Supplementary Material

High diatom species turnover in a Baltic Sea rock pool metacommunity

Marine Biodiversity

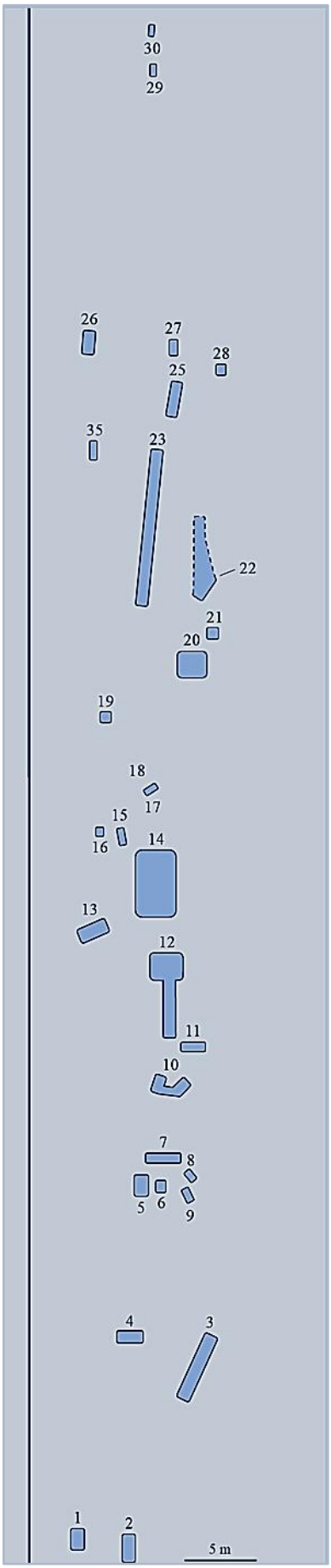
Sonja Aarnio[1], Anette Teittinen[1] and Janne Soininen[1]

[1]Department of Geosciences and Geography, P.O. Box 64, FI-00014 University of Helsinki, Finland

Corresponding author: Sonja Aarnio

Email: sonja.aarnio@helsinki.fi

Orchid ID: 0000-0002-4447-6161



Online Resource 1 A schematic map of the studied rock pools. Shown are all the sampled pools numbered 1–23, 25–30 and 35 (excluding pool 24 merged with pool 22 and the dried pools 31–34) and their relative location to each other and to the coastline. The dashed border extending upwards from pool 22 represents the merged area to that pool from June onwards. The seashore is located vertically to the left of the pools, marked as a blue solid line

Online Resource 2 The climate data from Kumpula meteorological station, Helsinki, covering a 7-day period before each sampling and the sampling days (bolded). Air temperature and wind speed are daily means; rainless days are marked as –. FMI (2017)

Date	Temperature (°C)	Precipitation (mm)	Wind speed (m s^{-1})
10 May	16.8	0.6	4.1
11 May	11.8	–	4.4
12 May	10.5	–	3.0
13 May	12.6	–	4.4
14 May	11.6	5.4	3.9
15 May	13.6	1.0	4.2
16 May	10.9	0.3	3.4
17 May	**10.6**	–	**4.2**
15 June	17.5	9.0	4.9
16 June	14.3	46.1	4.6
17 June	15.7	31.0	4.2
18 June	14.3	16.0	7.4
19 June	13.4	0.7	6.0
20 June	15.2	–	4.5
21 June	16.9	–	3.3
22 June	**16.6**	–	**4.7**
15 July	15.7	17.6	4.3
16 July	17.3	–	6.2
17 July	16.0	–	5.5
18 July	17.4	0.1	3.2
19 July	18.2	–	3.7
20 July	18.5	0.1	4.3
21 July	18.5	–	4.3
22 July	**18.0**	–	**2.6**

Online Resource 3 Monthly environmental data for the studied rock pools. Pool area has been calculated by multiplying pool length by pool width. For the exceptionally irregularly shaped pools 10 and 12, only the mean of multiple measurements of both pool length and width is shown

				May				
Pool	Tot P ($\mu g\ L^{-1}$)	pH	Conduct. ($\mu S\ cm^{-1}$)	Temp. (°C)	Length (m)	Width (m)	Depth (m)	Area (m^2)
1	107.9	9.1	5360	19.0	0.75	0.35	0.09	0.26
2	484.6	9.9	10075	19.6	0.60	0.35	0.13	0.21
3	273.2	9.5	3095	20.1	4.35	0.50	0.17	2.18
4	1208.1	9.3	6166	19.7	1.80	0.55	0.12	0.99
5	262.3	9.3	16741	22.8	0.90	1.00	0.15	0.90
6	319.3	8.6	14460	18.6	1.25	0.75	0.08	0.94
7	131.2	9.5	7260	21.8	2.80	0.50	0.17	1.40
8	267.3	8.7	3758	18.5	1.25	0.45	0.23	0.56
9	182.3	9.0	2304	19.5	0.65	0.60	0.28	0.39
10	132.0	9.5	5970	20.9	1.43	0.85	0.30	1.21
11	437.1	9.1	3380	20.7	1.20	0.85	0.23	1.02
12	123.1	9.5	1723	22.0	2.80	2.40	0.29	6.72
13	49.1	9.3	8439	21.7	1.70	1.40	0.20	2.38
14	164.0	9.8	1134	21.0	6.90	4.80	0.34	33.12
15	135.1	9.4	1485	22.5	1.65	0.50	0.20	0.83
16	848.9	9.5	3144	24.7	0.60	0.55	0.10	0.33
17	378.7	8.2	458	22.3	0.45	0.20	0.14	0.09
18	384.6	9.4	219	22.0	1.00	0.15	0.15	0.15
19	507.1	9.6	9054	22.9	1.45	0.80	0.13	1.16
20	71.0	8.6	744	20.4	5.50	2.40	0.29	13.20
21	451.7	8.6	134	19.5	0.50	0.30	0.05	0.15
22	1448.3	8.6	188	26.2	1.20	0.35	0.05	0.42
23	187.4	8.1	400	21.3	10.70	1.00	0.25	10.70
25	689.0	9.5	472	21.3	0.55	0.30	0.15	0.17
26	66.3	8.6	8745	22.0	1.00	0.35	0.17	0.35
27	54.1	8.6	1275	22.4	0.75	0.20	0.15	0.15
28	225.2	9.8	152	19.7	0.70	0.30	0.17	0.21
29	448.0	9.7	752	22.2	0.70	0.25	0.14	0.18
30	1016.8	9.1	348	20.3	0.80	0.15	0.08	0.12
35	298.5	9.5	1498	22.7	1.50	0.45	0.16	0.68

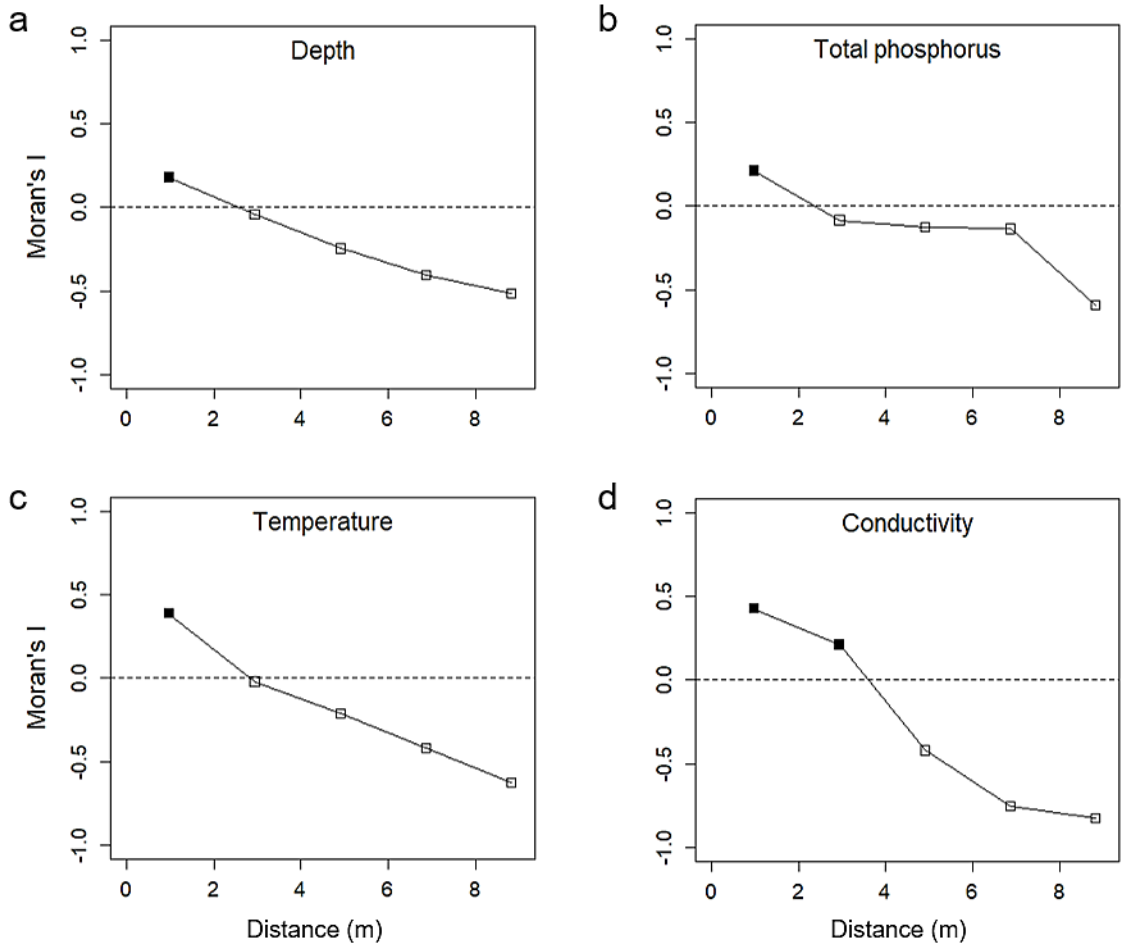
June								
Pool	Tot P ($\mu g\ L^{-1}$)	pH	Conduct. ($\mu S\ cm^{-1}$)	Temp. (°C)	Length (m)	Width (m)	Depth (m)	Area (m^2)
1	24.1	8.9	8872	14.8	0.85	0.55	0.11	0.47
2	184.6	9.0	10754	17.1	0.68	0.37	0.14	0.25
3	87.4	9.0	8004	17.1	4.80	0.75	0.30	3.60
4	72.8	9.6	10140	17.7	1.83	0.66	0.13	1.21
5	105.6	9.3	9890	17.6	3.90	1.50	0.21	5.85
6	41.4	9.5	8912	17.2	1.45	1.06	0.14	1.54
7	17.3	10.0	8960	17.7	2.95	0.59	0.25	1.74
8	33.4	9.5	7932	17.8	1.20	0.45	0.26	0.54
9	66.4	8.8	5202	17.3	0.65	0.63	0.30	0.41
10	363.1	9.4	8347	19.4	1.78	1.03	0.40	1.82
11	187.0	8.5	5520	18.6	1.20	0.86	0.23	1.03
12	78.4	8.5	3823	18.8	3.55	1.62	0.34	5.73
13	19.1	8.8	8732	16.4	2.00	1.60	0.24	3.20
14	42.4	7.4	1277	19.2	6.80	5.40	0.36	36.72
15	213.5	7.6	3203	20.4	1.80	0.50	0.24	0.90
16	60.6	8.7	3913	20.6	0.70	0.65	0.15	0.46
17	59.2	8.9	533	19.4	1.85	0.70	0.21	1.30
18	31.6	8.1	1278	20.0	0.97	0.30	0.20	0.29
19	94.4	9.3	7409	20.6	2.10	0.50	0.15	1.05
20	72.5	8.0	115	21.3	5.50	3.20	0.37	17.60
21	67.3	7.7	126	19.6	0.65	0.52	0.13	0.34
22	36.4	7.2	63	20.5	3.60	1.35	0.20	4.86
23	54.3	7.2	410	19.0	16.20	1.50	0.30	24.30
25	60.7	8.7	207	16.4	1.60	1.30	0.27	2.08
26	27.0	8.6	8475	18.2	2.00	0.43	0.18	0.86
27	50.6	8.8	178	18.2	1.05	0.50	0.22	0.53
28	99.3	9.8	62	19.5	0.90	0.42	0.22	0.38
29	64.2	9.0	384	20.8	1.00	0.30	0.19	0.30
30	80.7	9.8	119	20.7	0.97	0.20	0.12	0.19
35	68.7	7.6	307	19.2	1.70	0.48	0.19	0.82

				July				
Pool	Tot P ($\mu g\ L^{-1}$)	pH	Conduct. ($\mu S\ cm^{-1}$)	Temp. (°C)	Lenght (m)	Width (m)	Depth (m)	Area (m^2)
1	50.1	8.0	8075	17.4	0.82	0.40	0.09	0.33
2	101.4	8.3	12203	18.0	0.71	0.35	0.14	0.25
3	127.5	7.9	9430	18.8	4.65	0.75	0.30	3.49
4	444.5	7.9	14383	20.0	1.80	0.55	0.09	0.99
5	174.9	8.1	4509	19.0	3.90	1.82	0.19	7.10
6	152.8	7.9	1429	19.5	1.42	1.02	0.11	1.45
7	58.9	7.7	2404	19.6	2.90	0.62	0.22	1.80
8	131.7	7.6	1564	19.9	1.17	0.47	0.26	0.55
9	200.1	7.9	151	19.8	0.66	0.60	0.29	0.40
10	265.7	8.3	847	19.9	1.73	1.05	0.32	1.81
11	268.8	7.7	532	19.9	1.20	0.85	0.24	1.02
12	80.7	7.6	371	19.6	6.70	3.05	0.29	20.44
13	22.2	8.0	8920	17.1	1.70	1.35	0.22	2.30
14	204.9	7.8	229	19.1	6.60	5.30	0.34	34.98
15	96.1	7.3	10390	19.9	1.80	0.52	0.22	0.94
16	250.8	8.5	12474	19.8	0.64	0.58	0.11	0.37
17	724.8	7.8	188	19.9	1.85	0.85	0.22	1.57
18	104.0	6.9	1039	20.5	1.02	0.34	0.16	0.35
19	39.3	7.5	8972	16.9	2.30	0.68	0.20	1.56
20	111.2	7.6	109	19.4	5.60	3.60	0.36	20.16
21	583.6	7.8	39	20.5	0.60	0.37	0.09	0.22
22	55.3	6.7	48	19.9	3.55	1.23	0.18	4.37
23	150.9	7.1	90	18.9	15.90	1.85	0.29	29.42
25	147.7	8.4	168	18.4	1.55	1.15	0.26	1.78
26	28.1	8.5	8965	15.8	2.20	0.80	0.27	1.76
27	75.0	8.0	127	19.3	1.05	0.50	0.21	0.53
28	162.9	9.5	38	19.8	0.80	0.41	0.19	0.33
29	168.2	8.9	101	20.6	0.95	0.31	0.18	0.29
30	413.6	7.9	151	20.7	0.85	0.16	0.11	0.14
35	48.4	8.0	9100	18.3	1.65	0.50	0.20	0.83

Online Resource 4 Spatial data for the studied rock pools. The coordinates and isolation are estimated distances from the drawn grid map of the study area. Pool isolation has been calculated as a mean distance to five closest pools

Pool	X coordinate (m)	Y coordinate (m)	Isolation (m)
1	1.6	1.8	16.3
2	5.0	1.4	15.9
3	10.0	13.8	10.9
4	5.0	15.6	9.8
5	5.8	26.0	3.5
6	7.2	26.0	2.8
7	7.4	27.2	2.7
8	9.4	26.6	3.0
9	9.0	25.6	3.2
10	8.0	32.6	5.4
11	9.4	35.4	6.6
12	8.0	38.8	7.1
13	2.2	43.6	8.3
14	7.0	46.6	6.2
15	4.6	49.4	4.1
16	3.4	49.8	4.4
17	6.2	53.0	4.6
18	5.6	54.2	4.8
19	3.2	59.2	7.5
20	9.0	62.8	7.1
21	10.4	64.8	7.4
22	10.0	68.0	7.6
23	6.8	72.4	7.6
25	8.0	81.0	5.9
26	2.2	84.8	8.5
27	8.0	84.6	6.9
28	11.4	83.0	7.8
29	6.4	103.6	16.9
30	6.6	106.2	18.9
35	2.4	77.4	8.1

Online Resource 5 Statistically significant spatial correlograms for the environmental variables: **a** June, **b**–**d** July. Shown are Moran's *I* correlation coefficients [−1, 1] for the observation values in each of the five distance classes at 2.5 m intervals. Statistically significant correlations (Bonferroni-corrected *p*-value < 0.05) in each distance class are marked as a black square



Online Resource 6 Spearman rank correlation coefficients and statistical significance of correlations for the environmental and spatial variables and the four salinity groups: **a** May, **b** June, **c** July, **d** all months. The combined dataset **d** also includes the temporal 'month' variable. Shown are three significance levels according to the *p*-value of each pairwise correlation: – non-significant, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. All statistically significant ($p < 0.05$) correlation coefficients are bolded

a

	Total P	pH	Conductivity	Temperature	Lenght	Width	Depth	Area	X coordinate	Y coordinate	Isolation	Marine	Brackish	Freshwater	Freshwater/marine
Tot P		0.14	−0.20	0.06	**−0.37**	−0.35	**−0.65**	**−0.39**	0.07	0.09	0.13	−0.21	−0.14	0.13	0.16
pH	–		0.17	0.12	0.05	0.08	0.13	0.13	−0.14	−0.12	0.16	0.11	0.33	−0.36	−0.23
Cond.	–	–		−0.07	0.19	**0.44**	0.04	**0.37**	**−0.45**	**−0.62**	−0.12	**0.39**	**0.68**	**−0.71**	**−0.43**
Temp.	–	–	–		0.03	−0.01	−0.07	−0.01	−0.35	**0.43**	−0.07	0.07	−0.03	0.13	−0.18
Length	*	–	–	–		**0.67**	**0.54**	**0.89**	−0.02	−0.18	0.02	0.09	−0.05	0.01	−0.18
Width	–	–	*	–	***		**0.58**	**0.91**	−0.01	**−0.43**	−0.23	0.18	0.30	−0.20	**−0.53**
Depth	***	–	–	–	**	***		**0.62**	0.21	−0.11	−0.26	0.05	0.07	0.03	−0.32
Area	*	–	*	–	***	***	***		0.05	**−0.37**	−0.10	0.11	0.18	−0.13	**−0.44**
X	–	–	*	–	–	–	–	–		0.04	−0.25	−0.33	**−0.44**	**0.49**	0.12
Y	–	–	***	*	–	*	–	*	–		0.25	−0.09	**−0.52**	**0.55**	0.22
Isolation	–	–	–	–	–	–	–	–	–	–		0.11	−0.27	0.12	0.15
Marine	–	–	*	–	–	–	–	–	–	–	–		0.11	−0.34	−0.24
Brackish	–	–	***	–	–	–	–	–	*	**	–	–		−0.89	**−0.39**
Fresh	–	–	***	–	–	–	–	–	**	**	–	–	–		0.21
Frsh/mar.	–	–	*	–	–	**	–	*	–	–	–	–	*	–	

b

	Total P	pH	Conductivity	Temperature	Lenght	Width	Depth	Area	X coordinate	Y coordinate	Isolation	Marine	Brackish	Freshwater	Freshwater/marine
Tot P		0.12	−0.04	0.24	−0.06	−0.05	0.09	−0.06	0.19	−0.09	0.11	−0.13	−0.06	0.04	0.22
pH	–		**0.44**	−0.24	−0.23	−0.33	−0.23	−0.26	0.01	−0.29	−0.01	0.31	0.30	**−0.39**	−0.04
Cond.	–	*		**−0.63**	0.06	0.07	−0.14	0.09	**−0.43**	**−0.79**	−0.13	**0.55**	**0.36**	**−0.50**	0.02
Temp.	–	–	***		0.01	−0.22	−0.06	−0.17	0.09	**0.61**	0.05	−0.27	−0.27	**0.39**	**−0.36**
Lenght	–	–	–	–		**0.65**	**0.51**	**0.90**	0.00	−0.01	−0.05	**0.38**	0.02	−0.08	−0.19
Width	–	–	–	–	***		**0.55**	**0.90**	0.20	−0.28	−0.27	0.14	−0.32	0.23	0.11
Depth	–	–	–	–	**	**		**0.61**	**0.45**	−0.08	**−0.39**	−0.16	−0.20	0.18	0.21
Area	–	–	–	–	***	***	***		0.14	−0.17	−0.22	0.31	−0.12	0.03	−0.01
X	–	–	*	–	–	–	*	–		0.04	−0.23	0.21	−0.13	0.08	0.19
Y	–	–	***	***	–	–	–	–	–		0.26	**−0.30**	−0.30	0.32	−0.20
Isolation	–	–	–	–	–	–	*	–	–	–		−0.02	0.03	−0.01	0.00
Marine	–	–	**	–	*	–	–	–	–	*	–		**0.44**	**−0.60**	−0.27
Brackish	–	–	*	–	–	–	–	–	–	–	–	*		**−0.90**	−0.18
Fresh	–	*	**	*	–	–	–	–	–	–	–	***	***		−0.06
Frsh/mar.	–	–	–	*	–	–	–	–	–	–	–	–	–	–	

c

	Total P	pH	Conductivity	Temperature	Length	Width	Depth	Area	X coordinate	Y coordinate	Isolation	Marine	Brackish	Freshwater	Freshwater/marine
Tot P		0.11	−0.28	**0.64**	−0.25	−0.06	−0.11	−0.19	0.36	−0.06	−0.18	−0.31	0.13	0.22	−0.22
pH	–		0.13	−0.23	**−0.44**	−0.23	−0.19	−0.33	−0.20	0.09	0.28	0.31	0.12	−0.19	−0.01
Cond.	–	–		−0.36	0.05	−0.10	−0.16	−0.01	**−0.65**	**−0.53**	0.01	0.17	0.21	**−0.46**	0.12
Temp.	***	–	–		−0.31	**−0.37**	−0.27	**−0.37**	**0.39**	0.14	−0.17	−0.24	0.08	0.25	−0.21
Lenght	–	*	–	–		**0.77**	**0.59**	**0.92**	0.01	−0.04	−0.08	−0.23	0.00	0.03	0.00
Width	–	–	–	*	***		**0.64**	**0.94**	0.13	−0.12	−0.29	−0.30	0.10	0.12	−0.11
Depth	–	–	–	–	***	***		**0.68**	0.31	0.00	−0.25	−0.20	0.11	0.12	−0.11
Area	–	–	–	*	***	***	***		0.11	−0.12	−0.23	−0.28	0.06	0.07	−0.05
X	–	–	***	*	–	–	–	–		0.04	−0.23	**−0.53**	−0.17	**0.48**	−0.04
Y	–	–	**	–	–	–	–	–	–		0.26	0.18	−0.27	0.23	0.11
Isolation	–	–	–	–	–	–	–	–	–	–		0.00	**−0.50**	0.17	**0.52**
Marine	–	–	–	–	–	–	–	–	**	–	–		0.23	**−0.66**	−0.06
Brackish	–	–	–	–	–	–	–	–	–	–	**	–		**−0.62**	**−0.60**
Fresh	–	–	**	–	–	–	–	–	**	–	–	***	***		−0.01
Frsh/mar.	–	–	–	–	–	–	–	–	–	–	**	–	***	–	

d

	Total P	pH	Conductivity	Temperature	Lenght	Width	Depth	Area	X coordinate	Y coordinate	Isolation	Marine	Brackish	Freshwater	Freshwater/marine	Month
Tot P		0.19	−0.14	**0.47**	**−0.30**	**−0.23**	**−0.29**	**−0.29**	0.19	−0.06	−0.04	−0.20	0.07	0.08	−0.08	**−0.27**
pH	–		**0.22**	0.18	**−0.26**	**−0.25**	**−0.21**	**−0.26**	−0.04	−0.08	0.08	0.18	**0.42**	**−0.32**	**−0.33**	**−0.64**
Cond.	–	*		**−0.29**	0.05	0.09	−0.13	0.08	**−0.52**	**−0.60**	−0.05	**0.37**	**0.36**	**−0.54**	−0.05	−0.10
Temp.	***	–	**		−0.18	**−0.26**	**−0.23**	**−0.24**	0.04	**0.32**	−0.04	−0.16	0.05	0.19	**−0.38**	**−0.44**
Length	**	*	–	–		**0.71**	**0.58**	**0.92**	0.01	−0.07	−0.04	0.04	−0.05	0.02	−0.03	0.18
Width	*	*	–	*	***		**0.63**	**0.92**	0.10	**−0.26**	**−0.27**	0.00	−0.02	0.05	−0.08	0.21
Depth	**	*	–	*	***	***		**0.66**	**0.32**	−0.04	**−0.27**	−0.10	−0.08	0.15	0.02	**0.21**
Area	**	*	–	*	***	***	***		0.10	−0.20	−0.17	0.02	−0.02	0.02	−0.06	0.20
X	–	–	***	–	–	–	**	–		0.04	**−0.23**	**−0.39**	**−0.25**	**0.41**	0.10	0.00
Y	–	–	***	**	–	*	–	–	–		**0.25**	−0.12	**−0.31**	**0.37**	0.02	0.00
Isol.	–	–	–	–	–	*	**	–	*	*		0.04	**−0.26**	0.11	**0.22**	0.01
Marine	–	–	***	–	–	–	–	–	***	–	–		**0.24**	**−0.55**	−0.17	0.03
Brack.	–	***	***	–	–	–	–	–	*	**	*	*		**−0.81**	**−0.51**	**−0.41**
Fresh	–	**	***	–	–	–	–	–	***	***	–	***	***		0.13	0.17
Fr/mar.	–	**	–	***	–	–	–	–	–	–	*	–	***	–		**0.43**
Month	**	***	–	***	–	–	*	–	–	–	–	–	***	–	***	

Online Resource 7 The species-specific environmental preferences toward water salinity and the relative monthly abundance of the identified diatom species (excluding 8 specimens identified to genus level and 1 *Nitzschia* specimen with an unknown salinity preference). Salinity: 1 marine, 2 brackish, 3 freshwater, 4 freshwater/marine (Taylor et al. 2007, Antón-Garrido et al. 2013, Cantonati et al. 2017). Abundance: – absent

Species	Salinity	Abundance (%)		
		May	*June*	*July*
Achnanthes brevipes C. Agardh	4	< 0.1	–	–
Achnanthes longboardia A. R. Sherwood & R. L. Lowe	3	< 0.1	–	0.1
Achnanthes punctulata R. M. Patrick & Freese	2	< 0.1	< 0.1	< 0.1
Achnanthes rupestoides Hohn	3	–	< 0.1	–
Achnanthidium minutissimum (Kützing) Czarnecki	3	11.7	9.3	8.6
Actinocyclus normanii (W. Gregory ex Greville) Hustedt	1	< 0.1	–	–
Amphora pediculus (Kützing) Grunow	3	< 0.1	0.1	< 0.1
Astartiella punctifera (Hustedt) Witkowski & Lange-Bertalot	1	–	–	< 0.1
Aulacoseira granulata (Ehrenberg) Simonsen	3	< 0.1	–	–
Bacillaria paxillifera (O. F. Müller) T. Marsson	1	–	< 0.1	< 0.1
Berkeleya rutilans (Trentepohl ex Roth) Grunow	2	3.2	0.9	0.2
Brachysira brebissonii R. Ross	3	< 0.1	< 0.1	< 0.1
Brachysira vitrea (Grunow) R. Ross	3	–	< 0.1	–
Cocconeis placentula Ehrenberg	3	0.3	0.5	1.4
Cocconeis scutellum Ehrenberg	1	–	< 0.1	< 0.1
Cosmioneis pusilla (W. Smith) D. G. Mann & A. J. Stickle	2	< 0.1	< 0.1	< 0.1
Craticula halophila (Grunow) D. G. Mann	3	–	–	< 0.1
Craticula subminuscula (Manguin) C. E. Wetzel & Ector	3	–	< 0.1	< 0.1
Ctenophora pulchella (Ralfs ex Kützing) D. M. Williams & Round	2	0.3	0.1	0.3
Cyclotella atomus Hustedt	3	0.3	0.7	0.1
Cyclotella choctawhatcheeana Prasad	4	< 0.1	0.2	0.5
Cyclotella distinguenda var. unipunctata (Hustedt) Håkansson...[1]	3	0.1	< 0.1	< 0.1
Cyclotella meneghiniana Kützing	4	0.1	0.3	10.3
Cymbella aspera (Ehrenberg) Cleve	3	< 0.1	–	–
Cymbella cistula (Ehrenberg) O. Kirchner	3	–	< 0.1	–
Cymbella tumida (Brébisson) Van Heurck	3	< 0.1	< 0.1	< 0.1
Denticula subtilis Grunow	2	–	< 0.1	–
Diatoma moniliformis (Kützing) D. M. Williams	2	5.1	7.4	2.6
Encyonema minutum (Hilse) D. G. Mann	3	–	< 0.1	–
Encyonema reichardtii (Krammer) D. G. Mann	3	–	< 0.1	–
Encyonema silesiacum (Bleisch) D. G. Mann	3	< 0.1	< 0.1	< 0.1
Epithemia sorex Kützing	3	–	–	< 0.1
Epithemia turgida (Ehrenberg) Kützing	3	–	< 0.1	< 0.1
Eucocconeis laevis (Østrup) Lange-Bertalot	3	–	< 0.1	< 0.1
Eunotia bilunaris (Ehrenberg) Schaarschmidt	3	0.2	0.3	0.1
Eunotia diodon Ehrenberg	3	< 0.1	< 0.1	< 0.1
Eunotia exigua (Brébisson ex Kützing) Rabenhorst	3	< 0.1	–	–
Eunotia glacialis F. Meister	3	< 0.1	< 0.1	< 0.1
Eunotia incisa W. Smith ex W. Gregory	3	< 0.1	< 0.1	–

Species	Salinity	Abundance (%)		
Eunotia minor (Kützing) Grunow	3	0.1	< 0.1	0.1
Eunotia praerupta Ehrenberg	3	–	< 0.1	–
Eunotia rhomboidea Hustedt	3	–	0.1	< 0.1
Fallacia cryptolyra (Brockmann) Stickle & D. G. Mann	1	–	< 0.1	< 0.1
Fallacia indifferens (Hustedt) D. G. Mann	3	1.1	0.3	0.1
Fallacia pseudoforcipata (Hustedt) D. G. Mann	2	–	< 0.1	< 0.1
Fragilaria capucina Desmazières	4	0.1	0.1	< 0.1
Fragilaria exigua Grunow	4	< 0.1	< 0.1	< 0.1
Fragilariforma virescens var. subsalina (Grunow) Bukhtiyarova	3	< 0.1	< 0.1	< 0.1
Frustulia rhomboides (Ehrenberg) De Toni	3	0.1	0.1	< 0.1
Gomphonema angustatum (Kützing) Rabenhorst	3	0.3	0.1	0.5
Gomphonema exiguum var. exiguum Kützing	3	< 0.1	0.1	0.4
Gomphonema exiguum var. minutissimum Grunow	3	< 0.1	< 0.1	< 0.1
Gomphonema gracile Ehrenberg	3	0.7	0.7	3.2
Gomphonema hebridense W. Gregory	3	0.4	0.2	0.5
Gomphonema minutum (C. Agardh) C. Agardh	3	0.1	0.1	0.1
Gomphonema olivaceum (Hornemann) Brébisson	3	0.4	0.2	0.1
Gomphonema parallelistriatum Lange-Bertalot & E. Reichardt	3	0.5	0.6	0.6
Gomphonema parvulum (Kützing) Kützing	3	3.5	3.2	2.9
Gomphonema truncatum Ehrenberg	3	< 0.1	< 0.1	< 0.1
Gomphonema vibrio var. bohemicum (Reichelt & Fricke) R. Ross	3	< 0.1	< 0.1	–
Gyrosigma acuminatum (Kützing) Rabenhorst	3	< 0.1	–	–
Halamphora acutiuscula (Kützing) Levkov	2	1.0	0.4	< 0.1
Halamphora coffeiformis (C. Agardh) Levkov	2	0.9	0.4	0.3
Halamphora veneta (Kützing) Levkov	2	2.3	0.8	0.4
Hippodonta subcostulata (Hustedt) Lange-Bertalot...Witkowski[2]	3	< 0.1	0.1	0.2
Licmophora gracilis (Ehrenberg) Grunow	1	0.1	0.1	0.1
Luticola mutica (Kützing) D. G. Mann	2	< 0.1	0.1	0.1
Martyana schulzii (C. Brockmann) Snoeijs	1	–	< 0.1	–
Mastogloia exigua F. W. Lewis	3	–	< 0.1	–
Mastogloia pumila (Grunow) Cleve	1	< 0.1	< 0.1	0.6
Mayamaea atomus (Kützing) Lange-Bertalot	3	–	< 0.1	–
Melosira lineata (Dillwyn) C. Agardh	2	< 0.1	–	–
Melosira moniliformis C. Agardh	4	–	< 0.1	–
Melosira nummuloides C. Agardh	1	< 0.1	< 0.1	< 0.1
Meridion circulare (Greville) C. Agardh	3	< 0.1	–	< 0.1
Minidiscus proschkinae (Makarova) J. S. Park & J. H. Lee	1	0.1	0.5	0.1
Navicula bottnica Grunow	2	0.1	0.1	–
Navicula capitatoradiata H. Germain ex Gasse	2	–	< 0.1	–
Navicula cari Ehrenberg	3	–	< 0.1	< 0.1
Navicula cincta (Ehrenberg) Ralfs	2	0.2	< 0.1	< 0.1
Navicula cryptotenella Lange-Bertalot	3	–	< 0.1	< 0.1
Navicula digitoradiata (W. Gregory) Ralfs	1	< 0.1	–	–
Navicula eidrigiana J. R. Carter	3	–	< 0.1	–
Navicula erifuga Lange-Bertalot	2	< 0.1	< 0.1	< 0.1
Navicula gregaria Donkin	3	2.7	2.3	1.2
Navicula lanceolata Ehrenberg	3	1.9	1.0	0.4

Species	Salinity	Abundance (%)		
Navicula margalithii Lange-Bertalot	2	0.2	< 0.1	−
Navicula menisculus Schumann	3	0.8	0.6	0.1
Navicula minima Grunow	3	0.1	0.1	< 0.1
Navicula perminuta Grunow	1	9.7	5.2	2.7
Navicula radiosa Kützing	3	< 0.1	< 0.1	−
Navicula ramosissima var. mollis (W. Smith) Hendey	1	< 0.1	< 0.1	< 0.1
Navicula recens (Lange-Bertalot) Lange-Bertalot	2	0.8	0.4	0.1
Navicula slesvicensis Grunow	2	< 0.1	−	−
Navicula tripunctata (O. F. Müller) Bory	3	−	−	< 0.1
Navicula trivialis Lange-Bertalot	3	0.3	0.2	0.4
Navicula viridula (Kützing) Ehrenberg	3	< 0.1	−	< 0.1
Nitzschia agnita Hustedt	4	−	−	< 0.1
Nitzschia bulnheimiana (Rabenhorst) H. L. Smith	2	1.6	0.4	0.2
Nitzschia capitellata Hustedt	4	< 0.1	−	−
Nitzschia clausii Hantzsch	2	< 0.1	< 0.1	−
Nitzschia commutata Grunow	4	−	−	< 0.1
Nitzschia desertorum Hustedt	2	< 0.1	−	−
Nitzschia dissipata (Kützing) Rabenhorst	3	< 0.1	< 0.1	< 0.1
Nitzschia fonticola (Grunow) Grunow	3	0.7	1.3	1.2
Nitzschia frustulum (Kützing) Grunow	2	5.4	4.1	2.0
Nitzschia gracilis Hantzsch	3	0.1	< 0.1	−
Nitzschia incognita Legler & Krasske	2	< 0.1	−	−
Nitzschia inconspicua Grunow	3	3.8	1.3	1.4
Nitzschia microcephala Grunow	3	12.2	24.5	26.1
Nitzschia nana Grunow	2	< 0.1	< 0.1	< 0.1
Nitzschia palea (Kützing) W. Smith	3	2.8	3.6	4.6
Nitzschia paleacea (Grunow) Grunow	3	1.3	1.3	0.4
Nitzschia parvula W. Smith	2	< 0.1	−	−
Nitzschia perspicua Cholnoky	2	0.3	0.1	0.1
Nitzschia pusilla Grunow	3	1.7	4.3	3.7
Nitzschia recta Hantzsch ex Rabenhorst	4	< 0.1	< 0.1	< 0.1
Nitzschia reversa W. Smith	2	−	−	< 0.1
Nitzschia sigma (Kützing) W. Smith	2	< 0.1	< 0.1	< 0.1
Nitzschia supralitorea Lange-Bertalot	3	0.1	0.7	0.1
Nitzschia thermaloides Hustedt	1	−	−	< 0.1
Nitzschia tubicola Grunow	1	0.5	0.3	0.1
Nitzschia valdecostata Lange-Bertalot & Simonsen	4	< 0.1	−	−
Nitzschia valdestriata Aleem & Hustedt	2	0.7	0.8	0.7
Opephora mutabilis Sabbe & Wyverman	1	0.1	< 0.1	0.1
Pauliella taeniata (Grunow) Round & Basson	1	0.1	< 0.1	−
Pinnularia borealis Ehrenberg	3	< 0.1	0.3	0.4
Pinnularia dornii Metzeltin	3	−	< 0.1	−
Pinnularia interrupta W. Smith	3	0.1	0.2	0.1
Pinnularia microstauron (Ehrenberg) Cleve	3	0.2	0.2	0.3
Pinnularia streptoraphe Cleve	3	−	< 0.1	−
Pinnularia subcapitata W. Gregory	3	< 0.1	−	< 0.1
Pinnularia viridis (Nitzsch) Ehrenberg	3	< 0.1	−	< 0.1

Species	Salinity	Abundance (%)		
Planothidium delicatulum (Kützing) Round & Bukhtiyarova	2	1.2	0.8	1.0
Planothidium hauckianum (Grunow) Bukhtiyarova	3	< 0.1	< 0.1	< 0.1
Planothidium lanceolatum (Brébisson ex Kützing) Lange-Bertalot	3	0.1	0.3	0.2
Platessa conspicua (Ant. Mayer) Lange-Bertalot	3	–	< 0.1	–
Platessa lutheri (Hustedt) Potapova	3	–	–	< 0.1
Platessa oblongella (Østrup) C. E. Wetzel, Lange-Bertalot & Ector	3	0.2	0.2	0.1
Pleurosigma elongatum W. Smith	1	–	–	< 0.1
Psammothidium helveticum (Hustedt) Bukhtiyarova & Round	3	–	< 0.1	< 0.1
Psammothidium subsalsum (J. B. Petersen) Kulikowskiy...Pliński[3]	3	4.0	6.9	9.2
Pseudofallacia tenera (Hustedt) Y. Liu, Kociolek & Q. Wang	2	–	< 0.1	–
Pseudostaurosira elliptica (Schumann) Edlund, Morales & Spaulding	3	< 0.1	< 0.1	0.1
Reimeria sinuata (W. Gregory) Kociolek & Stoermer	3	–	< 0.1	–
Rhoicosphenia abbreviata (C. Agardh) Lange-Bertalot	3	1.4	0.8	2.4
Rhopalodia constricta (Brébisson) Krammer	2	< 0.1	–	–
Rhopalodia musculus (Kützing) O. Müller	2	–	< 0.1	–
Sellaphora pupula (Kützing) Mereschkovsky	3	< 0.1	< 0.1	–
Sellaphora submuralis (Hustedt) C. E. Wetzel...D. G. Mann[4]	3	–	< 0.1	–
Stauroneis anceps Ehrenberg	3	–	–	< 0.1
Stauroneis kriegeri R. M. Patrick	3	1.3	0.6	0.6
Stauroneis producta Grunow	3	–	< 0.1	–
Staurosira binodis (Ehrenberg) Lange-Bertalot	3	–	–	< 0.1
Staurosira construens Ehrenberg	3	< 0.1	< 0.1	0.1
Staurosira leptostauron (Ehrenberg) Kulikovskiy & Genkal	3	–	< 0.1	–
Staurosirella pinnata (Ehrenberg) D. M. Williams & Round	4	–	–	< 0.1
Stephanodiscus medius Håkansson	3	< 0.1	< 0.1	–
Surirella amphioxys W. Smith	4	–	–	< 0.1
Surirella brebissonii Krammer & Lange-Bertalot	2	5.1	3.0	2.2
Surirella librile (Ehrenberg) Ehrenberg	3	< 0.1	–	–
Synedra famelica Kützing	2	0.2	0.1	< 0.1
Tabellaria flocculosa (Roth) Kützing	3	1.2	0.7	0.4
Tabularia fasciculata (C. Agardh) D. M. Williams & Round	1	2.8	4.1	2.4
Thalassiosira baltica (Grunow) Ostenfeld	1	0.2	0.1	< 0.1
Tryblionella angustulata (Lange-Bertalot) Cantonati & Lange-Bertalot	3	< 0.1	< 0.1	–
Tryblionella apiculata W. Gregory	1	< 0.1	< 0.1	–
Tryblionella debilis Arnott ex O'Meara	1	–	< 0.1	< 0.1
Tryblionella levidensis W. Smith	1	–	–	< 0.1

[1](Hustedt) Håkansson & J. R. Carter

[2](Hustedt) Lange-Bertalot, Metzeltin & Witkowski

[3](J. B. Petersen) Kulikowskiy, Witkowski & Pliński

[4](Hustedt) C. E. Wetzel, L. Ector, B. Van de Vijver, Compère & D. G. Mann

Online Resource 8 The most frequently occurring diatom species in the studied rock pools from May to July. Shown are the 11 commonest species in each month ranked by the percentage of occupied pools by each species, and the mean and the range of per-pool species abundancies (%)

Month	Species	Occupancy (%)	Abundance (range) (%)
May	*Diatoma moniliformis* (Kützing) D.M.Williams	100	5.2 (0.3–21.8)
	Navicula perminuta Grunow	100	9.2 (1.7–29.9)
	Tabularia fasciculata (C.Agardh) D.M.Williams & Round	100	2.8 (0.3–9.7)
	Achnanthidium minutissimum (Kützing) Czarnecki	97	12.1 (0.2–66.4)
	Navicula gregaria Donkin	97	2.7 (0.2–10.4)
	Navicula lanceolata Ehrenberg	97	1.9 (0.2–7.4)
	Navicula recens (Lange-Bertalot) Lange-Bertalot	97	0.8 (0.2–3.9)
	Nitzschia frustulum (Kützing) Grunow	97	5.4 (0.2–22.0)
	Rhoicosphenia abbreviata (C.Agardh) Lange-Bertalot	97	1.4 (0.2–4.6)
	Nitzschia inconspicua Grunow	90	4.0 (0.2–21.3)
	Surirella brebissonii Krammer & Lange-Bertalot	90	5.7 (0.3–50.6)
June	*Diatoma moniliformis* (Kützing) D.M.Williams	100	7.0 (0.4–41.4)
	Navicula gregaria Donkin	100	2.2 (0.2–11.3)
	Nitzschia frustulum (Kützing) Grunow	100	4.0 (0.3–18.8)
	Tabularia fasciculata (C.Agardh) D.M.Williams & Round	100	4.1 (0.2–25.7)
	Navicula perminuta Grunow	97	5.2 (0.3–17.6)
	Nitzschia microcephala Grunow	97	24.5 (0.2–83.2)
	Achnanthidium minutissimum (Kützing) Czarnecki	90	10.2 (0.2–43.4)
	Planothidium delicatulum (Kützing) Round & Bukhtiyarova	87	0.9 (0.2–4.0)
	Nitzschia inconspicua Grunow	83	1.5 (0.2–6.9)
	Rhoicosphenia abbreviata (C.Agardh) Lange-Bertalot	83	0.9 (0.2–3.2)
	Nitzschia pusilla Grunow	80	5.1 (0.2–21.7)
July	*Rhoicosphenia abbreviata* (C.Agardh) Lange-Bertalot	97	2.3 (0.2–16.3)
	Cocconeis placentula Ehrenberg	93	1.5 (0.2–10.2)
	Tabularia fasciculata (C.Agardh) D.M.Williams & Round	93	2.4 (0.2–13.7)
	Navicula gregaria Donkin	87	1.4 (0.2–10.4)
	Navicula perminuta Grunow	87	3.1 (0.2–16.1)
	Diatoma moniliformis (Kützing) D.M.Williams	80	3.4 (0.2–21.5)
	Nitzschia microcephala Grunow	80	32.5 (0.2–90.0)
	Achnanthidium minutissimum (Kützing) Czarnecki	77	11.5 (0.2–55.4)
	Nitzschia frustulum (Kützing) Grunow	77	2.5 (0.2–11.6)
	Nitzschia pusilla Grunow	73	5.1 (0.2–27.0)
	Surirella brebissonii Krammer & Lange-Bertalot	70	3.2 (0.2–21.9)

Online Resource 9 The monthly proportion (%) of marine, brackish and freshwater diatom species, and the species favoring both freshwater and marine habitats (excluding 8 specimens identified to genus level and 1 *Nitzschia* specimen with an unknown salinity preference) according to the species-specific salinity preferences (Taylor et al. 2007, Antón-Garrido et al. 2013, Cantonati et al. 2017)

	May				*June*				*July*			
Pool	Marine	Brackish	Fresh-water	Freshw./ marine	Marine	Brackish	Fresh-water	Freshw./ marine	Marine	Brackish	Fresh-water	Freshw./ marine
1	20.7	34.5	41.4	3.4	19.4	32.3	41.9	6.5	16.1	25.8	51.6	6.5
2	10.5	52.6	36.8	0.0	13.9	30.6	52.8	2.8	13.3	20.0	60.0	6.7
3	10.5	28.9	52.6	7.9	12.1	33.3	48.5	6.1	0.0	0.0	60.0	40.0
4	20.0	28.0	52.0	0.0	24.0	16.0	56.0	4.0	9.1	22.7	59.1	9.1
5	17.9	39.3	42.9	0.0	15.0	27.5	52.5	5.0	15.0	50.0	35.0	0.0
6	11.8	32.4	52.9	2.9	16.7	38.9	44.4	0.0	12.5	37.5	50.0	0.0
7	7.4	51.9	40.7	0.0	14.3	31.4	51.4	2.9	18.2	31.8	45.5	4.5
8	16.2	32.4	48.6	2.7	16.0	36.0	48.0	0.0	15.6	31.3	50.0	3.1
9	11.8	41.2	44.1	2.9	12.5	25.0	54.2	8.3	13.3	26.7	53.3	6.7
10	17.9	25.0	57.1	0.0	13.8	27.6	51.7	6.9	12.5	29.2	54.2	4.2
11	10.5	31.6	57.9	0.0	11.1	27.8	55.6	5.6	7.1	25.0	64.3	3.6
12	15.4	26.9	57.7	0.0	14.3	25.0	57.1	3.6	9.1	22.7	63.6	4.5
13	15.2	39.4	45.5	0.0	11.8	26.5	55.9	5.9	18.5	22.2	51.9	7.4
14	13.2	34.2	52.6	0.0	14.0	26.0	54.0	6.0	10.0	26.7	56.7	6.7
15	12.1	36.4	48.5	3.0	12.5	28.1	53.1	6.3	14.3	28.6	53.6	3.6
16	12.5	37.5	50.0	0.0	10.0	25.0	65.0	0.0	16.0	24.0	52.0	8.0
17	9.1	30.3	60.6	0.0	15.0	30.0	55.0	0.0	14.3	21.4	64.3	0.0
18	11.4	25.7	57.1	5.7	9.4	25.0	62.5	3.1	12.9	22.6	61.3	3.2
19	18.2	42.4	39.4	0.0	22.7	31.8	43.2	2.3	21.2	21.2	48.5	9.1
20	10.6	27.7	61.7	0.0	10.3	20.7	69.0	0.0	9.5	23.8	61.9	4.8
21	8.8	26.5	55.9	8.8	6.1	24.5	63.3	6.1	10.8	21.6	62.2	5.4
22	12.8	12.8	71.8	2.6	14.3	20.0	62.9	2.9	6.7	13.3	70.0	10.0
23	8.6	22.9	65.7	2.9	15.2	30.3	54.5	0.0	14.3	17.9	60.7	7.1
25	12.9	29.0	54.8	3.2	9.4	21.9	62.5	6.3	10.0	25.0	65.0	0.0
26	22.2	33.3	44.4	0.0	20.0	40.0	37.8	2.2	18.9	29.7	45.9	5.4
27	13.6	13.6	68.2	4.5	6.7	26.7	53.3	13.3	14.3	14.3	57.1	14.3
28	15.2	28.3	56.5	0.0	11.9	26.2	57.1	4.8	15.9	13.6	63.6	6.8
29	5.6	27.8	63.9	2.8	8.3	20.8	70.8	0.0	17.9	25.0	57.1	0.0
30	12.1	18.2	60.6	9.1	13.3	36.7	46.7	3.3	14.3	25.0	50.0	10.7
35	14.6	29.3	51.2	4.9	11.1	36.1	50.0	2.8	11.1	22.2	59.3	7.4