SUPPLEMENTARY MATERIAL

Strong seasonality of marine microbial eukaryotes in a high-arctic fjord (Isfjorden, West Spitsbergen)

Running title: One-year study of Arctic marine protists

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TABLE S1: Pyrosequencing raw data, filtering and OTU statistics from DNA and RNA libraries. The three 454 plates used in this study also contained samples from other projects (36 samples out of 113 samples sequenced belong to this IsA 25m-study). Percentages are given relative to the reads available from the preceding step.

Processing step	All samples (3 projects, 113 samples)
Pre-filtering:	
Total Reads	1259321
Mean Length	442 bp
Post-filtering:	
Reads retained after quality control	871769 (69 %)
Mean Length	414 bp
Chimeras removed	844556 (97 %)
Of those reads retained for IsA_25m project (36 samples)	563011 (67%)
Metazoans removed	528277 (94 %)
Global singletons removed	525455 (99%)
No hit	396 (<0.1 %)
OTU clustering (97 % level)	
IsA_25 m project	5006
Min OTUs per sample	313
Max OTUs per sample	1066
Mean OTUs per sample	663

TABLE S2: Calculation of species number and diversity indices with rarified DNA and RNA libraries (subsampled to 5550 reads).

Julian Day_Sample	-18_DNA	-18_RNA	17_DNA	17_RNA	28_DNA	28_RNA	47_DNA	61_DNA	68_DNA	79_DNA	82_DNA	102_DNA	107_DNA	110_DNA	114_DNA	117_DNA	117_RNA	121_DNA
Species no.	676	500	640	610	653	568	492	742	543	650	601	635	569	459	383	320	506	385
Shannon Wiener (H')	4.94	4.38	4.70	4.82	4.84	4.60	4.52	5.22	4.70	5.02	4.72	4.74	4.52	3.64	3.43	3.17	4.10	3.12
Pielou´s eveness (J')	0.76	0.71	0.73	0.75	0.75	0.73	0.73	0.79	0.75	0.77	0.74	0.74	0.71	0.59	0.58	0.55	0.66	0.52
Chao Index	1013.51	663.08	1021.49	919.56	1091.98	797.09	722.73	1079.70	794.37	840.41	884.53	1073.15	848.35	786.32	777.53	516.35	818.06	717.80

Julian Day_Sample	124_DNA	128_DNA	130_DNA	131_DNA	131_RNA	137_DNA	151_DNA	151_RNA	166_DNA	188_DNA	188_RNA	219_DNA	219_RNA	262_DNA	262_RNA	305_DNA	334_DNA	334_RNA
Species no.	331	229	299	403	389	316	274	390	378	392	421	557	517	640	261	682	702	603
Shannon Wiener (H')	3.20	2.15	2.62	2.94	3.58	2.38	2.66	3.75	3.56	3.74	4.35	4.72	4.76	5.01	3.40	4.85	4.87	4.64
Pielou´s eveness (J')	0.55	0.40	0.46	0.49	0.60	0.41	0.47	0.63	0.60	0.63	0.72	0.75	0.76	0.78	0.61	0.74	0.74	0.72
Chao Index	542.14	433.84	420.09	666.22	597.16	529.84	467.52	545.04	545.19	599.68	593.97	891.68	687.50	936.36	372.58	1168.25	1028.99	910.92

TABLE S3: Results (p-values) from Spearman Rank correlation analysis between the environmental parameters used (or disregarded) in the multivariate statistics. Significant p-values are marked in red.

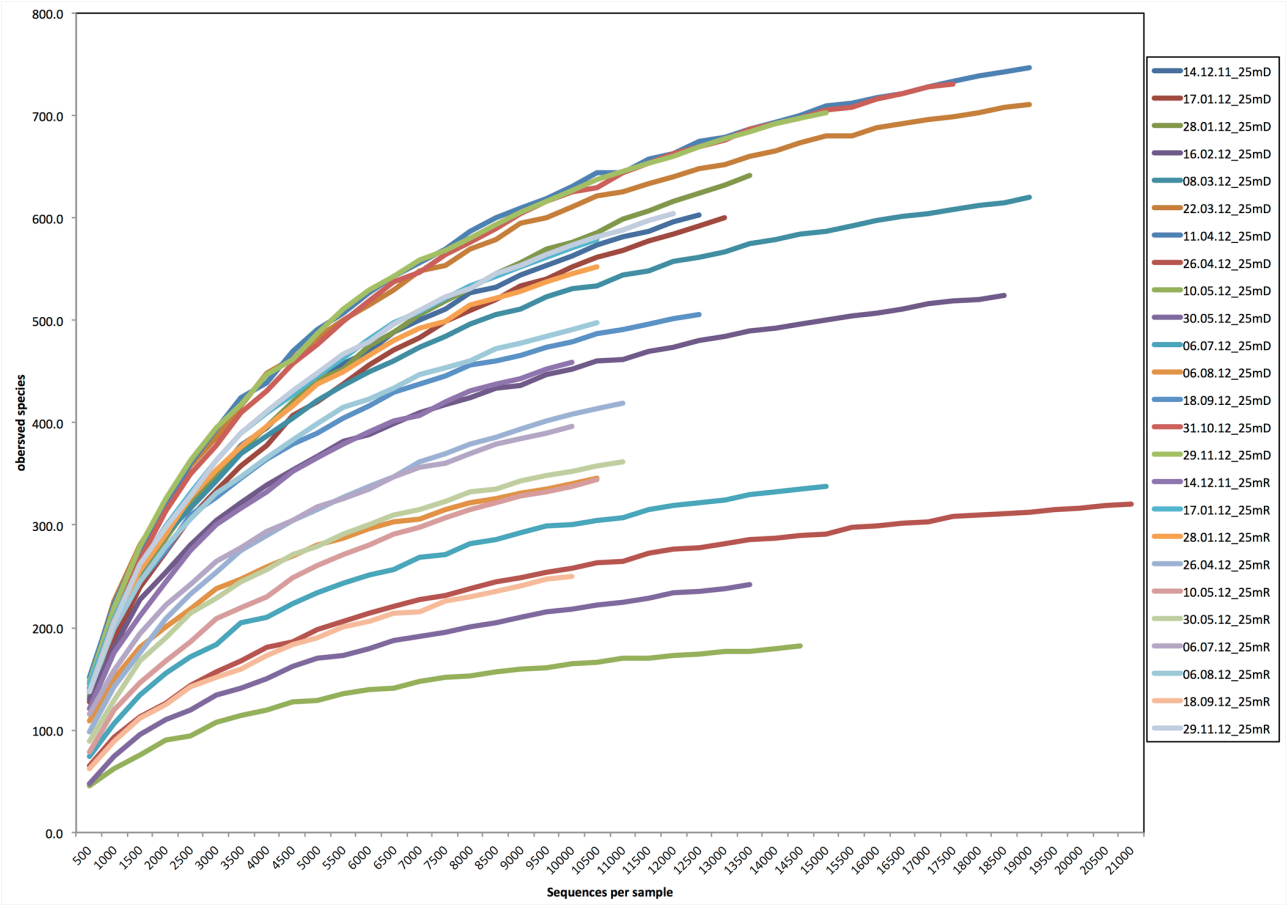
p-value	Julian Day	Season	Watermass	$Type_{DNA/cDNA}$	Salinity	Temperature	Fluorescence	Density	Chl $a_{>10\mu m}$	Chl $a_{>0.7\mu m}$	Chl $a_{<10\mu m}$	Turbidity	Daylength	Solarangle	NO_3+NO_2	PO_4	Si	POC	PON	C:N
Julian Day	**0.00**																			
Season	**0.00**																			
Watermass	**0.02**	**0.03**																		
$Type_{DNA/cDNA}$	0.42	0.39	0.70																	
Salinity	0.19	0.23	0.44	0.06																
Temperature	**0.01**	**0.01**	**0.00**	0.85	0.91															
Fluorescence	**0.01**	**0.00**	**0.05**	0.81	0.26	0.17														
Density	**0.03**	**0.04**	0.09	0.07	**0.00**	0.13	0.24													
Chl $a_{>10\mu m}$	**0.01**	**0.02**	0.05	0.65	0.10	0.08	**0.00**	0.14												
Chl $a_{>0.7\mu m}$	**0.01**	**0.01**	**0.03**	0.92	0.41	0.88	**0.00**	0.37	**0.00**											
Chl $a_{<10\mu m}$	**0.00**	**0.00**	0.59	0.85	0.48	0.17	0.00	0.36	**0.00**	**0.00**										
Turbidity	0.46	0.54	0.41	0.63	0.07	0.06	0.12	**0.00**	**0.05**	**0.05**	0.52									
Daylength	**0.00**	**0.00**	0.66	0.98	0.58	0.89	**0.00**	0.56	**0.00**	**0.00**	**0.00**	**0.05**								
Solarangle	**0.00**	**0.00**	0.50	0.71	0.35	0.90	**0.00**	0.45	**0.00**	**0.00**	**0.00**	0.11	**0.00**							
NO_3+NO_2	**0.00**	**0.00**	0.80	0.40	0.07	0.16	**0.01**	**0.01**	**0.01**	**0.00**	**0.00**	0.22	**0.00**	**0.00**						
PO_4	**0.01**	**0.03**	1.00	0.29	**0.00**	0.40	0.36	**0.00**	0.50	0.20	**0.01**	0.11	0.07	**0.03**	**0.00**					
Si	**0.01**	**0.01**	0.26	0.70	0.88	0.74	**0.00**	0.75	**0.00**	**0.00**	**0.00**	0.31	**0.00**	**0.00**	**0.00**	**0.00**				
POC	**0.00**	**0.00**	**0.04**	0.96	0.76	0.16	**0.00**	0.76	**0.00**	**0.00**	**0.00**	0.73	**0.00**	**0.00**	**0.00**	0.06	**0.00**			
PON	**0.00**	**0.00**	0.10	0.98	0.57	0.24	**0.00**	0.58	**0.00**	**0.00**	**0.00**	0.73	**0.00**	**0.00**	**0.00**	0.10	**0.00**	**0.00**		
C:N	**0.00**	**0.00**	0.89	0.44	0.77	0.92	**0.00**	0.91	**0.00**	**0.00**	**0.00**	0.44	**0.00**	**0.00**	**0.00**	0.06	**0.00**	**0.00**	**0.00**	**0.00**

TABLE S4: Overview of mean chlorophyll *a* concentrations in µg l^{-1} (> 0.7 µm, > 10 µm and < 10 µm) and their standard deviations (SD). Also given is the relative contribution (%) of Chl *a* > 10 µm and < 10µm to the total Chl *a* (> 0.7µm). * First reported in Stübner EI, Søreide J, Reigstad M, Marquardt M, Blachowiak-Samolyk K. Year-round meroplankton dynamics in high-Arctic Svalbard. Journal of Plankton Research, in press.

Sampling Date	Julian Day	Chl a_{total} [µg L^{-1}]*	± SD	Chl $a_{>10µm}$ [µg L-1]	± SD	Chl $a_{>10µm}$ ~total Chl *a* [%]	Chl $a_{<10µm}$ [µg L-1]	± SD	Chl $a_{<10µm}$ ~ total Chl *a* [%]
14.12.2011	-18	0.042	± 0.004	0.006	± 0.001	14	0.036	± 0.005	86
17.01.2012	17	0.065	± 0.003	0.014	± 0.001	21	0.051	± 0.003	79
28.01.2012	28	0.061	± 0.004	0.024	± 0.002	39	0.037	± 0.002	61
09.02.2012	40	0.047	± 0.004	0.010	± 0.001	21	0.038	± 0.004	79
16.02.2012	47	0.047	± 0.004	0.007	± 0.001	16	0.040	± 0.005	84
23.02.2012	54	0.021	± 0.001	0.006	± 0.001	31	0.014	± 0.001	69
01.03.2012	61	0.032	± 0.002	0.013	± 0.001	40	0.019	± 0.001	60
08.03.2012	68	0.023	± 0.010	0.011	± 0.003	46	0.012	± 0.008	54
19.03.2012	79	0.027	± 0.001	0.013	± 0.002	48	0.014	± 0.002	52
20.03.2012	80	0.017	± 0.001	0.010	± 0.000	57	0.007	± 0.001	43
21.03.2012	81	0.021	± 0.001	0.009	± 0.001	43	0.012	± 0.002	57
22.03.2012	82	0.026	± 0.003	0.010	± 0.001	38	0.016	± 0.004	62
29.03.2012	89	0.022	± 0.007	0.013	± 0.003	59	0.009	± 0.009	41
03.04.2012	94	0.056	± 0.005	0.025	± 0.002	45	0.031	± 0.003	55
11.04.2012	102	0.135	± 0.005	0.063	± 0.004	46	0.073	± 0.007	54
16.04.2012	107	0.258	± 0.008	0.110	± 0.003	43	0.148	± 0.011	57
23.04.2002	114	2.950	± 0.075	2.061	± 0.300	70	0.889	± 0.275	30
26.04.2012	117	1.620	± 0.078	1.460	± 0.086	90	0.160	± 0.050	10
30.04.2012	121	2.093	± 0.195	1.398	± 0.321	67	0.694	± 0.265	33
03.05.2012	124	2.700	± 0.132	2.078	± 0.108	77	0.623	± 0.217	23
07.05.2012	128	1.927	± 0.118	1.245	± 0.082	65	0.682	± 0.199	35
08.05.2012	129	5.483	± 0.189	2.604	± 0.263	47	2.879	± 0.443	53
09.05.2012	130	8.094	± 2.254	5.433	± 0.321	67	2.594	± 1.830	33
10.05.2012	131	4.208	± 0.038	3.450	± 0.090	82	0.758	± 0.126	18
16.05.2012	137	2.575	± 0.066	2.047	± 0.039	79	0.528	± 0.103	21
24.05.2012	145	1.484	± 0.050	0.902	± 0.038	61	0.582	± 0.088	39
30.05.2012	151	1.388	± 0.029	0.666	± 0.035	48	0.723	± 0.064	52
07.06.2012	159	4.707	± 0.266	2.048	± 0.155	44	2.659	± 0.401	56
14.06.2012	166	1.424	± 0.016	0.328	± 0.145	23	1.096	± 0.135	77
21.06.2012	173	0.425	± 0.020	0.049	± 0.006	11	0.376	± 0.015	89
06.07.2012	188	0.539	± 0.030	0.059	± 0.017	11	0.481	± 0.031	89
06.08.2012	219	1.244	± 0.039	0.038	± 0.011	3	1.206	± 0.045	97
23.08.2012	236	0.125	± 0.034	0.020	± 0.010	16	0.105	± 0.033	84
06.09.2012	240	0.589	± 0.029	0.120	± 0.054	20	0.469	± 0.071	80
18.09.2012	262	0.281	± 0.019	0.057	± 0.008	20	0.224	± 0.027	80
31.10.2012	305	0.171	± 0.005	0.028	± 0.005	16	0.143	± 0.009	84
15.11.2012	320	0.081	± 0.002	0.016	± 0.000	19	0.066	± 0.002	81
29.11.2012	334	0.069	± 0.002	0.014	± 0.001	20	0.055	± 0.001	80
06.12.2012	341	0.056	± 0.001	0.013	± 0.001	24	0.042	± 0.001	76
13.12.2012	348	0.047	± 0.001	0.011	± 0.001	23	0.036	± 0.002	77

TABLE S5: Overview of the environmental parameters that were fitted as vectors (envfit function) in the DCA analysis. Significant environmental parameters (vectors) were indicated with * and bold letters. Significance codes: *** 0.001, ** 0.01, * 0.05, . 0.1; p-values were based on 999 permutations.

Vectors	**dca1**	**dca2**	**r2**	**Pr(>r)**	
Julianday	0.19925	0.97995	0.073	0.313	
Season	0.93772	0.34738	0.4285	0.001	***
Watermass	-0.68179	0.73155	0.1869	0.043	*
Type (DNA/RNA)	0.0866	-0.99624	0.0684	0.353	
Salinity	0.37577	-0.92671	0.0337	0.617	
Temperature	-0.34259	0.93948	0.2233	0.03	*
Fluorescence	0.95717	-0.28953	0.6695	0.001	***
Density	0.3496	-0.9369	0.1174	0.158	
Chla>10µm	0.98891	-0.14854	0.4302	0.001	***
Total chl *a* (chlatot)	0.9348	-0.35517	0.571	0.001	***
Chla<10µm	0.9966	0.08241	0.4119	0.002	**
Turbidity	-0.25221	0.96767	0.1836	0.044	*
Daylength	0.96354	-0.26755	0.5743	0.001	***
Solarangle	0.98427	0.17669	0.5168	0.001	***
NO3_NO2	-0.76654	-0.6422	0.433	0.001	***
PO4	-0.60819	-0.79379	0.1906	0.041	*
Si	-0.99369	0.11217	0.4541	0.001	***
POC	0.9993	-0.0375	0.6807	0.001	***
PON	0.99571	-0.0925	0.6684	0.001	***
C:N ratio (C.N)	-0.94355	0.33124	0.5444	0.001	***



59

60 **FIGURE S1**: Rarefaction curves. Sampling date (day.month.year), depth and sample type (D =

61 DNA, R = RNA) are indicated.

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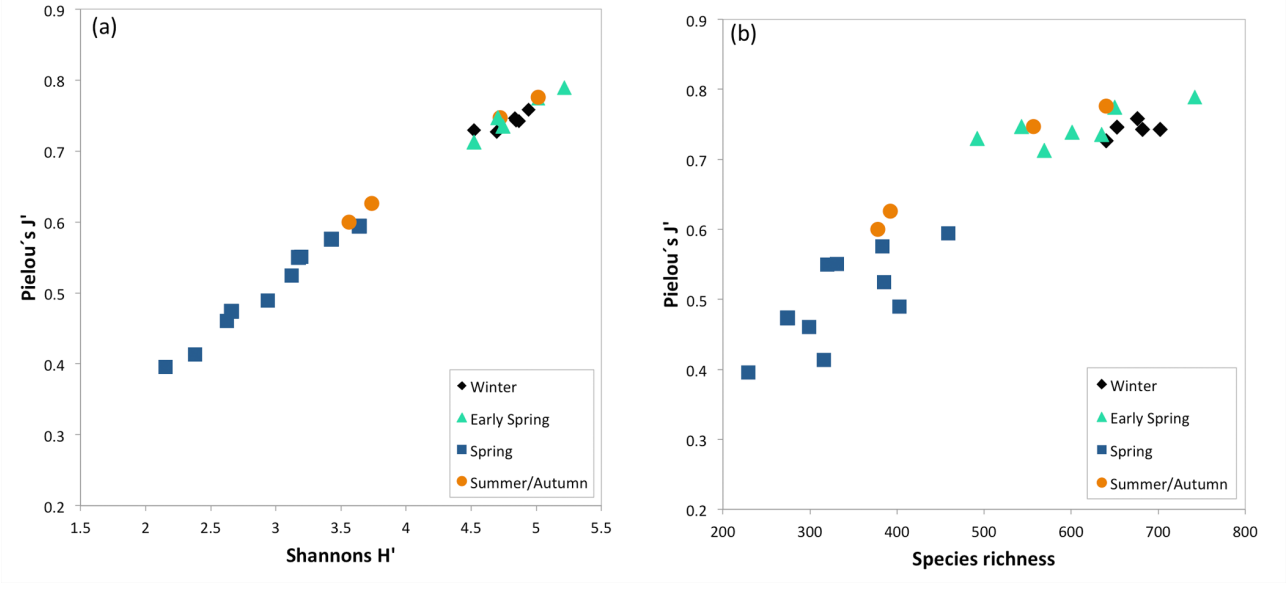

64

FIGURE S2: Pielou´s evenness J' (y-axis) and Shannon Wiener´s H' diversity (a) or species richness (b) (x-axis) calculated for the 26 DNA samples using OTU read abundances.

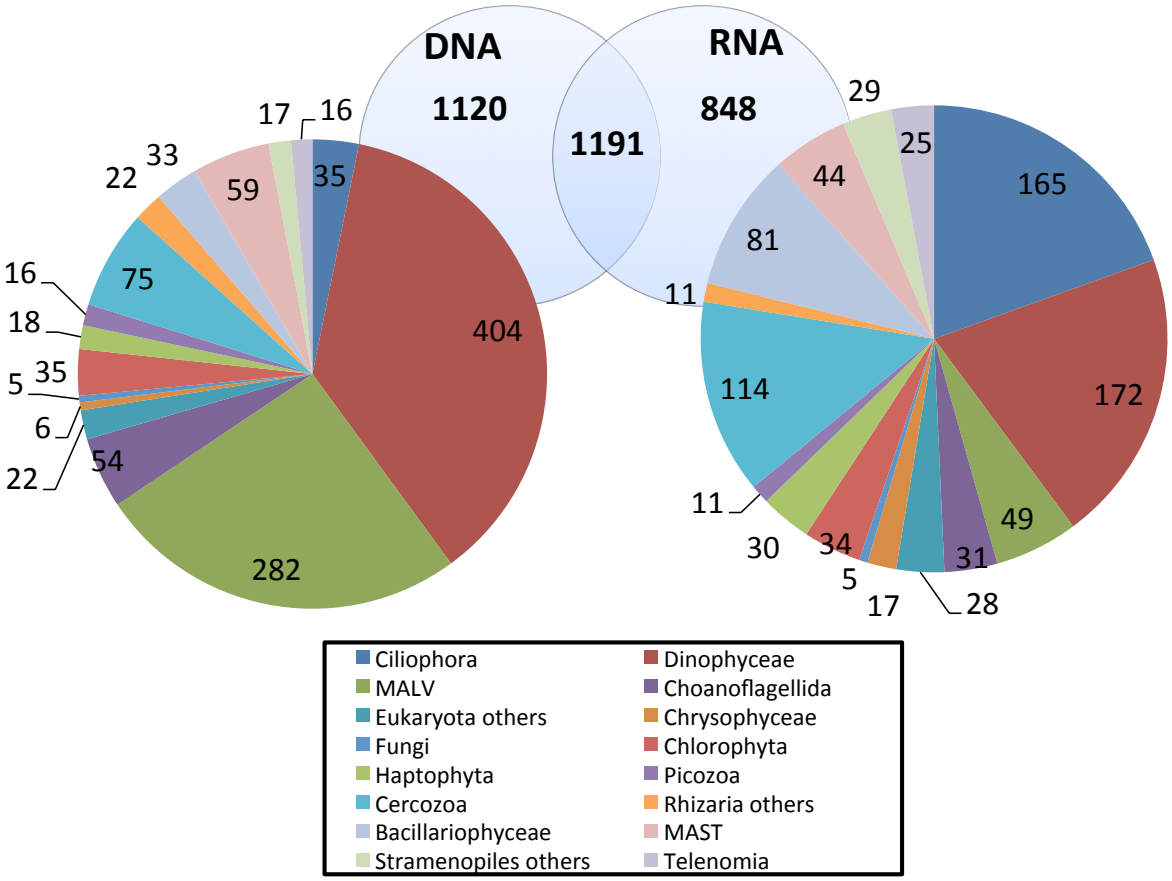

FIGURE S3: Venn diagram showing the shared (middle) and unique numbers (left: DNA, right: RNA) of OTUs for the DNA and RNA libraries (total number of OTUs 3159). Pie charts presenting the number of unique OTUs of different taxa found within the DNA (left) and RNA (right).