
What does it mean to be(come) Arctic? Functional and genomic traits of Arctic and temperate adapted diatoms

Supplementary Material

Table S1: Detailed available information about the diatom strains used in this study. Information contains species name, strain name as used throughout the manuscript (ID), the official strain name as used in the respective culture collections where the strains originated from (strain name), isolation date, and the sampling location (latitude, longitude) in decimal degrees (if available). Moreover, culture conditions during long-term cultivation in the respective culture collections are given, showing that both Arctic and temperate strains were kept at rather intermediate photoperiods before they were obtained for this study.

species	ID	Strain name	isolation date	latitude	longitude	culture collection temperature	culture collection photoperiod
<i>T. gravida</i>	A1	UiO478	2018-08-20	83.33	29.29	4°C	14:10h
<i>T. gravida</i>	A2	UiO483	2018-08-05	83.15	31.46	4°C	14:10h
<i>T. gravida</i>	A3	UiO484	2018-08-05	83.15	31.46	4°C	14:10h
<i>T. gravida</i>	A4	UiO447	2017-09-12	79.99	14.97	4°C	14:10h
<i>T. gravida</i>	A5	UiO448	2017-09-12	79.99	14.97	4°C	14:10h
<i>T. rotula</i>	T1	t_rotula_S16	unknown	54.183333	7.9	15°C	16:8h
<i>T. rotula</i>	T2	strain_WHV	2022-03-06	54.183333	7.9	15°C	16:8h
<i>T. rotula</i>	T3	strain_Sylt	2021-09-01	55.0300	8.46	15°C	16:8h
<i>T. rotula</i>	T4	RCC_778	unknown	English channel		13°C	12:12h
<i>T. rotula</i>	T5	RCC_290	unknown	English channel		20°C	12:12h

Table S2: Details and references for RNA-seq input data for CAAStools analysis. For each RNA-seq data set location code number in Figure 4 of the main manuscript is given, as well as RNA-seq type (i.e., obtained from culture isolate or metatranscriptomic field sample), species and strain (in case of culture isolates), origin and specific sampling or isolation coordinates and data references. Coordinates marked with an asterisk (*) indicate approximate coordinates as exact location could not be identified.

Location Code (Fig.4)	RNA-seq type	Species	Strain	Origin	Lat	Long	Reference
1	Isolate	<i>Thalassiosira gravida</i>	NORCCA UIO478 (A1)	Arctic	83.33	29.29	this study
2	Isolate	<i>Thalassiosira gravida</i>	NORCCA UIO483 (A2)	Arctic	83.15	31.46	this study
3	Isolate	<i>Thalassiosira gravida</i>	NORCCA UIO484 (A3)	Arctic	83.15	31.46	this study
4	Isolate	<i>Thalassiosira gravida</i>	NORCCA UIO447 (A4)	Arctic	79.99	14.97	this study
5	Isolate	<i>Thalassiosira gravida</i>	NORCCA UIO448 (A5)	Arctic	79.99	14.97	this study
6	Isolate	<i>Thalassiosira rotula</i>	Harder Lab t.rotula S16 (T1)	Temperate	54.18	7.90	this study
7	Isolate	<i>Thalassiosira rotula</i>	WHV (T2)	Temperate	54.18	7.90	this study
8	Isolate	<i>Thalassiosira rotula</i>	Syllt (T3)	Temperate	55.03	8.46	this study
9	Isolate	<i>Thalassiosira rotula</i>	RCC290 (T4)	Temperate	49.79*	-2.57*	this study
10	Isolate	<i>Shionodiscus bioculatus</i>	-	Arctic	78.98	9.48	this study
11	Isolate	<i>Minidiscus spinulatus</i>	RCC4659	Temperate	49.79*	-2.57*	https://zenodo.org/records/5256603
12	Isolate	<i>Minidiscus variabilis</i>	RCC4665	Temperate	49.79*	-2.57*	https://zenodo.org/records/5256603
13	Isolate	<i>Minutocellus polymorphus</i>	-	Temperate	-17.50	11.25	https://evocellbio.com/eukprot/
14	Isolate	<i>Fragilariopsis sp.</i>	-	Arctic	69.07	-52.41	https://doi.org/10.1186/s12867-019-0124-0
15	Isolate	<i>Pseudo-Nitzschia turgidula</i>	-	Arctic	69.07	-52.41	https://doi.org/10.1186/s12867-019-0124-0
16	Isolate	<i>Arcooecellus cornuensis</i>	-	Arctic	71.18	-159.42	https://evocellbio.com/eukprot/
17	Isolate	<i>Chaetoceros diadema</i>	-	Arctic	78.98	9.48	this study
18	Isolate	<i>Pseudo-Nitzschia turgidula</i>	-	Arctic	78.98	9.48	this study
19	Isolate	<i>Dactylosolen fragillissimus</i>	-	Temperate	41.33	-70.57	https://evocellbio.com/eukprot/
20	Isolate	<i>Detonula confervaceae</i>	-	Temperate	41.60	-71.40	https://evocellbio.com/eukprot/
21	Metatranscriptome	-	-	Temperate	44.28	-12.61	DOI: 10.46936/10.25585/60000951
22	Metatranscriptome	-	-	Temperate	45.53	-12.43	DOI: 10.46936/10.25585/60000951
23	Metatranscriptome	-	-	Temperate	47.57	-12.11	DOI: 10.46936/10.25585/60000951
24	Metatranscriptome	-	-	Arctic	78.85	9.23	DOI: 10.46936/10.25585/60000951
25	Metatranscriptome	-	-	Arctic	78.87	8.11	DOI: 10.46936/10.25585/60000951
26	Metatranscriptome	-	-	Arctic	79.02	-9.52	DOI: 10.46936/10.25585/60000951
27	Metatranscriptome	-	-	Arctic	79.04	-7.67	DOI: 10.46936/10.25585/60000951
28	Metatranscriptome	-	-	Arctic	79.07	7.08	DOI: 10.46936/10.25585/60000951
29	Metatranscriptome	-	-	Arctic	79.08	-8.52	DOI: 10.46936/10.25585/60000951
30	Metatranscriptome	-	-	Temperate	41.50	-71.33	https://doi.org/10.1073/pnas.1421993112
31	Isolate	<i>Minidiscus comicus</i>	-	Temperate	49.79*	-2.57*	https://zenodo.org/records/5256603

Table S3: ANOVA results testing for differences of GAM shape as a response of photoperiod and the interaction of photoperiod and strain origin. Reference degrees of freedom (Ref. df), F-, and p-values are reported for each effect. Values marked with an asterisk (*) indicate significant effects ($p < 0.05$).

	<i>Ref. df</i>	GAM shape		
		<i>F</i>	<i>p</i>	
photoperiod	3	420.53	<0.001	*
photoperiod*origin	3	49.96	<0.001	*

Figure S1: Phylogenetic tree of ITS1 sequences for the *T. rotula* and *T. gravida* strains used in this study and respective reference sequences for both species (strains JX074...) identified by Whittaker et al (2012).

