

Diatom taxonomic composition of rivers in South and West Bulgaria

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Abstract. The study is based on 345 diatom samples from river periphyton in South and West Bulgaria. Most of the sites and rivers are studied for the first time for diatoms. Taxonomic composition is presented by 395 taxa from 74 genera. Thirty seven percent of the taxa are reported for the first time for Bulgaria. Raphid pennate species predominated: 332 species, varieties and forms from 52 genera. The most abundant genera were: *Nitzschia* – 61 taxa, *Navicula* – 45 taxa, *Gomphonema* – 45 taxa. Some rare and new species for Bulgaria (*Reimeria uniseriata*, *Gomphonema lateripunctatum*, *G. rosenstockianum* and *G. tergestinum*) are presented in LM micrographs.

Key words: Bulgaria, diatoms, rivers, taxonomy

Introduction

The taxonomic composition and distribution of diatoms in Bulgarian rivers are poorly investigated. Periphytic diatoms (especially epilithic) are one of the basic components in river biomonitoring and assessment of the ecological status of rivers, but they are not included in the Bulgarian national monitoring system of rivers because of the lack of floristic data. The only river in Bulgaria studied for diatoms (and their relation to ecological conditions) from its springs to the border is river Mesta (Passy & al. 1999). Fragmented stretches of other rivers are also studied. Some springs and streams in Mt Ograzhden were studied too (Temniskova-Topalova & Misaleva 1982). The diatom flora of the upper river Iskur and some of its tributaries in the Rila Mts was studied by Kawecka (1974). Later on, some particular aspects of the diatom flo-

ra (abundance in different sites and substrates, species diversity, etc.) and the ecological conditions (physicochemical data, etc.) of river Iskur in the Sofia region were studied by Ivanov & al. (2003a, b).

This paper is based on a study of the periphytic diatoms at 49 sites of 27 rivers and streams and five different substrates from seven river catchments in mountainous areas of South and West Bulgaria, during the period June 2000 – March 2005. Most of the sites and rivers were studied for the first time for diatoms. A list of the observed periphytic diatom species in stretches of river Iskur, their distribution in the different substrata and community analysis, and light micrographs of the most common species have been already reported (Ivanov & Kirilova 2006; Ivanov & al. 2006). A new taxon – *Achnantheidium temniskovae* Ivanov & Ector has been reported for river Mesta (Ivanov & Ector 2006).

The purpose of this paper is to enhance knowledge on periphytic diatoms in the Bulgarian rivers by presenting their taxonomic composition at the studied sites, and to provide taxonomic reference for diatom assemblages of lotic environments in Bulgaria. Concise notes on some unidentified and rare species are given.

Materials and methods

A total of 345 diatom samples were collected at 49 sites in 26 rivers and five different substrates from seven river catchments in South and West Bulgaria, during the period June 2000 – March 2005 (Fig. 1, Table 1). Thirty-six sites and 22 rivers and streams were studied for the first time. The catchment of river Iskur was sampled during the period October 2001 – March 2005. One hundred and seven samples from eight sites and five substrates – epilithon, epipelon, epiphyton on nonvascular plants, epiphyton on vascular plants and epipsammon – were collected. The sampled sites were mainly from stretches of river Iskur in the highly urbanized area of Sofia city and the town of Svoge – sites I1-I5, sampled monthly from October 2001 to August 2002 (for details see Ivanov & Kirilova 2006). The sites Jel1, Ved1 and Rad1 located not in highly urbanized mountainous regions surrounded by small villages, were sampled once in March 2005. The catchment of river Mesta was sampled seasonally during the period June 2000 – March 2005. Only epilithic samples were collected. The studied stretches of the rivers lie in mountainous regions abundant in small villages and few small towns. The sites Gla1, ChM1, Kan1, GDr1, Kr1, and Vot1 are located in the upper parts of the rivers, before any villages and towns. The catchment of river Strouma was sampled seasonally during the period June 2000 – March 2005. Only epilithic samples were collected. River Strouma was sampled at eight sites in its upper stream: from the uninhabited mountainous region of Mt Vitosha (site S1) to the Bulgarian–Greek border (site S8). The region is abundant in villages and towns. The sites Vla1, Rech1 and Sta1 located on small streams, in the mountainous, sparsely inhabited regions, were sampled once in March 2005. The sampled sites of the catchments of rivers Ogosta and Lom lie in the rural mountainous region of the

Western Stara Planina. They were sampled once in May 2004, only epilithic samples were collected. The catchment of river Arda was sampled once in August 2005. Only epilithic samples were collected. The sites A1, A2, Cher1, and Vur1 are located in mountainous rural areas. The area along river Arda between sites A3 and A6 is more densely inhabited and highly affected by three reservoirs on its course. River Trigradska was sampled in September 2004, only one epilithic sample was collected. The site Tr1 is located in an uninhabited mountainous area.

The samples were collected according to Chapter 6 of the Rapid Biomonitoring Protocols of the U. S. Environmental Protection Agency (<http://www.epa.gov/owow/nps/MMGI/Chapter6/>). Laboratory processing of the samples was carried out after Hasle & Fryxell (1970). For light microscopy, the cleaned material was mounted on permanent slides with Naphrax. Five hundred valves were counted in each sample. Light microscopy was performed with Amplival Carl Zeiss Jena and Leica DMRB, with 100× oil-immersion objectives. Determination of the diatoms was carried out primarily according to Krammer & Lange-Bertalot (1986–1991), Lange-Bertalot & Krammer (1989), Lange-Bertalot (1993, 2001), Lange-Bertalot & Metzeltin (1996), Krammer (1997a, b, 2000, 2002, 2003), Reichardt (1999, 2004), Håkansson (2002), Houk (2003), Nagumo (2003) and Werum & Lange-Bertalot (2004). The taxonomy of diatoms is according to Round & al. (1990), with some additions according to Bukhtiyarova & Round (1996), Håkansson (2002) and Krammer (2003).

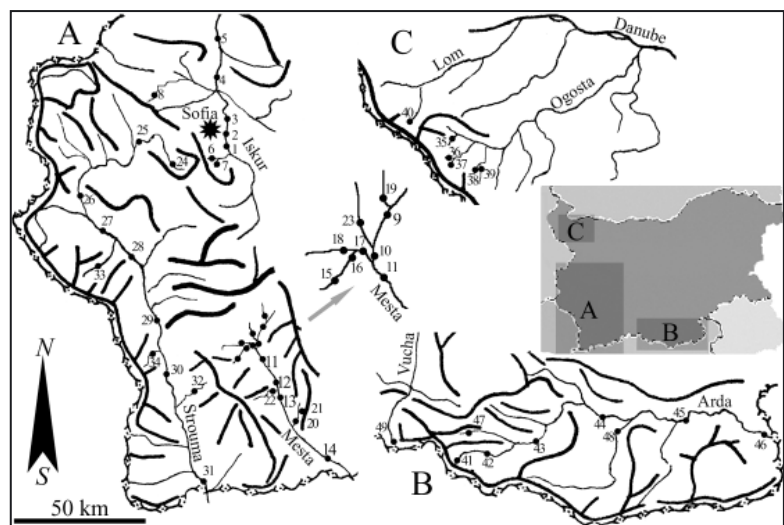


Fig. 1. Study area and sample sites (the numbered black dots). Only the main river catchments are named. For details see Table 1 and explanations in the text.

Table 1. Studied sites, catchments, rivers and localities (those studied for the first time are marked with *), substrates, and number of samples.

No of site	Name of site	Catchment	River	Locality	Substrate and number of samples				
					L	S	P	N	V
1	I1	Iskur	Iskur	before Kokalyane village	4	6	5	1	4
2	I2			camping Vrana	3	5	2	6	7
3	I3			Vrazhdebna quarter	3	6	3	6	7
4	I4			after town Novi Iskur	3	–	8	5	5
5	I5*			town Svoge	8	2	8	8	8
6	Jel1*		Zheleznishka*	before Zheleznitsa village	1	–	–	–	1
7	Ved1*		Vedena*	before Zheleznishka flow	–	–	1	–	–
8	Rad1*		Radoui*	Radoui village	1	–	–	–	–
9	M1	Mesta	Mesta	before Yakorouda	12	–	–	–	–
10	M2			Gen. Kovachev station	12	–	–	–	–
11	M3			before Banyata area	12	–	–	–	–
12	M4			bridge to Gostun village	12	–	–	–	–
13	M5			Koupena area	11	–	–	–	–
14	M6			5 km before Greece border	9	–	–	–	–
15	Gla1*		Glazne*	before town Bansko	13	–	–	–	–
16	Gla2*			before Iztok flow	1	–	–	–	–
17	Iz2		Iztok	after Glazne flow	13	–	–	–	–
18	Iz1			after town Razlog	13	–	–	–	–
19	ChM1		Cherna Mesta	before Ch. Mesta vilage	1	–	–	–	–
20	Kan1*		Kanina*	before Ognyanovo village	1	–	–	–	–
21	GDr1*		tributary of Kanina*	before G. Dryanovo village	1	–	–	–	–
22	Kr1*		Kremenska*	before Mesta	1	–	–	–	–
23	Vot1*		Votruchka*	before Belitsa village	1	–	–	–	–
24	S1*	Strouma*	Strouma*	before Bosnek village	6	–	–	–	–
25	S2*			after town Pernik	12	–	–	–	–
26	S3*			before Ruzhdavitsa village	12	–	–	–	–
27	S4*			Nevestino village	11	–	–	–	–
28	S5*			town Boboshevo	11	–	–	–	–
29	S6*			after town Blagoevgrad	12	–	–	–	–
30	S7*			before Kresna gorge	12	–	–	–	–
31	S8*			5 km before Greece border	11	–	–	–	–
32	Vla1*		Vlahinska*	after Vlahi village	1	–	–	–	–
33	Rech1*		Rechitsa*	before Vaksino village	1	–	–	–	–
34	Sta1*		Stara*	before Strouma	1	–	–	–	–
35	Pr1*	Ogosta*	tributary of Prevalaska*	before G. Luka village	1	–	–	–	–
36	Og1*		Ogosta*	before Martinovo village	1	–	–	–	–
37	Chip1*		Chiprovska*	before town Chiprovtsi	1	–	–	–	–
38	Kop1*		Kopilovska*	before Kopilovtsi village	1	–	–	–	–
39	Kop2*		Dobrutska*	before Kopilovtsi village	1	–	–	–	–
40	Chup1*	Lom*	Chouprenska*	before Chouprene village	1	–	–	–	–
41	A1*	Arda*	Arda*	before Arda village	1	–	–	–	–
42	A2*			before town Roudozem	1	–	–	–	–
43	A3*			after Vehtino village	1	–	–	–	–
44	A4*			town Kurdzhali	1	–	–	–	–
45	A5*			Oreshare bridge	1	–	–	–	–
46	A6*			after Ivaylovgrad reservoir	1	–	–	–	–
47	Cher1*		Cherna*	before town Smolyan	1	–	–	–	–
48	Vur1*		Vurbitsa*	Dzhebel station	1	–	–	–	–
49	Tr1*	Vucha*	Trigradska*	before Kesten village	1	–	–	–	–
Total	49	7	26		241	19	27	26	32

L – epilithon; S – epipsammon; P – epipelon; N – epiphyton from nonvascular plants; V – epiphyton from vascular plants.

Results and discussion

The taxonomic composition of periphytic diatoms of the studied rivers was presented by 395 taxa (331 species, 58 varieties, 5 forms and 1 morphotype) from 74 genera, 32 families, 15 orders and 3 classes. Thirty seven percent of the taxa (127 species, 18 varieties and 1 form) were reported for the first time for Bulgaria and one new species is described: *Achnantheidium temniskovae* (Ivanov & Ector 2006). The raphid pennate species (class *Bacillariophyceae*) predominated: 332 species, varieties and forms (84 % of all) from 52 genera (70 % of all). The most abundant genera of the class *Bacillariophyceae* were: *Nitzschia* – 61 taxa (15 %), *Navicula* – 45 taxa (11 %), *Gomphonema* – 34 taxa (9 %), *Pinnularia* – 19 taxa (5 %), *Cymbella* – 17 taxa (4 %), and *Encyonema* – 10 taxa (3 %). The araphid pennate species (class *Fragilariophyceae*) were presented by 38 species, varieties, forms and morphotypes (10 % of all) from 13 genera (18 % of all). The most abundant genera of the class *Fragilariophyceae* were: *Fragilaria* – 13 taxa (3 %), *Diatoma* – 8 taxa (2 %) and *Staurosira* – 5 taxa (1 %). The centric diatoms (class *Coscinodiscophyceae*) were presented by 25 species, varieties and forms (6 % of all) from nine genera (12 % of all). The most abundant genera of the class *Coscinodiscophyceae* were: *Cyclotella* – 6 taxa (2 %), *Stephanodiscus* – 6 taxa (2 %), and *Aulacoseira* – 5 taxa (1 %). There were 2 unidentified species from *Gomphonema*, one from *Achnantheidium* and one from *Nitzschia*. Nine taxa were probably determined to the species level (aff.).

The taxonomic composition of diatoms found at the sites and substrates is presented in the list below. The new taxa for Bulgaria are marked with asterisk (*). The abbreviations after the names of the sites show the substrate where the diatoms were found: L – in epilithon, S – in epipsammon, P – in epipelon, N – in epiphyton from nonvascular plants, V – in epiphyton from vascular plants.

BACILLARIOPHYTA

Coscinodiscophyceae

Thalassiosirales Glezer & I.V. Makarova

Thalassiosiraceae M. Lebour

Thalassiosira Cleve

**T. weissflogii* (Grunow) G.A. Fryxell & Hasle (S6L)

Stephanodiscaceae Glezer & I.V. Makarova

Cyclotella (Kütz.) Bréb.

**C. atomus* Hust. (S6L); *C. aff. bodanica* *var. *lemanica* (O. Müll. ex Schröt.) Bachmann (S6L); *C. iris* Brun & Hérib. (S6L); *C. meneghiniana* Kütz. (I2L, I2N, I2P, I2S, I2V, I3L, I3N, I3P, I3S, I3V, I4L, I4N, I4P, I4V, I5L, I5N, I5P, I5S, I5V, Iz2L, M1L, M2L, M3L, M4L, M5L, Iz1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Vur1L); *C. ocellata* Pant. (I1V, I2L, I2N, I2P, I2S, I2V, I3N, I3P, I3V, I4L, I5L, I5N, I5P, I5V, M1L, M3L, S3L); **C. polymorpha* Meyer & Håk. (S6L)

Cyclostephanos Round

S. dubius (Fricke) Round (I2L, I2P, I2S, I3L, I3S, I4P, I5L, I5P, Iz2L, M4L, S3L, S6L, S8L); **C. invisitatus* (Hohn & Helleman) E.C. Ther., Stoermer & Håk. (S6L)

Stephanodiscus Ehrenb.

S. hantzschii Grunow (S4L, S5L, S6L, S7L, S8L); *S. medius* Håk. (I5P); *S. minutulus* (Kütz.) Cleve & Möller 1878 (S3L, S5L, S6L, S7L, S8L); *S. parvus* Stoermer & Håk. (Gla1L, M5L, S2L, S4L, S6L); **S. tenuis* Hust. (S4L, S5L); **S. aff. transsylvanicus* Pant. (Iz2L)

Puncticulata Håk.

P. aff. bodanica (Grunow) Håk. (I2S, I2V, I3S); *P. radiosa* (Lemmermann) Håk. (A4L, M4L, S3L, S4L, S5L, S6L, S7L)

Melosirales R.M. Crawford

Melosiraceae Kütz.

Melosira C. Agardh

M. varians C. Agardh (A3L, I1L, I1N, I1P, I1S, I1V, I2L, I2N, I2P, I2S, I2V, I3L, I3N, I3P, I3S, I3V, I4L, I4N, I4P, I4V, I5L, I5N, I5P, I5S, I5V, Iz2L, M1L, M3L, M4L, M5L, M6L, Iz1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Vur1L)

Aulacoseirales R.M. Crawford

Aulacoseiraceae R.M. Crawford

Aulacoseira Thwaites

A. ambigua (Grunow) Simonsen (I1S, I2N, I2P, I2S, I2V, I3N, I3P, I3S, I3V, I4P, I4V, I5N, I5P, I5V, S3L, S8L); *A. granulata* (Ehrenb.) Simonsen (I1N, I1P, I2L, I2N, I2P, I2S, I2V, I3L, I3N, I3P, I3S, I3V, I4N, I4P, I4V, I5N, I5P, I5S, I5V, S6L); *A. islandica* (O.F. Müller) Simonsen (I2P); *A. italica* (Ehrenb.) Simonsen (I2V, I3V, I4P, I5V); *A. subarctica* (O.F. Müller) E.Y. Haw. (Iz2L Iz1L S4L)

Orthoseirales R.M. Crawford

Orthoseiraceae R.M. Crawford

Orthoseira (Ehrenb.) R.M. Crawford

O. roeseana (Rabenh.) O'Meara (M1L)

Coscinodiscales Round & R.M. Crawford

Hemidiscaceae Hendey

Actinocyclus Ehrenb.

A. normanii (Greg. ex Grev.) Hust. (S6L)

Fragilariophyceae

Fragilariales Silva

Fragilariaceae Greville

Fragilaria Lyngb.

F. capucina *var. *amphicephala* (Grunow) Lange-Bert. (I5P); *F. capucina* *var. *austriaca* (Grunow) Lange-Bert. (I2N); *F. capucina* *var. *capitellata* (Grunow) Lange-Bert. (I1L, I1S, I1V, I4N, Gla2L, M1L, M2L, M3L, M4L, M5L, Iz1L, Rech1L, S1L, S2L, S3L, S5L, S7L, Sta1L, Ved1P); *F. capucina* var. *capucina* Desmazieres (A4L, Cher1L, Gla1L, I1V, I2N, I4N, I4P, I5L, I5N, I5P, I5V, Gla2L, Iz2L, Jel1V, Kan1L, Kop1L, M1L, M2L, M3L,

M4L, M5L, M6L, S1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Rad1L, Iz1L, Vot1L, Vur1L); *F. capucina* *var. *perminuta* (Grunow) Lange-Bert. (S1L, S4L); *F. capucina* var. *rumpens* (Kütz.) Lange-Bert. ex Bukhtiyarova (Chup1L, Gla1L, I1P, I1S, I1V, I5L, I5N, I5P, I5S, Gla2L, Iz2L, Kop1L, M1L, M3L, M4L, Iz1L, S1L, S4L, S6L, S7L, S8L, Tr1L); *F. capucina* var. *vaucheriae* (Kütz.) Lange-Bert. (Chup1L, Gla1L, I1L, I1P, I1S, I1V, I2L, I2N, I2P, I2V, I3P, I3V, I4L, I4N, I4P, I4V, I5L, I5N, I5V, Iz2L, Jel1V, M1L, M2L, M5L, M6L, Pr1L, Iz1L, S1L, S3L, S4L, S5L, S6L, S7L, S8L, Tr1L); *F. crotonensis* Kitton (A5L, A6L, I2N, I2P, I2S, M2L); *F. gracilis* Østrup (Gla1L, I1P, I5P, M1L, S6L); **F. henryi* Lange-Bert. (I4P, I5P); *F. neoproducta* Lange-Bert. (I2P, I4P); *F. ulna* (Nitzsch) Lange-Bert. (A3L, A6L, Gla1L, I1L, I1P, I1S, I1V, I2L, I2N, I2S, I2V, I3L, I3N, I3P, I3S, I3V, I4L, I4N, I4P, I4V, I5L, I5N, I5P, I5S, I5V, Iz2L, M1L, M2L, M3L, M4L, M5L, M6L, Pr1L, Iz1L, S1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Vur1L); *F. ulna* var. *acus* (Kütz.) Lange-Bert. (I2N, I2S, I2V, I3N, I3P, I3V, I5N, M5L, S6L)

Asterionella Hassall

A. formosa Hassall (I1S, I2L, I2N, I2P, I2S, I2V, I3L, I3N, I3P, I3S, I3V, I4P, I5N, I5P, I5S, I5V, S2L)

Staurosirella Williams & Round

S. leptostauron (Ehrenb.) Williams & Round (Gla1L)

Staurosira Ehrenb.

S. construens (Ehrenb.) Williams & Round (I3N, S6L, S8L, Vur1L); *S. construens* f. *venter* (Ehrenb.) Bukhtiyarova (I1P, I2P, I3S, I4L, I4P, I5L); *S. construens* var. *binodis* (Ehrenb.) Hamilton (I2V, I3N, I3V, S5L, Vur1L); *S. pinnata* Ehrenb. (Gla1L, I4P, I5L, I5P, Iz2L, M1L, M4L, M5L, Iz1L, S1L, S8L, Tr1L, Vur1L); *S. venter* (Ehrenb.) Cleve & Moeller (Gla1L, M1L, M5L)

Pseudostaurosira Williams & Round

P. brevistriata (Grunow) Williams & Round (I1P, I3N, I3P, I4P, Vur1L)

Fragilariforma (J. Ralfs) Williams & Round

F. virescens (Ralfs) Williams & Round (M1L)

Diatoma Bory

D. ehrenbergii Kütz. (Gla1L, I1S, I1V, I2L, I2P, I2V, I4P, I5L, I5N, I5P, I5S, I5V, Iz2L, M1L, M2L, M4L, M6L, Iz1L, S3L, S6L, S7L, S8L, Vur1L); *D. ehrenbergii* f. *capitulata* (Grunow) Lange-Bert. (Gla1L); *D. hyemalis* (Roth) Heiberg (Gla1L, M5L, S1L); *D. mesodon* (Ehrenb.) Kütz. (Og1L, Chup1L, Gla1L, I1S, I1V, I2V, I4P, I5L, I5P, Iz2L, Gla2L, Jel1V, Kop1L, Kop2L, Kr1L, M1L, M2L, M4L, Pr1L, Iz1L, S1L, S6L, Sta1L, Vla1L, Vot1L); **D. moniliformis* Kütz. (Gla1L, I1S, I4L, I4N, I4P, I4V, I5L, I5N, I5P, I5V, Rad1L, Rech1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Sta1L); *D. tenuis* C. Agardh (M1L, S3L, S5L); *D. vulgaris* Bory (Og1L, Gla1L, I1L, I1N, I1P, I1S, I1V, I2L, I2N, I2P, I2S, I2V, I3L, I3N, I3P, I3S, I3V, I4L, I4N, I4P, I4V, I5L, I5N, I5P, I5S, I5V, Iz2L, Gla2L, M1L, M3L, M4L, M5L, M6L, Iz1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L); *D. vulgaris* morphotype *ovalis* (Fricke) Lange-Bert. (Iz2L, M3L, M4L, M5L, S3L, S4L, S5L, S6L)

Hannaea Patrick

H. arcus (Ehrenb.) Patrick (A3L, Cher1L, Og1L, Chup1L, Gla1L, GDr1L, Jel1V, Kan1L, Kop1L, Kr1L, M1L, M2L, M3L, M4L, M5L, M6L, I1L, I1P, I1S, I1V, I2L, I2P, I2S, I4P, I2V, I5L, I5N, I5P, I5V, Gla2L, Iz2L, Iz1L, S1L, S5L, S6L, S7L, S8L, Vla1L, Vot1L)

Meridion C. Agardh

M. circulare var. *circulare* (Greville) C. Agardh (Og1L, GDr1L, Gla1L, I1L, I1P, I1S, I1V, I2L, I2N, I2P, I2S, I2V, I3L, I3N, I3P,

I3S, I3V, I4L, I4N, I4P, I4V, I5L, I5N, I5P, I5V, Gla2L, Iz2L, Jel1L, Kop2L, Kr1L, M1L, M2L, M3L, M4L, M5L, Pr1L, Rad1L, Iz1L, Rech1L, S1L, Sta1L, Ved1P); *M. constrictum* Ralfs (I1S, I2S, I4P, I5L, Rad1L)

Synedra Ehrenb.

S. fasciculata Kütz. (I4P)

Opephora Petit

**O. mutabilis* (Grunow) Sabbe & Vyverman (I1P, I1S, I2N, I2P, Iz1L, S1L)

Synedrella Round & Maidana

S. parasitica (W. Smith) Round & Maidana (I2L, I2N, I2P, I2S, I2V, I3V); *S. subconstricta* (Grunow) Round & Maidana (I2P, I2V, I3L, I3P, I3N, I3S, I3V, I5L)

Tabellariales Round

Tabellariaceae Kütz.

Tabellaria Ehrenb.

T. fenestrata (Lyngb.) Kütz. (M1L)

Bacillariophyceae

Eunotiales Silva

Eunotiaceae Kütz.

Eunotia Ehrenb.

E. bilunaris var. *bilunaris* (Ehrenb.) Mills (I5N); *E. paludosa* var. *paludosa* Grunow (I4P); *E. pectinalis* (Dyllum) Rabenh. (Iz2L); *E. soleirolii* (Kütz.) Rabenh. (Gla1L, I1P)

Mastogloiales Mann

Mastogloiaceae Mereschk.

Aneumastus Mann & Stickle

**A. stroesei* (Østrup) Mann (I5V)

Cymbellales Mann

Rhoicospheniaceae Chen & Zhu

Rhoicosphenia Grunow

R. abbreviata (C. Agardh) Lange-Bert. (A4L, Og1L, ChM1L, Chup1L, GDr1L, I1L, I1N, I1P, I1S, I1V, I2L, I2N, I2P, I2S, I2V, I3L, I3N, I3P, I3S, I3V, I4L, I4N, I4P, I4V, I5L, I5N, I5P, I5S, I5V, Kop1L, M1L, M3L, M6L, Pr1L, Iz1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L)

Anomoeoneidaceae Mann

Anomoeoneis Pfitzer

A. sphaerophora (Ehrenb.) Pfitzer (I4V, I5P); *A. vitrea* (Grunow) Ross (M1L)

Cymbellaceae Greville

Placoneis Mereschk.

P. elginensis (Gregory) Cox (I1P, I1V, I2S, I4P, I4V, M2L, Iz1L); *P. gastrum* (Ehrenb.) Mereschk. (I4P); **P. ignorata* (Schimanski) Lange-Bert. (M1L, M3L); *P. placenta* (Ehrenb.) Heinzerling (I1P)

Cymbella C. Agardh

C. affinis var. *affinis* Kütz. (sensu Krammer) (I1V, I2N, I2S, I2V, I3L, I3N, I3P, I3S, I3V, I4V, I5L, I5N, I5P, I5V, Tr1L); *C. amphicephala* Naegeli (I3P, I5L, I5P, M6L); *C. aspera* (Ehrenb.) H. Peragallo (I1P, I2V, I3N); *C. cistula* (Ehrenb.) Kirchner 1878 (I2S, I3N, I3S, I4P, I5L, I5N, I5P, I5V, Iz2L, M6L); *C. compacta* Østrup (Og1L, ChM1L, Gla1L, Jel1V, Iz2L, M4L, Iz1L, S1L, S3L, S4L, S5L, S6L, Ved1P); *C. cymbiformis* C. Agardh (I3N); **C. excisa* Kütz. (A1L, Gla1L, I1N, I1S, I3N, I3S, I5L, Iz2L, M1L, M3L, M4L, Iz1L, S4L, S5L, S6L, S7L, S8L, Tr1L, Vur1L); *C. helvetica* Kütz. (Og1L, Gla1L, Iz2L, M1L, M3L, M4L, M5L, M6L, Iz1L, S1L, S3L, S4L, S6L, S8L); *C. hustedtii* var. *hustedtii*

Krasske (I3P); *C. hybrida* (Grunow) Cleve (I1V); *C. laevis* var. *laevis* Naegeli (I1P); *C. lanceolata* var. *lanceolata* (C. Agardh) C. Agardh (I2N, I2S, I2V, I3S, I3V, I5P, M1L, M4L, M5L, M6L, S2L, S3L, S5L, S8L); **C. lange-bertalotii* Krammer (Gla1L, M2L, M3L, M4L, M6L, S1L); **C. similis* Krasske (I1S, I5P); **C. subcistula* Krammer (M4L, S4L, S6L, S8L); *C. tumida* (Bréb.) Van Heurck (I2N, I2S, I2V, I3L, I3N, I3P, I3S, I3V, I4P, I5N, M1L, M4L, M5L, M6L, S5L, S6L, S7L, S8L, Vur1L); *C. turgidula* var. *turgidula* Grunow (I2S, I5L, I5P)

Encyonema Kütz.

E. caespitosum Kütz. (S6L); *E. elginense* (Krammer) Mann (I2P, S7L); *E. minutum* (Hilse) Mann (A1L, A3L, A4L, A5L, A6L, Cher1L, Og1L, ChM1L, Chup1L, GDr1L, Gla1L, I1L, I1N, I1P, I1S, I1V, I2L, I2N, I2P, I2S, I2V, I3L, I3N, I3P, I3S, I3V, I4L, I4N, I4P, I4V, I5L, I5N, I5P, I5S, I5V, Iz2L, Gla2L, Iz2L, Jel1V, Kan1L, Kop1L, Kr1L, M1L, M2L, M3L, M4L, M5L, M6L, Iz1L, S1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Sta1L, Tr1L, Ved1P, Vla1L, Vot1L, Vur1L); **E. aff. minutiforme* Krammer (Gla1L, M1L); *E. muelleri* (Hust.) Mann 1990 (I2P); *E. neogracile* Krammer (I5P, M1L, S4L); *E. prostratum* (Berkeley) Kütz. (I1P, I1V, I3N, I3P, M4L, M5L, S2L, S3L, S5L, S6L, S8L); *E. reichardtii* (Krammer) Mann (Gla2L, Iz2L, M1L, M3L, M4L, M5L, M6L, Iz1L); *E. silesiacum* (Bleisch) Mann (ChM1L, Chup1L, GDr1L, Gla1L, I1P, I1S, I1V, I2N, I2P, I2L, I2S, I2V, I3N, I3S, I3V, I4P, I4V, I5N, I5P, I5V, Gla2L, Iz2L, Jel1V, Kop1L, M1L, M2L, M3L, M4L, M5L, M6L, Pr1L, Iz1L, S1L, S2L, S4L, S6L, S7L, S8L, Tr1L, Ved1P, Vla1L, Vur1L); *E. ventricosum* (C. Agardh) Grunow (Og1L, Gla1L, M2L, M4L, M5L, Iz1L, S1L, S4L, S6L, Tr1L)

Cymbopleura Krammer

C. cuspidata (Kütz.) Krammer (I1P, I1S, I1V); **C. reinhardtii* (Grunow) Krammer (Tr1L)

Encyonopsis Krammer

**E. delicatissima* (Hust.) Krammer (Chip1L); **E. falaisensis* (Grunow) Krammer (I1S, I1V); *E. microcephala* (Grunow) Krammer (Chip1L, Gla1L, M1L)

Gomphonemataceae Kütz.

Gomphonema Ehrenb.

G. acuminatum Ehrenb. (Gla1L, I1P, I4P, I5N, I5V, Iz2L, M1L); **G. affine* Kütz. (Iz2L, I4P, I4V, I5N, I5P, I5V); **G. amoenum* Lange-Bert. 1985 (I4P, I5P); *G. angustatum* (Kütz.) Rabenh. (Gla1L, I1L, I1S, I1P, I1V, I2V, I2S, I3L, I3V, I4L, I4P, I5P, I5L, I5N, M5L, Iz1L, S6L, S7L); *G. angustum* C. Agardh (I1L, I1P, I1S, I1V, I2L, I3L, I3N, I3V, I4V, I5P, M1L, S5L, S6L); *G. augur* Ehrenb. (I5L, I5P); **G. aff. auritum* A. Braun ex Kütz. (Chip1L); *G. calcifugum* Lange-Bert. & Reichardt (Gla1L, I1P, I1V, I2N, I4P, I5P, I5N, I5V, Iz2L, Kop1L, Kop2L, Kr1L, M1L, M5L, M6L, Rad1L, S1L, S6L, Sta1L, Vla1L); **G. carolinense* Hagelstein (I1P); *G. clavatum* Ehrenb. (M5L, S1L); *G. clevei* Fricke (S4L); **G. exilissimum* (Grunow) Lange-Bert. & Reichardt (Gla1L, Kop2L, S1L); *G. gracile* Ehrenb. (I2N, I2V, I2S, I3S, I3L, I3P, I4V, I4L, I4P, I5P, I5L, I5S, I5V, Iz2L, M3L, M5L, Iz1L, S3L, S4L, S6L, S7L); *G. innocens* Reichardt (Chip1L); *G. intricatum* Kütz. (S3L); **G. lateripunctatum* Reichardt & Lange-Bert. (Gla1L); *G. micropus* Kütz. (Chup1L, GDr1L, Gla1L, Gla2L, Jel1L, Kan1L, Kop1L, Kop2L, Kr1L, M1L, Rad1L, Iz1L, Rech1L, S5L, S6L, Sta1L); *G. minutum* (C. Agardh) C. Agardh (GDr1L, I1P, I1L, I1S, I1V, I1N, I2V, I2N, I2L, I3S, I3L, I3N, I3V, I4P, I5P, I5L, I5V, Iz2L, M1L, M3L, M4L, M5L, M6L, Iz1L, S1L, S2L, S3L, S4L, S6L, S7L, S8L); *G. minutum* *f. *pachypus* Lange-Bert. & Reichardt (M2L, Iz1L); **G. neonasutum* Lange-Bert. & Reichardt (I4P); *G. olivaceum* var. *calcareum* (Cleve) Cleve (I2N, I2V, I3V, I4P); *G. olivaceum* var. *olivaceum* (Hornemann) Bréb. (Og1L, Chup1L, Gla1L,

I1L, I1P, I1S, I1V, I2L, I2N, I2S, I2V, I3L, I3N, I3P, I3V, I4N, I4P, I4V, I5L, I5N, I5P, I5V, Iz2L, Iz2L, Kop1L, Kop2L, M1L, M2L, M3L, M4L, M5L, M6L, Pr1L, Rad1L, Iz1L, Rech1L, S1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Sta1L, Vot1L); *G. parvulum* (Kütz.) Kütz. (A3L, A4L, A5L, A6L, Gla1L, I1L, I1N, I2V, I2N, I2P, I2L, I2S, I3S, I3L, I3P, I3N, I3V, 4N, I4P, I4L, I4V, I5P, I5L, I5S, I5N, I5V, I1P, I1S, I1V, Gla2L, Kop1L, Pr1L, Iz1L, S1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, M1L, M2L, M3L, M4L, M5L, M6L, Vot1L, Vur1L); *G. productum* (Grunow) Lange-Bert. & Reichardt (S1L, S4L); **G. pseudoaugur* Lange-Bert. (I2V, I4V, I4P, I5P, I5L, I5N, I5V); *G. pumilum* *var. *elegans* Reichardt & Lange-Bert. (A1L, Cher1L, Og1L, ChM1L, Chup1L, GDr1L, Gla1L, Iz2L, Jel1V, Kop1L, Kop2L, Kr1L, M1L, M2L, M3L, M4L, M6L, Pr1L, Iz1L, S1L, S3L, S4L, S6L, S7L, Sta1L, Tr1L, Ved1P, Vla1L, Vot1L); *G. pumilum* *var. *rigidum* Reichardt & Lange-Bert. (Pr1L, M4L, M5L, S1L, S8L); **G. rhombicum* Fricke (ChM1L, Gla1L, Kop1L, M1L); **G. rosenstockianum* Lange-Bert. & Reichardt (A2L, GDr1L, Gla1L, I1P, I1S, Gla2L, Iz2L, Kop2L, M1L, M4L, M5L, Iz1L, Rech1L, S1L, S3L, S4L, S5L, S6L, S8L, Sta1L, Tr1L, Ved1P, Vla1L); *G. subclavatum* (Grunow) Grunow (Kr1L, M4L, Tr1L, Vla1L); *G. tergestinum* Fricke (Chup1L, Gla1L, I1V, Iz2L, Kop2L, M1L, M2L, M3L, M4L, Pr1L, Iz1L, S1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Sta1L, Tr1L); *G. truncatum* Ehrenb. (I1V, I4P, I5N, I5P, Iz2L, M3L, M4L, Iz1L, S1L, S5L, S6L); *G. sp. 1* (S1L); *G. sp. 2* (M5L)

Gomphoneis Cleve

G. olivaceum *var. *staurophorum* (Pant.) Bukhtiyarova (I3V, S3L)

Reimeria Kociolek & Stoermer

R. sinuata (Gregory) Kociolek & Stoermer (A1L, A2L, A4L, Cher1L, Og1L, Chip1L, ChM1L, Chup1L, GDr1L, Kan1L, I1L, I1P, I1S, I1V, I2V, I2N, I2P, I2L, I2S, I3S, I3L, I3P, I3N, I3V, I4P, I5P, I5L, I5N, I5V, Gla2L, Iz2L, Jel1L, Jel1V, Kop1L, Kop2L, M1L, M2L, M3L, M4L, M5L, M6L, Pr1L, Iz1L, S1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Sta1L, Ved1P, Vla1L, Vot1L, Kr1L, Vur1L); **R. uniseriata* Sala, Guerrero & Ferrario (GDr1L, I1L, I1P, I1S, I1V, I2N, I2S, I3S, I3P, I5P, I5N, S2L, S3L, S7L)

Achnanthes Silva

Achnantheaceae Kütz.

Achnanthes Bory

A. clevei *var. *botnica* Cleve (I1V, I4P); *A. exigua* Grunow (Chip1L, I1P); *A. petersenii* Hust. (Jel1L, M3L); **A. ricala* Hohn & Hellerman (Chip1L); **A. temperei* M. Peragallo (S5L)

Karayevia Round & Bukhtiyarova

K. clevei (Grunow) Round & Bukhtiyarova (Gla1L, Tr1L); *K. laterostrata* (Hust.) Kingston (Chup1L, I1P, M2L, Iz1L)

Kolbesia Round & Bukhtiyarova

K. ploenensis (Hust.) Round & Bukhtiyarova (S6L)

Lemnicola Round & Basson

L. hungarica (Grunow) Round & Basson (S6L)

Planothidium Round & Bukhtiyarova

**P. dubium* (Grunow) Round & Bukhtiyarova (Tr1L); *P. frequentissimum* (Lange-Bert.) Lange-Bert. (A1L, ChM1L, Chup1L, GDr1L, I1L, I1P, I1S, I1V, I2V, I2N, I2P, I2L, I3S, I3N, I3V, I4N, I4P, I4V, I5P, I5L, I5S, I5N, I5V, Iz2L, Kan1L, Kop2L, M1L, M2L, M5L, M6L, Rad1L, Iz1L, S1L, S2L, S6L, S7L, Ved1P, Vot1L, Vur1L); **P. granum* (Hohn & Hellerman) Lange-Bert. (I4P); *P. lanceolatum* (Bréb.) Round & Bukhtiyarova (Og1L, Chip1L, Chup1L, GDr1L, I1P, I1S, I1V, I2N, I2S, I3L, I4V, I4L, I4P, I5P, I5L, I5N, I5V, Iz2L, Jel1V, Kan1L, Kr1L, M1L, M2L, M3L, M4L, M5L, M6L, Rad1L, Iz1L, S1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Sta1L, Ved1P); **P. rostratum* (Østrup) Round & Bukhtiyarova (S5L)

Cocconeidaceae Kütz.**Cocconeis** Ehrenb.

C. disculus (Schumann) Cleve (Gla1L, I1P, M1L, Iz1L); *C. neodiminuta* Krammer (I1P, I1S, I2N, I5L, Kop2L); *C. pediculus* Ehrenb. (A2L, A4L, Iz2L, M2L, M3L, M4L, M5L, M6L, Iz1L, S1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Vur1L, I1P, I1S, I1V, I1N, I1L, I2V, I2N, I2P, I2L, I2S, I3S, I3L, I3P, I3N, I3V, I4V, I4N, I4P, I5P, I5L, I5S, I5N, I5V); *C. placentula* var. *euglypta* (Ehrenb.) Grunow (Gla1L, I1N, I1P, I1S, I1V, I2V, I2N, I2S, I3S, I3P, I3N, I3V, I4V, I4N, I4P, I5P, I5S, I5N, I5V, Iz2L, Gla2L, Kop2L, M1L, M2L, M3L, M4L, M5L, M6L, Pr1L, Iz1L, S1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Vot1L, Vur1L); *C. placentula* var. *klinoraphis* Geitler (I1P, I2S, I2V, I3V, M1L, S1L); *C. placentula* var. *lineata* (Ehrenb.) Van Heurck (ChM1L, GDr1L, Gla1L, I1L, I1P, I1V, I2V, I2N, I2P, I2S, I3S, I3N, I3V, I4V, I4N, I4P, I5P, I5N, I5V, Iz2L, Jel1V, Kop1L, M1L, M3L, S1L, S2L, S3L, S6L, S7L, Ved1P, Vot1L); *C. placentula* var. *placentula* Ehrenb. (A1L, A2L, A3L, Cher1L, Og1L, Gla1L, I1L, I1S, I1V, I2V, I2L, I2S, I3S, I3L, I3P, I3N, I3V, I4L, I4P, I5P, I5L, I5V, Iz2L, M1L, M2L, M3L, M4L, M5L, M6L, Iz1L, S1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Tr1L, Vot1L); *C. placentula* *var. *pseudolineata* Geitler (A3L, I1N, I1P, I1S, I1V, I3V, I5P, I5V, Iz2L, Jel1V, M1L, Iz2L, Iz1L, S1L, S7L, Tr1L, Ved1P, Vla1L, Vot1L)

Achnanthesiaceae Mann**Achnanthes** Kütz.

**A. eutrophilum* (Lange-Bert.) Lange-Bert. (Gla1L, Iz2L, I2N, I3N, M1L, M2L, M3L, M4L, M5L, M6L, Iz1L, S3L, S4L, S5L, S6L, S7L, S8L); *A. minutissimum* (Kütz.) Czarnecki (A1L, A2L, A3L, A4L, A5L, A6L, Cher1L, Og1L, ChM1L, Chup1L, GDr1L, Gla1L, Gla1L, I1L, I1N, I1P, I1S, I1V, I2N, I2P, I2L, I2S, I2V, I3S, I3L, I3P, I3N, I3V, I4N, I4P, I5P, I5L, I5S, I5N, I5V, Gla2L, Iz2L, Jel1L, Jel1V, Kan1L, Kop1L, Kop2L, Kr1L, M1L, M2L, M3L, M4L, M5L, M6L, Pr1L, Rad1L, Iz1L, Iz1L, Rech1L, S1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Sta1L, Tr1L, Ved1P, Vla1L, Vot1L, Vur1L); *A. minutissimum* *var. *jacki* (Kütz.) Czarnecki (Gla1L); **A. aff. pfisteri* Lange-Bert. (Jel1V); *A. pyrenaicum* (Hust.) Kobayasi (A2L, Gla1L, M1L, M4L, S1L, M3L, I1S, S8L, Tr1L); **A. saprophilum* (Kobayasi & Mayama) Round & Bukhtiyarova (Chip1L, Iz1L, Vur1L); **A. subatomus* (Hust.) Lange-Bert. (A1L, A3L, Cher1L, Og1L, ChM1L, Chup1L, GDr1L, Gla1L, Gla1L, I1P, I1V, Jel1V, Kop1L, Kr1L, M1L, M1L, M2L, M3L, M4L, M5L, Iz1L, S1L, Sta1L, Tr1L, Vla1L, Vot1L); **A. temniskovae* Ivanov & Ector (M2L, M3L, M4L, M5L, Vla1L); *A. sp.* (Tr1L)

Eucocconeis Lange-Bert.

E. flexella (Kütz.) Brun (Gla1L); *E. laevis* (Østrup) Lange-Bert. (Gla1L, I4P, M1L, Vla1L)

Psammothidium Bukhtiyarova & Round

P. bioretii (Germain) Bukhtiyarova & Round (Chup1L, Iz2L, M1L, M2L, M3L, M4L, M6L, Iz1L, S1L, S2L, S7L, S8L); *P. grischunum* f. *daonensis* (Lange-Bert.) Bukhtiyarova & Round (Kop1L, M1L, S1L, Sta1L); *P. helveticum* (Hust.) Bukhtiyarova & Round (I5V, Jel1L, Kr1L); **P. oblongellum* (Østrup) Van de Vijver (M1L); **P. pseudoswazi* (Carter) Bukhtiyarova & Round (Vot1L); **P. rechtensis* (Leclercq) Lange-Bert. (M2L); **P. subatomoides* (Hust.) Bukhtiyarova & Round (ChM1L, Iz2L, Kan1L, M1L, M4L, M5L, M6L, Iz1L, S1L, Vla1L, Vot1L)

Naviculales Bessey**Berkeleyaceae** Mann**Parlibellus** E.J. Cox

P. crucicula (Brockmann) Witkowski, Lange-Bert. & Metzelin (I1P, I4P)

Cavinulaceae Mann**Cavinula** Mann & Stickle

**C. variostrata* (Krasske) Mann & Stickle (M1L, M2L)

Diadesmidaceae Mann**Diadesmis** Mann

D. perpusilla (Grunow) Mann (Chup1L, I1S, I5L, Kop1L, M1L, S1L, Vla1L, Vot1L)

Luticola Mann

L. goeppertiana (Bleisch) Mann (I1S, I2L, I2N, I2S, I2V, I3N, I3L, I3V, I4V, I4N, I4L, I4P, I5P, I5L, I5S, I5N, I5V, I3S, M4L, M5L, M6L, S2L, S4L, S5L, S6L, S7L, S8L, Vur1L); **L. aff. kotschy* Grunow (Chip1L); **L. monita* (Hust.) Mann (I5V); *L. mutica* (Kütz.) Mann (I4P, S4L); **L. muticopsis* (Van Heurck) Mann (I1P, I4P); *L. nivalis* (Ehrenb.) Mann (I2S, Iz2L)

Amphipleuraceae Grunow**Frustulia** Rabenhost

F. vulgaris (Thwaites) De Toni (Chup1L, I1P, I2N, I2P, I2S, I3S, I3V, Iz2L, Jel1V, M1L, M2L, Ved1P)

Neidiaceae Mereschk.**Neidium** Pfitzer

N. affine (Ehrenb.) Pfitzer (M2L, M5L); *N. ampliatus* (Ehrenb.) Krammer (M1L, M5L); **N. binodis* (Ehrenb.) Hust. (S3L); *N. bisulcatum* *var. *subampliatum* Krammer (M1L); *N. dubium* (Ehrenb.) Cleve (I3N, I1P, I3V, Vur1L)

Sellaphoraceae Mereschk.**Sellaphora** Mereschk.

S. bacillum (Ehrenb.) Mann (I1P, I1S, I2N, I2L, I2S, I3S, I3L, I3P, I3N, I3V, M3L, S2L, S3L, S5L, S8L); *S. pupula* (Kütz.) Mereschkowsky (I1P, I1V, I2V, I2S, I3S, I3L, I3P, I3N, I3V, I4N, I4P, I4V, I5P, I5S, I5N, I5V, Iz2L, M1L, M2L, M3L, M4L, M5L, M6L, Iz1L, S3L, S4L, S5L, S6L, S7L, S8L); *S. seminulum* (Grunow) D. G. Mann (I5L, I5P)

Fallacia Stickle & Mann

**F. helensis* (Schulz) Mann (I3P); **F. insociabilis* (Krasske) Mann (I5P); **F. monoculata* (Hust.) Mann (S4L); *F. pygmaea* (Kütz.) Stickle & Mann (I2S, I4P, I5P); **F. subhamulata* (Grunow) Mann (M5L)

Pinnulariaceae Mann**Pinnularia** Ehrenb.

P. acuminata W.M. Smith (Iz1L); *P. biceps* Gregory (I1V); *P. bo-realis* *var. *scalaris* (Ehrenb.) Rabenh. (S8L); **P. dubitabilis* var. *dubitabilis* Hust. (S1L); *P. gibba* Ehrenb. (I1P, I4L, I5L); **P. isselana* Krammer (M3L, S7L); *P. lapponica* Hust. (M4L, M5L); *P. major* (Kütz.) Rabenh. (I3N); **P. marchica* var. *marchica* Ilka Schönfelder (S5L); *P. microstauron* (Ehrenb.) Cleve (I1V, I2S, I2V, I5P, Iz2L, M1L, M4L); **P. parvulissima* Krammer (S3L, S6L); *P. rupestris* Hantzsch (S6L); **P. sinistra* Krammer (M1L); *P. subcapitata* var. *subcapitata* Gregory (I1V, I5L, I5N, I5V); **P. subcommutata* var. *subcommutata* Krammer (Jel1V, Ved1P); *P. subrostrata* (Cleve) Cleve-Euler (I4V); *P. subrupestris* *var. *cuneata* Krammer (S3L); **P. viridiformis* var. *viridiformis* Krammer (Jel1V, Ved1P); *P. viridis* var. *viridis* (Nitzsch) Ehrenb. (M4L)

Caloneis Cleve

C. amphibaena (Bory) Cleve (S4L); *C. bacillum* (Grunow) Cleve (A3L, A6L, I5P, Kop2L, M1L, M2L, M6L, Iz1L, S4L, Vur1L); *C. molaris* (Grunow) Krammer (A1L, I2P, I3S); *C. silicula* (Ehrenb.) Cleve (S1L)

Diploneidaceae Mann**Diploneis** Ehrenb.

D. elliptica (Kütz.) Cleve (I2P); *D. oblongella* (Naegeli) Cleve-Euler (I2S, M1L); *D. ovalis* (Hilse) Cleve (Jel1V, M4L); *D. parma* Cleve (M5L, S7L); *D. peterseni* Hust. (Iz1L)

Naviculaceae Kütz.

Navicula Bory de St. Vincent

N. amphiceropsis Lange-Bert. & Rumrich (Pr1L, M5L, S1L, S4L, S5L, S6L, S8L); **N. antonii* Lange-Bert. (Og1L, Kop1L, M1L, M3L, M5L, S6L, S7L, Tr1L); **N. aff. arctotenelloides* Lange-Bert. & Metzeltin (M4L, S1L); *N. capitatoradiata* Germain (A2L, I1L, I1N, I1P, I1S, I1V, I2V, I2N, I2P, I2L, I2S, I3S, I3L, I3P, I3N, I3V, I4N, I4P, I4V, I4L, I5P, I5L, I5S, I5N, I5V Iz2L, M1L, M2L, M3L, M4L, M5L, M6L, Iz1L, S1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L); *N. cari* Ehrenb. (I1P, I3V, Iz1L); **N. cariocincta* Lange-Bert. (M2L, S3L); **N. catalanogermanica* Lange-Bert. & Hofmann (Og1L, Chup1L, Kop1L, Kr1L, M1L, Pr1L, Sta1L, Tr1L); *N. cincta* (Ehrenb.) Ralfs (I1P, I2N, I2S, I5V); **N. concentrica* Carter (I1S); *N. cryptocephala* Kütz. (A3L, Cher1L, Chip1L, Chup1L, Gla1L, I1L, I1P, I1S, I1V, I2V, I2N, I2P, I2L, I2S, I3S, I3L, I3P, I3N, I3V, I4N, I4P, I4L, I5P, I5L, I5S, I5N, I5V, Iz2L, Kop1L, M1L, M2L, M3L, M4L, Iz1L, S1L, S2L, S6L, Sta1L); **N. cryptotenella* Lange-Bert. (A2L, Og1L, Chip1L, Gla1L, I1L, I1P, I1S, I1V, I2V, I2N, I2L, I2S, I3S, I3L, I3P, I3N, I3V, I4L, I5P, I5L, I5N, I5V Gla2L, Iz2L, Kop1L, Kop2L, M1L, M2L, M3L, M4L, M5L, M6L, Pr1L, Iz1L, S1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Sta1L, Tr1L, Ved1P, Vla1L, Vot1L, Vur1L); **N. detenta* Hust. (M1L, M5L, S1L); *N. digitoradiata* (Gregory) Ralfs (I5P, Iz1L); *N. exilis* Kütz. (A1L, I1P, I2S, I3P, I4P, I5P, I5L, I5N, I5V, Iz1L); **N. germanii* Wallace (I2V, I3L); *N. gregaria* Donkin (A3L, A4L, Chup1L, I1L, I1S, I1V, I2V, I2N, I2L, I2S, I3S, I3L, I3N, I3V, I4N, I4P, I4V, I4L, I5P, I5L, I5S, I5N, I5V, Gla2L, Iz2L, Kan1L, Kr1L, M1L, M2L, M3L, M4L, M5L, M6L, Iz1L, S1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Sta1L, Ved1P); *N. hambergii* Hust. (M1L, M2L, M4L, M5L, S3L, S4L); **N. aff. harderi* Hust. (Sta1L); **N. heimansii* Van Dam & Kooyman (I3N); **N. joubaudii* Germain (I2S, Gla2L, M1L, M2L, M3L, M4L, M5L); *N. lanceolata* (C. Agardh) Ehrenb. (Chup1L, I1L, I1N, I2V, I2N, I2P, I2L, I2S, I3S, I3L, I3P, I3N, I3V, I4N, I4P, I4V, I4L, I5P, I5L, I5S, I5N, I5V, I1P, I1S, I1V, Gla2L, Iz2L, Kan1L, M1L, M2L, M3L, M4L, M5L, M6L, Iz1L, Rech1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Sta1L, Ved1P, Vot1L); *N. medioconvexa* Hust. (I1S); *N. menisculus* var. *menisculus* Schumann (I2L, I2N, I1P, I1S, I2V, I2S, I3S, I3L, I3N, I3V, I4V, I4N, I4P, I5P, I5L, I5N, I5V Iz2L, M2L, M3L, Iz1L, S4L, S6L); **N. novaesiberica* Lange-Bert. (Chip1L, M1L); **N. oligotrapphenta* Lange-Bert. & Hofmann (M2L, M5L); **N. opportuna* Hust. (I1P, I5P); **N. perminuta* Grunow (Kop2L); *N. phyllepta* Kütz. (I1P, I1V, I2V, I2S, I4P, I5P, I5N, I5V, M1L); *N. radiosa* Kütz. (I1L, I1P, I1S, I1V, I2V, I2N, I2P, I2L, I2S, I3S, I3P, I3N, I3V, I4P, I5P, I5L, I5S, I5N, I5V Iz2L, M1L, M2L, M3L, M4L, M5L, Iz1L, S2L, S4L); **N. recens* (Lange-Bert.) Lange-Bert. (I1P, I2S, I3N, I3P, I3V, I5P, Iz2L, Pr1L, Iz1L, Sta1L); **N. reichardtiana* Lange-Bert. (Chup1L, I2S, I3S, Gla2L, Kop2L, M1L, M2L, M3L, M4L, M5L, M6L, Pr1L, Iz1L, Rech1L, S1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Sta1L); *N. rhynchocephala* Kütz. (I1P, I4P, I5P, M2L, M3L, M4L, Ved1P); *N. rostellata* Kütz. (I1N, I1P, I1S, I1V, I2V, I2N, I2P, I2L, I2S, I3S, I3L, I3P, I3N, I3V, I4P, I5L, I5V, Iz2L, M2L, M3L, M4L, M5L, M6L, Pr1L, Iz1L, S4L, S5L, S6L, S7L, S8L); *N. salinarum* Grunow (Iz1L); **N. salinicola* Hust. (I1P); **N. schroeteri* var. *schroeteri* Meister (S8L, Ved1P); *N. sp.* (S3L); **N. subplacentula* Hust. (I1P); *N. tripunctata* (O.F. Müller) Bory (A1L, I1L, I1N, I1P, I1S, I1V, I2V, I2N, I2L, I2S, I3S, I3L, I3P, I3N, I3V, I4N, I4V, I4L, I5P, I5L, I5S, I5N, I5V, Gla2L, Iz2L, Kop2L, M1L, M2L, M3L, M4L, M5L, M6L, Rad1L, Iz1L, Rech1L, S2L, S3L, S4L,

S5L, S6L, S7L, S8L, Sta1L, Tr1L, Ved1P); *N. trivialis* var. *trivialis* Lange-Bert. (I2N, I1P, I1S, I2P, I2S, I2V, I3N, I3S, I4N, I4P, I4V, I5L, I5N, I5P, I5V, Iz2L, M2L, M3L, Iz1L); **N. upsaliensis* (Grunow) Peragallo (I1P, I1S, I4L, I4P, I5L, I5P); **N. vandamii* var. *vandamii* Schoeman & Archibald (M1L, S3L); *N. veneta* Kütz. (I1P, I2V, I2S, I3S, I3P, I4N, I4P, I5L, I5N, I5V, M2L, S2L, S4L, Vur1L); **N. vilaplani* (Lange-Bert. & Sabater) Lange-Bert. & Sabater (M1L, S3L); *N. viridula* (Kütz.) Ehrenb. (I1S, I2V, I2N, I2L, I2S, I3S, I3L, I5L, Iz2L, M3L, Iz1L, S5L, Vur1L)

Adlafia Lange-Bert.

**A. minuscula* (Grunow) Lange-Bert. (I2V, Iz2L, Kan1L, Kop2L, Kr1L, M5L, M6L, Rech1L, Sta1L)

Eolimna Lange-Bert. & Schiller

E. minima (Grunow) Lange-Bert. (A3L, A5L, A6L, Chip1L, I5P, Gla2L, Iz2L, Jel1V, Kop1L, Kop2L, M1L, M2L, M3L, 4L, M5L, M6L, Rad1L, Iz1L, S1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Vur1L); *E. subminuscula* (Manguin) Moser, Lange-Bert. & Metzeltin (A1L, A3L, A4L, Chip1L, Gla2L, Iz2L, M1L, M2L, M3L, M4L, M5L, M6L, Iz1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L)

Fistulifera Lange-Bert.

F. pelliculosa (Bréb.) Lange-Bert. (Chup1L, Iz2L, Kr1L, M3L, M4L, S3L, S4L, S5L, S6L, S7L, S6L, S8L); *F. saprophylla* (Lange-Bert. & Bonic) Lange-Bert. (A3L, I2L, I2S, I3S, I3L, I4L, I5L, I5S, Iz2L, Kan1L, M2L, M3L, M4L, M6L, Iz1L, Rech1L, S2L, S4L, S5L, S6L, S7L, S8L, Sta1L)

Geissleria Lange-Bert. & Metzeltin

**G. acceptata* (Hust.) Lange-Bert. & Metzeltin (A4L, M1L); *G. decussis* (Ostrup) Lange-Bert. & Metzeltin (A1L, I1P, I1S, I4N, I5P, Iz2L, M1L, M2L, M3L, M5L, Iz1L, Vur1L); **G. schoenfeldii* (Hust.) Lange-Bert. & Metzeltin (I4P)

Hippodonta Lange-Bert., Metzeltin & Witkowski

H. capitata (Ehrenb.) Lange-Bert., Metzeltin & Witkowski (I1P, I1S, I1V, Iz2L, M1L, M2L, M4L, M5L); *H. costulata* (Grunow) Lange-Bert., Metzeltin & Witkowski (M2L)

Mayamaea Lange-Bert.

M. atomus *var. *permitis* (Hust.) Lange-Bert. (A4L, A6L, Gla2L, Iz2L, Kop2L, Kr1L, M1L, M3L, M5L, Iz1L, S1L); *M. fossalis* (Krasske) Lange-Bert. (M1L); **M. recondita* (Hust.) Lange-Bert. (S6L)

Pleurosigmataceae Mereschk.

Gyrosigma Hassal

G. acuminatum (Kütz.) Rabenh. (I1N, I1P, I1S, I2V, I2N, I2L, I2S, I3S, I3L, I3P, I3N, I3V, I5L, S3L, S4L, S5L); *G. attenuatum* (Kütz.) Rabenh. (I1S, I2V, I2S, I3N, I3V, S3L, S4L, S5L, S6L); **G. nodiferum* (Grunow) Reimer (I1P, I1S, I3V, S4L, S5L, S6L, S8L); *G. scalproides* (Rabenh.) Cleve (Chup1L, Kop1L); *G. spencerii* (Quekett) Griffitt & Henfrey (I2V, I3P)

Stauroneidaceae Mann

Stauroneis Ehrenb.

**S. lapidicola* Petersen (Iz1L); **S. obtusa* Langerstedt (I2P); *S. phoenicenteron* (Nitzsch) Ehrenb. (S1L); *S. smithii* Grunow (I1S)

Craticula Grunow

**C. accomoda* (Hust.) Mann (A4L, I1L, I4V, I4N, I4P, I5P, I5L, I5V, Iz2L, M3L, M4L, M6L, Iz1L, S6L, S7L, S8L); *C. ambigua* (Ehrenb.) Mann (M5L, S6L); **C. buderi* (Hust.) Lange-Bert. (I1N, I1P, I1S, I1V, I2P, I3P, I3N, I4V, I4N, I4L, I4P, I5P, I5L, I5S, I5N, I5V); *C. cuspidata* (Kütz.) Mann (I4V, I4P, I5P, S4L, S6L, S7L)

Thalassiophysales Mann**Catenulaceae Mereschk.****Amphora Ehrenb.**

A. commutata Grunow (I1P); **A. copulata* (Kütz.) Schoeman & Archibald (A1L, I3N, I3L, I3S, I1S, Kop2L, M1L, M2L, M4L, M5L, S3L, S4L, S5L, S6L, S7L, S8L, Tr1L, Vla1L); **A. fagediana* Krammer (I1L, I1P, I1S, I2N, I3P, I4P, S8L); **A. inariensis* Krammer (ChM1L, I1S, I2S, M1L, Pr1L, S6L, Sta1L, Tr1L); **A. montana* Krasske (I2S, I3S); *A. ovalis* (Kütz.) Kütz. (I1N, I1L, I1P, I1S, I1V, I2V, I2L, I2S, I3S, I3L, I3P, I3N, I3V, Iz2L, M1L, M3L, M4L, M5L, M6L, Iz1L, S2L, S3L, S5L, S6L, S8L); *A. pediculus* (Kütz.) Grunow (Og1L, ChM1L, Chup1L, Gla1L, I1L, I1P, I1S, I1V, I2V, I2N, I2L, I2S, I3S, I3L, I3P, I3N, I3V, I4V, I4N, I5L, I5S, I5N, I5V, Gla2L, Iz12L, Gla2L, Kop1L, Kop2L, M1L, M2L, M3L, M4L, M5L, M6L, Rad1L, Iz1L, Rech1L, S1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Sta1L, Tr1L, Vla1L); *A. veneta* Kütz. (I3P, M3L)

Bacillariales Hendey**Bacillariaceae Ehrenb.****Hantzschia Grunow**

H. amphioxys (Ehrenb.) Grunow (I1P, I1V, I2S, I3N, I3S, I5S, M1L, M2L, M5L, Iz1L, S1L, S6L, S8L)

Psammodictyon Mann

**P. constricta* (Gregory) Mann (I4P, I5P)

Tryblionella W.M. Smith

T. victoriae Grunow (I3N)

Nitzschia Hassal

N. acicularis (Kütz.) W.M. Smith (S4L, S5L); *N. acidoclinata* Lange-Bert. (Og1L, I2P, Iz2L, Kop2L, Kr1L, M1L, M3L, M5L, Rad1L, S1L, S6L, Sta1L); **N. acula* Hantzsch (I2P, Iz1L, S3L); **N. aequora* Hust. (I1V, I4P, I5P); **N. agnita* Hust. (I1V); *N. alpina* Hust. (M4L); *N. amphibia* Grunow (A3L, Chup1L, Chip1L, I1P, I2S, I3L, I4L, I4P, I5L, I5N, Iz2L, M2L, M3L, M4L, M5L, M6L, Iz1L, Rech1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Vur1L); **N. amplexans* Hust. (I4P, I5P); *N. angustata* (W. M. Smith) Grunow (I2L, I2N, I2S, I2V, I3S, I3P, I3N, I3V, I4N, I4P, I5N, I5V); **N. archibaldii* Lange-Bert. (Og1L, Chup1L, I1S, I2P, I3V, I4P, I5P, Kop1L, Kr1L, M1L, M2L); **N. bacillum* Hust. (Iz2L, Sta1L); **N. brunoi* Lange-Bert. (I2L, I2N, I2V, I2S, I3S, I3P, I3N, I3V, I4V, I4N, I4P); **N. bulnheimiana* (Rabenh.) H. L. Smith (I3P, I3S); **N. calida* Grunow (I2L, I3P, I3V, I5P); **N. capitellata* Hust. (I1P, I2V, I3P, I3V, I4V, I4N, I4L, I4P, I5P, I5L, I5N, Iz2L, M1L, M2L, M3L, M6L, Iz1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L); **N. clausii* Hantzsch (M3L, M4L); *N. commutata* Grunow (I4V); **N. debilis* (Arnott) Grunow (M1L, S7L); *N. denticula* Grunow (Iz1L); *N. dissipata* var. *dissipata* (Kütz.) Grunow (Og1L, ChM1L, Gla1L, I1L, I1N, I1P, I1S, I1V, I2V, I2N, I2P, I2L, I2S, I3S, I3L, I3N, I3V, I4N, I4P, I4V, I4L, I5P, I5L, I5N, I5V, Gla2L, Iz2L, Kop1L, Kr1L, M1L, M2L, M3L, M4L, M5L, M6L, Pr1L, Iz1L, Rech1L, S1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Sta1L, Ved1P, Vot1L); *N. dissipata* *var. *media* (Hantzsch) Grunow (I1L, I1S, I1V, I2V, I2L, I2S, I3S, I3L, I3N, I3V, I3P, I4P, I5P, I5S, I5N, I5V, Iz2L, Kr1L, M1L, M2L, S2L, S4L, S5L, S6L); **N. dubiiformis* Hust. (I4P); **N. elegans* Hust. (Iz1L); *N. filiformis* var. *filiformis* (W. Smith) Van Heurck (S2L); **N. flexoides* Geitler (I1P, I3V, S8L); *N. fonticola* Grunow (A2L, A3L, A4L, I1L, I1S, I2P, I2V, I2P, I2L, I2S, I3S, I3L, I3P, I3N, I3V, I4P, I5P, I5L, I5V, Gla2L, Iz2L, M1L, M2L, M3L, M4L, M5L, M6L, Iz1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Sta1L, Vur1L); *N. frustulum* var. *frustulum* (Kütz.) Grunow (I1L, I1P, I1S, I1V, I2V, I2P, I2L, I2S, I3S, I3L, I3P, I3N, I3V, I4N, I4P, I4V, I4L, I5P, I5L, I5S, I5N, I5V); *N.*

gracilis Hantzsch (I1S, I2N, I2V, I3S, I3P, I3N, I3V, I4V, I4P, I5N, I5V Iz2L); *N. hantzschiiana* Rabenh. (M1L, M2L); *N. heufleriana* Grunow (I1P, I2V, I3N, I3S, S2L, S4L, S6L, S7L, S8L, Tr1L, Ved1P, Vur1L); **N. homburgiensis* Lange-Bert. (Kan1L); *N. hungarica* Grunow (I2S, I3S, I4P, I5P S8L); *N. inconspicua* Grunow (A3L, A4L, I1L, I1P, I1S, I2V, I2N, I2L, I2S, I3S, I3L, I3P, I3N, I3V, I4V, I5L, Gla2L, Iz2L, M1L, M2L, M3L, M4L, M5L, M6L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Iz2L, Iz1L, Vur1L); *N. intermedia* Hantzsch ex Cleve & Grunow (I1P, I2P, I2V, I4P, I5P, M6L, S4L); **N. liebetruthii* var. *liebetruthii* Rabenh. (I1N, I4P); *N. linearis* var. *linearis* (C. Agardh) W.M. Smith (Iz2L, I1L, I1P, I1S, I1V, I2V, I2N, I2L, I2S, I3S, I3N, I3V, I4P, I4V, I5P, I5L, I5S, I5N, I5V M1L, M2L, M3L, M4L, M6L, Iz1L, S1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Sta1L, Ved1P); *N. linearis* *var. *subtilis* (Grunow) Hust. (I1P, I1S, I2S, I4P, I5P); *N. linearis* var. *tenuis* (W.M. Smith) Grunow (I5P, S3L, S4L, S5L, S6L); *N. palea* (Kütz.) W.M. Smith (A2L, A3L, ChM1L, I1L, I1P, I1S, I1V, I2V, I2N, I2L, I2S, I3S, I3L, I3N, I3V, I4N, I4P, I4V, I4L, I5P, I5L, I5S, I5N, I5V, Gla2L, Iz2L, Jel1L, M1L, M2L, M3L, M4L, M5L, M6L, Pr1L, Iz1L, S1L, S2L, S3L, S4L, S5L, S6L, S7L, Vur1L); *N. palea* var. *debilis* (Kütz.) Grunow (A3L, I1P, I1V, I2V, I2N, I2S, I3S, I3P, I3N, I4P, I5P, I5L, I5N, I5V, Iz2L, Kr1L, M1L, M5L, Iz1L, S1L, S4L, S6L, S7L, S8L); *N. paleacea* (Grunow) Grunow (A3L, A5L, A6L, Cher1L, ChM1L, Chup1L, I1L, I1P, I1S, I2L, I2S, I3S, I3L, I4N, I4L, I4P, I5P, I5L, I5N, Gla2L, Iz2L, Kan1L, Kop2L, Kr1L, M1L, M2L, M3L, M4L, M5L, M6L, Pr1L, Rad1L, Iz1L, S1L, S2L, S3L, S4L, S5L, S6L, S7L, Sta1L); **N. pellucida* Cleve & Grunow (I1P, I1V, I4P, I4V, I5P); *N. perminuta* (Grunow) M. Peragallo (I2N, I2S, I2V, I3S, I3L, I3P, I3N, I3V, Iz2L, Kan1L, M1L, M2L, M3L, M4L, M5L, M6L, S1L, S2L, S4L, S5L, S6L, S7L, S8L, Sta1L); **N. perspicua* Cholnoky (Ved1P); **N. pseudofonticola* Hust. (I3P); *N. pura* Hust. (I1P, I5P, M1L, M3L); **N. pusilla* (Kütz.) Grunow (Cher1L, I1L, I1P, I2L, I3L, I3S, I4P, I5L, Gla2L, M1L, Iz1L, Rech1L, S3L, Sta1L, Ved1P); *N. recta* Hantzsch (I1P, I1V, I2V, I2S, I3P, I4P, M1L, M2L, M3L, M6L, S3L, S4L, S5L, S6L, S7L, S8L); **N. rosenstochii* Lange-Bert. (I3P); **N. scalpeliformis* (Grunow) Grunow (I4P); **N. sigma* (Kütz.) W.M. Smith (I2S); **N. sigmoidea* (Nitzsch) W.M. Smith (I1L, I1S, I1V, I2V, I2N, I2P, I2S, I3S, I3L, I3P, I3N, I3V, I4P, I5P, I5V M3L, S2L, S3L, S4L, S5L, S6L, S7L, S8L); *N. sinuata* (Thwaites) Grunow (Gla2L, Iz1L); *N. sinuata* var. *tabellaria* (Grunow) Grunow (I2L, I2P, I2S, S2L); **N. solgensis* Cleve-Euler (I3L, M5L, M6L, S8L); *N. sublinearis* Hust. (I4P, I5P, M1L, M3L, M5L, Iz1L, S1L, S2L, S4L, S5L, S6L, S8L); **N. supralitorea* Lange-Bert. (I4P, M2L, S3L, S4L, S8L); **N. tubicola* Grunow (I1P, I1V, I3P, I4P, M2L, S4L, S5L, S6L); **N. umbonata* (Ehrenb.) Lange-Bert. (I3N, I3V, I4N, I4P, I5P, I5L, I5S, I5N, I5V, S2L, S6L); *N. vermicularis* (Kütz.) Hantzsch (I1P, I2S, I4P, I5L, M2L, S3L, S6L); **N. vermicularis* f. *angustior* Grunow (I4P)

Denticula Kütz.

D. tenuis Kütz. (Gla1L, I3S, M3L, M5L, Iz1L, S7L, Tr1L)

Rhopalodiales Mann**Rhopalodiaceae (Karsten) Topachevs'kyj & Oksiyuk****Epithemia Bréb.**

E. adnata (Kütz.) Bréb. (Chip1L); *E. sorex* Kütz. (I1V, Vur1L)

Rhopalodia Müller

**R. acuminata* var. *acuminata* Krammer (I1P); *R. gibba* var. *gibba* (Ehrenb.) O.F. Müller (I3P, I5P, M5L, Iz1L); **R. gibba* var. *minuta* Krammer (I1P, Vur1L)

Surirellales Mann**Surirellaceae Kütz.****Surirella Turpin**

S. angusta Kütz. (A3L, I1L, I1P, I1V, I2V, I2S, I2L, I2N, I3S, I3N, I3V, I4P, I5V, Iz2L, Kr1L, M1L, M2L, M5L, Rad1L, Iz1L, S1L); *S. biseriata* Bréb. & Godey (I3V); *S. brebissonii* Krammer & Lange-Bert. (A3L, I2L, I3S, I4L, I4P, I5P, I5S, I5V, Gla2L, Iz2L, M1L, M3L, M5L, M6L, Rad1L, Iz1L, Rech1L, S1L, S2L, S3L, S4L, S5L, S6L, S7L, S8L, Sta1L); *S. brebissonii* var. *kuetzingii* Krammer & Lange-Bert. (I1P, I1S, I1V, I2V, I2N, I2P, I2S, I3S, I3P, I3N, I3V, I4N, I4P, I4V, I5P, I5L, I5N, I5V, S4L, S6L); *S. elegans* Ehrenb. 1843 (I3N, I3V, M5L, S5L, S6L); *S. minuta* Bréb. (I1P, I1V, I2P, I2S, I2V, I3S, Iz2L, Iz1L, Sta1L); *S. ovalis* Bréb. 1838 (I1P, I2S, I4P); *S. tenera* Gregory (I1P, I2S, I3P, I3S)

Cymatopleura W.M. Smith

C. elliptica var. *hibernica* (W.M. Smith) Van Heurc (I1P, I3V, I3P); *C. solea* var. *apiculata* (W.M. Smith) Ralfs (Vur1L); *C. solea* var. *solea* (Bréb.) W.M. Smith (I1V, I2N, I2S, I3S, M6L, S3L, S4L, S5L, S6L, S8L)

Short descriptions of the unidentified taxa and notes on some rare and new species for Bulgaria :

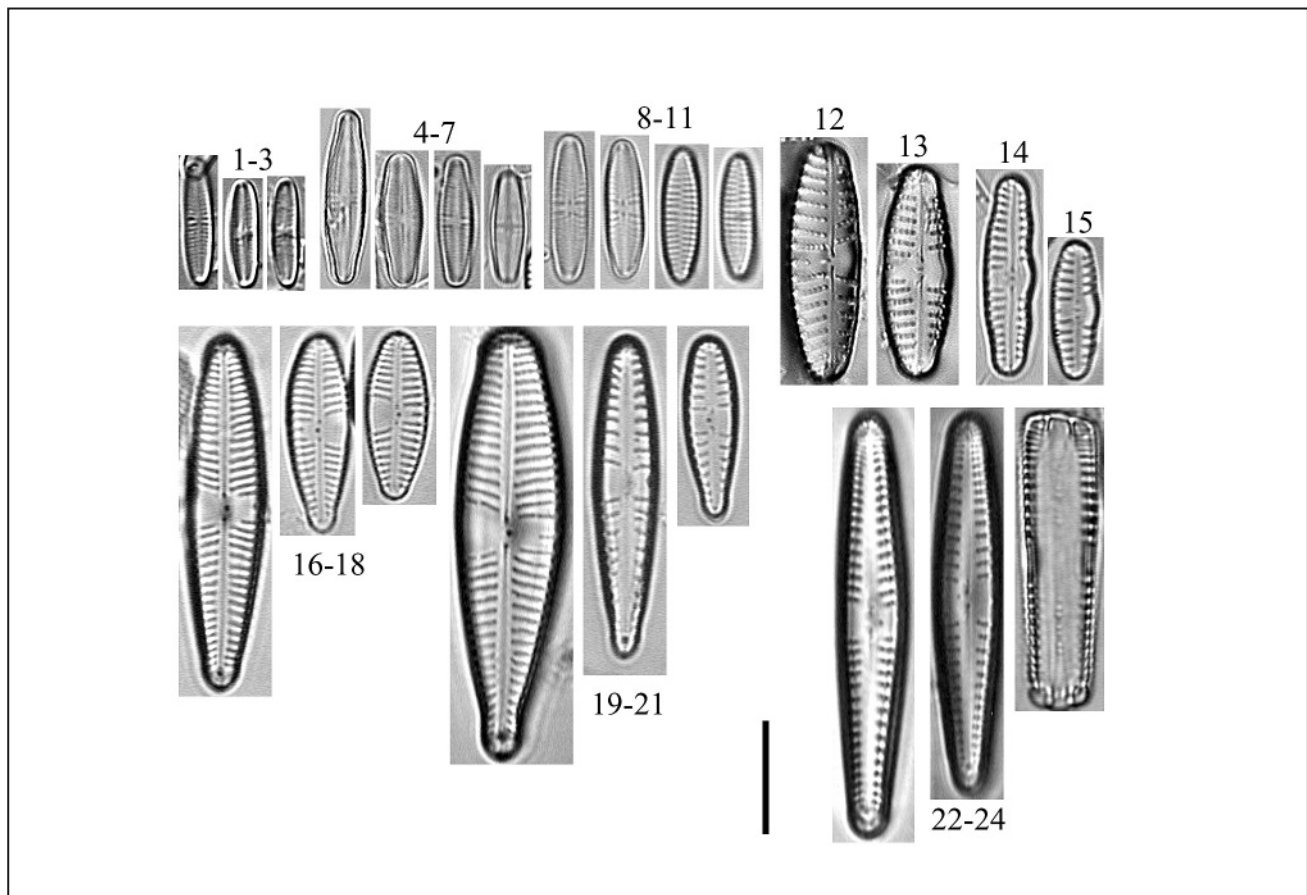
Achnantheidium sp. (Figs 1-3): Valves are finely striated. The shape of the valves resembles most *A. temniskovae* (Figs 8-11), *A. atomoides* Monnier, Lange-Bert. & Ector and *A. atomus* (the two latter were not found in the samples), but the central area of the rapheless valve rather resembles those of *A. minutissimum* (Figs 4-7). The taxon was found only at the site on river

Trigradska (Tr1). A more detailed study of the ultrastructure is required for correct determination of this taxon.

Gomphonema sp. 1: Length: 22 µm; width: 5 µm; one isolated stigma asymmetrically in the central area; very wide and rounded ends. The taxon was found only at one site of river Strouma (S1).

Gomphonema sp. 2: Cells slightly asymmetrical along the longitudinal axis (curved); length: 30–32 µm; width: 5–6 µm; stria: short, 12–13/10 µm, the central three on each side much shorter; one isolated stigma asymmetrically in the central area. The taxon was found only at one site of river Mesta (M5).

Reimeria uniseriata Sala, Guerrero & Ferrario (Figs 12-13) reported for the first time for Bulgaria is a recently described species from Argentina, but in Europe it was probably misidentified as *R. sinuata* (Gregory) Kociolek & Stoermer (Figs 14-15) (Ector & Coste 2000). The differences between the two species are visible in light microscopy. The stria of *R. uniseriata* are uniseriate, unlike the double-seriate stria in *R. sinuata*, and *R. uniseriata* has also larger apical areas, with pores on the ventral side of the valve. The species is reported also from France



Figs 1-24. LM micrographs of: 1-3, *Achnantheidium* sp.; 4-7, *A. minutissimum*; 8-11, *A. temniskovae*; 12-13, *Reimeria uniseriata*; 14-15, *R. sinuata*; 16-18, *Gomphonema rosenstockianum*; 19-21, *G. tergestinum*; 22-24, *G. lateripunctatum*. Scale bar = 10 µm

and South Africa. *Luticola* aff. *kotchy* Grunow, described from hot waters in Hungary and later found in the canals in France is reported also for the first time for Bulgaria. *Gomphonema lateripunctatum* (Figs 22-24) described from the Alps (Reichardt & Lange-Bertalot 1991) and very seldom in Europe was found in river Glazne in the Pirin Mts for the first time for Bulgaria. Two easily misidentified and rare *Gomphonema* species – *G. rosenstockianum* (Figs 16-18) and *G. tergestinum* (Figs 19-21) – occurred in few samples. The major visible difference between them was the density and character of the stria: *G. rosenstockianum* has 12–14 uniseriate stria/10 µm and *G. tergestinum* has 8–11 double-seriate stria/10 µm.

The diatom flora of the studied rivers and catchments was presented by different number of taxa corresponding to the different number of sites, samples, substrates and length of the studied stretches of the rivers. The maximum number of taxa was found in the catchment of river Iskur: 266 taxa, from eight sites, five substrates and 127 samples. Two hundred and twenty-three taxa of epilithic diatoms were found in 113 samples from 15 sites along the catchment of river Mesta and 203 taxa of epilithic diatoms were found in 90 samples from 11 sites and reported for the first time for the catchment of river Strouma. As compared to the earlier investigations of these rivers, more species (329 taxa) were found in the same stretch of river Iskur in the period 1998–2002 (Ivanov & al. 2006). Three hundred and twenty-eight diatom taxa were identified from the periphyton of river Mesta in the period 1989–1991, but only 108 taxa with relative abundance above 1% in the epilithon were reported (Passy & al. 1999). A lesser number of taxa were found and reported for the first time for the catchments of rivers Ogosta (71 taxa from five sites and five samples), Arda (65 taxa from eight sites and eight samples), Lom (31 taxa from one sample), and Vucha (31 taxa from one sample). These rivers were sampled only once. A more detailed study of them will be part of a future investigation.

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