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QUANTITATIVE INVESTIGATIONS ON MICROPHYTOBENTHOS IN 25 TRANSVERSAL SECTIONS OF LAKE BALATON*

GIZELLA TAMÁS

Biological Research Institute of the Hungarian Academy of Sciences, Tihany, Hungary

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Two series of mud samples were taken in 25 transversal sections of the lake in September, 1968. One of them was collected for biological investigations using the sampler of Craib, while the other was taken for sedimentological purposes using a special sampler. The latter investigations have partly been published (MÜLLER, 1969).

This paper evaluates the samples from biological point of view similarly to the quantitative algological elaboration which was carried out on series of mud samples taken from the open water during the recent years (TAMÁS, 1966; 1967; 1968).

Our investigations had two aspects: 1. To obtain further data on the quantitative and qualitative composition of the microphytobenthos living in the surface layer of the mud of the open water and along-the-shore areas. 2. To gather further information about the distribution of the species of microphytobenthos in the lake.

Material and methods

Sample takings were carried out on 16 transversal sections of the south-western and on 9 of the north-eastern basin between 2nd—13th September, 1968. The 2—3 cm thick superficial layer of the mud was taken for biological investigations using a modified Craib's sampler (PONYI et al. 1967) at 7 points of each transversal section except section No. 17 where only 6 points were tested.

The collecting sites are shown in *Fig. 1* while their other characteristics (temperatures of water and mud, water depth, etc.) are summarized in *Table 1.* The qualitative and quantitative algological evaluation of the mud samples proceeded according to earlier methods (TAMÁS, 1967; p. 233; 1968; p. 227).

* A mutual agreement was concluded in 1968 between the Sedimentological Laboratory of the Department of Mineralogy and Petrography, University of Heidelberg and the Hydrobiological Department of the Biological Institute of the Hungarian Academy of Sciences for investigating the sediment in Lake Balaton.

TABLE 1

Sites, dates and other data of sample

Date and hour of collecting		Transversal sections	Sampling 1			2			3		
			Mud temperature °C	Water temperature °C	Water depth, cm	Mud temperature °C	Water temperature °C	Water depth, cm	Mud temperature °C	Water temperature °C	Water depth, cm
2.	9—12	I.	19.3	19.5	250	19.3	19.3	268	19.3	19.5	272
2.	13—16	II.	19.5	19.9	236	19.1	19.5	282	19.3	19.6	275
2.	16—18	III.	18.7	19.4	337	18.7	19.5	348	18.6	19.4	332
3.	8—10	IV.	19.1	19.1	382	19.2	19.3	378	19.1	19.0	378
3.	10—13	V.	19.0	19.4	375	18.8	19.1	360	19.1	19.4	345
3.	17—19	VII.	19.8	20.4	230	18.8	20.2	363	18.8	20.2	357
4.	8—10	VIII.	19.6	19.6	142	19.0	19.5	365	18.9	19.4	344
4.	10—13	IX.	19.1	19.8	395	18.8	19.3	375	18.8	19.6	355
4.	13—15	VII.			215	19.0	20.0	380	19.2	19.9	365
4.	15—18	X.	19.2	20.3	282	19.0	20.2	377	19.0	20.0	378
6.	8—10	XVII.	18.4	18.4	330	18.4	18.4	10370	18.2	18.2	277
9.	8—10	XI.	18.0	18.1	392	18.0	18.1	392	18.1	18.4	365
9.	10—12	XII.	17.9	19.4	395	17.8	19.3	405	17.8	19.1	400
9.	14—16	XIII.	19.0	20.7	212	17.8	19.8	412	18.0	19.2	410
9.	16—18	XIV.	18.0	19.0	400	18.0	19.2	414	18.1	19.2	404
10.	7—9	XV.	17.9	18.6	382	18.0	18.0	420	17.9	18.0	400
10.	9—12	XVI.	17.9	18.0	255	18.0	18.2	368	18.2	18.6	365
10.	14—17	XVIII.	18.6	19.8	336	18.2	19.8	376	18.6	20.4	375
11.	9—11	XXV.	17.8	18.6	378	18.2	18.6	370	18.6	19.0	348
11.	11—14	XXIV.	18.0	18.7	392	18.2	18.8	404	18.2	18.8	400
11.	14—17	XXIII.	18.2	19.0	454	18.3	19.2	436	18.4	19.7	425
12.	8—10	XXII.	19.1	19.1	415	18.4	19.1	432	18.4	19.0	423
12.	10—11	XXI.	18.4	18.6	370	18.2	18.2	420	18.0	18.2	410
13.	11—13	XX.	18.4	18.8	365	18.2	18.5	422	18.2	18.4	405
13.	13—15	XIX.	18.4	19.1	310	18.4	18.6	380	18.4	18.6	400

Results

The identified species of algae and water fungi found in 175 mud samples belong to 6 phyla.

Cyanophyta: 12 species: *Lyngbya circumcreta* G. S. West and *L. limnetica* Lemm. known from the mud samples of open water, collected in earlier years,

takings in September, 1968

places												
4			5			6			7			
Mud temperature °C	Water temperature °C	Water depth, cm	Mud temperature °C	Water temperature °C	Water depth, cm	Mud temperature °C	Water temperature °C	Water depth, cm	Mud temperature °C	Water temperature °C	Water depth, cm	Remarks
19.3	19.5	257	19.3	19.5	250	19.5	19.6	232	19.5	19.6	198	
19.2	19.7	257	19.5	19.7	245	19.7	19.7	223	19.7	19.8	205	
18.7	19.6	338	18.7	19.5	327	18.8	20.1	322	18.9	20.0	300	
19.3	19.3	363	19.3	19.4	350	19.3	19.4	345	19.0	19.3	302	weak wind
19.1	19.4	320	19.3	19.3	295	19.1	19.4	258	19.2	19.4	205	
18.6	20.4	340	19.0	20.4	305	19.0	20.1	250	18.9	19.7	200	
19.0	19.4	300	19.1	19.5	262	19.4	19.6	230	19.3	19.6	190	stronger wind
19.0	20.1	334	19.0	20.6	300	19.3	20.6	232	19.4	20.5	200	weak wind
19.3	20.4	357	19.1	20.2	310	19.4	21.4	255	19.7	21.4	225	weak wind
19.1	20.2	353	19.1	20.5	324	19.2	20.2	250	19.6	22.0	182	
18.2	17.7	268	17.7	17.4	220	17.4	17.3	160				heavy storm north wind, waves
18.2	18.7	370	18.0	18.6	338	18.4	19.0	306	18.4	19.0	272	ripple water, weak
18.4	19.0	390	18.3	19.2	362	18.4	19.0	328	18.4	18.8	250	southern wind
18.0	20.2	403	18.3	19.8	368	18.3	20.0	338	18.8	20.6	265	weak north-western wind
18.0	19.4	386	18.1	19.4	365	18.8	19.9	330	18.6	20.0	235	weak north wind, rain
18.0	18.1	400	18.0	18.0	370	18.0	18.0	345	18.2	18.2	300	stormy weather, north
18.4	18.6	345	18.0	18.8	325	18.2	18.8	237	19.0	19.2	180	wind, medium waves
18.6	20.3	378	18.6	20.7	363	18.5	20.6	330	18.6	20.7	220	weak north wind
18.6	18.6	327	18.6	18.8	305	18.6	18.6	305	18.8	18.8	230	fog, wetern wind
18.3	19.4	395	18.4	18.6	370	18.3	19.5	368	18.6	20.2	310	weak western wind
18.4	20.4	410	18.7	20.2	386	19.0	20.2	310	18.7	19.4	215	calm
18.4	18.8	405	18.4	18.7	390	18.4	18.5	376	18.7	18.6	247	weak wind, waves,
18,1	18,1	400	18,6	18,5	384	18,6	18,6	338	18,7	18,6	215	rain
18.1	18.3	415	18.0	18.0	370	18.2	18.2	280	18.3	18.3	187	weak wind, medium waves
18.2	18.6	383	18.3	18.3	372	18.2	18.4	336	18.2	18.2	189	weak wind

occurred in every sample, in some places in high number. Living and dead samples of *Aphanizomenon flos-aquae* var. *klebahnii* ELENKIN and *Chroococcus limneticus* LEMM. were found in the south-western basin of the lake. Only a few specimens of living *Oscillatoria formosa* BORY, *O. tenuis* AG. and *O. terebriformis* (AG.) GOM. were collected.

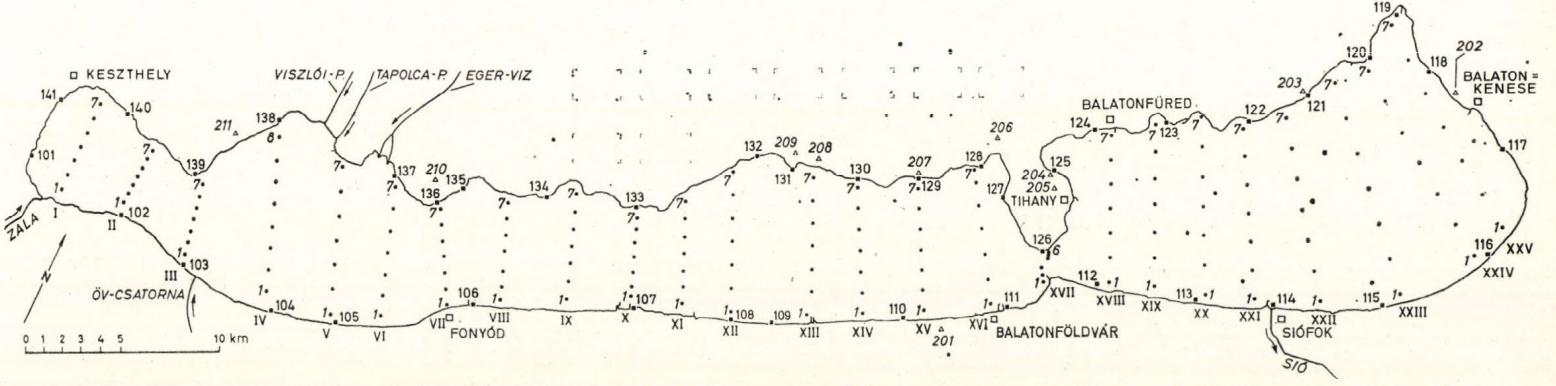

Fig. 1. Sketch map of Lake Balaton showing transversal sections No. I—XXV and collecting sites 1—7 of each. The localization of the sections: (end points on the shore)

I. Mouth of River Zala, Alsógyenesdiás
II.: Balatonberény, Vonyarcvashegy
III.: Balatonmáriafürdő, Balatongyörök
IV.: Balatonmáriafürdő alsó, Balatonederics
V.: Balatonfenyves, Szigliget
VI.: Alsó Bélatelep, Badacsonylábdihegy
VII.: Castle hill of Fonyód, Badacsony
VIII.: Fonyódliget, Ábrahámhegy
IX.: Szabadság-Üdülőtelep, Balatonrendes
X.: Balatonboglár, Révfülöp
XI.: Balatonlelle, Balatonszepezdfürdő
XII.: Balatonlelle felső, Balatonszepezd
XIII.: Balatonszemes, Ságpuszta
XIV.: Balatonöszöd, Balatonakali
XV.: Balatonszárszó, Kiliántelep
XVI.: Balatonföldvár, Örvényes
XVII.: Szántód-fürdőtelep, Tihanyrév
XVIII.: Zamárdi, Balatonfüred
XIX.: Zamárdi felső, Kerekedi-Bay
XX.: Balatonszéplak, Paloznak-Bay
XXI.: Siófok, Alsóörs
XXII.: Siófok-telep, Felsőörs
XXIII.: Balatonszabadi-Sóstó, Káptalanfüred
XXIV.: Balatonvilágos, Balatonalmádi-Budatava
XXV.: Balatonaliga, Fűzfő-Bay

The number of Cyanophyta species varied between 1—6, while the number of individuals was 300—12.400/dm² *(Tables II—XXVI)* in the 25 transversal sections.

Euglenophyta: Only a small number of *Euglena ehrenbergii* KLEBS and *E. klebsii* (LEMM.) MAINX occurred in samples No. XXIII/4 and IV/5, respectively. *Trachelomonas volvocina* EHR. and *Trachelomonas* sp. were restricted to the south-western part of the lake.

The number of Euglenophyta species varied between 1—2, that of the individuals 300—2.300/dm² in 5 transversal sections.

Pyrrophyta: Only cystic form of *Ceratium hirundinella* (O. F. MÜLL.) SCHRANK occurred in sample No. XXV/1, in a small number of individuals.

Chrysophyta: The pelagic *Planktonema lauterborni* SCHMIDLE representing class Xanthophyceae occurred alive sporadically among the 68 species. The majority of 42 mud inhabiting *Diatoma* of class Bacillariophyceae has been discussed in detail elsewhere (TAMÁS, 1966; p. 195; 1967; p. 237; 1968; p. 228). *Fragilaria pinnata* EHR. showed a high individual number in some along the shore samples of the sections (living 69.700/dm², dead 20.100/dm² in sample No. XVII/2). The high individual number of *Navicula cryptocephala* KÜTZ., *Nitzschia amphibia* GRUN. and *N. sigmoidea* (EHR.) W. SMITH was remarkable.

Besides the mud inhabiting species 15 pelagic *Diatoma* were found. The majority of them was observed in both living and dead states. In the case of *Fragilaria construens* (EHR.) GRUN. higher individual numbers were obtained only on the along-the-shore sites of the sections (X, XVII, XVIII, XX/1). *Melosira granulata* (EHR.) RALFS is a characteristic pelagic diatom of the open waters nevertheless its individual number reached 114.000/dm² in sample No. XXIII/5. The number of *Melosira granulata* found in the open water was also high per litre in August—September, 1968.

Dead specimens of certain species were found, described (TAMÁS, 1963) from the detritic off-shore bars of the littoral zone, from the along-the-shore stones and the hydropsammon (e.g. *Cocconeis diminuta* PANT., *Mastogloia smithii* THWAITES, *Melosira arenaria* MOORE). Among the fixed species *Cocconeis placentula* EHR. reached large individual numbers at some places near the shore. Ten identified fixed *Diatoma* species were found.

The number of Chrysophyta species varied between 18—42 while their individual number was 18.100—33.500/dm² in the samples of 25 transversal sections.

Chlorophyta: 17 species represented order Chlorococcales, and 5 species order Zygnematales in the mud samples. *Ankistrodesmus, Crucigenia, Dictyosphaerium, Oocystis, Pediastrum, Scenedesmus* and *Tetraedron* species were found, all known from the horizontal plankton samples (TAMÁS, 1965; 1967; 1969). High number per unit volume of *Closterium aciculare* T. West was observed in the mud samples of the north-eastern part of the lake. The number of living individuals varied between 3.000—17.000/dm² while that of dead ones, devoid of cellular content was 1.000—5.700/dm² at the collecting sites of the transversal sections No. XXI—XXV.

The number of Chlorophyta species varied between 1—7 while their individual number was 200—19.000/dm².

Mycophyta: the phylum was represented by a single *Dactylosporium* species. Its scattered occurrence has been described earlier. It was found both

TABLE 2

Numerical distribution of species and individuals of algal phyla on the collecting sites of transversal section No. I. (The symbol i/dm² means 1000 individuals per dm²)

Systematic group	Sampling places													
	1		2		3		4		5		6		7	
	Species	i/dm²	Sp	i/dm²	Sp	i/dm²	Sp	i/dm²	Sp	i/dm²	Sp	i/dm²	Sp	i/dm²
Cyanophyta	2	8.0	3	0.9	2	3.4	1	0.3	2	3.4	2	0.6	1	0.3
Euglenophyta	2	2.3	2	1.5	2	1.5	2	0.9	2	1.2	1	0.3	—	—
Chrysophyta	40	62.9	27	62.3	29	72.1	21	59.5	22	90.4	23	74.6	18	32.8
Chlorophyta	3	0.9	2	0.6	—	—	1	0.3	3	0.9	1	0.3	1	0.3
Mycophyta	—	—	1	0.3	—	—	—	—	1	0.3	—	—	—	—
Total	47	74.1	35	65.6	33	77.0	25	61.0	30	96.2	27	75.8	20	33.4

TABLE 3

The numerical distribution of species and individuals of algal phyla on the collecting sites of transversal section No. II. (The symbol i/dm² means 1000 individuals per dm²)

Cyanophyta	1	0.6	1	0.3	1	0.3	—	—	—	—	—	—	2	— 0.6
Euglenophyta	1	0.3	—	—	—	—	—	—	—	—	—	—	—	—
Chrysophyta	31	78.1	27	122.6	22	104.1	22	81.6	25	61.7	23	44.7	22	75.7
Chlorophyta	3	1.2	—	—	—	—	—	—	1	0.3	1	0.3	—	—
Total	36	80.2	28	122.9	23	104.4	22	81.6	26	62.0	24	45.0	24	76.3

TABLE 4

The numerical distribution of species and individuals of algal phyla on the collecting sites of transversal section No. III. (The symbol i/dm² means 1000 individuals per dm²)

Cyanophyta	1	0.3	—	—	3	1.8	2	0.9	1	0.3	3	0.9	3	0.9
Chrysophyta	28	120.4	21	67.7	20	84.3	21	91.3	22	64.0	29	86.4	28	81.4
Chlorophyta	—	—	1	0.3	2	0.6	3	0.9	1	0.6	—	—	2	0.9
Mycophyta	—	—	—	—	—	—	1	0.3	1	0.3	—	—	—	—
Total	29	120.7	22	68.0	25	86.7	27	93.4	25	65.2	32	87.3	33	83.2

TABLE 5

The numerical distribution of species and individuals of algal phyla on the collecting sites of transversal section No. IV.
(The symbol i/dm² means 1000 individuals per dm²)

Cyanophyta	6	2.1	2	0.6	3	1.2	1	0.6	2	0.6	4	1.8	1	0.3
Euglenophyta	—	—	—	—	—	—	—	—	1	0.3	—	—	—	—
Chrysophyta	32	114.0	21	84.3	23	79.5	21	95.0	25	80.7	19	47.3	24	83.6
Chlorophyta	1	0.3	4	1.8	2	0.9	2	0.9	3	1.5	2	1.5	2	0.6
Total	39	116.4	27	86.7	28	81.6	24	96.5	31	83.1	25	50.6	27	84.5

TABLE 6

The numerical distribution of species and individulas of algal phyla on the collecting sites of transversal section No. V.
(The symbol i/dm² means 1000 individuals per dm²)

Cyanophyta	3	0.9	2	0.6	3	0.9	—	—	3	0.9	1	0.3	1	0.3
Chrysophyta	24	140.2	22	63.5	19	50.8	21	65.9	23	86.1	28	81.0	29	83.1
Chlorophyta	—	—	2	0.6	3	1.2	1	0.3	—	—	1	0.3	1	0.3
Total	27	141.1	26	64.7	25	52.9	22	66.2	26	87.0	30	81.6	30	83.7

TABLE 7

The numerical distribution of species and individuals of algal phyla on the collecting sites of transversal section No. VI.
(The symbol i/dm² means 1000 individuals per dm²)

Cyanophyta	3	1.8	2	0.6	2	0.6	2	0.9	1	0.3	1	0.3	4	1.2
Chrysophyta	26	150.2	27	70.8	26	70.4	22	93.5	23	57.3	22	29.8	21	82.0
Chlorophyta	—	—	2	0.6	2	0.6	5	1.8	1	0.6	2	0.9	1	0.3
Total	29	152.0	31	72.0	30	71.6	29	96.2	25	58.2	25	31.0	26	83.5

TABLE 8

The numerical distribution of species and individuals of algal phyla on the collecting sites of transversal section No. VII. (The symbol i/dm² means 1000 individuals per dm²)

Systematic group	Sampling places													
	1		2		3		4		5		6		7	
	Sp	i/dm²	Sp	id/m²	Sp	i/dm²	Sp	i/dm²	Sp	i/dm²	Sp	i/dm²	Sp	i/dm²
Cyanophyta			1	0.3	3	1.5	3	0.9	4	1.2	—	—	2	0.6
Chrysophyta			21	106.2	23	50.4	22	80.3	21	45.2	25	47.7	22	52.6
Chlorophyta			1	0.3	1	0.6	—	—	3	1.2	1	0.6	—	—
Total			23	106.8	27	52.5	25	81.2	28	47.6	26	48.3	24	53.2

TABLE 9

The numerical distribution of species and individuals of algal phyla on the collecting sites of transversal section No. VIII. (The symbol i/dm² means 1000 individuals per dm²)

Cyanophyta			1	0.3	—	—	2	0.9	2	0.6	4	2.4	3	2.7
Chrysophyta			26	104.5	27	78.3	23	53.5	29	73.7	24	69.3	24	76.8
Chlorophyta			2	0.6	2	0.6	3	0.6	—	—	1	0.6	—	—
Total			29	105.4	29	78.9	28	55.0	31	74.3	29	72.3	27	79.5

TABLE 10

The numerical distribution of species and individuals of algal phyla on the collecting sites of transversal section No. IX. (The symbol i/dm² means 1000 individuals per dm²)

Cyanophyta	2	0.6	3	1.2	1	0.3	2	0.6	—	—	2	0.6	2	1.2
Chrysophyta	28	106.1	24	59.8	21	35.3	19	55.2	26	63.4	25	36.7	23	42.4
Chlorophyta	3	1.5	3	0.9	1	0.3	—	—	—	—	1	0.6	2	0.6
Total	33	108.2	30	61.9	23	35.9	21	55.8	26	63.4	28	37.9	27	44.2

TABLE 11

The numerical distribution of species and individuals of algal phyla on the collecting sites of transversal section No. X.
(The symbol i/dm² means 1000 individuals per dm²)

Cyanophyta	3	1.2	3	1.2	2	2.4	1	1.2	3	1.5	2	1.8	1	0.6
Chrysophyta	23	221.0	31	67.0	22	38.4	23	58.0	32	37.6	26	53.8	23	45.3
Chlorophyta	—	—	2	0.6	2	0.9	1	0.3	3	0.9	3	0.9	1	0.3
Mycophyta	—	—	—	—	1	0.3	—	—	—	—	—	—	—	—
Total	26	222.2	36	68.8	27	42.0	25	59.5	38	40.0	31	56.5	25	46.2

TABLE 12

The numerical distribution of species and individuals of algal phyla on the collecting sites of transversal section No. XI.
(The symbol i/dm² means 1000 individuals per dm²)

Cyanophyta	6	3.9	4	3.6	3	2.5	2	1.2	2	0.6	3	1.2	3	1.2
Chrysophyta	31	82.2	31	70.3	20	37.1	27	85.6	25	23.5	21	61.4	23	40.8
Chlorophyta	4	2.1	2	0.6	3	0.9	2	1.2	1	0.3	—	—	—	—
Total	41	88.2	37	74.5	26	40.5	31	88.0	28	24.4	24	62.6	26	42.0

TABLE 13

The numerical distribution of species and individuals of algal phyla on the collecting sites of transversal section No. XII.
(The symbol i/dm² means 1000 individuals per dm²)

Cyanophyta	1	0.3	2	5.6	4	5.5	5	3.9	4	8.3	2	1.8	2	1.5
Chrysophyta	33	89.4	22	35.3	26	89.5	30	104.8	23	66.7	24	40.8	26	64.2
Chlorophyta	2	0.6	1	0.3	3	2.8	3	1.5	3	1.5	2	0.6	3	0.9
Total	36	90.3	25	41.2	33	97.8	38	110.2	30	76.5	28	43.2	31	66.6

TABLE 14

The numerical distribution of species and individuals of algal phyla on the collecting sites of transversal section No. XIII. (The symbol i/dm² means 1000 individuals per dm²)

Systematic group	Sampling places													
	1		2		3		4		5		6		7	
	Sp	i/dm²	Sp	i/dm²	Sp	i/dm²	Sp	i/dm²	Sp	i/dm²	Sp	i/dm²	Sp	i/dm²
Cyanophyta	4	2.1	2	0.9	3	2.4	2	2.7	1	1.9	3	1.5	2	1.5
Chrysophyta	38	317.3	22	36.1	25	55.0	30	64.4	24	29.5	21	41.7	26	40.2
Chlorophyta	5	1.5	1	0.3	—	—	1	0.3	1	0.3	1	0.3	2	0.6
Total	47	320.9	25	37.3	28	57.4	33	67.4	26	31.7	25	43.5	30	42.3

TABLE 15

The numerical distribution of species and individuals of algal phyla on the collecting sites of transversal section No. XIV. (The symbol i/dm² means 1000 individuals per dm²)

Cyanophyta	3	0.9	4	3.7	2	0.4	4	2.0	2	1.0	2	1.5	3	1.5
Chrysophyta	32	71.4	28	49.1	31	61.0	25	46.9	27	39.2	25	36.1	22	25.6
Chlorophyta	3	0.9	3	0.9	1	0.2	3	0.6	—	—	2	0.4	3	0.9
Total	38	73.2	35	53.7	34	61.6	32	49.5	29	40.2	29	38.0	28	28.0

TABLE 16

The numerical distribution of species and individuals of algal phyla on the collecting sites of transversal section No. XV. (The symbol i/dm² means 1000 individuals per dm²)

Cyanophyta	4	2.1	4	3.9	3	4.3	3	2.7	4	3.6	5	2.4	2	0.9
Euglenophyta	—	—	—	—	—	—	—	—	—	—	1	0.3	—	—
Chrysophyta	25	78.3	27	104.8	35	97.2	29	56.5	30	58.9	27	88.7	25	54.4
Chlorophyta	2	0.6	2	1.2	2	0.6	1	0.3	2	1.8	6	2.1	1	0.3
Total	31	81.0	33	109.9	40	102.1	33	59.5	36	64.3	39	93.5	28	55.6

TABLE 17

The numerical distribution of species and individuals of algal phyla on the collecting sites of transversal section No. XVI. (The symbol i/dm² means 1000 individuals per dm²)

Cyanophyta	3	2.1	2	1.5	3	2.1	4	2.4	6	4.0	1	0.6	—	—
Chrysophyta	29	155.9	30	63.8	30	72.6	27	59.7	33	113.5	30	61.3	35	83.1
Chlorophyta	2	0.6	3	1.5	5	1.5	—	—	1	0.3	2	0.6	1	0.3
Total	34	158.6	35	66.8	38	76.2	31	62.1	40	117.8	33	62.5	36	83.4

TABLE 18

The numerical distribution of species and individuals of algal phyla on the collecting sites of transversal section No. XVII. (The symbol i/dm² means 1000 individuals per dm²)

Cyanophyta	3	1.2	5	5.9	3	5.0	3	4.6	1	0.6	3	1.2		
Chrysophyta	37	131.6	31	119.1	37	119.8	35	119.8	30	181.2	20	335.0		
Chlorophyta	2	0.6	4	1.5	—	—	3	1.2	1	0.3	2	0.6		
Total	42	133.4	40	126.5	40	124.8	41	125.6	32	182.1	25	336.8		

TABLE 19

The numerical distribution of species and individuals of algal phyla on the collecting sites of transversal section No. XVIII. (The symbol i/dm² means 1000 individuals per dm²)

Cyanophyta	1	1.2	3	1.2	1	0.9			4	4.6	4	6.4	1	0.3
Chrysophyta	33	195.0	28	89.9	33	90.8			31	96.7	28	71.6	36	84.2
Chlorophyta	1	0.3	1	0.3	1	0.9			1	0.3	—	—	—	—
Mycophyta	—	—	—	—	—	—			—	—	1	0.3	—	—
Total	35	196.5	32	91.4	35	92.6			36	101.6	33	78.3	37	84.5

TABLE 20

The numerical distribution of species and individuals of algal phyla on the collecting sites of transversal section No. XIX. (The symbol i/dm² means 1000 individuals per dm²)

Cyanophyta	3	1.8	3	1.9	2	2.4	2	2.1	2	1.5	3	1.2	1	0.6
Chrysophyta	34	88.6	36	72.4	34	107.6	23	18.1	27	41.4	26	22.8	35	30.7
Chlorophyta	—	—	2	0.6	—	—	—	—	—	—	—	—	1	0.2
Total	37	90.4	41	74.9	36	110.0	25	20.2	29	42.9	29	24.0	37	31.5

TABLE 21

The numerical distribution of species and individuals of algal phyla on the collecting sites of transversal section No. XX. (The symbol i/dm² means 1000 individuals per dm²)

Systematic group	Sampling places													
	1		2		3		4		5		6		7	
	Sp	i/dm²	Sp	i/dm²	Sp	i/dm²	Sp	i/dm²	Sp	i/dm²	Sp	d/im²	Sp	i/dm²
Cyanophyta	1	0.6	3	2.1	2	2.7	2	1.8	2	2.1	3	3.1	3	1.9
Chrysophyta	36	223.7	26	44.1	21	36.1	26	59.9	27	34.4	42	57.1	27	44.0
Chlorophtya	2	1.5	3	0.9	—	—	—	—	—	—	4	1.0	—	—
Total	39	225.8	32	47.1	23	38.8	28	61.7	29	36.5	46	61.2	30	45.9

TABLE 22

The numerical distribution of species and individulas of algal phyla on the collecting sites of transversal section No. XXI. (The symbol i/dm² means 1000 individuals per dm²)

Cyanophyta	3	4.6	3	3.1	3	4.0	2	4.3	3	1.7	2	8.6	2	2.5
Chrysophyta	28	80.8	28	72.5	33	68.1	26	73.1	25	49.8	30	49.8	32	65.5
Chlorophyta	3	1.2	4	1.2	3	0.9	2	0.6	2	0.4	2	0.6	1	0.3
Mycophyta	1	0.3	—	—	—	—	—	—	—	—	—	—	—	—
Total	35	86.9	35	76.8	39	73.0	30	78.0	30	51.9	34	59.0	35	68.3

TABLE 23

The numerical distribution of species and individuals of algal phyla on the collecting sites of transversal section No. XXII. (The symbol means 1000 individuals per dm²)

Cyanophyta	5	5.8	3	4.3	2	5.5	2	6.8	3	1.8	3	6.8	2	1.2
Chrysophyta	33	98.9	31	70.3	32	47.2	30	44.5	24	31.8	28	42.2	27	43.4
Chlorophyta	4	1.2	1	0.3	3	0.9	—	—	—	—	3	1.5	1	0.3
Total	42	105.9	35	74.9	37	53.6	32	51.3	27	33.6	34	50.5	30	44.9

TABLE 24

The numerical distribution of species and individuals of algal phyla on the collecting sites of transversal section No. XXIII. (The symbol i/dm² means 1000 individuals per dm²)

Cyanophyta	3	7.6	4	8.4	6	12.4	6	8.9	5	5.7	2	1.7	1	0.9
Euglenophyta	—	—	—	—	—	—	1	0.2	—	—	—	—	—	—
Chrysophyta	30	93.9	28	69.2	32	72.3	31	85.6	30	185.4	35	106.7	23	26.3
Chlorophyta	5	16.4	4	12.9	7	4.9	4	1.6	4	1.2	4	7.6	2	5.1
Mycophyta	—	—	—	—	—	—	—	—	—	—	1	0.2	—	—
Total	38	117.9	36	90.5	45	89.6	42	96.3	39	192.3	42	116.2	26	32.3

TABLE 25

The numerical distribution of species and individuals of algal phyla on the collecting sites of transversal section No. XXIV. (The symbol i/dm² means 1000 individuals per dm²)

Cyanophyta	3	3.4	3	2.5	4	2.7	4	3.8	3	3.4	3	3.4	2	2.2
Chrysophyta	33	46.7	32	59.7	26	95.8	32	103.4	28	62.2	32	63.0	32	53.1
Chlorophyta	2	0.4	4	3.0	5	1.8	7	5.9	2	2.1	3	4.3	4	2.9
Total	38	50.5	39	65.2	35	100.3	43	113.1	33	67.7	38	70.7	38	58.2

TABLE 26

The numerical distribution of species and individuals of algal phyla on the collecting sites of transversal section No. XXV. (The symbol i/dm² means 1000 individuals per dm²)

Cyanophyta	3	3.0	3	1.7	4	6.5	2	1.2	5	5.8	2	0.9	2	2.1
Pyrrophyta	1	0.2	—	—	—	—	—	—	—	—	—	—	—	—
Chrysophyta	31	57.6	24	42.1	33	56.3	23	29.8	28	63.7	32	74.7	29	46.1
Chlorophyta	4	3.2	6	2.7	6	19.0	2	0.4	4	18.2	5	15.7	—	—
Total	39	64.0	33	46.5	43	81.8	27	31.4	37	87.7	39	91.3	31	48.2

in the north-eastern and south-western parts of the lake, at places in a number of 200—300/dm².

The majority of blue-green algae, *Euglena, Planktonema, Attheya, Ankistrodesmus* species as well as that of green algae were always found alive in the samples.

According to our observations *Melosira granulata* var. *angustissima* O. MÜLL. was more frequent in the south-western than in the north-eastern part of the lake. *Oscillatoria formosa* and *Trachelomonas volvocina* were restricted to the Keszthely-Bay and its surrounding (samples of transversal sections No. I—III). Other species are frequent in the samples of the central (section No. X) and north-eastern parts of the lake, e.g. *Lyngbya circumcreta, Campylodiscus, Diploneis, Epithemia, Navicula, Neidium, Stenopterobia, Surirella* species.

Only the dead shell of most pelagic diatoms of the open water can be found in the mud samples, e.g. *Cyclotella bodanic* EULENST., *Cymatopleura*, etc.

The number of species and individuals of algae found in the samples of the 25 transversal sections of the lake are summarized in *Tables 2—26*. The highest values, apart from some exceptions, were found at the collecting sites No. 1 and 2, being near the southern shore of the lake in every section. The highest individual number was 336.800/dm², in sample of No. XVII/1, while the lowest was 20.200/dm² found in sample No. XIX/4.

The following individual numbers were found: living algae 300—22.300/dm²; dead algae 300—9.400/dm²; living diatoms 6.700—169.200/dm²; dead diatoms 11.100—271.000/dm².

Summary

In 175 mud samples collected on 25 transversal section of the lake in September, 1968, 108 species of algae have been identified showing the following distribution: Cyanophyta 12; Euglenophyta 4; Pyrrophyta 1; Chrysophyta 68; Chlorophyta 22; Mycophyta 1.

Some of the identified species are more frequent in the south-western while others in the north-eastern part of the lake.

The highest number of species and individuals of algae was found, apart from some exceptions, in the samples of collecting sites 1, and 2, being near the southern shoreline of Lake Balaton (336.000/dm², collecting site No. XVII/1).

The relation between the living and dead algae was at some places 1 : 1 but as high as 1 : 4 was also recorded.

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MENNYISÉGI MIKROFITOBENTOSZ VIZSGÁLATOK A BALATON 25 HARÁNTSZELVÉNYÉN AZ 1968. ÉVI SZEPTEMBERI GYÜJTÉSEK ALAPJÁN

Tamás Gizella

Összefoglalás

1968. év szeptemberében a tó 25 harántszelvényéről gyűjtött 175 fenékiszapmintában 108 algafajt határozott meg: Cyanophyta 12, Euglenophyta 4, Pyrrophyta 1, Chrysophyta 68, Chlorophyta 22, Mycophyta 1.

A meghatározott fajok egy része a tó DNy-i részén, míg mások az ÉK-i rész iszapmintáiban gyakoribbak.

A legmagasabb algafaj- és egyedszám/dm² értékeket — egy-két kivételtől eltekintve — a Balaton déli partjához közel eső 1-es és 2-es gyűjtőhelyek mintájából (XVII/1. gyh. 336000/dm²) jegyezte fel.

Helyenként az élő algák és az elpusztultak közötti arány 1 : 1, de előfordult 1 : 4 is.