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Fifth Report of the Regular Limnological Survey of Lake Biwa (1971) II. Benthos[1)2)]

By

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The regular limnological survey on benthos at four stations selected in Lake Biwa has been carrying on as a part of the routine work of the Otsu Hydrobiological Station. The aim of this research is to detect quantitative as well as qualitative changes in benthic communities extending over a long period (Mori et al. 1967).

The sampling stations and their conditions, the methods for collection and the results during past five years have been mentioned in the previous papers (Mori et al. 1967; Mori 1970, 1971; Suzuki and Mori 1967, 1968).

The numbers of individuals and total fresh weight of three samples (each 15×15 cm) and their average values per m^2 are shown in Tables 1, 2, 3 and 4. In these tables the following marks are used.

– : No specimen was collected.
? : Uncountable because of various reasons.
( ) : Average value was calculated from one or two samples.

The series of reports were edited by the Director of the Station, Syuiti Mori, and the present part, on the benthos, was arranged by Syuiti Mori and Tetsuya Narita. The collection of samples was mainly performed by T. Narita, A. Kawabata and T. Ueda, and other members of the Otsu Hydrobiological Station have assisted this survey in many ways.

A. Benthic community at Station Ie–1

Station Ie–1 has been chosen as having a representative character of the northern part of the lake or main basin, where the lake is oligotrophic and the depth is about 74 m.

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1) Contribution from the Otsu Hydrobiological Station, Kyoto University, No. 228.
2) JIBP-PF Publication No. 146.

Table 1. Benthic faunal composition and their abundance at St. Ie-1

Date	January 12, 1971								February 10, 1971							
Sampling No.	1		2		3		Average		1		2		3		Average	
	No.	mg	No.	mg	No.	mg	No./m²	g/m²	No.	mg	No.	mg	No.	mg	No./m²	g/m²
Oligochaeta	5	95	10	40	11	190	386	4.8	10	160	11	161	18	322	577	9.5
Amphipoda																
Anisogammarus annandalei (Tattersall)	—	—	—	—	1	13	13	0.2	—	—	—	—	—	—	—	—
Chironomidae larvae																
Spaniotoma sp.	1	18	—	—	—	—	13	0.3	—	—	—	—	—	—	—	—

Date	March 12, 1971								Aprial 16, 1971							
Sampling No.	1		2		3		Average		1		2		3		Average	
	No.	mg	No.	mg	No.	mg	No./m²	g/m²	No.	mg	No.	mg	No.	mg	No./m²	g/m²
Oligochaeta	14	755	15	604	25	685	799	30.3	26	1136	21	572	18	347	963	30.4
Amphipoda																
Anisogammarus annandalei (Tattersall)	—	—	2	3	—	—	31	0.05	4	17	1	4	15	64	297	1.3
Chironomidae larvae																
Spaniotoma sp.	—	—	1	3	—	—	13	0.04	—	—	—	—	—	—	—	—

Date	May 12, 1971								June 14, 1971							
Sampling No.	1		2		3		Average		1		2		3		Average	
	No.	mg	No.	mg	No.	mg	No./m²	g/m²	No.	mg	No.	mg	No.	mg	No./m²	g/m²
Oligochaeta	17	1126	20	543	17	292	799	29.0	10	311	17	314	16	546	635	17.3
Amphipoda																
Anisogammarus annandalei (Tattersall)	—	—	11	45	9	35	297	1.2	7	34	7	47	—	—	209	1.2

Date	July 15, 1971								August 16, 1971							
Sampling No.	1		2		3		Average		1		2		3		Average	
	No.	mg	No.	mg	No.	mg	No./m²	g/m²	No.	mg	No.	mg	No.	mg	No./m²	g/m²
Oligochaeta	38	765	27	805	24	1146	1319	40.2	7	344	22	472	30	568	875	20.5
Amphipoda																
Anisogammarus annandalei (Tattersall)	3	24	3	19	12	75	266	1.8	—	—	1	7	1	8	31	0.2

Date	September 16, 1971								October 15, 1971							
Sampling No.	1		2		3		Average		1		2		3		Average	
	No.	mg	No.	mg	No.	mg	No./m²	g/m²	No.	mg	No.	mg	No.	mg	No./m²	g/m²
Oligochaeta	29	531	29	189	39	1264	1434	29.4	23	803	35	812	26	545	1243	32.0
Amphipoda																
Anisogammarus annandalei (Tattersall)	—	—	—	—	—	—	—	—	1	11	4	47	3	32	120	1.3

Date	November 17, 1971								December 16, 1971							
Sampling No.	1		2		3		Average		1		2		3		Average	
	No.	mg	No.	mg	No.	mg	No./m²	g/m²	No.	mg	No.	mg	No.	mg	No./m²	g/m²
Oligochaeta	18	387	31	848	24	426	1079	24.6	33	485	21	492	14	266	564	18.4
Amphipoda																
Anisogammarus annandalei (Tattersall)	1	10	1	16	—	—	31	0.4	—	—	—	—	—	—	—	—

Result is shown in Table 1. Oligochaeta and Amphipoda appeared regularly in the samples of 1971, but Chironomidae larvae were found only in January and March. No Pelecypoda was found in this year.

Increase of Oligochaeta biomass was still persisted in this year.

B. Benthic communities at Stations Nb–2, Nb–5 and Na–3

Stations Nb–2, Nb–5 and Na–3 have been chosen as having the representative characters of the mesotrophic southren part of the lake or sub-basin. Nb–2 (sand or sandy mud substratum) and Na–3 (muddy substratum) are the stations of 0.1 km off the east and west coast of the southern part of the lake respectively and both are about 2 m in depth, while Station Nb–5 (muddy substratum) is in the central part of the southern lake and about 4.5 m in depth.

Results are shown in Tables 2, 3 and 4. Animals found were Oligochaeta, Hirudinea, Chironomidae larvae (more than 4 species), Crustacea (3 species), Gastropoda (5 species), Pelecypoda (5 species) and Pisces (1 species).

The trend of increase of Oligochaeta still continued in this year at Station Nb–5, but at other two stations the populations were maintained nearly constant. A pelecypod mollusc, *Unio biwae,* which showed constant increase through past 5 years, decreased remarkably in this year, especially at Station Na–3. On the other hand, increase of *Spaniotoma* (Chironomidae) is observed in this year, irrespective of the constant decrease during past 5 years (1966–1970). A sudden and remarkable increase of a pelecypod mollusc, *Sphaerium japonicum biwaense,* in this year should be noticed.

Table 2. Benthic faunal composition and their abundance at St. Nb-2

Date	January 13, 1971								February 12, 1971							
Sampling No.	1		2		3		Average		1		2		3		Average	
	No.	mg	No.	mg	No.	mg	No./m²	g/m²	No.	mg	No.	mg	No.	mg	No./m²	g/m²
Oligochaeta	—	—	3	36	2	5	76	0.6	5	58	9	90	—	—	209	2.2
Gastropoda																
Semisulcospira decipiens (Westerlund)	—	—	—	—	1	550	13	8.1	—	—	—	—	1	480	13	7.1
Pelecypoda																
Sphaerium japonicum biwaense Mori	—	—	1	10	4	1	76	0.1	5	0	4	1	—	—	133	0.1

Date	March 15, 1971								April 15, 1971							
Sampling No.	1		2		3		Average		1		2		3		Average	
	No.	mg	No.	mg	No.	mg	No./m²	g/m²	No.	mg	No.	mg	No.	mg	No./m²	g/m²
Oligochaeta	2	60	4	31	5	53	164	2.1	—	—	5	59	—	—	75	0.9
Hirudinea	—	—	—	—	—	—	—	—	—	—	1	5	—	—	13	0.08
Amphipoda																
Anisogammarus annandalei (Tattersall)	—	—	2	8	—	—	31	0.1	—	—	—	—	—	—	—	—
Chironomidae larvae																
unidentified-B	—	—	1	4	—	—	13	0.06	—	—	—	—	—	—	—	—
Gastropoda																
Semisulcospira decipiens (Westerlund)	—	—	—	—	—	—	—	—	1	920	1	223	—	—	31	13.9
Pelecypoda																
Corbicula sandai Reinhardt	1	120	—	—	1	940	31	15.7	—	—	3	670	—	—	44	9.9
Unio biwae Kobelt	1	1520	—	—	—	—	13	22.5	—	—	—	—	—	—	—	—
Sphaerium japonicum biwaense Mori	2	1	2	10	2	1	89	0.1	—	—	5	240	—	—	75	3.6

Date	May 13, 1971								June, 15 1971							
Sampling No.	1		2		3		Average		1		2		3		Average	
	No.	mg	No.	mg	No.	mg	No./m²	g/m²	No.	mg	No.	mg	No.	mg	No./m²	g/m²
Oligochaeta	6	63	3	12	4	4	191	1.2	1	1	44	4	1	1	679	0.008
Amphipoda																
Anisogammarus annandalei (Tattersall)	—	—	—	—	1	5	13	0.08	—	—	—	—	—	—	—	—
Chironomidae larvae																
Tendipes plumosus (Meigen)	2	12	—	—	1	11	44	0.3	—	—	—	—	1	0.2	13	0.003
Tendipes halophilus (Kieffer)	1	3	—	—	—	—	13	0.04	—	—	—	—	—	—	—	—
unidentified	1	1	3	1	—	—	58	0.03	—	—	1	2	—	—	13	0.04
Gastropoda																
Semisulcospira decipiens (Westerlund)	—	—	—	—	—	—	—	—	1	10	2	20	—	—	31	0.4
Pelecypoda																
Corbicula sandai Reinhardt	4	1580	1	1	1	3490	89	75.0	3	20	18	250	2	1	342	4.0
Unio biwae Kobelt	—	—	—	—	—	—	—	—	1	2190	1	40	—	—	31	33.0
Sphaerium japonicum biwaense Mori	3	150	3	250	7	750	191	17.0	—	—	—	—	3	220	44	3.2

Date	July 12, 1971								August 17, 1971							
Sampling No.	1		2		3		Average		1		2		3		Average	
	No.	mg	No.	mg	No.	mg	No./m²	g/m²	No.	mg	No.	mg	No.	mg	No./m²	g/m²
Oligochaeta	——	—	—	—	1	0.3	13	0.004	—	—	—	—	—	—	—	—
Amphipoda																
Kamaka biwae Uéno	—	—	—	—	1	0.4	13	0.004	—	—	—	—	—	—	—	—
Chironomidae larvae																
unidentified	1	0.3	—	—	—	—	13	0.004	—	—	—	—	—	—	—	—

Gastropoda																
Semisulcospira decipiens (Westerlund)	3	190	—	—	—	—	44	2.8	—	—	—	—	1	110	13	1.6
Sinotaia histrica (Gould)	1	30	—	—	1	3480	31	51.9	—	—	3	1040	—	—	44	15.4
Pelecypoda																
Corbicula sandai Reinhardt	6	320	—	—	4	1780	147	31.1	4	710	6	1200	1	20	164	28.5
Unio biwae Kobelt	—	—	—	—	—	—	—	—	—	—	—	—	1	4920	13	72.8
Sphaerium japonicum biwaense Mori	—	—	4	1	—	—	58	0.01	—	—	—	—	—	—	—	—
Anodonta calipygos Kobelt	—	—	—	—	—	—	—	—	—	—	1	350	—	—	13	5.2

Date	September 17, 1971								October 14, 1971							
Sampling No.	1		2		3		Average		1		2		3		Average	
	No.	mg	No.	mg	No.	mg	No./m²	g/m²	No.	mg	No.	mg	No.	mg	No./m²	g/m²
Oligochaeta	—	—	—	—	1	1	13	0.01	—	—	2	1	—	—	31	0.01
Gastropoda																
Semisulcospira decipiens (Westerlund)	—	—	6	1590	1	1610	102	47.4	—	—	—	—	2	610	31	9.0
Sinotaia histrica (Gould)	—	—	4	1990	2	2470	89	66.0	—	—	1	480	1	2430	31	43.1
Heterogen longispira (Smith)	1	1240	—	—	—	—	13	18.3	—	—	—	—	—	—	—	—
Parafossarulus manchuricus japonicus (Pilsbry)	1	20	—	—	—	—	13	0.3	—	—	—	—	—	—	—	—
Pelecypoda																
Corbicula sandai Reinhardt	4	1010	2	290	6	880	177	32.3	—	—	2	640	8	3380	147	59.5
Unio biwae Kobelt	—	—	1	5760	1	660	31	95.0	—	—	2	5480	—	—	31	81.1

Date	November 18, 1971								December 17, 1971							
Sampling No.	1		2		3		Average		1		2		3		Average	
	No.	mg	No.	mg	No.	mg	No./m²	g/m²	No.	mg	No.	mg	No.	mg	No./m²	g/m²
Oligochaeta	—	—	4	7	2	15	89	0.3	2	5	9	23	4	3	222	0.5
Gastropoda																
Semisulcospira decipiens (Westerlund)	1	970	1	710	1	320	44	29.6	2	920	2	1070	—	—	58	29.4
Sinotaia histrica (Gould)	—	—	1	810	—	—	13	12.0	—	—	—	—	—	—	—	—
Pelecypoda																
Corbicula sandai Reinhardt	2	520	1	240	—	—	44	11.2	—	—	—	—	—	1030	13	15.2
Sphaerium japonicum biwaense Mori	—	—	—	—	—	—	—	—	—	—	—	—	3	1	44	0.01
Pisces																
Rhinogobius brunneus (Temminck et Schlegel)	—	—	—	—	—	—	—	—	2	321	—	—	—	—	31	4.7

Table 3. Benthic faunal composition and their abundance at St. Nb-5

Date	January 13, 1971								February 12, 1971							
Sampling No.	1		2		3		Average		1		2		3		Average	
	No.	mg	No.	mg	No.	mg	No./m²	g/m²	No.	mg	No.	mg	No.	mg	No./m²	g/m²
Oligochaeta	20	236	15	673	22	499	844	20.8	14	157	22	781	45	656	1199	23.6
Chironomidae larvae																
Spaniotoma spp.	1	4	1	2	—	—	31	0.1	4	38	2	18	4	32	147	1.3
Pentaneura spp.	—	—	1	4	—	—	13	0.07	—	—	1	3	1	5	31	0.1
unidentified	1	0.8	—	—	1	1	31	0.02	—	—	—	—	—	—	—	—

Date	March 15, 1971								April 15, 1971							
Sampling No.	1		2		3		Average		1		2		3		Average	
	No.	mg	No.	mg	No.	mg	No./m²	g/m²	No.	mg	No.	mg	No.	mg	No./m²	g/m²
Oligochaeta	33	660	20	549	27	382	1185	23.6	15	124	7	140	13	113	519	5.6

Hirudinea	1	6	—	—	—	—	13	0.09	—	—	—	—	—	—	—	—
Amphipoda																
Anisogammarus annandalei (Tattersall)	—	—	—	—	—	—	—	—	1	5	—	—	1	4	31	0.1
Chironomidae larvae																
Spaniotoma spp.	2	15	4	74	5	99	164	2.8	2	3	—	—	1	4	44	0.1
Tendipes plumosus (Meigen)	1	48	—	—	1	19	31	1.0	—	—	—	—	—	—	—	—
Tendipes halophilus (Kieffer)	—	—	—	—	1	1	13	0.02	—	—	—	—	—	—	—	—
Pentaneura sp.	2	2	—	—	—	—	31	0.03	—	—	—	—	—	—	—	—
unidentified–A	3	52	1	17	—	—	58	1.0	—	—	—	—	—	—	—	—
Pelecypoda																
Sphaerium japonicum biwaense Mori	—	—	1	1	1	1	13	0.01	1	10	—	—	—	—	13	0.1

Date	May, 13, 1971								June 15, 1971							
Sampling No.	1		2		3		Average		1		2		3		Average	
	No.	mg	No.	mg	No.	mg	No./m²	g/m²	No.	mg	No.	mg	No.	mg	No./m²	g/m²
Oligochaeta	13	213	16	156	7	23	533	5.8	6	44	5	112	7	36	266	2.8
Mirudinea	1	20	—	—	—	—	13	0.3	—	—	—	—	—	—	—	—
Amphipoda																
Anisogammarus annandalei (Tattersall)	1	6	—	—	1	3	31	0.1	—	—	—	—	—	—	—	—
Chironomidae larvae																
Tendipes plumosus (Meigen)	4	18	—	—	—	—	58	0.3	—	—	1	5.2	—	—	13	0.08
Pentaneura sp.	2	4	1	2	3	6	89	0.2	—	—	—	—	—	—	—	—
unidentified	2	1	—	—	4	1	89	0.03	—	—	—	—	—	—	—	—
Pelecypoda																
Corbicula sandai Reinhardt	—	—	—	—	—	—	—	—	—	—	1	1	—	—	13	0.01
Sphaerium japonicum biwaense Mori	—	—	—	—	1	5	13	0.1	—	—	—	—	1	280	13	4.1

Date	July 12, 1971								August 17, 1971							
Sampling No.	1		2		3		Average		1		2		3		Average	
	No.	mg	No.	mg	No.	mg	No./m²	g/m²	No.	mg	No.	mg	No.	mg	No./m²	g/m²
Oligochaeta	2	34	5	54	7	88	209	2.6	5	110	4	65	13	162	324	5.0
Chironomidae larvae																
Pentaneura sp.	3	5	—	—	1	6	58	0.2	1	9	—	—	—	—	13	0.1
unidentified	1	0.2	—	—	—	—	13	0.004	1	0.2	—	—	—	—	13	0.004
Gastropoda																
Semisulcospira decipiens (Westerlund)	—	—	1	30	—	—	13	0.4	—	—	—	—	—	—	—	—
Pelecypoda																
Corbicula sandai Reinhardt	—	—	—	—	—	—	—	—	—	—	—	—	1	2970	13	44

Date	September 17, 1971								October 14, 1971							
Sampling No.	1		2		3		Average		1		2		3		Average	
	No.	mg	No.	mg	No.	mg	No./m²	g/m²	No.	mg	No.	mg	No.	mg	No./m²	g/m²
Oligochaeta	6	36	6	50	9	121	311	3.1	9	84	4	62	13	167	386	4.6
Chironomidae larvae																
Pentaneura sp.	—	—	—	—	1	1	13	0.01	—	—	—	—	—	—	—	—
Gastropoda																
Semisulcospira decipiens (Westerlund)	—	—	—	—	—	—	—	—	1	360	—	—	—	—	13	5.3

Date	November 18, 1971								December 17, 1971							
Sampling No.	1		2		3		Average		1		2		3		Average	
	No.	mg	No.	mg	No.	mg	No./m²	g/m²	No.	mg	No.	mg	No.	mg	No./m²	g/m²
Oligochaeta	27	?	15	163	21	142	932	(6.8)	14	158	11	65	20	325	666	8.1
Chironomidae larvae																
Tendipes plumosus (Meigen)	—	—	—	—	—	—	—	—	1	14	1	22	—	—	31	0.5
Spaniotoma spp.	—	—	1	24	4	80	75	1.5	—	—	2	25	—	—	31	0.4
Pentaneura sp.	—	—	1	3	—	—	13	0.04	1	6	—	—	—	—	13	0.1

Gastropoda																
Semisulcospira decipiens (Westerlund)	—	—	—	—	2	1100	31	16.3	—	—	—	—	—	—	—	—

Table 4. Benthic faunal composition and their abundance at St. Na–3

Date	January 13, 1971								February 12, 1971							
Sampling No.	1		2		3		Average		1		2		3		Average	
	No.	mg	No.	mg	No.	mg	No./m²	g/m²	No.	mg	No.	mg	No.	mg	No./m²	g/m²
Oligochaeta	15	109	53	548	27	179	1407	15.2	11	225	28	604	25	229	946	15.7
Hirudinea	—	—	1	10	—	—	13	0.2	—	—	—	—	—	—	—	—
Chironomidae larvae																
Spaniotoma spp.	13	210	5	60	33	421	755	10.2	2	22	—	—	—	—	31	0.3
Gastropoda																
Semisulcospira decipiens (Westerlund)	—	—	3	600	3	3070	89	54.3	1	380	—	—	3	1210	58	23.5
Pelecypoda																
Unio biwae Kobelt	—	—	—	—	1	7850	13	116.2	—	—	—	—	—	—	—	—
Lanceolaria oxyrhyncha (v. Martens)	—	—	1	1750	—	—	13	25.9	—	—	—	—	—	—	—	—

Date	March 15, 1971								April 15, 1971							
Sampling No.	1		2		3		Average		1		2		3		Average	
	No.	mg	No.	mg	No.	mg	No./m²	g/m²	No.	mg	No.	mg	No.	mg	No./m²	g/m²
Oligochaeta	19	249	23	225	19	206	901	10.1	11	103	9	34	10	58	444	2.6
Chironomidae larvae																
Spaniotoma spp.	4	25	5	24	3	16	178	1.0	—	—	—	—	—	—	—	—
Pentaneura sp.	—	—	—	—	—	—	—	—	—	—	—	—	1	10	13	0.2
unidentified–A	2	28	3	53	2	30	102	1.6	—	—	—	—	—	—	—	—
Gastropoda																
Semisulcospira decipiens (Westerlund)	1	1380	3	2070	—	—	58	51.1	1	260	1	260	4	1080	89	23.7
Gyraulus biwaensis (Preston)	—	—	1	1	—	—	13	0.01	—	—	—	—	—	—	—	—
Pelecypoda																
Sphaerium japonicum biwaense Mori	—	—	—	—	—	—	—	—	—	—	1	40	—	—	13	0.6

Date	May 13, 1971								June 15, 1971							
Sampling No.	1		2		3		Average		1		2		3		Average	
	No.	mg	No.	mg	No.	mg	No./m²	g/m²	No.	mg	No.	mg	No.	mg	No./m²	g/m²
Oligochaeta	4	12	10	78	13	108	400	2.9	7	127	5	44	7	38	280	3.1
Hirudinea	—	—	—	—	—	—	—	—	—	—	—	—	1	331	13	4.9
Chironomidae larvae																
Tendipes plumosus (Meigen)	—	—	—	—	—	—	—	—	2	9	—	—	—	—	31	0.1
Pentaneura sp.	—	—	—	—	1	7	13	0.1	—	—	—	—	—	—	—	—
Gastropoda																
Semisulcospira decipiens (Westerlund)	2	370	3	3340	4	1650	133	79.3	2	980	13	2880	7	970	324	71.5
Cipangopaludina japonica (v. Martens)	—	—	—	—	—	—	—	—	—	—	1	100	1	90	31	2.8
Pelecypoda																
Sphaerium japonicum biwaense Mori	1	130	—	—	1	10	31	2.1	—	—	—	—	—	—	—	—

Date	July 12, 1971								August 17, 1971							
Sampling No.	1		2		3		Average		1		2		3		Average	
	No.	mg	No.	mg	No.	mg	No./m²	g/m²	No.	mg	No.	mg	No.	mg	No./m²	g/m²
Oligochaeta	13	81	9	46	8	69	444	2.9	7	75	8	130	9	113	355	4.7
Chironomidae larvae																
Tendipes plumosus (Meigen)	—	—	—	—	—	—	—	—	—	—	1	0.4	—	—	13	0.004
Tendipes halophilus (Kieffer)	—	—	1	4	—	—	13	0.1	1	2	—	—	—	—	13	0.03
Pentaneura sp.	1	1	—	—	—	—	13	0.01	—	—	—	—	—	—	—	—
unidentified	1	0.4	—	—	8	2	133	0.1	—	—	—	—	—	—	—	—
Gastropoda																
Semisulcospira decipiens (Westerlund)	—	—	6	3220	1	740	27	58.6	2	1120	—	—	2	1080	58	32.7
Sinotaia histrica (Gould)	—	—	1	2690	—	—	13	39.8								

Date	September 17, 1971								October 14, 1971							
Sampling No.	1		2		3		Average		1		2		3		Average	
	No.	mg	No.	mg	No.	mg	No./m²	g/m²	No.	mg	No.	mg	No.	mg	No./m²	g/m²
Oligochaeta	6	50	7	105	2	6	222	2.4	6	71	7	132	4	61	253	3.9
Chironomidae larvae																
Pentaneura sp.	—	—	1	1	—	—	13	0.01	—	—	—	—	1	3	13	0.04
Gastropoda																
Semisulcospira decipiens (Westerlund)	1	1180	—	—	3	2840	58	59.5	—	—	—	—	—	—	—	—

Date	November 18, 1971								December 17, 1971							
Sampling No.	1		2		3		Average		1		2		3		Average	
	No.	mg	No.	mg	No.	mg	No./m²	g/m²	No.	mg	No.	mg	No.	mg	No./m²	g/m²
Oligochaeta	47	84	22	175	13	46	1212	4.5	6	111	8	142	8	84	324	5.0
Hirudinea	—	—	—	—	1	7	13	0.1	—	—	—	—	—	—	—	—
Decapoda																
Macrobrachium nipponensis (De Haan)	—	—	—	—	1	27	13	0.4	—	—	—	—	—	—	—	—
Chironomidae larvae																
Spaniotoma spp.	—	—	—	—	1	20	13	0.3	6	77	1	15	—	—	102	1.4
Pentaneura sp.	—	—	—	—	1	3	13	0.04	—	—	—	—	—	—	—	—
Gastropoda																
Semisulcospira decipiens (Westerlund)	1	140	—	—	3	2310	58	36.3	—	—	1	530	3	1620	58	31.8

C. On some remarkable changes in biomass of benthic animals

1. Oligochaeta

Average amount of Oligochaeta from 1966 through 1971 at Stations Ie–1, Nb–2, Nb–5 and Na–3 are illustrated in Fig. 1. Changes in the southern lake are not clear except Station 5, but that in the northern lake (Ie–1) is very noticeable. Continuous increase since 1967 seems to indicate a sign of progress of eutrophication there.

2. Pelecypod mollusc, *Unio biwae* Kobelt

Contrary to the trend of previous years, decrease was observed at all stations, especially noticeable at Na–3. The reason of these changes are not clear at present.

3. Pelecypod mollusc, *Spaerium japonicum biwaense* Mori

This small mussel has been occasinoally found from shallow bottom of the southern lake, but in this year a sudden increase was observed. Fig. 3 shows the feature of outbreak. The cause of this increase is not determined, but the progress of eutrophication may have a connection with this phenomenon.

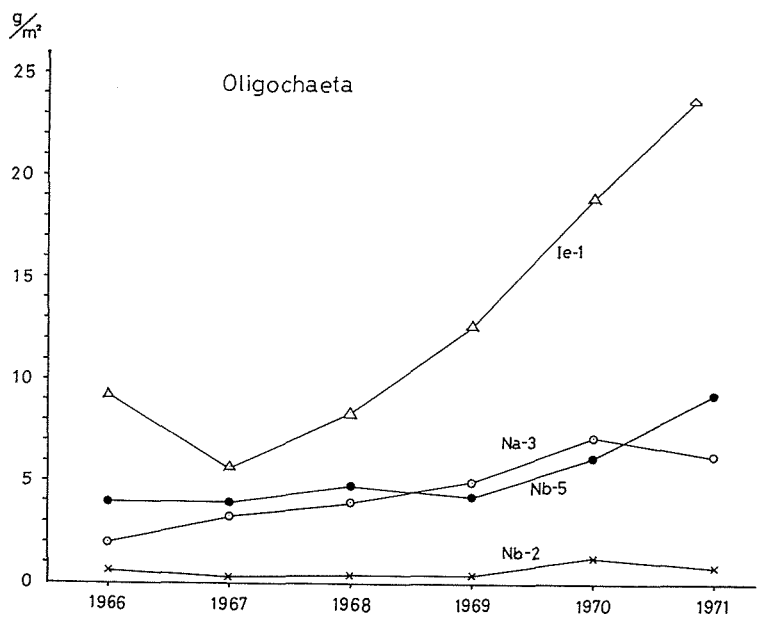

Fig. 1. Change of average biomass of oligochaete worms from 1966 through 1971.

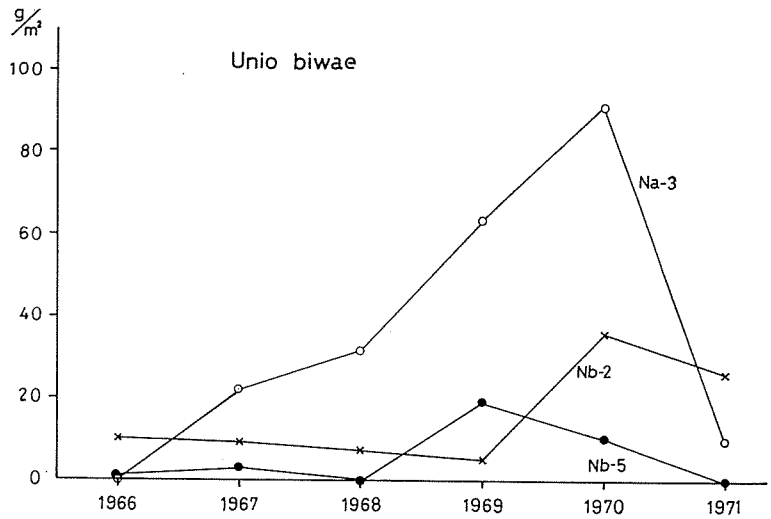

Fig. 2. Change of average biomass of *Unio biwae* from 1966 through 1971.

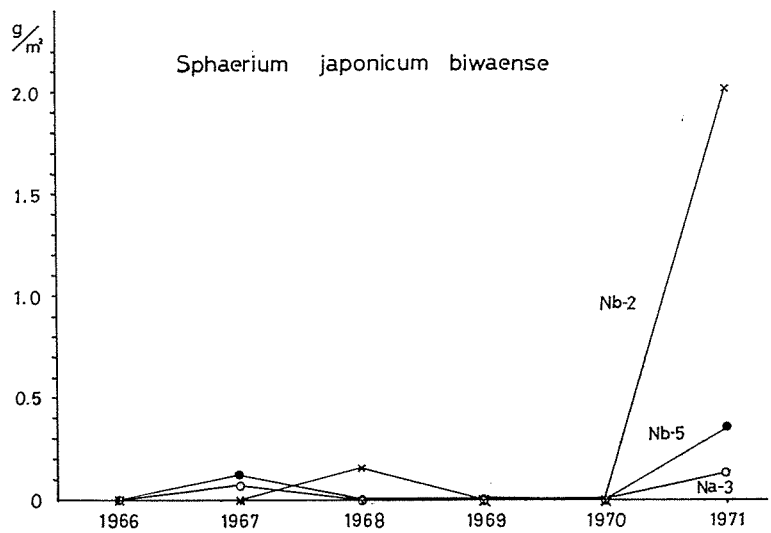

Fig. 3. Change of average biomass of *Sphaerium japonicum biwaense* from 1966 through 1971.

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