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HORIZONTAL PHYTOPLANKTON STUDIES IN LAKE BALATON BASED ON SCOOPED SAMPLES AND FILTRATES TAKEN IN 1967

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This study continues to investigate the horizontal distribution and quantitative relationships of the phytoplankton in Lake Balaton, based on water samples from the warm-water period in 1965 and 1966 (TAMÁS, 1967; 1969).

The examinations endeavoured to obtain further data on the horizontal distribution, the number of individuals and the qualitative relationships of the phytoplankton on the basis of serial collections along the transversal sections during the warm-water period.

Collection data and methods

During 1967, as in the previous years (1965 and 1966), the collections were carried out once a month in the period ranging from April to the end of November. The samples were taken from three previously allocated points on each of the three transversal sections (M, K, G) in the south-west basin and the two (A, E) in the north-east basin of the lake The samples were brought to the surface by means of the Friedinger apparatus from different levels and the filtrates were collected by means of nets of No. 6 and 25 mesh, respectively.

It has always been a matter of question during previous investigations how much the numbers of plant microorganisms varied in the simultaneously collected samples from collecting sites of each of the transversal sections. To this end serial samples collected according to three different methods were counted: 1. The water samples (1 litre each) taken from different depths of water were mixed in a large glass container on each of the sampling points and fixed with 2% formaline. 2. At the three collecting points of each of the transversal sections the water samples from the surface and 1, 2, 3 m depths of water were poured into separate glass containers, and fixed subsequently with JJK. 3. The 250 ml water samples from the different depths of each of the three collecting points of the transversal sections were fixed with JJK.

The map showing the location of the sampling places (TAMÁS, 1967; 234) and the data on the technique of collection (TAMÁS, 1968; 229) are presented in previous works.

Data on the water level of Lake Balaton during 1967 are summarized in *Fig. 1*, and the changes of water temperature are illustrated in *Fig. 2*.

The chemical analysis of water was carried out by the coworkers of the Institute of Public Hygiene, Veszprém county, parallel with the collection of samples (ORSÓS, 1968).

Fig. 1. Changes of the water level in Lake Balaton in 1967, on the basis of Tihany water-gauge data (mark 0 = 104.075 m above Adria)

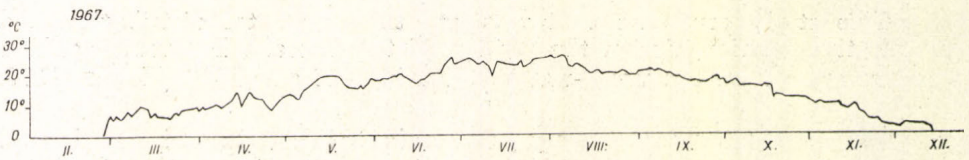

Fig. 2. Temperature of the water in Lake Balaton in 1967 (measured in Kis-Bay at Tihany at a water depth of ±30 cm)

The quantitative estimation of scooped samples was made by the Utermöhl method, which consists of counting, by means of an inverted microscope. For the identification of algae the taxonomical works also used and cited in previous publications were used (TAMÁS, 1969).

Results

In the course of the phytoplankton studies performed in 1967, the data on the 495 scooped samples and 117 net-filtrates collected at three sampling points of each of the five transversal sections of the lake in the period ranging from April to the end of November were evaluated. The identified phytoplankton species including the aquatic mycophyta belong to six phyla:

	species	variety	form
Cyanophyta	18	—	—
Euglenophyta	11	—	—
Pyrrophyta	5	—	—
Chrysophyta	61	3	1
Chlorophyta	51	8	1
Mycophyta	1	—	—
Total	147	11	2

The numbers per 1 liter of water of phytoplankton species was established in the three serial samples collected in April. The values for the three characteristic pelagic species in the three serial samples are summarized in tables *(Tables 1—3)*. As seen from the data there is only a very small difference in values for the individual number per liter between the three series.

TABLE 1

Individual number per liter of Lyngbya circumcreta in three series of samples from each of the transversal sections (April, 1967)

	M	K	G	A	E
Series 1	M_2 604	K_2 792	G_2 990	A_2 1460	E_2 2498
	M_0 600	K_1 800	G_0 1000	A_0 1540	E_1 2500
	M_1 592	K_0 808	G_1 1010	A_1 1498	E_0 2502
Series 2	0m 598	802	1004	1680	2600
	1m 608	802	1008	1580	2550
	2m 596	796	998	1540	2450
	3m —	800	990	1200	2400
Series 3	M_2 602	K_2 796	G_2 1002	A_2 1510	E_2 2510
	M_0 608	K_1 800	G_0 1000	A_0 1496	E_1 2500
	M_1 590	K_0 804	G_1 1000	A_1 1492	E_0 2490

TABLE 2

Individual number per liter of Planktonema lauterborni in three series of samples from each of the transversal sections (April, 1967)

	M	K	G	A	E
Series 1	M_2 2010	K_2 4400	G_2 6600	A_2 4200	E_2 1150
	M_0 2000	K_1 4000	G_0 6200	A_0 4300	E_1 1200
	M_1 1990	K_0 4500	G_1 6000	A_1 4400	E_0 1250
Series 2	0m 2090	4500	6400	4580	1350
	1m 2000	4400	6400	4460	1300
	2m 1910	4000	6000	4890	1150
	3m —	4300	6200	3270	1100
Series 3	M_2 2005	K_2 4400	G_2 6300	A_2 4200	E_2 1260
	M_0 2000	K_1 4500	G_0 6200	A_0 4400	E_1 1200
	M_1 1995	K_0 4000	G_1 6300	A_1 4300	E_0 1140

Because of the low depth of water the vertical distribution of the pelagic plant species is more uniform than generally indicated in works describing the techniques of quantitative phytoplankton analysis (GLENK, 1962; 1963; SCHWOERBEL, 1966; UTERMÖHL, 1958).

TABLE 3

Individual number per liter of Cyclotella ocellata in three series of samples from each of the transversal sections (April, 1967)

	M	K	G	A	E
Series 1	M_2 19 980	K_2 25 200	G_2 30 600	A_2 24 900	E_2 40 020
	M_0 20 000	K_1 24 800	G_0 30 000	A_0 25 000	E_1 40 500
	M_1 20 020	K_0 25 000	G_1 29 400	A_1 25 100	E_0 39 500
Series 2	0m 20 500	26 000	31 000	25 500	41 000
	1m 20 000	26 000	30 000	25 000	41 000
	2m 19 500	24 000	29 500	24 750	40 000
	3m —	24 000	29 500	24 750	37 000
Series 3	M_2 19 700	K_2 24 500	G_2 29 800	A_2 24 800	E_2 40 500
	M_0 20 000	K_1 25 000	G_0 30 000	A_0 25 500	E_1 40 000
	M_1 20 300	K_0 25 500	G_1 30 200	A_1 24 700	E_0 39 000

18 species were found to belong to two orders (Chroococcales 11, Oscillatoriales 7) of phylum Cyanophyta. Of these the pelagic *Coelosphaerium kützingianum*, *Merismopedia tenuissima* and *Microcystis flos-aquae* occurred in large numbers in some places. Of the filamentous algae of order Oscillatoriales, *Aphanizomenon flos-aquae* var. *klebahnii* was the most numerous in July from the Bay of Keszthely (24 000). The numbers of *Lyngbya limnetica* along transversal sections A and E varied between 10 000—16 000 in the warm-water period (from July to September) *(Table 4)*.

Phylum Euglenophyta was represented by 11 species (Euglenales 8, Colaciales 3). In some places the number of *Euglena acus* was as high as 1000—2000 i/liter. The number fo *Euglena oxyuris* in the August samples of the Bay of Keszthely and the transversal section K was much bigger than in the previous years (TAMÁS, 1967; 1969). Of the *Colacium* species, *C. vesiculosum* occurred in great number in the August samples of the Bay of Keszthely (4500). The two other species of this genus occurred in the filtrates as epibionts of zooplankton organisms.

The five species of phylum Pyrrophyta represented two classes (Peridineae 5, Cryptophyceae 1). The population of *Ceratium hirundinella* gradually increased during the warm-water period and reached a top value in August (at transversal sections K = 60 800, E = 50 000). Numbers of *Diplopsalis acuta* in August and September and of *Gonyaulax apiculata* in August varied between 3000—4000 i/liter and 1000—2800 i/liter, respectively.

The 65 species belonging to phylum Chrysophyta represented 3 classes (Xanthophyceae 3, Chrysophyceae 6, Bacillariophyceae 56). Of the species belonging to the class Xanthophyceae the pelagic *Planktonema lauterborni* was found to be the most numerous during the warm-water period. High numbers of *Dinobryon divergens* of class Chrysophyceae were registered in July in the area of the Bay of Keszthely. Of the 56 species of class Bacillariophyceae 24 were pelagic, 24 benthic and 8 epiphytic-epibiont. In the water samples from the south-west region of the lake the pelagic *Cyclotella bodanica* was found to occur occasionally in numbers as high as 40 000—45 000 i/liter

and *C. ocellata* in numbers twice of that. *Melosira granulata* and its variety were also represented by 100 000 i/liter in the warm-water period. It is seen from the data presented in *Table 4*, that *Fragilaria construens* and *Nitzschia acicularis* also occurred in remarkably large individual numbers (the values for the latter in the April—May samples of the north-east basin were many times those of previous years). Of the benthic diatoms, *Amphora ovalis* and its varity occurred in significant numbers. Numbers of benthic, epibiont or epiphytic species alike were consistently small horizontally.

The 60 species belonging to phylum Chlorophyta represented 4 orders (Volvocales 5, Tetrasporales 1, Chlorococcales 41, Zygnematales 13). The Chlorococcales species occurred in large numbers in some places *(Ankistrodesmus falcatus* and its varieties, *A. lacustris*, *Crucigenia quadrata*, *Dictyosphaerium pulchellum*, *Oocystis solitaria* and *Scenedesmus quadricauda)*. Of the order Zygnematales, *Closterium aciculare* occurred in some places of the north-east basin in numbers varying between 3000 and 4800 i/liter.

Mycophytes were represented only by the species *Dactylosporium* already known from previous collections. This species occurred in small numbers during the warm-water period.

The biggest number of species (131) and individuals (709700 i/liter) was found in the August sample from the Bay of Keszthely. The lowest species number (44) occurred in the November collections at Balatonalmádi—Balatonvilágos, and the smallest individual number in November at Ságpuszta-Balatonszemes (79900) *(Table 5)*.

The eurytherm species often listed in previous publications regularly occurred in the samples and contributed by their constant numbers to the phytoplankton population.

It is seen in *Table 4*, containing the list of species as well as data on their occurrence, that the distribution of some species is limited to the south-east part of the lake, while others that were perhaps transported by River Zala into the lake occur only in the area of the Bay of Keszthely, and again others are resident of the north-east part of the lake.

Chrysophytes were the most numerous with regard to both species and individual numbers in the summer samples of the Bay of Keszthely.

The horizontal distribution of the phytoplankton in Lake Balaton was more uniform in the period ranging from April to November, 1967 than during the previous two years. The same holds true also for the algal phyla. Excessive numbers, algal blooms, discoloration of water were not observed during the period of examination.

No attempt is made here to compare the data on phytoplankton with those of the previous years. Detailed evaluation of the collectons in 1965, 1966, 1967 will be given in a separate comprehensive paper.

TABLE 4

A quantitative analysis of the phytoplankton of Lake Balaton on the basis of collections in 1967 (ind./l = 1000 individuals per liter; + = filtrated plankton (Nr. 25 net); N = evening filtration)

Species	Period	Locality									
		M		K		G		A		E	
		i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25
Cyanophyta											
Chroococcales											
Aphanocapsa delicatissima W. et G. S. West	IV.	—		0.2		0.2	+	0.3	+	0.1	N
	V.	—		0.2	+	0.2	+	—		0.2	+
	VI.	0.1		—		0.2	+	0.2	N	0.1	N
	VII.	0.2	+	0.5	+	0.5		0.4	N	0.1	+ N
	VIII.	0.2		0.2		0.3	+	0.5	+	0.2	+ N
	IX.	0.05		0.1	+	0.4	+	0.1	+ N	0.4	N
	X.	0.1		—		—		0.1		—	+ N
Aphanothece clathrata var. *brevis* Bachm.	IV.	0.1		—		0.1	+	—		0.2	N
	V.	0.3		0.2	+	0.2		0.3		0.2	
	VI.	0.1	+	0.2	+	0.1		0.3	+	0.3	+
	VII.	0.3		0.5	+	0.4		1.0	N	0.5	N
	VIII.	1.0		1.5		0.3	+	0.4	+ N	0.5	+
	IX.	0.2		0.1	+	0.1	+	0.4	+	0.5	N
	X.	0.1		—		0.1		—		0.2	
Chroococcus limneticus Lemm.	IV.	—		—		0.1	+	0.1	+	—	
	V.	—		—		0.3	+	0.4	+	0.5	+
	VI.	0.4	+ N	0.2	+	0.2	+	0.4	+ N	0.4	+
	VII.	0.3	N	0.1		0.2		0.2	N	0.3	+
	VIII.	0.2		0.1		0.3	+	0.4	+	0.5	+ N
	IX.	0.1	+	—		0.2	+	0.5	+ N	0.4	N
	X.	0.1		0.1		0.2		0.4		0.3	
	XI.	0.1		—		0.1		—		0.1	
Chroococcus minimus (Keissl.) Lemm.	V.	—		—		—		—		0.4	
	VI.	—		0.5		—		—		—	
	VII.	—		—		0.2		0.3		—	
	VIII.	—		0.3		—		0.2		—	

Croococcus turgidus (Kütz.) Naeg.	VI.	0.1		—		—		—		—				
	VII.	0.2		—		—		—		0.1				
	VIII.	0.4		—		—		—		—				
	IX.	0.2		—		—		—		—				
	X.	0.1		0.3		—		—		—				
Coelosphaerium kützingianum Naeg.	IV.	0.1		0.3	+	0.2	+	0.3	+	0.4	+	N		
	V.	0.2		0.2	+	0.1		0.4	+	0.3	+			
	VI.	1.4		0.4	+	3.5	+	3.5	+	N	2.0	+	N	
	VII.	2.1	+	2.0	+	3.0		4.0		N	3.5	+	N	
	VIII.	2.0		3.0	+	2.5	+	2.5	+	N	2.0	+	N	
	IX.	1.5	+	1.2	+	3.5	+	3.0	+	N	3.0		N	
	X.	0.5		3.0	+	1.2		1.5			3.0	+	N	
	XI.	0.2		2.5		2.1		1.5			0.5			
Gomphosphaeria lacustris Chod.	IV.	0.1		0.2		0.5	+	0.1			0.2			
	V.	0.2		0.3		0.4		0.5	+		0.5	+		
	VI.	0.1		0.3		2.5		2.5			1.4			
	VII.	0.1		0.3		0.4		0.5			0.7			
	VIII.	0.2		0.1		0.3		0.4			0.8			
	IX.	0.2	+	0.1		0.3		0.2		N	0.5		N	
	X.	0.1		0.2		0.1		0.2			0.2			
	XI.	0.2		0.2		0.2		0.1			0.1			
Merismopedia glauca (Ehr.) Naeg.	IV.	—		—		0.2	+	0.5	+		—			
	V.	0.5		0.3		0.2		0.1			0.2			
	VI.	0.2		4.0		2.1		2.0	+		0.5			
	VII.	0.8		2.5		3.0		3.0		N	0.2			
	VIII.	0.2		0.2		0.1		0.2	+		0.3			
	IX.	0.5		0.2		0.1		0.5		N	0.1			
	X.	0.1		0.2		0.1		0.1			0.1			
	XI.	0.5		0.2		0.2		0.1			0.2			
Merismopedia tenuissima Lemm.	IV.	0.5		0.4		0.6		0.4			0.8			
	V.	3.1		2.0		0.3		0.2			2.0			
	VI.	6.2		5.0		—		0.4			0.2			
	VII.	0.2		0.1		0.4		0.3			0.1			
	VIII.	1.0		2.0		0.8		0.8		N	0.6			
	IX.	0.2		0.4		0.5		0.6			0.3			
	X.	0.5		0.4		0.3		0.5			0.4			
	XI.	0.2		0.2		0.1		0.1			0.1			
Microcystis flos-aquae (Wittr.) Kirchn.	IV.	0.1		0.1		0.1		0.1			0.2			
	V.	0.4		0.5		0.3		0.4	+		0.4	+		

TABLE 4 (continued)

Species	Period	Locality									
		M		K		G		A		B	
		i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25
	VI.	0.2		0.1		0.4	+	0.6	+ N	3.0	+ N
	VII.	5.0	+	4.5	+	2.0		0.8	N	3.0	+ N
	VIII.	7.2		5.0		4.5	+	1.5	N	4.5	+ N
	IX.	0.8		0.5	+	0.6	+	1.5	+	2.0	N
	X.	0.6		0.6		0.4	+	0.6	+	4.0	+ N
	XI.	0.2		0.2		0.2		0.3		0.4	
Rhabdoderma lineare	VI.	0.1		—		—		—		—	
SCHMIDLE et LAUT.	VII.	0.5	N	—		—		—		—	
	VIII.	0.1		—		—		—		—	
	IX.	—		—		0.1		—		—	
	X.	0.2		—		—		—		—	
Oscillatoriales											
Anabaena scheremetievi	IV.	0.1		0.1	+	0.2	+	—		—	
ELENK.	V.	0.1		—		—		—		—	
	VI.	1.0		—		—		—		—	
	VII.	0.8	+	—		—		—		—	
	VIII.	0.8	+	—		—		—		—	
	IX.	2.5	+	—		—		—		0.2	
	X.	0.2		—		—		—		0.1	
Anabaena spiroides	VI.	0.2		0.1		—		—		—	
KLEB.	VII.	0.8		1.0		—		—		0.1	N
	VIII.	2.5		2.0		0.2		—		—	
	IX.	4.0		3.0		—		—		—	
	X.	0.2		0.1		—		—		—	
Aphanizomenon flos-	IV.	0.2		0.2	+	0.3		0.5	+	0.6	
aquae var. *klebahnii*	V.	0.4		0.3		0.4		0.2		0.8	+
ELENK.	VI.	4.8	N	2.0		1.0		4.5	+ N	6.0	+ N
	VII.	24.0	+	20.0	+	8.0		15.0		20.0	+ N
	VIII.	20.0	+ N	18.0	+	5.0		7.0		22.0	+
	IX.	5.0	+	4.0	+	6.0		6.0	+	15.0	N
	X.	3.0		2.0		3.0		2.0		7.0	
	XI.	0.2		0.3		0.2		0.2		0.4	

Lyngbya circumcreta G. S. West	IV.	0.6			0.8	+		1.0	+		1.5	+		2.5	+	N
	V.	3.0	+	N	1.0	+		2.0	+		1.8	+		4.2	+	
	VI.	0.8			2.0			3.0	+		6.0	+	N	5.8	+	N
	VII.	0.8	+		0.8	+		4.2			2.5		N	6.4	+	N
	VIII.	1.0		N	3.0	+		3.4	+		8.6	+	N	10.5	+	N
	IX.	2.0	+		2.0	+		2.5	+		6.5	+	N	7.8		N
	X.	1.0			1.5	+		2.0	+		2.6			3.5	+	N
	XI.	0.4			0.2			0.5			0.4			0.4		
Lyngbya limnetica Lemm.	IV.	0.6			0.8			1.0	+		2.0	+		2.0	+	N
	V.	0.8			0.6			0.8			1.8	+		2.0	+	
	VI.	1.2			2.1			4.5	+		10.2	+	N	10.5	+	N
	VII.	2.5			2.0			6.4			10.8		N	13.5	+	N
	VIII.	1.4		N	2.0			4.2			15.8	+	N	16.4	+	N
	XI.	1.0			2.5			5.3	+		14.2	+	N	12.5		N
	X.	0.8			1.2			2.5			6.8	+		8.5	+	N
	XI.	0.6			0.4			0.8			2.0			3.0		
Oscillatoria tenuis Ag.	V.	0.2			0.1			—			—			—		
	VI.	0.6			0.1			0.1			—			—		
	VII.	0.6		N	0.1			0.1			0.1			—		
	VIII.	0.8			0.5			0.2			—			—		
	IX.	0.5			0.2			0.1	—		—			—		
	X.	0.2			0.1			—			—			—		
Pseudanabaena catenata Laut.	IV.	—			—			0.1			—			—		
	V.	0.1			0.2			0.3			0.5			—		
	VI.	0.2			0.1			0.2			0.1			—		
	VII.	0.2			0.1			0.1			0.5			—		
	VIII.	0.4			0.2			0.1			0.1			0.1		
	IX.	0.4			0.2			0.2			0.2			—		
Euglenophyta Euglenales																
Euglena acus Ehr.	IV.	—			0.1			—			0.1			—		
	V.	—			0.2	+		—			0.1	+		—		
	VI.	—			0.4			0.8			1.5			—		
	VII.	—			0.5	+		2.8			1.8			1.8		
	VIII.	—			1.0			1.0			0.5			—		
	IX.	0.1	+		—			—			0.1			—		
	X.	0.1			0.1	+		—			0.1			0.2		
	XI.	—			—			0.1			—			—		

TABLE 4 (continued)

Species	Period	Locality									
		M		K		G		A		E	
		i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25
Euglena ehrenbergii KLEBS.	V.	0.1		0.2		0.2		0.1		—	
	VI.	0.3		0.8	+	0.8		0.5		—	
	VII.	0.6		0.8	+	0.4		0.2		0.3	
	VIII.	0.2		1.5		0.8		0.2		0.2	
	IX.	0.2		0.8	+	0.2		0.2	+	0.2	N
	X.	0.1		0.2	+	0.1		0.1		0.2	
	XI.	0.1		0.1		0.2		0.2		0.1	
Euglena klebsii (LEMM.) MAINX	IV.	—		—		0.1	+	0.1	+	—	
	V.	0.1		0.1		0.2		0.3		0.2	+
	VI.	0.5		0.8		0.2	+	0.2	+	0.1	
	VII.	0.8		0.8	+	0.2		0.4		1.5	
	VIII.	3.2		3.4		0.8		0.1		0.8	
	IX.	0.8		0.4		0.1		0.1	+	0.1	
	X.	0.2		0.1		0.1		0.1		0.1	
	XI.	0.1		0.1		0.1		0.1		0.1	
Euglena limnophila LEMM.	V.	0.4		0.1	+	—		—		—	
	VI.	0.1		0.1		—		—		—	
	VII.	—		0.8		0.6		—	+	—	
	VIII.	0.2		1.4		0.8		0.6	+	—	
	IX.	0.1		0.1	+	0.6		0.1	N	—	
	X.	0.1		0.1		0.3		—		—	
	XI.	0.1		0.1		0.1		—		—	
Euglena oxyuris SCHMARDA	IV.	—		0.1	+	0.2	+	0.1		—	
	V.	0.1	+	0.2	+	0.3	+	0.2	+	0.4	+
	VI.	0.1	+	0.2	+	—		0.3	N	0.4	N
	VII.	0.8	+	0.8	+	—		1.2	N	1.4	N
	VIII.	3.0	+	6.5		—		1.5	+ N	0.8	+
	IX.	0.8	+	0.8		—		1.0	+ N	0.2	
	X.	0.1	N	0.4	+	0.1		0.1		0.2	+
	XI.	0.1		0.1		0.1		—		—	
Phacus acuminatus STOKES	IV.	—		—		0.1	+	—		—	
	V.	0.1		—		—		0.1	+	0.1	

	VI.	0.1			—		—			0.2	+	0.4	+	
	VII.	0.4			0.4	+	—			0.4		0.2	N	
	VIII.	0.6			0.2		—			0.6	+	—		
	IX.	0.4	+		0.4	+				0.4	+	—		
	X.	0.1			0.1		—			—		—		
	XI.	0.1			—		—			—		—		
Phacus tortuosus ROLL.	V.	0.1			—		—			—		—		
	VI.	0.1			—		—			—		—		
	VII.	0.4			—		—			0.1		0.1	N	
	VIII.	1.4			0.8		—			0.1		—		
	IX.	0.6	+		—		—			0.1		—		
Phacus trypanon POCHM.	IV.	—		N	0.1	+	—			—		—		
	VI.	—			0.1	+	—			—		—		
	VII.	0.1			0.2	+	—			—		0.1	+	
	VIII.	0.4			—		—			—		—		
	IX.	0.1			—		—			—		—		
Colaciales														
Colacium cyclopicola (GICKLH.) BOURR.	IV.	—	+	N	—	+	—			—		—		
	V.	—	+	N	—	+	—	+		—		—		
	VI.	—		N	—		—			—		—		
	VII.	—	+	N	—	+	—	+		—	+	—		
	IX.	—	+		—		—			—		—		
	X.	—	+		—	+	—	+		—	+	—	+	
Colacium simplex HUBER-PESTALOZZI	IV.	—	+	N	—	+	—			—		—		
	V.	—	+	N	—	+	—	+		—		—		
	VI.	—	+	N	—	+	—	+		—		—		
	VII.	—	+	N	—	+	—	+		—		—		
	VIII.	—	+	N	—	+	—	+		—		—		
	IX.	—	+	N	—	+	—			—		—		
	X.	—	+	N	—		—			—		—		
Colacium vesiculosum EHR.	IV.	0.4	+	N	0.4	+	—	+		—	+	0.1	+	N
	V.	0.4	+	N	0.4	+	0.2	+		0.2	+	0.2	+	
	VI.	0.8	+	N	0.4	+	0.6	+		0.8	+	N	0.2	+ N
	VII.	0.8	+	N	0.2	+	0.5	+		0.6	+	N	0.2	+ N
	VIII.	4.5	+	N	0.6	+	0.6	+		0.4	+	N	0.2	+ N
	IX.	0.4	+		0.2	+	0.1	+		0.4	+	N	0.2	+
	X.	0.4	+	N	0.4	+	—			0.2	+		0.1	+ N

TABLE 4 (continued)

Species	Period	Locality									
		M		K		G		A		E	
		i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25
Pyrrophyta											
Cryptophyceae											
Cryptomonas erosa	VI.	0.2	+	—		—	+	—		—	
Ehr.	VII.	0.3	+	—		—	+	—		—	+
	VIII.	0.1		—		—		—		—	+
	IX.	0.2	+	—		—		—		—	
Peridineae											
Ceratium hirundinella	IV.	0.2	+ N	0.3	+	0.6	+	0.8	+	2.0	+ N
(O. F. Müll.)	V.	4.8	+ N	2.5	+	4.6	+	2.2	+	3.8	+
Schrank	VI.	22.8	+ N	20.0	+	18.4	+	18.0	+ N	20.0	+ N
	VII.	30.4	+ N	45.2	+	40.0	+	15.6	N	25.8	+ N
	VIII.	40.6	+ N	60.8	+	44.2	+	35.0	+ N	50.0	+ N
	IX.	20.2	+	26.4	+	25.6	+	30.0	+ N	25.0	N
	X.	5.4	+ N	3.2	+	2.8	+	1.8	+	4.2	+ N
	XI.	0.8		0.6		0.8		0.6		0.8	
Diplopsalis acuta	V.	0.2		0.2		0.2		0.2		0.2	
Entz.	VI.	0.8		0.6		0.6	+	0.8	+ N	0.4	+
	VII.	3.4	+ N	2.8	+	1.5		1.8	N	2.8	+ N
	VIII.	3.6	+	3.2	+	2.0	+	4.0	+ N	3.0	+ N
	IX.	3.8	+	3.6	+	3.4	+	2.8	+ N	2.4	+ N
	X.	0.8		0.6	+	0.4		0.8	+	0.6	
	XI.	0.1		0.1		0.1		0.1		0.1	
Glenodinium gymno-	VI.	0.5		0.4		0.2		0.6	N	0.4	
dinium Penard	VII.	0.8		0.6		0.8		0.8		0.6	
	VIII.	0.6		0.8		0.8		0.6		0.5	
	IX.	0.4		0.2		0.4		0.4		0.4	
Gonyaulax apiculata	V.			0.1		0.1		0.1		0.1	
(Penard) Entz	VI.	0.6		0.4		0.4		0.8	+ N	0.6	N
	VII.	0.4		0.6		0.5		0.4		0.6	N
	VIII.	2.8	+	2.8		1.8		1.0		1.5	+

	IX.	0.8	+		0.8	+		0.6			0.8	+	N	0.8		N
	X.	0.4			0.4			0.5	+		0.4			0.4		
Chrysophyta																
Xanthophyceae																
Botryococcus braunii	IV.	0.1			—			0.1			0.1			0.1		
Kütz.	V.	0.2			0.2			0.2			0.2	+		0.1		
	VI.	0.2			0.3			0.5	+		0.5	+		0.1	+	N
	VII.	0.5	+		0.5	+		2.0			3.0		N	2.0	+	N
	VIII.	1.5	+		0.5			0.5	+		0.8	+	N	1.0	+	N
	IX.	1.0	+		0.5	+		2.5	+		1.0	+	N	3.4		N
	X.	0.5		N	0.5			0.6			0.8	+		0.8	+	
	XI.	0.1			0.2			0.2			0.1			0.1		
Planktonema lauter-	IV.	2.0			4.3	+		6.2	+		4.3	+		1.2	+	N
borni Schmidle	V.	3.0			6.6	+		10.5	+		7.6	+		2.4	+	
	VI.	4.8	+	N	12.4	+		6.2	+		4.5	+	N	3.2	+	N
	VII.	3.4	+		3.4	+		8.6	+		3.6		N	2.8	+	N
	VIII.	2.8	+	N	2.0	+		5.4	+		2.5		N	1.4		N
	IX.	2.0	+		1.6	+		4.2	+		2.0	+	N	1.0		
	X.	5.2	+	N	3.8	+		6.5	+		3.0			2.4	+	N
	XI.	2.0			1.5			3.8			2.6			1.5		
Stipitococcus urceola-	VII.	—	+		—	+		—			—	+		—	+	
tus W. et G. S. West	VIII.	—	+		—	+		—			—	+		—	+	
	IX.	—	+		—	+		—			—			—	+	
Chrysophyceae Dino-	IV.	0.1		N	0.2	+		0.1	+		0.1	+		0.1		N
bryon divergens Imh.	V.	0.1			0.1			0.1	+		0.2	+		0.1	+	
	VI.	1.0	+		0.6			0.8	+		1.4	+	N	0.8		N
	VII.	15.2	+		8.8	+		8.0			2.4		N	4.0	+	N
	VIII.	4.0			2.5			3.0			2.5	+	N	2.0	+	N
	IX.	1.0	+		1.0	+		1.0	+		—			—		
	X.	—			—			0.4	+		0.4	+		0.6	+	N
Dinobryon sociale	IV.	—			0.2	+		0.2	+		0.4	+		—		
Ehr.	VII.	0.6	+		0.4	+		—			—			—		
Mallomonas acaroides	V.	0.1	+		—			—			—			—		
Perty	VI.	0.6	+		—			—			—			—		
	VII.	4.2	+		0.4	+		—			—			—		
	VIII.	8.0	+		0.4	+		—			—			—		
	IX.	4.0	+		0.8			—			—			—		

TABLE 4 (continued)

Species	Period	Locality									
		M		K		G		A		E	
		i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25
Mallomonas elongata	VI.	0.4	+	—		—		—		—	
Reverdin	VII.	0.8	+	—		—		—		–	
	VIII.	2.4	+	—		—		—		—	
	IX.	1.2	+	—		—		—		—	
	X.	0.6	+			—		—		—	
Mallomonas tonsurata	VI.	0.1		—		—		—		—	
Teiling	VII.	0.1	+	—		—		—		—	
	VIII.	8.4	+	—		—		—		—	
	IX.	6.6	+	—		—		—		—	
	X.	0.8		—		—		—		—	
Salpingoeca frequentissima (Zach.) Lemm.	V.	—	+	—		—		—		—	+
	VI.	—	+ N	—		—		—	+	—	+ N
	VII.	—	+	—		—		—	+ N	—	+
Bacillariophyceae Centrales											
Attheya zachariasi J.	VI.	—		—		—		0.1	+ N	0.1	+ N
Brun.	VII.	—		—		—		0.1	N	0.1	+
	IX.	—		—		0.1	+	0.1	+ N	0.1	+ N
Cyclotella bodanica	IV.	4.0	N	4.5	+	8.0	+	—		10.0	+ N
Eulenst.	V.	20.4	+ N	10.6	+	16.0	+	8.8	+	14.4	+
	VI.	25.6	+	30.4	+	20.0	+	16.4	+ N	20.4	+ N
	VII.	40.5	+ N	35.6	+	40.5		20.4	N	16.4	+ N
	VIII.	45.0	+ N	30.0	+	25.0	+	15.0	+	10.2	
	IX.	40.0	+ N	30.4	+	20.2		17.0	+	8.4	+ N
	X.	12.6		8.4		8.0		8.0	+	5.6	+ N
	XI.	5.0		5.6		5.0		8.6		3.4	
Cyclotella meneghiniana Kütz.	V.	0.1	+	—		—		—		—	
	VI.	0.1	+	—	+	—		—	+	—	+
	VII.	0.2	+	—		—		—		—	
	VIII.	0.2	+	—		—		—	+	—	+

	IX.	0.6	+	—		—		—		—			
	X.	0.1	+	—		—		—		—			
Cyclotella ocellata	IV.	20.0	N	25.0	+	30.0	+	25.0	+	40.0	+ N		
PANT.	V.	50.6	+ N	40.0	+	50.0	+	30.0	+	30.5	+		
	VI.	90.0	+	90.0	+	100.8	+	35.0	+ N	25.0	+ N		
	VII.	80.0	+ N	70.8	+	20.0		40.0	N	30.0	+ N		
	VIII.	80.0	+ N	60.4	+	30.4	+	30.0	+	25.0			
	IX.	30.0	+	40.2	+	20.2		25.0	+	20.0	+ N		
	X.	40.0		35.0		15.0		10.5	+	8.6	+ N		
	XI.	8.8		15.8		7.5		6.2		7.5			
Melosira arenaria	V.	0.1	N	—		—		—		—			
MOORE	VI.	—		—		—		0.1		—			
	VII.	0.1	N	—		—		0.1		—			
	IX.	0.1	N	—		—		—		—			
Melosira granulata	IV.	20.0		25.0	+	20.0	+	25.0	+	30.0	+ N		
(EHR.) RALFS	V.	50.0	+ N	40.0	+	25.0	+	26.0	+	18.0	+		
	VI.	150.0	+ N	60.0	+	30.0	+	25.0	+ N	20.0	+ N		
	VII.	180.0	+ N	80.0	+	40.0	+	50.0	+ N	25.0	+ N		
	VIII.	200.0	+ N	150.0	+	80.0	+	60.5	+ N	30.0	+ N		
	IX.	80.0	+	40.0	+	30.0		40.4	+ N	25.6	N		
	X.	50.0	N	20.0	+	25.0	+	20.4	+	15.6	+ N		
	XI.	15.0		10.0		8.4		10.2		8.2			
Melosira granulata var.	IV.	18.0	N	10.0		20.0		15.0		20.0			
angustissima O. MÜLL.	V.	90.0	+	30.0		40.0		60.0	+	30.0	+		
	VI.	200.0	+ N	150.0	+	50.0		80.0	+ N	80.0	+		
	VII.	150.0	N	120.0	+	150.0		90.0		100.0	+		
	VIII.	100.0		90.0		100.0	+	95.0		90.0	+ N		
	IX.	80.0	+	80.0		60.0		100.0	+ N	80.0			
	X.	65.0		80.0	+	50.0		70.0	+	60.0	+ N		
	XI.	15.0		20.0		30.0		25.0		30.0			
Melosira granulata var.	IV.	—		—		1.2	+	1.0	+	0.8	+		
angustissima f. *spirale*	V.	2.5		—		—		—		—			
MÜLL.	VI.	3.2		—		—		0.2		—			
	VII.	6.5		—		—		0.6		—			
	VIII.	10.5		—		—		—		—			
	IX.	7.2		—		—		—		—			
	X.	4.6		—		—		—		—			
	XI.	3.1		—		—		—		—			

TABLE 4 (continued)

Species	Period	Locality									
		M		K		G		A		E	
		i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25
Melosira varians C. A. Ag.	IV.	—	N	—		—		—		—	
	V.	0.4		—		—		—		—	
	VII.	0.5		—		—		—		—	
	VIII.	0.6	N	—		—		—		—	
	IX.	0.4		—		—		—		—	
Stephanodiscus dubius (Fricke) Hust.	VI.	0.4	+	—	+	—		—		—	
	VII.	1.0	+								
	VIII.	0.5	+	—	+	—		—		—	
	IX.	0.6	+	—		—		—		—	
	X.	1.2	+	—		—		—		—	+
Pennales											
Amphora ovalis Kütz.	IV.	2.5	N	2.0		2.1	+	3.0	+	2.4	+
	V.	3.4	+ N	3.0	+	2.0	+	4.8	+	4.0	+
	VI.	4.6		3.6	+	1.0		3.0	+	2.0	
	VII.	8.4	+ N	2.5		1.2		2.1		3.0	
	VIII.	5.0	N	3.0		2.4		10.5	+	5.6	
	IX.	5.0	N	3.2		2.3		6.0	+	3.4	N
	X.	4.2	+	2.4		2.2		2.5	+	2.5	
	XI.	1.0		1.5		1.4		2.0		2.0	
Amphora ovalis var. *pediculus* Kütz.	IV.	0.8		2.0		1.5		—		—	
	V.	1.0	+ N	2.8	+	3.0	+	—		—	
	VI.	0.5	N	0.6		2.0		3.2		—	
	VII.	0.8		3.4		1.5		2.5		—	
	VIII.	2.8		4.1		2.6		1.0		1.0	
	IX.	2.0		2.0		1.6		—		0.8	
	X.	1.2		0.8		—		—		0.5	
	XI.	0.8		—		—		—		—	
Asterionella formosa Hassal	IV.	8.0	N	6.0	+	0.8	+	—		5.0	+ N
	V.	20.0		10.0		1.0		1.0	+	—	
	VI.	100.0	+ N	40.0	+	4.0	+	4.0	+	1.0	+
	VII.	40.0		28.0		—		—		—	

	VIII.	40.0		20.0		—		0.1		—		
	IX.	30.0		10.0		—		2.0	+	—		
	X.	8.0		5.0		—		—		—		
	XI.	6.0		4.0		—		—		—		
Caloneis schumanniana	IV.	0.1	N	—		—		—		—		
var. *biconstricta*	VI.	—		—		0.1		0.1		—		
GRUN.	VIII.	—		—		—		0.2		—		
	IX.	—		—		—		0.4		—		
	X.	0.2		0.2		—		0.2		0.4		
Campylodiscus noricus	V.	—		—		—		—		0.1	+	
var. *hibernica* (EHR.)	VI.	—		—		—		0.1		—		
GRUN.	IX.	—		—		—		—		0.1		N
	X.	—		—		—		0.1		—		
Cocconeis placentula	V.	0.1	N	—		—		—		—		
EHR.	VII.	—		—		—		—		2.0	+	
Cymatopleura elliptica	IV.	0.4	+ N	0.2	+	0.6	+	0.4	+	0.8	+	N
(BRÉB.) W. SMITH	V.	0.4	+ N	0.2	+	1.0	+	0.4	+	0.6	+	
	VI.	0.4	N	1.6	+	0.8		0.4	+	0.4		
	VII.	0.8	+ N	0.8	+	0.6		0.2		0.4	+	
	VIII.	0.8	+ N	0.4		0.6	+	0.6	+	0.6		
	IX.	0.6	+ N	0.4	+	0.4	+	0.4		0.6		N
	X.	0.4		0.2	+	0.6	+	0.5	+	0.5	+	
	XI.	0.2		0.1		0.1		0.4		0.2		
Cymatopleura solea	IV.	0.1	+ N	0.1		0.2	+	0.2	+	0.3	+	
(BRÉB.) W. SMITH	V.	0.1	N	0.1		0.1		0.2	+	0.3	+	
	VI.	0.2		0.1		0.1		0.2	+	0.2		
	VII.	0.4		0.1		0.1		0.1		0.2		
	VIII.	0.2	N	0.1		0.1		0.1		0.1		
	IX.	0.1	+	0.1		0.1		0.1		0.1		
	X.	0.1		0.1		0.4	+	0.1		0.1		
	XI.	0.1		0.1		0.1		0.1		0.2		
Cymetopleura solea	V.	—		—		—		0.1	+	0.1	+	
var. *apiculata* (W.	VI.	—		—		—		0.1		0.1		
SMITH) RALFS	VII.	—		—		—		—		0.1		
	VIII.	0.1		—		—		—		—		
	IX.	0.1		—		—		—		—		
Cymbella cymbiformis	VI.	0.2		0.1		—		—		—		
(KÜTZ.) V. HEURCK	VII.	0.2	+	0.1		—		0.2		—		

TABLE 4 (continued)

Species	Period	Locality									
		M		K		G		A		E	
		i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25
	VIII.	0.4	N	—		—		0.1		—	
	IX.	0.3		—		—		0.1		—	
	X.	0.4	N	—		—		—		—	
Cymbella ehrenbergii KÜTZ.	IV.	—	+ N	—		—		—		—	
	VII.	—	+	—		—		—		—	+
	VIII.	—	+ N	—		—		—		—	+
Cymbella prostata (BERK.) CLEVE	VI.	0.2	+ N	—		0.1		—		—	
Diatoma elongatum AGARDH.	IV.	—		0.1	+	—		0.1		—	
	V.	0.1		—		—		—		—	
	VI.	0.1		—		—		—		—	
	VII.	0.1		—		—		—		—	
	VIII.	0.1		—		—		—		—	
Diatoma vulgare var. *producta* GRUN.	IV.	0.1	N	—		—		—		—	
	V.	0.1	N	—		—		—		—	
	VI.	—		—		—		0.1		—	
Diploneis elliptica (KÜTZ.) CLEVE	IV.	0.1	N	0.4		0.4		0.2		0.1	
	V.	0.1		0.6		0.4		0.4	+	0.2	
	VI.	0.1		1.0		0.6		0.4	+	0.2	
	VII.	0.4		1.0		0.8		0.8		0.2	
	VIII.	0.2		1.2		0.4		0.1		0.2	
	IX.	0.1		0.8		0.6		0.2		0.2	N
	X.	0.1		0.1		0.2		0.1		0.1	
	XI.	0.1		0.1		0.1		0.1		0.1	
Diploneis puella (SCHUM.) CLEVE	IV.	—		—		—		—		0.4	N
	V.	0.2		—		—		—		—	
	VI.	0.4		—		—		—		—	
	VII.	0.4	+	—		—		0.2		—	
	VIII.	0.1		—		—		0.3		—	
	IX.	0.1		—		—		0.2	+	0.3	N
	X.	0.1		—		—		0.1		—	

Epithemia hyndmanni W. SMITH	VII.	0.1		N	—		0.1		0.1		—	
	VIII.	—			—		0.1		—		—	
	IX.	0.1		N	—		0.1		0.1		—	
Epithemia sorex KÜTZ.	VII.	0.1			—		—		—		—	
	VIII.	0.1			0.1		0.1		0.1	+		
	IX.	0.1		N	—		—		0.1		—	
Fragilaria construens (EHR.) GRUN.	IV.	5.4		N	4.4		8.4	+	3.2		2.4	
	V.	8.6		N	6.2		5.6		10.2	+	6.4	+
	VI.	15.0			8.4	+	5.8		16.4	+	4.6	
	VII.	20.5	+	N	10.6	+	8.2		20.4		5.6	
	VIII.	18.8			15.2		6.4		21.3		8.2	
	IX.	20.0	+		8.4		2.5		18.4		4.1	
	X.	8.4			6.4	+	3.6		6.8		6.2	
	XI.	6.4			4.5		4.6		4.8		6.2	
Fragilaria crotonensis KITTON	IV.	0.6			0.2		—		—		—	
	V.	0.8	+		—		—		—		—	
	VI.	1.4	+		—	+	—		—		—	
	VII.	2.0	+		—		—		—		—	
	VIII.	1.5	+		—		—		—		—	
	IX.	0.8	+		—	+	—		—		—	
	X.	1.2	+		—	+	—		—		—	
	XI.	0.6			0.4		—		—		—	
Fragilaria pinnata EHR.	IV.	6.4	+	N	4.0		5.2		4.5		3.2	
	V.	8.6	+	N	4.6		4.6		6.1		4.2	+
	VI.	10.5			6.4		6.1		8.2		6.4	
	VII.	14.6			8.2		8.8		8.0		10.4	
	VIII.	16.4			8.4		8.2		8.2		6.2	
	IX.	12.6	+	N	10.2		6.5		6.8		4.8	
	X.	4.4			6.4		5.2		5.6		4.2	
	XI.	2.5			4.5		4.2		4.8		3.2	
Gomphonema acuminatum EHR.	IV.	0.2	+		—		—		0.4	+	—	
	V.	0.2	+		—		—		—		—	
	VI.	0.2	+		—		—		—		—	
	VII.	0.6	+		—		—		—		0.6	+
	VIII.	0.4	+		—		—		—		—	
	IX.	0.4	+		—		—		—		—	
	X.	0.2	+		—		—		0.4	+	—	
	XI.	0.2	+		—		—		—		—	

TABLE 4 (continued)

Species	Period	Locality									
		M		K		G		A		E	
		i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25
Gomphonema intricatum var. *vibrio* (EHR.) CLEVE	V.	0.4		—		—		—		—	
	VI.	0.6		—		—		—		—	
	VII.	1.0	N	—		—		0.4		—	
	VIII.	0.8	+	—		—		0.2		—	
	IX.	0.8	+	—		—		—		—	
	X.	0.6		—		—		—		—	
Gyrosigma acuminatum (KÜTZ.)RABH.	V.	—		—		—		—		0.4	+
	VI.	—		—		—		0.6		0.6	+
	VII.	—		—		—		0.4		0.8	+
	VIII.	0.4	+	—		—		0.2		0.6	+
	IX.	0.4		—		—		0.4	+	0.4	+
	X.	—		—		—		—		0.4	
Gyrosigma attenuatum (KÜTZ.) RABH.	IV.	0.2	N	—		—		—		0.2	N
	V.	0.2		—		—		0.4	+	—	
	VI.	0.4		—		—		0.2		0.8	+
	VII.	0.6	+ N	—		—		0.2		0.4	+
	VIII.	0.6	+ N	—		—		—		0.8	+
	IX.	0.8	+ N	—		—		—		—	
	X.	—		—		—		0.4		—	
Gyrosigma distortum var. *parkeri* HARRIS	IV.	0.4	N	0.4	+	—		—		—	
	V.	0.4		—		—		0.2		0.4	
	VI.	0.6	N	0.4		0.4		0.6	+	0.4	
	VII.	0.8	+ N	0.6		0.2		0.4	+	0.4	
	VIII.	0.6	N	0.8		0.6		0.4	+	0.6	
	IX.	0.8	+ N	0.4		0.4		0.2	+	0.8	
	X.	0.4		—		—		0.2		0.6	
Gyrosigma kützingii (GRUN.) CLEVE	IV.	0.6	N	0.4		—		—		—	
	V.	0.8	+ N	0.4		0.4		0.6	+	—	
	VI.	0.6		0.4		0.4		0.8		0.8	
	VII.	0.8	+ N	0.6		0.8		0.8		0.6	
	VIII.	0.8		0.8		—		0.6		0.6	
	IX.	0.8		0.8		0.6		0.5		0.8	N

	X.	0.6		0.6		—		0.4		0.4		
	XI.	0.4		0.4		—		0.4		—		
Gyrosigma prolongatum	IV.	0.4	+ N	—		0.1	+	0.1	+	—		
(W. Smith) Cleve	V.	0.8	+ N	—		0.2		0.2		—		
	VI.	0.6		—		—		—		—		
	VII.	0.8	+ N	—		—		—		—		
	VIII.	0.6	+ N	—		—		—		—		
	IX.	0.4		—		—		—		—		
	X.	0.6	+ N	—		0.4		—		—		
	XI.	0.4		0.1		0.1		0.1		—		
Navicula cryptocephala	IV.	0.4	N	0.1		0.4		0.4	+	0.2		
Kütz.	V.	0.6	N	0.1	+	0.4		0.4		0.4		
	VI.	0.6		0.4		0.6		0.6		0.6	+	
	VII.	0.8		0.4		1.8		0.8		—		
	VIII.	0.8		0.6		1.6		0.8		0.4		
	IX.	0.6		0.4		1.0		0.6		0.2		
	X.	0.4		0.4		0.6		0.8		0.1		
	XI.	0.2		0.2		0.2		0.6		0.1		
Navicula dicephala	VI.	0.4	+	0.2	+	—		0.6	+	0.4	+	
(Ehr.) W. Smith	VII.	0.2	+	0.4	+	0.2		0.4	+	0.3	+	
Navicula gracilis Ehr.	IV.	0.2		0.6		0.6		0.4		0.4	+	
	V.	0.2	+	0.8	+	1.0	+	0.2	+	0.2		
	VI.	0.8		0.6		0.8		0.4	+	0.2		
	VII.	0.8	+ N	0.4		0.6		0.4		0.4		
	VIII.	0.6	N	0.4		0.8		0.2		0.4		
	IX.	0.4	+	0.4		0.4		0.2		0.6		N
	X.	0.4	N	0.4		0.6		0.2		0.4		
Navicula hungarica	IV.	—		0.2	+	0.2		—		—		
var. *capitata* (Ehr.)	V.	0.1	+	0.1		0.1		0.2		0.1		
Cleve	VI.	0.1		0.3		0.4		0.3		0.2		
	VII.	0.2		—		0.2		0.2		0.4		
	VIII.	0.2		0.4	+	—		0.2		0.3		
	IX.	0.2	+	—		—		0.1	+	0.2		
	X.	—		—		—		0.1		—		
Navicula placentula	VI.	0.2	+	0.4	+	0.3	+	0.2	+	0.1	+	
(Ehr.) Grun.	VII.	—		—		—		0.2		0.2		
	VIII.	0.2	+	—		—		0.2	+	0.2		
	IX.	—		—		—		0.3		0.2	+	
	X.	0.2		0.4	+	0.6	+	0.3	+	0.2	+	

TABLE 4 (continued)

Species	Period	Locality									
		M		K		G		A		E	
		i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25
Navicula pupula Kütz.	IV.	0.1	N	—		0.2	+	—		—	
	V.	0.1	+	—		—		0.1	+	—	
	IX.	0.1	+	—		—		0.1	+	—	
Neidium dubium f. *constrcita* Hust.	IV.	0.2	N	—		—		—		0.1	+
	VIII.	0.1	+	—		—		0.1		—	
	IX.	0.2	+	—		—		0.2	+	—	
Nitzschia acicularis W. Smith	IV.	0.8	N	1.4	+	0.8	+	10.8	+	12.6	+ N
	V.	2.4	+ N	1.2	+	1.4	+	10.4	+	8.6	+
	VI.	4.2	N	4.2		3.4		6.4	+	6.2	
	VII.	8.2	+	5.4	+	2.0		4.6		6.4	+
	VIII.	8.8	N	5.2	+	2.4		9.8		4.8	
	IX.	6.8		5.4	+	2.6	+	4.0	+	4.2	
	X.	4.8		4.2		2.4		3.4		3.4	N
	XI.	4.2		3.2		2.2		2.4		2.6	
Nitzschia amphibia Grun.	IV.	0.8	N	0.8	+	—		0.6	+	1.8	N
	V.	1.0	+	0.8		0.6	+	0.8	+	2.0	+
	VI.	1.2	+	0.6	+	—		2.4	+	2.0	N
	VII.	1.4	N	0.8		—		0.8		1.8	N
	VIII.	1.0		0.4		0.8	+	0.6	+	1.2	
	IX.	0.8	N	—		0.8	+	0.4	+	1.4	N
	X.	0.8		—		—		—		—	
Nitzschia sigmoidea (Ehr.) W. Smith	IV.	0.6	N	0.5	+	0.6	+	0.4		0.3	N
	V.	0.6	+ N	0.4	+	0.4	+	0.4	+	0.4	+
	VI.	0.5	N	0.4	+	0.1		0.1		0.1	
	VII.	0.4	+ N	0.4	+	0.2		0.2		0.4	N
	VIII.	0.6	N	0.2	+	0.2		0.1		—	
	IX.	0.8	+ N	0.1	+	—		0.4	+ N	—	
	IX.	0.6		0.4	+	0.6	+	0.4	+	0.4	+
	IX.	0.4		0.4		0.2		0.2		0.2	
Nitzschia tryblionella var. *debilis* (Arnott)	IV.	—		—		0.1	+	—		0.2	+
	V.	0.1	+	—		0.1		—		0.1	

A. Mayer	VI.	0.1	+	0.1	+	0.6	+	0.1	+	—	
	VII.	0.6	+	0.4		0.4		0.2		—	
	VIII.	0.4		1.2		0.2		0.2		0.1	
	IX.	0.2		0.2		0.2		0.1	+	0.2	
	X.	0.1		0.2		—		—		—	
Pinnularia maior (Kütz.) Cleve	VI.	0.1	+	0.1		0.1		0.1		—	
	VII.	0.1		0.1		—		0.1	+	—	
	VIII.	0.2	N	0.1		0.1		0.1	+	—	
	IX.	0.1	+	—		—		—		—	
	X.	0.1		—		—		—		—	
Rhopalodia gibba (Ehr.) O. Müll.	VI.	—	+	—		—		0.2	+	—	
	VII.	—	+	—		—		—		—	+
	VIII.	0.1	+ N	—	+	—		—		—	+
	IX.	—	+	—	+	—		—	+	—	+
Stenopterobia pelagica Hust.	IV.	0.2	N	—		0.2	+	0.2		0.2	N
	V.	0.1	+ N	0.2		0.1		0.3	+	0.2	+
	VI.	0.1	N	0.1	+	0.2		0.2		0.2	
	VII.	0.1	+	0.1	+	—		0.2		0.2	
	VIII.	0.1	N	—		—		—		—	
	IX.	0.2		0.4	+	0.2		0.1		0.2	
	X.	0.2		0.5	+	0.2	+	0.2		0.4	+
Surirella biseriata Bréb.	IV.	0.1	N	—		—		—		—	
	V.	0.1	N	—		—		01.	+	—	
	VI.	0.1		—		—		—		—	
	VII.	0.1	N	—		—		—		—	
	IX.	—		—		—		0.1	+	—	
	X.	—		0.1	+	—		—		—	
Surirella robusta var. *splendida* (Ehr.) V. Heurck	IV.	0.8	+ N	0.2		—		0.4		—	
	V.	0.8	+ N	0.6	+	0.4		0.2	+	0.4	+
	VI.	0.8	N	0.6	+	0.4		0.4	+	0.2	
	VII.	1.0	+ N	0.6	+	0.2		0.3		0.2	
	VIII.	0.8	N	0.4	+	—		0.4	+	0.3	
	IX.	0.6	+	0.4	+	0.2		0.4	+ N	0.4	N
	X.	0.4	+	0.5	+	0.4	+	0.4	+	0.3	+
	XI.	0.4		0.2		0.2		0.2		0.4	
Surirella turgida W. Smith	VII.	0.1	+	—		—		0.1	+	0.2	+
	VIII.	0.2	+	0.1		0.2	+	—		0.4	+
	IX.	0.2	+	—		0.1	+	—		0.2	

TABLE 4 (continued)

Species	Period	Locality									
		M		K		G		A		E	
		i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25
Synedra acus var. *angustissima* GRUN.	IV.	0.4		0.4	+	0.4	+	0.4	+	0.4	N
	V.	0.8		0.6		0.6		0.8	+	0.4	+
	VI.	0.2	+	0.2		0.2	+	1.4	+ N	1.6	N
	VII.	0.8	+	0.2		0.4	+	0.8	N	0.4	
	VIII.	1.4	+	0.2		0.4		0.4	+	0.4	
	IX.	1.0	+	0.2		0.4	+	0.4	N	0.4	N
	X.	0.4		0.4	+	0.2		0.4	+	0.4	+
	XI.	0.4		0.2		0.2		0.2		0.2	
Chlorophyta Chlorophyceae Volvocales											
Chlamydomonas intermedia CHOD.	V.	0.4		0.2		—		—		—	
	VI.	0.8	+	—		—		—		—	
	VII.	2.1	+ N	0.2	+	0.4	+	—		—	+
	VIII.	0.8		0.2		—		—		—	
	IX.	0.4	+	—		—		—		—	
Chlamydomonas sp.	V.	0.4	+	0.8	+	0.2	+	—		—	
	VI.	0.8	+	0.4		—		0.2	N	0.2	N
	VII.	0.6	+	0.4		—		—		—	
	VIII.	0.4	+	0.2		—		—		—	
	IX.	0.2	+	0.2		—		—		—	
	X.	0.2	+	—		—		—		—	
Eudorina elegans EHR. and *Gonium pectorale* MÜLLER	IV.	—	+	—		—		—		—	
	V.	—	+	—		—		—		—	
	VI.	—	+	—	+	—		—		—	
	VII.	—	+	—		—		—		—	
	VIII.	—	+	—		—		—		—	
	IX.	—	+	—		—		—		—	
	X.	—	+	—	+	—		—		—	
	XI.	—	+	—		—		—		—	

Pandorina morum (Müll.) Bory	IV.	—		—	+	—		—		—		
	V.	0.4	+	0.4	+	—		—		—		
	VI.	0.6	+	0.2	+	—		—		—		
	VII.	0.6	+	—		—		—		—		
	VIII.	0.8	+	—		—		—		—		
	IX.	0.6	+	0.2	+	—		—		—		
	X.	0.4	+	0.4	+	—		—		—		
	XI.	—		0.2	+	—		—		—		
Tetrasporales												
Stylosphaeridium stipitatum Geitler	IV.	—		—		—	+	—		—		
	V.	—	+	—	+	—		—		—		
	VI.	—	+	—		—		—		—		
	VII.	—	+	—		—		—		—		
	VIII.	—	+	—	+	—		—		—		
	IX.	—	+	—	+	—		—		—		
	X.	—	+	—	+	—		—		—		N
Chlorococcales												
Actinastrum hantzschii Lagerh.	IV.	0.2	+	0.1	+	—	+	—		—		
	V.	0.2	+	—		—		—		—		
	VI.	0.6	+	—		—		—		—		
	VII.	0.6	+	—		—		—		—		
	VIII.	0.2	+	—		—		—		—		
	IX.	0.2	+	—		—		—		—		
	X.	0.4	+	0.2	+	—		—		—		
	XI.	0.4	+	0.4	+	—		—		—		
Ankistrodesmus falcatus (Corda) Ralfs	IV.	0.1	+	0.1		0.1		0.1		—		N
	V.	0.2	+	0.4		0.4	+	0.5	+	0.8	+	
	VI.	0.3	+	0.6		0.4	+	2.0	+	1.6	+	
	VII.	0.4	+	0.4	+	0.8	+	2.6	+ N	0.8	+	
	VIII.	0.4	+	0.4	+	1.8	+	1.8	+	0.6	+	
	IX.	0.4	+	0.4	+	1.0	+	1.0	+	0.4	+	
	X.	0.2	+	0.5	+	0.5	+	0.6	+	0.4	+	
	XI.	—		0.2		0.2		0.2		0.1		
Ankistrodesmus falcatus var. *aciculare* (A. Braun) S. West	IV.	0.1		0.2	+	0.4	+	1.0		1.0		
	V.	0.6	+	0.6	+	0.4	+	2.0	+	1.8	+	
	VI.	1.0	+	0.8	+	0.6	+	2.8	+	2.4	+	
	VII.	1.4	+	1.6	+	1.8	+	3.0	+	3.4	+	
	VIII.	1.6	+	1.8	+	1.8	+	3.6	+	4.4	+	
	IX.	1.4	+	2.4	+	2.4	+	3.8	+	4.0	+	

TABLE 4 (continued)

Species	Period	Locality									
		M		K		G		A		E	
		i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25
	X.	0.8	+	2.6	+	2.0	+	2.8	+	3.6	+
	XI.	0.4		1.0	+	0.8		1.0	+	2.0	+
Ankistrodesmus falcatus var. *mirabile* W. et G. S. WEST	IV.	0.4		0.2		0.2		0.2		0.2	
	V.	0.2		0.4		0.8		0.8		0.8	
	VI.	0.4	+	0.6	+	3.2	+	3.0	+	3.6	+
	VII.	0.6	+	0.8	+	4.0	+	5.8	+	4.0	+
	VIII.	0.8	+	1.8	+	4.2	+	6.4	+	4.2	+
	IX.	1.0	+	1.0		4.8	+	6.0	+	4.6	+
	X.	0.6	+	0.6	+	1.8	+	2.0	+	2.4	+
	XI.	0.4		0.4		0.8		0.8		1.8	+
Ankistrodesmus falcatus var-*spirilliformis* G. S. WEST	IV.	0.2		0.2	+	0.4	+	0.4	+	0.8	+
	V.	0.4	+	0.4	+	0.6	+	0.8	+	1.8	+
	VI.	0.6	+	0.6	+	0.8	+	1.0	+	3.0	+
	VII.	0.8	+	0.6	+	0.8	+	1.4	+	3.4	+
	VIII.	0.6	+	0.4	+	0.6	+	1.6	+	3.0	+
	IX.	0.4	+	0.4	+	0.4	+	1.2	+	2.6	+
	X.	0.2	+	0.2	+	0.2	+	1.0	+	0.8	+
	XI.	0.1	+	—	+	—	+	0.4		0.6	
Ankistrodesmus lacustris (CHOD.) OSTENF.	IV.	1.8	+	0.8		1.0	+	1.4		0.4	
	V.	2.4	+	2.0	+	2.8	+	3.6	+	2.0	+
	VI.	2.8	+	3.0	+	3.4	+	4.2	+	2.6	+
	VII.	4.0	+	3.6	+	4.8	+	3.2	+	2.0	+
	VIII.	3.4	+	3.2	+	3.6	+	3.0	+	2.0	+
	IX.	3.0	+	2.8	+	2.8	+	2.6	+	1.4	+
	X.	1.8	+	1.2	+	1.2	+	1.2	+	0.8	+
	XI.	0.8	+	0.6	+	0.6	+	0.8	+	0.2	+
Ankistrodesmus longissimus (LEMM.) WILLE	V.	0.4	+	—		0.2	+	—		—	
	VI.	0.6	+	0.2	+	—		—		0.4	+
	VII.	0.8	+	0.4	+	—		0.2	+	0.8	+
	VIII.	0.6	+	—		—		0.4	+	0.6	+
	IX.	0.8	+	0.4	+	—		0.4	+	0.6	+

	X.	0.8	+	0.6	+	0.1	+	0.2	+	0.4	+
	XI.	0.4	+	0.4	+	—		—		—	
Schroederia setigera	V.	0.2		—		—		—		—	
(Schroed.) Lemm.	VI.	0.6	+	0.4	+	0.6	+	—		—	
	VII.	0.8	+	0.6	+	0.8	+	—		0.8	+ N
	VIII.	1.0	+	0.8	+	0.4	9	0.4	+	1.8	+
	IX.	0.6	+	0.4	+	—		—		0.8	+
	X.	—		—		—		—		0.2	+
Chodatella balatonica	V.	—	+	—		—	+	—		—	
Scherffel	VI.	0.1		—		—	+	—		—	
	VII.	0.1	+	—		—	+	—		—	
	VIII.	0.1		—		0.1	+	—		—	
	IX.	0.1	+	—		—		—		—	
Chodatella quadriseta	V.	—	+	—		—		—		—	
Lemm.	VI.	0.1	+	—		—	+	—		—	
	VII.	0.1	+	—		—	+	—		—	
	VIII.	0.1	+	—		—	+	—		—	
	IX.	0.1	+	—		—		—		—	
	X.	—	+	—	+	—		—		—	
Coelastrum microporum	V.	0.1		0.1		0.1		0.1		0.1	+
Naeg.	VI.	0.4	+	0.3	+	0.2	+	0.3	+	0.2	+
	VII.	0.5	+	0.4	+	0.3	+	0.4	+ N	0.6	+
	VIII.	0.6	+	0.6	+	0.4	+	0.5	+	0.8	+
	IX.	0.4	+	0.5	+	0.5	+	0.8	+ N	0.8	+ N
	X.	0.2	+	0.2	+	0.3	+	0.4	+	0.4	+
	XI.	0.1		—		—		—		—	
Crucigenia quadrata	IV.	0.2	+	0.8	+	2.5	+	2.0	+	2.0	+ N
var. *octogona*	V.	0.2	+	2.0	+	4.0	+	2.6	+	3.4	+
Schmidle	VI.	0.6	+	4.0	+	3.4	+	2.8	+	4.0	+
	VII.	3.0	+	3.8	+	2.8	+	3.0	+	4.4	+ N
	VIII.	4.2	+	3.6	+	2.4	+	1.8	+ N	2.2	+
	IX.	3.4	+	3.0	+	1.8	+	1.6	+ N	1.6	+
	X.	1.5	+	2.0	+	1.4	+	1.2	+	0.8	+
	XI.	0.4	+	0.4	+	0.4	+	0.6	+	0.6	+
Crucigenia tetrapedia	IV.	—		—		—		0.1		—	
(Kirch.) W. et G. S.	V.	0.1	+	0.1		—		0.1		—	
West	VI.	0.1	+	—		—		—		—	
	VII.	0.2	+	—		—		—		—	
	VIII.	0.3	+	—		—		—		—	

TABLE 4 (continued)

Species	Period	Locality									
		M		K		G		A		E	
		i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25
	IX.	0.2	+	0.1		—		—		—	
	X.	0.2	+	—		0.1	+	0.1	+	0.1	+
	XI.	—	+	—		0.1	+	—	+	—	
Dictyosphaerium pulchellum WOOD	IV.	0.6		0.8	+	1.0	+	1.2	+	1.4	+ N
	V.	0.8	+	2.0	+	1.8	+	2.2	+	1.8	+
	VI.	1.2	+	2.8	+	2.0	+	2.6	+ N	2.0	+ N
	VII.	1.4	+	3.0	+	2.6	+	3.4	+ N	2.8	+ N
	VIII.	1.0	+	2.8	+	3.0	+	3.2	+ N	3.0	+ N
	IX.	1.4	+	3.0	+	3.2	+	3.0	+	2.6	+ N
	X.	1.6	+	1.8	+	1.8	+	2.4	+	1.8	+ N
	XI.	0.8		0.6	+	0.4	+	1.4	+	0.8	+
Kirchneriella lunaris (KIRCHN.) MOEBIUS	VII.	—	+	—		—		0.1	+	0.1	+
	VIII.	0.1	+	—		0.1	+	0.1	+	0.1	+ N
	IX.	0.1	+	0.1	+	0.1	+	0.1	+	0.1	+ N
Kirchneriella obesa (W. WEST) SCHMIDLE	V.	—		—		0.1	+	—		—	
	VI.	0.1	+	—		—		—		0.1	
	VII.	0.1	+	—		—		0.1	+ N	—	
	VIII.	—		—		—		0.1	+	—	
	IX.	—	+	—		0.1	+	0.1	+	—	
Oocystis elliptica f. *minor* W. WEST	IV.	—		—		0.05		—		—	
	V.	—		—		—		—		0.1	+
	VI.	0.1	+	—		0.1	+	0.1	+ N	—	+
	VII.	—		—		—	+	0.1	+ N	—	+ N
	VIII.	—	+	—		—		—		—	+ N
	IX.	—		—		0.1	+	0.1	+ N	0.1	+ N
	X.	—		—		0.1	+	—	+	0.1	
	XI.	—		—		0.05	+	—		—	
Oocystis solitaria WITTR.	IV.	1.0	+	0.6		0.4	+	0.2	+	0.8	+ N
	V.	2.2	+	1.0	+	1.0	+	0.8	+	1.4	+
	VI.	3.0	+	2.2	+	1.4	+	1.0	+ N	1.8	+ N
	VII.	3.6	+	1.6	+	1.6	+	1.4	N	2.2	+ N

	VIII.	4.0	+		1.0	+		1.2	+		1.4	+	N	2.0	+	N
	IX.	3.4	+		0.4	+		1.0	+		1.0	+	N	1.8		N
	X.	0.4	+		0.2	+		0.6	+		0.8	+		0.6	+	
	XI.	0.2			0.1			—			0.2			0.2		
Oocystis solitaria f.	IV.	0.2			0.1			0.2			0.1			0.2		
wittrockiana PRINTZ	V.	0.6	+		0.6	+		0.6	+		0.8	+		0.4	+	N
	VI.	1.2	+		0.6	+		0.8	+		0.8	+		0.8	+	N
	VII.	1.8	+		0.8	+		1.8	+		1.6		N	2.0	+	N
	VIII.	2.6	+		2.0	+		2.0	+		2.2	+		2.4		N
	IX.	2.0	+		2.2	+		1.8	+		3.0	+	N	1.6		N
	X.	1.4	+		0.8	+		0.8	+		2.0	+		1.0	+	
	XI.	0.4			—			0.4			0.8	+		0.6		
Oocystis submarina	IV.	0.6						—			—			—		
LAGERH.	V.	1.4	+		1.0	+		0.6			0.4	+		0.8	+	
	VI.	1.8	+		1.8	+		0.8	+		0.2	+		0.6	+	
	VII.	2.6	+		2.0	+		1.0	+		0.4	+		0.8	+	
	VIII.	3.2	+		1.8	+		0.8	+		0.6	+		1.0	+	
	IX.	2.8	+		1.8	+		0.4	+		0.4	+		0.6	+	
	X.	0.8	+		1.0	+		—			—			—		
	XI.	—			0.8	+		—			—			—		
Pediastrum boryanum	IV.	0.1	+	N	0.2	+		0.2	+		—			0.2	+	
(TURP.) MENEGH	V.	0.6	+	N	0.1			0.4	+		0.2	+		0.2	+	
	VI.	0.8	+	N	0.4	+		0.4	+		0.2	+		—		
	VII.	0.8	+	N	0.4	+		—			—			—		
	VIII.	1.0	+	N	0.4	+		0.6	+		0.2	+		—		
	IX.	0.6	+	N	0.1	+		0.4	+		0.2			0.4		N
	X.	0.4		N	0.2	+		0.4	+		0.2			—		
	XI.	0.2	+		—			0.1			0.1			—		
Pediastrum simplex	IV.	0.05	+	N	—			0.05	+		0.1	+		0.1		N
MEYEB (f. *clathratum*)	V.	0.1	+		0.1	+		0.1	+		0.1	+		0.1	+	
	VI.	0.1		N	—			0.1			0.2	+	N	0.1	+	N
	VII.	0.2	+	N	0.1	+		0.1			0.1		N	0.2	+	N
	VIII.	0.1		N	0.2	+		0.1	+		0.2	+		0.2	+	N
	IX.	0.1	+		0.1			0.1	+		0.2	+	N	0.1		N
	X.	0.1	+	N	0.05			0.1	+		0.1	+		0.1	+	N
	XI.	—			0.1			0.1	+		0.1	+		0.1	+	
Pediastrum duplex	V.	—			0.1	+		—			—			—		
var. *genuinum* A.	VI.	0.1	+	N	—			—			0.1	+		—		
BRAUN	VII.	0.1			—			—			—			—		

TABLE 4 (continued)

Species	Period	Locality									
		M		K		G		A		E	
		i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25
	VIII.	0.1	+	—		0.1	+	0.1	+	—	
	IX.	0.05	+	0.05	+	—		—		—	
	X.	—	+	—		—		0.1	+	0.1	+
	XI.	—	+	—		—		—		—	
Pediastrum duplex	IV.	—		0.1	+	0.1	+	0.1	+	0.1	+ N
var. *reticulatum*	V.	0.2	+ N	0.2	+	0.2	+	0.1	+	0.1	+
LAGERH.	VI.	0.5	+ N	0.4	+	0.2	+	0.2	+ N	0.1	+ N
	VII.	0.6	+ N	0.4	+	0.2	+	0.2	N	0.1	+ N
	VIII.	0.8	+	0.4		0.3	+	0.2	+ N	0.2	+ N
	IX.	0.6	+	0.4	+	0.2	+	0.2	+ N	0.2	N
	X.	0.4	+ N	0.2	+	0.2	+	0.1	+	0.1	+ N
	XI.	0.1		0.1		0.2		0.1		0.1	
Pediastrum simplex	IV.	0.05	+ N	—	+	—		—		—	
MEYEN	V.	—		—		0.05	+	0.05	+	—	+
	VI.	0.1	+	—		—		0.05	+ N	—	+
	VII.	0.1	+	0.1	+	0.1	+	0.1	N	0.1	+ N
	VIII.	0.1	+	—		0.1		0.1	+	0.05	N
	IX.	—	+	0.1	+	—		0.1	+ N	0.1	N
	X.	0.1	+ N	0.1	+	0.1	+	—	+	—	+
Pediastrum tetras	V.	0.1	+	—		—		—		—	
(EHR.) RALFS	VI.	0.1	+	—		—		—		—	
	VII.	0.1	+	—		—		—		—	
	VIII.	0.3	+	—		—		—		—	
	IX.	0.1	+	—		—		—		—	
	X.	0.1		—		—		—	+	—	
Rhopalosolen sebestye-	VI.	—		—		—		—	+ N	—	
nae FOTT	VII.	—	+	—	+	—		—	+	—	+ N
	VIII.	—	+	—	+	—	+	—	+	—	
	IX.	—	+	—	+	—		—		—	N
Scenedesmus acuminatus (LAGERH.) CHOD.	VI.	0.1	+	—		—		—		—	
	VII.	0.3	+	—		—		—		—	

	VIII.	0.2	+		0.1	+		—			—			—	
	IX.	0.2	+		—	+		—			—			—	
	X.	0.1	+		—	+		—			—			—	
Scenedesmus arcuatus forma UHERKOV.	V.	—	+		—	+		—			0.1	+		—	+
	VI.	0.2	+		0.1	+		—			0.1	+		0.2	+ N
	VII.	0.4	+		—			—			0.2	+		0.3	+ N
	VIII.	0.6	+		0.2	+		—			0.3	+	N	—	+
	IX.	0.1	+		0.2	+		—			0.2	+		—	
	X.	—	+		—	+		—	+		—			—	
Scenedesmus balatonicus HORTOB.	V.	—			—			0.1	+		0.1	+		—	
	VI.	—			—			0.1	+		0.1	+		—	
	VII.	—			—			0.1	+		0.1	+		0.1	+
	VIII.	0.2	+		0.2	+		0.2	+		0.1			—	
	IX.	0.1	+		0.1	+		0.1	+		0.2	+		0.1	+
	X.	—			—			—	+		—	+		—	+
Scenedesmus ecornis (RALFS) CHOD.	IV.	—			—			—	+		—			—	+
	V.	0.1			—			0.1	+		—	+		—	
	VI.	0·2	+		—			0.2			0.2	+	N	0.2	+ N
	VII.	0·4	+	N	—			0.2			0.4		N	0.4	+ N
	VIII.	0.3	+		0.3	+		0.4			0.4	+	N	0.3	+ N
	IX.	0.2	+		0.2	+		0.2	+		0.2	+		0.2	N
	X.	0.1	+		0.1	+		—			0.1			—	
	XI.	—			—			—			0.1			—	
Scenedesmus ecornis var. *disciformis* CHOD.	VI.	0.1	+		—			—			—			—	
	VII.	0.1	+		—			—			0.05	+	N	—	
	VIII.	0.2	+		—			—			—			—	N
	IX.	0.2	+		—			—			—		N	—	+ N
	X.	0.1	+		—			—			—			—	
Scenedesmus intermedius CHOD.	V.	—			—			—			0.1	+		—	
	VI.	—			—			—			0.1	+		—	
	VII.	0.1	+	N	—			—			0.1	+		—	
	VIII.	0.1	+		—			—			—			—	
Scenedesmus intermedius var. *balatonicus* HORTOB.	V.	0.1			—			—			—			—	
	VI.	0.1			—			—			0.1	+		0.1	+
	VII.	0.2	+	N	—			—			0.1	+		0.1	+
	VIII.	0.1	+		—			—			0.2	+		0.1	+
	IX.	0.1	+		—			—			0.1	+		0.1	
	X.	0.1	+		—			—			0.1	+		—	

TABLE 4 (continued)

Species	Period	Locality									
		M		K		G		A		E	
		i/l	No. 25	i/l s	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25
Scenedesmus quadricauda (Turp.) Bréb.	IV.	0.2	N	0.2	+	0.2	+	0.2		—	+
	V.	0.6	+ N	0.4	+	0.4	+	0.3	+	0.2	+
	VI.	0.8	+	0.6	+	0.6	+	0.4	+	0.4	+
	VII.	0.8	+	0.6	+	0.8	+	0.6	N	0.5	N
	VIII.	2.0	N	1.0	+	1.0	+	0.8		0.6	+
	IX.	1.5	+	0.8	+	0.4	+	0.6	+ N	0.5	
	X.	0.8	+	0.6	+	0.2	+	0.4	+	0.2	+
	XI.	0.2	+	0.2		0.1		0.1		—	
Scenedesmus quadricauda var. *longispina* (Chod.) G. M. Smith	V.	0.1	+	0.1	+	—		—		—	
	VI.	0.2	+	—		—		—		—	
	VII.	0.5	+	—		—		—		—	
	VIII.	0.6	+	—		—		—		—	
	IX.	0.4	+	0.2	+	—		—		—	
	X.	0.1	+	0.1	+	—		—		—	
Scenedesmus spinosus Chod.	VI.	0.1	+	—		—		—		—	
	VII.	0.1	+	—		—		—		—	
	VIII.	0.1	+	—		—		—		—	
	IX.	0.1	+	—		—		—		—	
Selenastrum gracile Reinsch	VI.	0.1		0.1	+	0.1		0.1	+	—	
	VII.	0.1	+	—		—		0.1	N	0.1	+
	VIII.	0.1	+	—		—		0.1	+	0.1	+
	IX.	0.1	+	0.1	+	—		0.1	+	—	
	X.	—		—		—		0.1	+	—	
Tetraëdron minimum (A. Braun) Hansg.	VII.	0.1	+	—		0.1	+	0.1	+	—	
	VIII.	0.1	+	—		0.1	+	0.1	+	0.1	+
	IX.	0.1	+	—		0.1	+	0.1	+	—	
Tatraëdron trigonum (Naeg.) Hansg.	VII.	0.1	+	0.1	+	—		0.1	+	—	
	VIII.	0.2	+	—	+	—		—	+	—	
	IX.	0.1	+	0.1	+	—		0.1	+	—	
	X.	0.1	+	—	+	—		—	+	—	

Tetrastrum staurogeniaeforme (SCHROED.) LEMM.	VI.	0.1	+	0.1	+	0.2	+	0.1	+	—	
	VII.	0.4	+	0.2	+	—		0.1	+	—	
	VIII.	0.6	+	0.1	+	—		—		—	
	IX.	0.4	+	0.1	+	—		—		—	
Zygnematales											
Closterium acerosum (SCHRANK.) EHR.	V.	—		—		0.3	+	0.3		—	
	VI.	0.2	+	0.2	+	0.3	+	0.2	+	0.1	
	VII.	0.2	+	0.2	+	0.3	+	0.3	+	0.1	
	VIII.	0.3	+	0.3	+	0.2	+	0.2	+	—	
	IX.	0.2		0.2	+	0.1		0.1		—	
	X.	—		0.1	+	—		—		—	
Closterium acerosum var. *elongatum* BRÉB.	VII.	0.1	+	0.1	+	0.1	+	0.1	+	—	+
	VIII.	0.1	+	0.1	+	0.1	+	—	+	—	+
	IX.	0.1	+	0.1	+	—		—		—	
Closterium aciculare WEST	IV.	0.4		0.4		0.4	+	0.6	+	0.6	+ N
	V.	0.6		0.8	+	0.8	+	0.8	+	0.8	+
	VI.	1.4	+	1.4		3.4		3.6	+ N	3.8	+ N
	VII.	2.4	+	2.6		3.6		3.8	N	4.0	+ N
	VIII.	2.2	+ N	2.3	+	4.8	+	4.4	+ N	4.2	+ N
	IX.	2.4	+	3.2	+	4.6	+	4.8	+ N	4.6	N
	X.	1.6	N	2.0	+	2.8	+	3.0	+	3.8	+ N
	XI.	0.4		1.6	+	0.8	+	1.4	+	0.8	+
Closterium moniliferum (BORY) EHR.	VII.	0.1	+	—		—		—		—	
	VIII.	0.1	N	—		—		—		—	
	IX.	0.1	+	—		—		—		—	
Closterium parvulum NAEG.	VI.	0.2	+	—		—		0.1	+	—	
	VII.	0.3	+	0.1	+	—	+	0.1	+	—	
	VIII.	—		0.1	+	—	+	0.1	+	—	+
Closterium polystictum NYGAARD	V.	—		—		—	+	—	+	0.05	+
	VI.	—		—		—		0.1	+	—	
	VII.	—		—		0.05	+	—		—	
	VIII.	—		—		—		0.1	+	—	+
Closterium praelongum BRÉB.	VIII.	—		0.1	+	—		0.1	+	—	
	IX.	0.1	+	0.1	+	—		0.1	+	0.1	+
	X.	—		0.1	+	—		—	+	—	
Closterium strigosum BRÉB.	V.	—		—		—		0.1	+	0.1	+
	VI.	0.3	+	—	+	—		—	+	—	

TABLE 4. (continued)

Species	Period	Locality									
		M		K		G		A		E	
		i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25	i/l	No. 25
	VII.	0.2	+	—		—		—		—	
	VIII.	0.2	+	0.1	+	0.1	+	—		—	
	IX.	0.1	+	0.1	+	0.1	+	0.1	+	0.1	+
	X.	—		0.1	+	0.1	+	0.1	+	—	+
Cosmarium bioculatum Bréb.	VI.	—		—		—		0.1	+ N	0.1	+ N
	VIII.	0.1	+	—		—		—		—	
	IX.	0.1	+	—		—		0.1	+	0.1	+
Cosmarium botrytis Menegh.	V.	0.05	+	—		—	+	—		—	
	VIII.	—		—		—		0.05	+	—	+
Cosmarium undulatum Corda	VI.	0.1	+	—	+	—	+	0.2	+	0.2	+
	VII.	0.1	+	—	+	—	+	0.1	+	0.1	+
	VIII.	0.1	+	—	+	—	+	0.1	+	0.1	+
Staurastrum gracile Ralfs	IV.	—		—	+	—	+		N	—	+ N
	V.	0.1		0.2	+	0.1	+	0.2	+ N	0.4	+
	VI.	0.3	+	0.3	+	0.3	+	0.4	+	0.6	+ N
	VII.	0.5	+ N	0.4	+	2.5		0.8	N	0.8	+ N
	VIII.	0.4	+ N	0.5	+	4.2	+	1.4	+	1.0	+ N
	IX.	0.1	+	0.4	+	3.0	+	1.2	+ N	1.2	N
	X.	0.1	+	0.2		2.0	+	0.8	+	0.3	+ N
	XI.	0.1		0.1		0.4	+	0.6	+	0.2	
Staurastrum paradoxum Meyen	IV.	—		—	+	—	+	—		—	N
	V.	0.4	+	—		0.3	+	0.3	+	0.2	+
	VI.	0.6	+ N	0.5	+	0.5	+	0.6	+ N	0.3	+ N
	VII.	0.4	+ N	0.4	+	1.8	+	0.7	N	0.3	+ N
	VIII.	0.8	+ N	0.8		0.5	+	1.0	+ N	0.6	+ N
	IX.	0.8	+	0.6		0.4	+	0.8	+ N	0.5	N
	X.	0.2	+ N	0.3	+	0.4	+	0.3	+	0.4	+ N
	XI.	0.1		—		0.1	+	0.1	+	0.1	+
Mycophyta											
Dactylosporium sp.	V.	—		—		—		—		0.2	
	VI.	—		—		—		—		0.1	
	VII.	0.1	N	0.2	+	0.1	+	0.1	N	0.2	+
	VIII.	0.1		0.8	+	0.2	+	0.2	+	0.3	+
	IX.	0.1		0.4	+	—		—		—	
	X.	—		0.2	+	—		—		—	

TABLE 5

Number of species and individuals in Balaton phytoplankton along the transversal sections, on the basis of collections in 1967 (i/l = individual number/liter×1000)

	M		K		G		A		E	
	sp	i/l	sp	i/l	sp	i/l	sp	i/l	sp	i/l
IV.	61	104.3	55	102.5	59	114.2	53	111.2	49	150.1
V.	94	300.5	69	184.1	71	188.9	76	198.9	68	159.2
VI.	120	691.6	81	478.4	75	300.7	96	297.5	77	261.2
VII.	129	706.4	86	499.3	75	399.7	101	354.1	86	334.5
VIII.	131	709.7	89	548.8	79	382.9	97	383.9	75	343.9
IX.	129	423.3	86	313.4	75	240.2	94	333.5	79	267.0
X.	96	251.5	76	209.3	61	155.1	72	178.0	66	166.7
XI.	57	82.8	51	85.5	50	79.9	48	93.5	44	80.6

Summary

In the period between April and November, 1967 495 scooped samples and 117 net-filtrates from 15 sampling sites of five transversal sections were examined. Evaluation of the data showed that the identified 147 species, 11 varieties and 2 forms belonged to 6 phyla according to the following distribution: Cyanophyta 18, Euglenophyta 11, Pyrrophyta 5, Chrysophyta 65, Chlorophyta 60, Mycophyta 1.

The number of individuals and species (709700 i/liter) was the biggest in the August collections from the Bay of Keszthely. The smallest number of species (44) and individuals (79900) was registered in the November collections of Balatonalmádi—Balatonvilágos and Ságpuszta—Balatonszemes, respectively.

Chrysophytes had the highest values for both species and individual numbers as well as percentage in the summer samples taken in the Bay of Keszthely.

During 1967 the distribution of the phytoplankton in Lake Balaton was uniform both horizontally and seasonally.

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The distribution of specific numbers per algal phyla number of individuals per liter,

Systematic group	Period	Locality					
		M			K		
		Number of species	i/l	%	Number of species	i/l	%
Cyanophyta (18)	IV.	9	2.4	2.3	9	3.1	3.0
	V.	12	9.3	3.0	12	5.9	3.2
	VI.	17	17.7	2.6	14	17.1	3.6
	VII.	17	39.4	5.6	14	34.5	6.9
	VIII.	17	39.4	5.5	15	38.1	7.0
	IX.	16	19.1	4.5	13	14.5	4.3
	X.	16	7.8	3.1	12	9.7	4.6
	XI.	9	2.6	3.2	8	4.2	4.9
Euglenophyta (11)	IV.	1	0.4	0.3	4	0.7	0.7
	V.	7	1.3	0.4	6	1.2	0.7
	VI.	7	2.0	0.3	7	2.8	0.6
	VII.	7	3.9	0.5	8	4.5	0.9
	VIII.	8	13.5	2.0	8	15.4	2.8
	IX.	9	3.5	1.0	6	2.7	1.0
	X.	7	1.1	0.5	7	1.4	0.6
	XI.	5	0.5	0.6	4	0.4	0.5
Pyrrophyta (5)	IV.	1	0.2	0.1	1	0.3	0.3
	V.	2	5.0	1.6	3	2.8	1.5
	VI.	5	24.9	3.6	4	21.4	4.5
	VII.	5	35.3	5.0	4	49.2	9.9
	VIII.	5	47.7	6.7	4	67.6	12.3
	IX.	5	25.4	6.0	4	31.0	10.0
	X.	3	6.6	2.6	3	4.2	2.0
	XI.	2	0.9	1.1	2	0.7	0.8
Chrysophyta (65)	IV.	34	95.1	91.3	27	93.6	91.3
	V.	43	270.7	90.0	25	160.2	87.0
	VI.	46	622.4	90.0	31	414.5	86.6
	VII.	50	591.8	83.8	31	385.0	77.1
	VIII.	50	570.1	80.3	30	399.1	72.7
	IX.	50	343.2	81.0	26	238.3	76.1
	X.	39	220.1	87.5	26	177.4	84.7
	XI.	24	73.3	88.5	21	73.0	85.4
Chlorophyta (60)	IV.	16	6.2	6.0	14	4.8	4.7
	V.	30	14.2	5.0	23	14.0	7.6
	VI.	45	24.6	3.5	25	22.6	4.7
	VII.	49	35.9	5.1	28	25.9	5.2
	VIII.	50	38.9	5.5	31	27.8	5.1
	IX.	48	32.0	7.5	36	26.5	8.5
	X.	31	15.9	6.3	27	16.4	8.0
	XI.	17	5.5	6.6	16	7.2	8.4
Mycophyta (1)	V.	—	—	—	—	—	—
	VI.	—	—	—	—	—	—
	VII.	1	0.1	0.0	1	0.2	0.0
	VIII.	1	0.1	0.0	1	0.8	0.1
	IX.	1	0.1	0.0	1	0.4	0.1
	X.	—	—	—	—	0.2	0.1

TABLE 6

and per cent, on the basis of collections in 1967 (ind./l. = 1000 individuals per litre)

G			A			E		
Number of species	i/l	%	Number of species	i/l	%	Number of species	i/l	%
13	4.6	4.0	10	5.8	5.2	9	7.0	4.7
12	5.5	2.9	11	6.6	3.3	12	11.7	7.3
12	17.8	6.0	12	30.7	10.3	11	30.2	11.6
14	28.9	7.2	14	39.4	11.1	13	48.5	14.5
14	22.2	5.8	13	38.4	10.0	12	58.4	17.0
14	19.9	8.3	12	33.7	10.1	12	42.7	16.0
10	9.9	6.4	10	14.8	8.3	11	27.3	16.4
9	4.4	5.6	8	4.7	5.0	9	5.2	6.5
3	0.4	0.3	3	0.3	0.3	1	0.1	0.1
4	0.9	0.5	6	1.0	0.5	4	0.9	0.6
4	2.4	0.8	6	3.5	1.2	4	1.1	0.4
5	4.5	1.1	7	4.7	1.3	8	4.8	1.4
5	4.0	1.0	8	4.0	1.0	4	2.0	0.6
4	1.0	0.4	8	2.4	0.8	4	0.7	0.2
4	0.6	0.4	5	0.6	0.3	5	0.7	0.4
5	0.6	0.8	2	0.3	0.3	2	0.2	0.2
1	0.6	0.5	1	0.8	0.7	1	2.0	1.3
3	4.9	2.6	3	2.5	1.3	3	4.1	2.6
4	19.6	6.2	4	20.2	6.8	4	21.4	8.2
4	42.8	10.7	4	18.6	5.3	4	29.8	9.0
4	48.8	12.7	4	40.6	10.6	4	55.0	16.0
4	30.0	12.5	4	34.0	10.1	4	28.6	10.7
3	3.7	2.4	3	3.0	1.7	3	5.2	3.1
2	0.9	1.1	2	0.7	0.7	2	0.9	1.1
27	101.4	88.9	25	96.6	86.8	26	133.2	88.7
27	165.2	87.4	30	171.3	86.1	27	125.0	78.5
30	236.8	79.0	40	214.9	72.2	31	178.9	68.5
25	290.0	72.6	39	256.3	72.4	32	215.9	64.5
26	272.5	71.2	35	263.4	68.6	28	192.6	56.0
27	159.2	66.3	36	228.8	68.6	30	163.1	61.1
22	123.7	79.7	29	139.4	78.3	26	115.1	69.1
18	68.5	85.7	19	69.0	73.7	17	66.1	82.0
15	7.2	6.3	14	7.7	7,0	12	7.8	5.2
25	12.4	6.6	26	17.5	8.8	21	17.3	10.9
25	24.1	8.0	34	28.2	9.5	26	29.5	11.3
26	33.4	8.4	36	35.0	9.9	28	35.3	10.6
29	35.2	9.2	36	37.3	9.7	26	35.6	10.3
26	30.1	12.5	34	34.6	10.4	29	31.9	12.0
22	17.2	11.1	25	20.2	11.4	21	18.4	11.0
16	5.5	6.8	17	8.8	9.3	14	8.2	10.2
—	—	—	—	—	—	1	0.2	0.1
—	—	—	—	—	—	1	0.1	0.0
1	0.1	0.0	1	0.1	0.0	1	0.2	0.0
1	0.2	0.1	1	0.2	0.1	1	0.3	0.1
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—

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HORIZONTÁLIS FITOPLANKTON VIZSGÁLATOK A BALATONON AZ 1967. ÉVI MERÍTETT MINTÁK ÉS HÁLÓSZÜREDÉK ALAPJÁN

Tamás Gizella

Összefoglalás

1967 év áprilisától novemberig a tó 5 harántszelvényének 15 gyűjtőhelyéről 495 merített és 117 hálószüredék mintát vizsgált. Az adatok értékelése során a meghatározott 147 faj, 11 változat és 2 forma 6 rendszertani törzsbe tartozik: Cyanophyta 18, Euglenophyta 11, Pyrrophyta 5, Chrysophyta 65, Chlorophyta 60, Mycophyta 1.

A gyűjtőhelyek közül faj- és egyedszámban is (709 700/liter) a Keszthelyi-öböl augusztusi vízmintája volt a leggazdagabb. A legalacsonyabb fajszámot (44) Balatonalmádi—Balatonvilágos, egyedszámát tekintve (79 900) a Ságpuszta—Balatonszemes novemberi mintáját jegyeztük fel.

Az algatörzsek közül a legmagasabb faj-, egyed-, százalékértékeket a Chrysophyta törzs érte el a Keszthelyi-öböl nyári mintáiban.

A Balaton fitoplanktonjának megoszlása 1967 évben mind horizontálisan, mind évszakosan egyenletes volt.