaena moniliformis Komárek & Kling	2, 9, 21, 24
Pseudanabaena mucicola (Naumann & Huber-Pestalozzi) Schwabe	25, 40*
Pseudanabaena skujae Claus	14, 15
Radiocystis fernandoi Komárek & Komárková-Legnerová	14, 32, 34, 38*
Raphidiopsis mediterranea Skuja	40
Romeria gracilis (Koczwara) Koczwara	14, 40*
Scytonema chiastum Geitler	21
Scytonema mirabile Bornet	21
Spirulina laxa Smith	21
Spirulina princeps West &West	2, 21, 27
Stenomitos frigidus (Fritsch) Miscoe & Johansen ≡ *Pseudanabaena frigida* (Fritsch) Anagnostidis	1, 9, 10, 24
Synechococcus cf. *sulphuricus* Dor	21
Synechococcus elongatus (Nägeli) Nägeli	1, 21
Synechococcus mundulus Skuja	20, 21
Synechocystis aquatilis Sauvageau	20, 21, 25, 27, 38, 30, 40*
Synechocystis pevalekii Ercegovic	21
Synechocystis salina Wislouch	40
Tapinothrix stagnalis (Hansgirg) Bohunická & Johansen ≡ *Homoeothrix stagnalis* (Hansgirg) Komárek & Kovácik	25
Trichodesmium lacustre Klebahn	20, 21
Euglenophyceae	
Colacium vesiculosum Ehrenberg	13
Cryptoglena skujae Marin & Melkonian = *Phacus agilis* Skuja	25
Euglena acus var. *longissima* Deflandre	40
Euglena cf. *viridis* (Müller) Ehrenberg	2
Euglena ehrenbergii Klebs	34, 40
Euglena oxyuris Schmarda	34, 40
Euglena spirogyra var. *fusca* Klebs	34, 40
Euglena spirogyra var. *spirogyra* (Brons) Ehrenberg	34, 40
Euglena tripteris (Dujardin) Klebs	34, 40
Euglena viridis (Müller) Ehrenberg = *Euglena* oblonga Schmitz	40

continue

Table 2 (continuation)

Family/Species	Reference
Lepocinclis acus (Müller) Marin & Melkonian	
≡ *Euglena acus* Ehrenberg	2, 23, 27, 34, 40
Lepocinclis caudata (Cunha) Pascher	34, 40
Lepocinclis fusiformis (Carter) Lemmermann	34, 40
Lepocinclis spirogyroides Marin & Melkonian	
= *Euglena spirogyra* Ehrenberg	27
Lepocinclis ovum (Ehrenberg) Lemmermann	2
Lepocinclis ovum var. *globula* (Perty) Lemmermann	34, 40
Lepocinclis ovum var. *ovum* (Ehrennberg) Lemmermann	40
Lepocinclis salina Fritsch	2, 34,40*
Lepocinclis texta var. *richiana* (Conrad) Hübber-Pestalozzi	34, 40
Lepocinclis texta var. *texta* (Dujardin) Lemmermann	40
Monomorphina pyrum (Ehrenberg) Mereschkowsky	
≡ *Phacus pyrum* (Ehrenberg) Archer	40
Phacus acuminatus Stokes	2, 40*
Phacus acutus Pochmann	40
Phacus arnoldii Swirenko	40
Phacus caudatus Hübner	40
Phacus cf. *gigas* Cunha	40
Phacus cf. *megalopsis* Pochmann	40
Phacus helicoides Pochmann	40
Phacus horridus Pochmann	34, 40
Phacus indicus Skvortzov	2
Phacus lefevrei Bourrelly	34, 40
Phacus longicauda var. *attenuata* (Pochmann) Hübber-Pestalozzi	34, 40
Phacus longicauda var. *longicauda* (Ehrenberg) Dujardin	40
Phacus margaritatus Pochmann	40
Phacus orbicularis Hübner	2, 34, 40*
Phacus platalea Drezepolski	40
Phacus pleuronectes (Müller) Nitzsch *ex* Dujardin	27, 34, 40*
Phacus polytrophos Pochmann	28
Phacus stokesii Lemmermann	28
Phacus suecicus Lemmermann	40, 41
Phacus textus Pochmann	40
Phacus tortus (Lemmermann) Skvortzov	34, 40
Strombomonas argentinensis Emiliani: 34, 40	
Strombomonas ensifera var. *ensifera* (Daday) Deflandre: 40, 41	
Strombomonas ensifera var. *javanica* Hübber-Pestalozzi: 34, 40	
Strombomonas fluviatilis (Lemmermann) Deflandre	7, 34, 40, 41*
Strombomonas gibberosa (Playfair) Deflandre	27, 34, 40*
Strombomonas girardiana var. *girardiana* (Playfair) Deflandre	30, 40
Strombomonas girardiana var. *triondulata* Tell & Domitrovic	34, 40

continue

Table 2 (continuation)

Family/Species	Reference
Strombomonas ovalis (Playfair) Deflandre	30, 40
Strombomonas rotunda (Playfair) Deflandre	30, 40
Strombomonas verrucosa (Daday) Deflandre	40
Trachelomonas abrupta Swirenko	40
Trachelomonas acanthophora Stokes	40
Trachelomonas allorgei Playfair	40
Trachelomonas amphoriformis var. *granulosa* Couté & Iltis	40
Trachelomonas armata var. *armata* (Ehrenberg) Stein	2, 27, 40*
Trachelomonas armata var. *heterospina* Swirenko	34, 40
Trachelomonas armata var. *steinii* Lemmermann	33, 34, 40
Trachelomonas caudata (Ehrenberg) Stein	40
Trachelomonas cervicula Stokes	33, 34, 40
Trachemolomas cf. *mucosa* Swirenko	40
Trachelomonas cf. *varians* Skvortzov	28
Trachelomonas clamydophora Nygaard	40
Trachelomonas conica Playfair	25, 40*
Trachelomonas cupula Deflandre	34
Trachelomonas curta Cunha	39
Trachelomonas curta var. *curta* Cunha	28
Trachelomonas curta var. *minima* Tell & Domitrovic	33, 34, 40
Trachelomonas cylindrica Playfair	33, 34, 40
Trachelomonas dangeardiana Deflandre	40
Trachelomonas dastuguei Balech	33, 34, 40
Trachelomonas fragaria Deflandre	40
Trachelomonas granulata Swirenko	40
Trachelomonas hemisphaerica Emiliani	40
Trachelomonas hexangulata (Swirenko) Playfair	40
Trachelomonas hirta Cunha	40
Trachelomonas hispida var. *crenulatocollis* (Maskell) Lemmermann	40
Trachelomonas hispida (Perty) Stein var. *duplex* Deflandre	28, 40
Trachelomonas hispida var. *hispida* (Perty) Stein	9, 24, 25, 28, 30, 39*
Trachelomonas irregularis var. *irregulares* Swirenko	1, 40*
Trachelomonas lacustris var. *lacustris* Drezepolski	40
Trachelomonas lacustris var. *ovalis* Drezepolski	33, 34, 40
Trachelomonas lemmermannii Woloszynska	34
Trachelomonas levefrei Deflandre	40
Trachelomonas magdaleniana Deflandre	40
Trachelomonas malum Conrad	34, 40
Trachelomonas mangini Deflandre	40
Trachelomonas megalacantha Cunha	40
Trachelomonas minuscula Drezepolski	40
Trachelomonas naviculiformis Deflandre	40
Trachelomonas oblonga Lemmermann	33, 39, 40

continue

Table 2 (continuation)

Family/Species	Reference
Trachelomonas obovata Stokes	40
Trachelomonas parvicollis Deflandre	33, 34, 40
Trachelomonas planctonica Swirenko	40
Trachelomonas pseudobulla Swirenko	28, 40*
Trachelomonas pulcherrima Playfair	40
Trachelomonas pusilla Playfair	33, 34, 40
Trachelomonas raciborskii Woloszynska	2, 40*
Trachelomonas robusta Swirenko	25, 40*
Trachelomonas rotunda Swirenko	27, 28, 33, 34, 40*
Trachelomonas rugulosa Stein	33, 34, 39, 40
Trachelomonas rugulosa Stein f. *paralela* Tell & Domitrovic	2, 40*
Trachelomonas saccata Lemmermann	28
Trachelomonas scabra Playfair	40
Trachelomonas sculpta Balech	2, 33, 34, 40*
Trachelomonas similis var. *similis* Stokes	40, 41
Trachelomonas similis Stokes var. *spinosa* Hubber-Pestalozzi	33, 34
Trachelomonas superba Swirenko	40
Trachelomonas varians Deflandre	34, 40
Trachelomonas verrucosa Stokes	2, 25, 28, 33, 34, 40*
Trachelomonas volvocina (Ehrenberg) Ehrenberg	1, 40*
Trachelomonas volvocinopsis Swirenko	25, 28, 30, 33, 34, 39, 40, 41*
Trachelomonas woycickii Koczwara	33, 34, 40
Trachelomonas woycickii var. *pusilla* Drezepolski	40
Oedogoniophyceae	
Oedogonium reinschii Roy *ex* Hirn	2, 14, 23, 27
Oedogonium warmingianum Wittrock *ex* Hirn	23, 27
Rodophyceae	
Audouinella pygmaea (Kützing) Weber-van Bosse	7, 27
Compsopogon caeruleus (Balbis *ex* Agardh) Montagne	
= *Compsopogon leptoclados* Montagne	27
Xanthophyceae	
Acanthochloris scherffelii Pascher	8
Brachiogonium ophiaster Pascher & Ettl	31, 40
Centritractus belenophorus Lemmermann	31,40
Centritractus belonophorus (Schmidle) Lemmermann	8
Characiopsis acuta (Braun) Borzì	8, 9
Characiopsis aquilonaris Skuja	1, 2, 8, 9, 10, 18, 27
Characiopsis elegans Ettl	8, 9, 10
Characiopsis falx Pascher	9
Characiopsis longipes (Rabenhorst) Borzi	2, 27
≡ *Characiopsis longipes* (Braun) Borzi	
Characiopsis microcysticola Skuja	8
Characiopsis minor Pascher	2, 27

continue

Table 2 (continuation)

Family/Species	Reference
Characiopsis minutissima Pascher	8
Characiopsis pyriformis (Braun) Borzi	8, 9, 24, 27
Characiopsis sphagnicola Pascher	9, 18
Characiopsis subulata (Braun) Borzì	27
Characiopsis subulata (Braun) Borzì var. *ensiformis* (Hermann) Lemmermann	
≡ *Characium ensiforme* Hermann	2, 9
Gloeobotrys lunatus Ettl	31
Goniochloris cochleata Pascher & Ettl	31, 40
Goniochloris contorta (Bourrelly) Ettl	31, 40
Goniochloris fallax Fott	40
Goniochloris spinosa Pascher	31
Isthmochloron gracile (Reinsch) Skuja	31, 40
Isthmochloron lobulatum (Nägeli) Skuja	31, 40
Isthmochloron neustonica Zolacar & Pizzaro	31
Ophiocytium capitatum Wolle	2, 27, 28, 40*
Pseudostaurastrum enorme (Ralfs) Chodat	31, 40
Pseudostaurastrum limneticum (Borge) Cout & Rous	31
Tetraedriella cf. *jovetii* (Bourrelly) Bourrelly	11
Tetraedriella jovetti (Bourrelly) Bourrelly	31, 40
Tetraedriella regularis (Kützing) Fott	31, 40
Tetraedriella spinigera Skuja	31, 40
Tetraplektron cf. a*cuminatum* (Pascher) Fott	40
Tetraplektron acutum (Pascher) Fott	31, 40
Tetraplektron laevis (Bourrelly) Ettl	31, 40
Tetraplektron torsum (Turner) Dedusenko-Shchegoleva	28, 31, 40*
Tetraplektron tribulus (Pascher) Loeb	31, 40
Zygnemaphyceae	
Actinotaenium cf. *wollei* (West &West) Teiling	2, 40*
Actinotaenium cucurbitinum (Bisset) Teiling	23, 27
Actinotaenium globosum (Bulnheim) Förster *ex* Compère	2, 27
Bambusina brebissoni Kützing	40
Closterium aciculare West	40
Closterium acutum var. *variable* Brébisson	39, 40
Closterium cf. *leibleinii* Kützing	40
Closterium cf. *navicula* (Brébisson) Lütkemüller	2
Closterium closterioides (Ralfs) Louis & Peeters	2
Closterium dianae Ehrenberg *ex* Ralfs	35
Closterium gracile Brébisson	2, 16, 40*
Closterium incurvum Brébisson	2, 9, 35*
Closterium jenneri Ralfs	2, 23, 27, 35, 39, 40*
Closterium kuetzingii Brébisson	2, 16, 27
Closterium leibleinii Kützing *ex* Ralfs	7, 27

continue

Table 2 (continuation)

Family/Species	Reference
Closterium limneticum Lemmermann	40
Closterium lineatum Ehrenberg *ex* Ralfs	35, 40
Closterium lunula Ehrenberg & Hemprich *ex* Ralfs var. *intermedium* Gutwinski	18
Closterium malmei Borge	2
Closterium moniliferum Ehrenberg *ex* Ralfs	7
Closterium navicula (Brébisson) Lütkemüller	9, 23, 27
Closterium nordstedtii Chodat	39, 40
Closterium parvulum Nägeli	27, 40*
Closterium setaceum Ehrenberg *ex* Ralfs	2, 16, 39, 40*
Closterium subulatum (Kützing) Brébisson	27
Closterium tortum Griffiths	1
Closterium toxon West	2
Closterium tumidum Johnson	18
Closterium venus Kützing *ex* Ralfs	27
Cosmarium abbreviatum Raciborski	2, 9, 18, 22, 27, 39, 40*
Cosmarium angulare Johnson	18
Cosmarium anisochondrum Nordstedt	2
Cosmarium baileyi Wolle	9
Cosmarium bioculatum var. *canadense* Krieger & Gerloff	35
Cosmarium biretum Brébisson *ex* Ralfs:	9, 27
Cosmarium cf *granatum* Brébisson *ex* Ralfs	40
Cosmarium cf. *blyttii* Wille	2
Cosmarium cf. *hammeri* Reinsch	2
Cosmarium cf. *ocellatum* Eichler & Gütwinski	40
Cosmarium cf. *ordinatum* (Børgesen) West & West	2
Cosmarium cf. *vexatum* West	7
Cosmarium commissurale Brébisson *ex* Ralfs	2, 7
Cosmarium connatum Brébisson *ex* Ralfs	16
Cosmarium contractum Kirchner	40
Cosmarium contractum var. *minutum* (Delponte) Coesel	35
Cosmarium decoratum West & West	40
Cosmarium denticulatum Borge	27, 35, 40*
Cosmarium galeritum Nordstedt	18
Cosmarium granatum Brébisson *ex* Ralfs	2, 7, 16, 23, 27
Cosmarium humile Nordstedt *ex* Toni	2
Cosmarium impressulum Elfving	18, 23, 27, 35*
Cosmarium laeve Rabenhorst	2, 9, 24
Cosmarium lagoense Nordstedt. var. *amoebum* Forst	40
Cosmarium majae Strøm	27
Cosmarium margaritatum (Lundell) Roy & Biss	1, 23, 27, 40*
Cosmarium minimum West & West	18
Cosmarium naegelianum Brébisson	2, 27, 43*

continue

Table 2 (continuation)

Family/Species	Reference
Cosmarium norimbergense Reinsch	2
Cosmarium ornatum var. *ornatum* Ralfs *ex* Ralfs	40
Cosmarium phaseolus Brébisson *ex* Ralfs	23
Cosmarium porrectum Nordstedt	9
Cosmarium porteanum Archer	1
Cosmarium protractum (Nägeli) Bary	35
Cosmarium pseudoconnatum Nordstedt	2, 7, 16, 40*
Cosmarium pseudopyramidatum Lundell	2, 9, 18, 23, 27
Cosmarium punctulatum Brébisson	2, 9
Cosmarium pyramidatum Brébisson *ex* Ralfs	16
Cosmarium quadratulum (Gay) Toni	16
Cosmarium quadrum Lundell	27
Cosmarium regnellii Wille	2, 9, 16, 24
Cosmarium regnesi Reinsch	1, 28
Cosmarium reniforme (Ralfs) Archer	9, 24
Cosmarium subadoxum Grönblad	9, 10
Cosmarium subspeciosum Nordstedt	9
Cosmarium subtumidum var. *subtumidum* Wittrock	35
Cosmarium triangulare Borge	27
Cosmarium trilobulatum Reinsch	1, 2, 9
Cosmarium undulatum Corda *ex* Ralfs	2
Cosmarium vexatum West	9, 23
Cylindrocystis brebissonii (Ralfs) Bary	23, 27
Desmidium aptogonum Brébisson *ex* Kützing	27
Desmidium baileyi (Ralfs) Nordstedt	27
Desmidium cf. *coarctatum* Nordestedt	40
Desmidium gracilliceps (Nordstedt) Lagerh	40
Desmidium laticeps Nordstedt	40
Desmidium pseudostreptonema West & West	2
Desmidium swartzii (Agardh) Agardh *ex* Ralfs	40
Euastrum abruptum Nordstedt	35, 40
= *Euastrum* cf. *abruptum* Nordstedt	9
Euastrum abruptum var. *abruptum* Nordstedt	2
Euastrum ansatum Ehrenberg *ex* Ralfs	2
= *Euastrum inusitatum* Förster & Eckert	35, 40
Euastrum denticulatum Gay	2, 16, 23, 40*
Euastrum elegans (Brébisson) Kützing	27, 40*
Euastrum gayanum Toni	2
Euastrum gayanum var. *angulatum* Krieger	35, 40
Euastrum gemmatum (Brébisson) *ex* Ralfs	2, 27
= *Euastrum gemmatum* Ralfs	
Euastrum insulare (Wittrock) Roy	40
Euastrum intermedium var. *longicolle* Borge	35

continue

Table 2 (continuation)

Family/Species	Reference
Euastrum mononcylum (Nordstedt) Raciborski	27
Euastrum porrectum Borge	27
Euastrum pulchellum Brébisson	23, 27
Euastrum rectangulare Fritsch & Rich	7, 40*
Euastrum sinuosum Lenorm *ex* Archer	40
Gonatozygon aculeatum Hastings	40
Gonatozygon kinahanii (Archer) Rabenhorst	40
Gonatozygon monotaenium Bary	2, 14
Gonatozygon pilosum Wolle	27, 40*
Hyalotheca dissiliens Brébisson *ex* Ralfs	40
= *Hyalotheca dissiliens* (Smith) Brébisson *ex* Ralfs	2, 27
Hyalotheca mucosa (Mert) Ehrenberg *ex* Ralfs	40
Micrasterias abrupta West & West	2, 35*
Micrasterias arcuata Bailey	27
Micrasterias borgei Krieg	35
Micrasterias cf. *abrupta* West & West	24
Micrasterias cf. *borgei* Willi	2
Micrasterias foliacea Bailey *ex* Ralfs	14
Micrasterias furcata Agardh *ex* Ralfs	27, 35, 40*
= *Micrasterias radiata* Hassall *ex* West & West	2
Micrasterias laticeps Nordstedt	2, 27, 35, 40*
Micrasterias mahabuleshwarensis Hobs	24, 35*
Micrasterias radiosa Ralfs	40
Micrasterias rotata (Greve) Ralfs *ex* Ralfs	24
= *Micrasterias rotata* Ralfs	
Micrasterias truncata (Corda) Brébisson *ex* Ralfs	24, 27
= *Micrasterias truncata* Brébisson *ex* Ralfs	
Mougeotia recurva (Hassall) Toni	23, 27
Netrium digitus (Ehrenberg) Itzigsohn & Rothe	2, 23, 27
= *Netrium digitus* (Brébisson *ex* Ralfs) Itzigsohn & Rothe	
Octacanthium mucronulatum (Nordstedt) Compère	24
≡ *Arthrodesmus mucronulatus* Nordstedt	27
Onychonema laeve Nordstedt	40
Pachyphorium taxichondrum (Lundell) Palamar-Mordvintseva	2
≡ *Cosmarium* cf. *taxichondrum* Lundell	
Pleurotaenium cylindricum var. *stuhlmannii* Turner	35
Pleurotaenium ehrenbergii (Ralfs) Bary	2, 27
Pleurotaenium nodosum (Bailey *ex* Ralfs) Lundell	27
Pleurotaenium trabecula (Ehrenberg)	35
Sphaerozosma laeve (Nordstedt) Thom	40
≡ *Onychonema laeve* Nordestedt	2, 27
Spondylosium panduriforme (Heimerl) Teiling	27
Spondylosium planum (Wolle) West & West	40

continue

Table 2 (continuation)

Family/Species	Reference
Spondylosium pulchellum (Archer) Archer	27
Spondylosium pulchrum (Bailey) Archer	40
Staurastrum americanum (West & West) Smith	40
Staurastrum arctiscon (Ehrenberg *ex* Ralfs) Lundell	27
Staurastrum aristiferum Ralfs	40
Staurastrum asterias Nygaard	27
Staurastrum boergesenii var. *depauperatum* Grönblad	37
Staurastrum brachiatum Ralfs	37
Staurastrum brevispina Brébisson	2
Staurastrum cf. *cerastes* Lundell	40
Staurastrum cf. *claviferum* (Delponte) West & West	2
Staurastrum cf. *elegantissimum* Jhons	40
Staurastrum cf. *hantzschii* Reinsch	2
Staurastrum cf. *micron* West & West	2
Staurastrum cf. *nudibrachiatum* Borge	2
Staurastrum cf. *teliferum* Ralfs	2,7
Staurastrum convergens (Ehrenberg) Meneghin	2
Staurastrum gracile var. *nanum* Ralfs	37
Staurastrum hirsutum Ehrenberg *ex* Ralfs	24
Staurastrum iotanum Wolle	40
Staurastrum leptacanthum Nordstedt	2, 23, 24, 27
S*taurastrum leptacanthum* Nordstedt var. *borgei* Förster	7
Staurastrum leptocladum var. *borgei* Förster	7
Staurastrum leptocladum var. *cornutun* Wille	37
Staurastrum leptocladum var. *leptocladum* Nordst	40
Staurastrum leptocladum var. *subinsigne* Scott *et* Grönblad	40
Staurastrum longipes (Nordstedt)	40
Staurastrum margaritaceum (Ehrenberg) *ex* Ralfs	1, 7, 2, 37*
Staurastrum muticum Brébisson *ex* Ralfs	27, 40*
Staurastrum nudibranchiatum Borge	27, 40*
Staurastrum pseudosebaldi Wille	40
Staurastrum quadrangulare Brébisson	7
Staurastrum quadrispinatum Turner	2, 37*
Staurastrum rotula Nordstedt	40
Staurastrum rugulosum var. *angulare* Grönblad	37
Staurastrum sebaldi Reinsch	2
Staurastrum setigerum Cleve	2, 7, 24, 27, 40*
Staurastrum subpolymorphum Borge	37
Staurastrum tectum var. *ayayense* Grönblad	37
Staurastrum tetracerum (Kützing) Ralfs *ex* Ralfs	27, 28, 40*
Staurastrum trifidum Nordstedt	2, 7, 27, 40*
Staurastrum volans West & West	7
Staurodesmus clepsydra Nordstedt	40

continue

Table 2 (continuation)

Family/Species	Reference
Staurodesmus convergens (Ehrenberg) Teiling	2, 40*
Staurodesmus cuspidatus (Brébisson) Teiling	7, 27, 40*
Staurodesmus dejectus (Brébisson) Teiling	23, 27, 28, 40*
Staurodesmus dickiei (Ralfs) Lillieroth	7, 23, 24, 27, 40*
Staurodesmus extensus (Andersson) Teiling	40
Staurodesmus glaber (Ehrenberg) Teiling	37
Staurodesmus glaber var. *limnophilus* Ehrenberg	37
Staurodesmus lobatus (Borge) Bourr	40
Staurodesmus mucronatus var. *subtriangularis* West & West	37
Staurodesmus pachyrhynchus var. *pachyrhynchus* Nordstedt	37
Staurodesmus subulatus (Kützing) Croasd	40
Staurodesmus triangularis (Lagerheim) Teiling	40
Staurodesmus triangularis var. *limneticus* Teil	37
Staurodesmus validus (West & West) Thom	40
Staurodesmus validus var. *subvalidus* Grönblad	37
Teilingia granulata (Roy & Bisset) Bourrelly	2, 27
Xanthidium antilopaeum var. *mamillosum* f. *mediolaeve* Grönblad	37
Xanthidium canadense (Joshua) Förster	40
Xanthidium concinum Archer	37
Xanthidium trilobum Nordstedt	2, 37*

researchs each, and *Aulacoseira distans* (Ehrenberg) Simonsen and *Dolichospermum spiroides* (Klebahn) Wacklin, Hoffmann & Komárek (*Anabaena spiroides* Klebahn) in five studies (table 2). In the total of taxa, 103 co-occurring to both habitats (table 2).

Conclusion

This study indicated that, since 1994 to 2016, 80 publications of some aspect of algae of the upper Paraná river floodplain were published. From these, 41 referenced algae at the generic and infrageneric level, and the compilation of them indicated 938 species, which constitutes an expressive microalgae richness for this study area. In the total, the Chlorophyceae class was the richest one followed by Zygnemaphyceae, but in the periphytic habitat Bacillariophyceae was the richest class, and in phytoplankton Chlorophyceae class. Some of these species may not be included in the Brazilian list of algae (which now has something around 4,747 species recorded so far) and now can be included.

This study contributed to the knowledge of the Brazilian microalgae biodiversity and provided data for future ecological and biogeographic studies. This study also demonstrated the importance of long-term studies (PELD-CNPq site 6) in the survey of biodiversity. We suggest that these compilations be made also using research reports to increase information about the Brazilian flora and fauna, and improve the knowledge of Brazilian biodiversity.

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