Supplementary material

Table S1. Temperature-dependent maximum growth rate

Equation	Constant	Reference
$\mu_T = \mu_0 \times e^{r_\mu \times T}$	μ_0 (1/d) is the specific growth rate at 0°C; r_μ (1/°C) is the rate constant representing the sensitivity of the maximum growth rate to changes in temperature	Collins and Boylen [58]; Arrigo and Sullivan [59]; Moisan et al. [60]
$\mu_T = a \times T^b + c$		Montagnes et al. [61]
$\mu_T = \mu_{20} \times \theta^{T-20}$	μ_{20} is the growth rate at (20 °C)	Haario et al. [62]; Pegallapati and Nirmalakhandan [63]; Ketheesan and Nirmalakhandan [64]
$\mu_T = a \times e^{-\frac{E_a}{k \times T}}$	E_a being the activation energy for microalgae growth (J); k is the Boltzmann constant (1.380649×10^{-23} J/K); and T is the temperature (K).	Bordel et al. [65]
$f(T) = a \times e^{b \times T} \times \left[1 - \left(\frac{T - z}{w/2}\right)^2\right]$	z (°C) is the maximum of the quadratic portion of the function; and w (°C) is the range over which the growth is positive (i.e. thermal breadth)	Bernhardt et al. [66]; Thomas et al. [67]

Table S2. Temperature factor

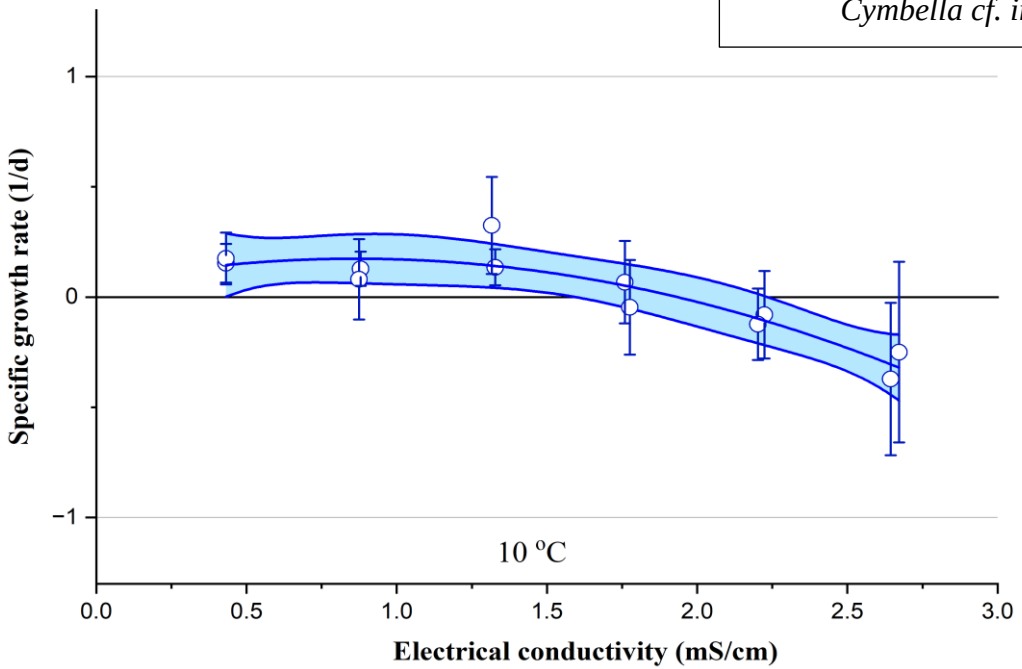
Equation	Constant	Reference
$f(T) = \begin{cases} e^{-k_1^T \times (T-T_1)^2} & for\ T \le T_1 \\ 1 & for\ T_1 < T \le T_2 \\ e^{-k_2^T \times (T_2-T)^2} & for\ T > T_2 \end{cases}$	T_1 is the lower optimal growth temperature; T_2 is the upper optimal growth temperature; $k_1^T$is the temperature effect below the optimal growth temperature; and k_2^T is the temperature effect above the optimal growth temperature	Cossins and Bowler [68]; James et al. [69]; Gharagozloo et al. [26]
$f(T) = \begin{cases} e^{-k_1 \times (T-T_{opt})^2} & for\ T \le T_{opt} \\ e^{-k_2 \times (T-T_{opt})^2} & for\ T > T_{opt} \end{cases}$	T_{opt} is the optimum temperature; k_1 is the temperature effect below the optimum temperature; and k_2 is the temperature effect above the optimum temperature	Cerco and Cole [25,70]
$f(T) = \frac{a_T}{b_T \times \sqrt{2 \times \pi}} \times e^{-\frac{1}{2} \times \left(\frac{T-T_0}{b_T}\right)^2}$	T_0 is the optimum temperature	Dudley et al. [28]
$f(T) = \begin{cases} 0 & for\ T < T_{min} \\ \frac{(T-T_{max}) \times (T-T_{min})^2}{(T_{opt}-T_{min}) \times (a(T)-b(T))} & for\ T_{min} < T < T_{max} \\ 0 & for\ T > T_{max} \end{cases}$ $a(T) = (T_{opt} - T_{min}) \times (T - T_{opt})$ $b(T) = (T - T_{opt}) \times (T_{opt} + T_{min} - 2 \times T)$	T_{min} is the temperature below which no growth takes place; T_{max} is the maximum temperature limit for growth; T_{opt} is the optimum temperature	Bernard and Remond [32]
$f(T) = \begin{cases} e^{-2.3 \times \left(\frac{T-T_{opt}}{T_L-T_{opt}}\right)^2} & for\ T < T_{opt} \\ e^{-2.3 \times \left(\frac{T-T_{opt}}{T_U-T_{opt}}\right)^2} & for\ T > T_{opt} \end{cases}$	T_{opt} is the optimum temperature; and T_L and T_U are the lower and upper limits at 10% of the maximal growth rate.	Dauta et al. [71]; Martins et al. [72]
$f(T) = \frac{e^{-\frac{E_a}{R \times T}}}{1 + K \times e^{-\frac{E_b}{R \times T}}}$	E_a is the activation energy required by enzymes to support metabolism; E_b is the activation energy for enzyme denaturation; R is the universal gas constant; and K is the dimensionless inactivation constant.	Tevatia et al. [73]
$f(T) = 1 - \left(\frac{T - T_{opt}}{T_{max} - T_{min}}\right)^2$	T_{opt}, T_{min}, and T_{max} are the optimum, minimum, and maximum temperatures of the temperature tolerance range	Guterman et al. [74]
$f(T) = c_1 \times e^{-c_2 \times \lvert T - T_{opt} \rvert}$	T_{opt} is the optimum temperature	Chen et al. [75]

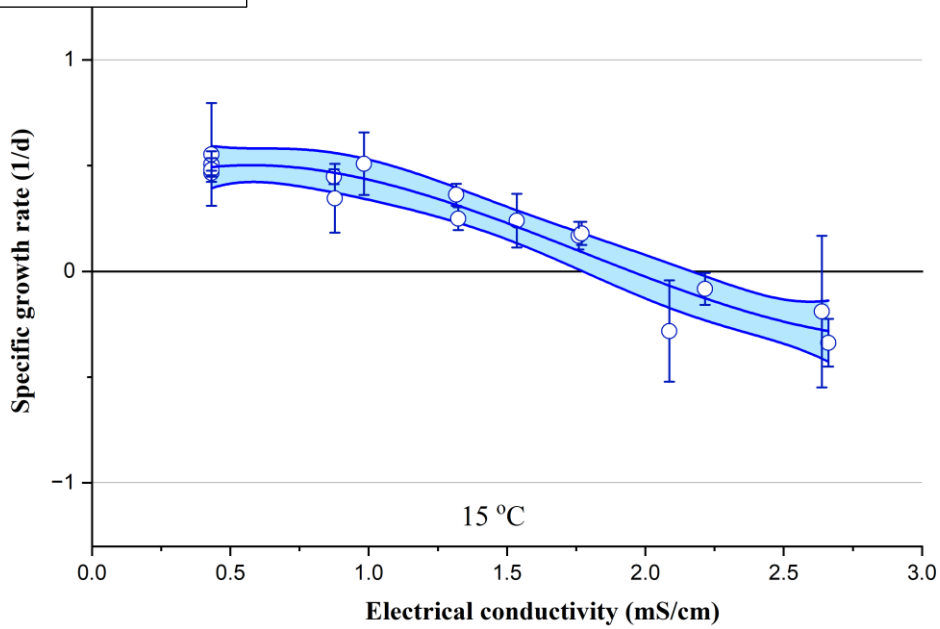
$f(T) = \frac{T - T_{min}}{T_{ref} - T_{min}}$	T_{ref} is the baseline reference temperature; and T_{min} is the minimum temperature	Chen et al. [75]; Di Toro et al. [76]; Ahlgren [77]
$f(T) = \frac{T}{M_T + T}$	M_T is the half-saturation constant for temperature	Chen et al. [75]; Di Tor et al. [76]
$f(T) = k \times \theta^{T - T_{ref}}$	K is the coefficient at T=T_{ref}; and θ is the temperature coefficient	Haario et al. [62]; Chen et al. [75]
$f(T) = \left(\frac{T_{max} - T}{T_{max} - T_{opt}}\right)^{\beta} \times e^{-\beta \times \left(1 - \frac{T_{max} - T}{T_{max} - T_{opt}}\right)}$	T_{max} is the maximum concentration above which the growth does not take place; T_{opt} is the optimum temperature	Blanchard et al. [78]; Slegers et al. [79]
$f(T) = \frac{2 \times e^{\frac{E_a}{R \times T_{opt}} - \frac{E_a}{R \times T}}}{1 + \left(e^{\frac{E_a}{R \times T_{opt}} - \frac{E_a}{R \times T}}\right)^2}$	R is the universal gas constant; E_a is the activation energy; and T_{opt} is the optimum temperature	Quinn et al. [80]
$f(T) = e^{\frac{E_a}{R \times T_{opt}} - \frac{E_a}{R \times T}}$	R is the universal gas constant; E_a is the activation energy; and T_{opt} is the optimum temperature	Geider et al. [81]
$f(T) = \begin{cases} 0 & if\ T < T_{min} \\ \frac{T - T_{min}}{T_{opt-low} - T_{min}} & if\ T_{min} < T < T_{opt-low} \\ 1 & if\ T_{opt-low} < T < T_{opt-high} \\ \frac{T_{max} - T}{T_{max} - T_{opt-high}} & if\ T_{opt-high} < T < T_{max} \\ 0 & if\ T > T_{max} \end{cases}$	T_{min} and T_{max} are the minimum and maximum water temperature for zero productivity (°C), respectively; $T_{opt-low}$ and $T_{opt-high}$ are the lower and upper water temperature for optimal productivity, respectively;	Wigmosta et al. [82]; Kleiman et al. [83]

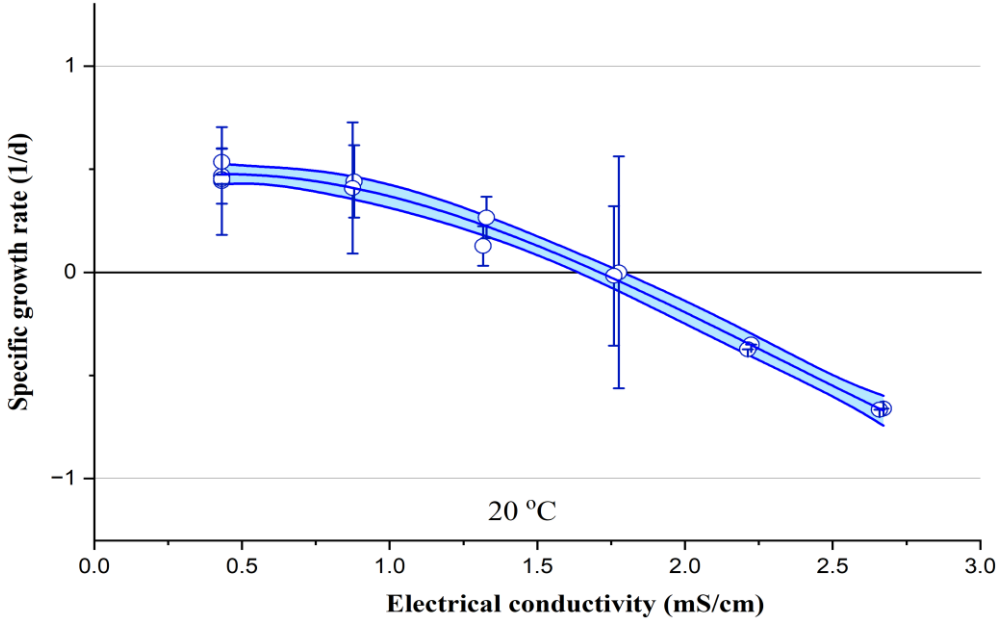
Table S3. Salinity factor

Equation	Remarks	Reference
$f_S = \begin{cases} 1 & (S \le S_{min}) \\ a \times S + b & (S_{min} < S < S_{max}) \\ 0 & (S \ge S_{max}) \end{cases}$	S_{min} and S_{max} are the minimum and maximum salinity	Gao et al. [27]
$f(S) = \begin{cases} e^{-k_1^S \times (S - S_{opt})^2} & for\ S \le S_{opt} \\ e^{-k_2^S \times (S - S_{opt})^2} & for\ S > S_{opt} \end{cases}$	S_{opt} is the optimum salinity; and k_1^S and k_2^S are the salinity effects below and above the optimal salinity, respectively	Gharagozloo et al. [26]
$f(S) = \frac{Stox^2}{Stox^2 + S^2}$	$Stox$ is the half-saturation constant for the effect of salinity on the growth	Cerco and Cole [70]
$f(S) = \frac{S - S_{min}}{S - S_{min} + S_h}$	Modified Mono relationship: S_{min} is the minimum salinity below which organisms do not growth; and S_h is the half saturation constant	Dudley et al. [28]
Above the critical salinity level (S_{crit}): $f(S) = \begin{cases} 1 - \left(\frac{S - S_{opt}}{S_{min} - S_{opt}}\right)^{2.5} & for\ S < S_{opt} \\ 1 - \left(\frac{S - S_{opt}}{S_{max} - S_{opt}}\right)^{2} & for\ S \ge S_{opt} \end{cases}$ Below the critical salinity level (S_{crit}): $f(S) = \frac{S - S_{min}}{S_{opt} - S_{min}}$	S_{crit} is the salinity level at which growth slows down; S_{min}, S_{max}, and S_{opt} are the minimum, maximum, and optimum salinity	Martins et al. [72]

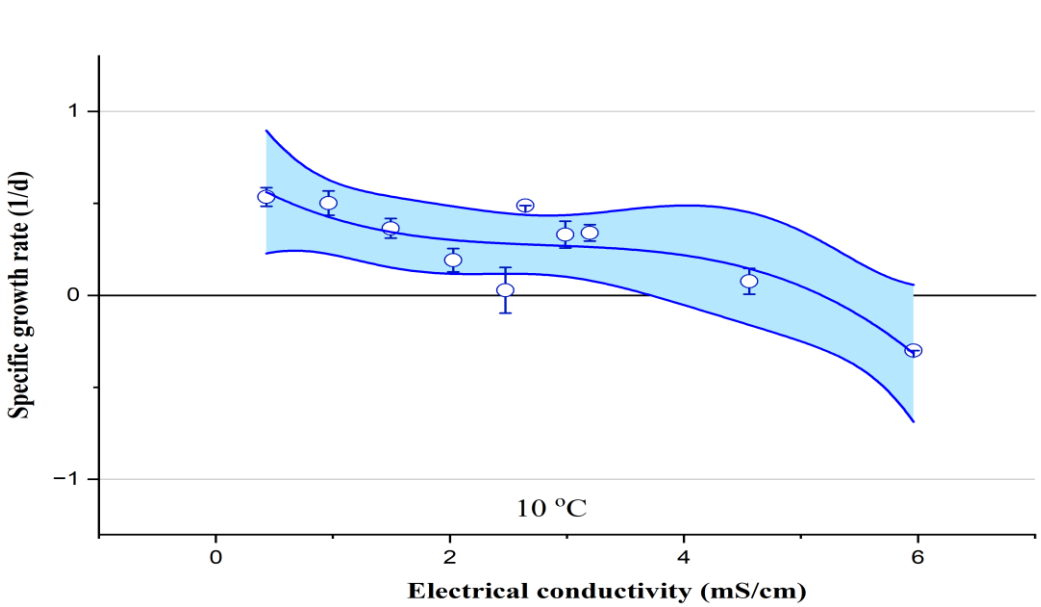
Cymbella cf. incurvata (A)

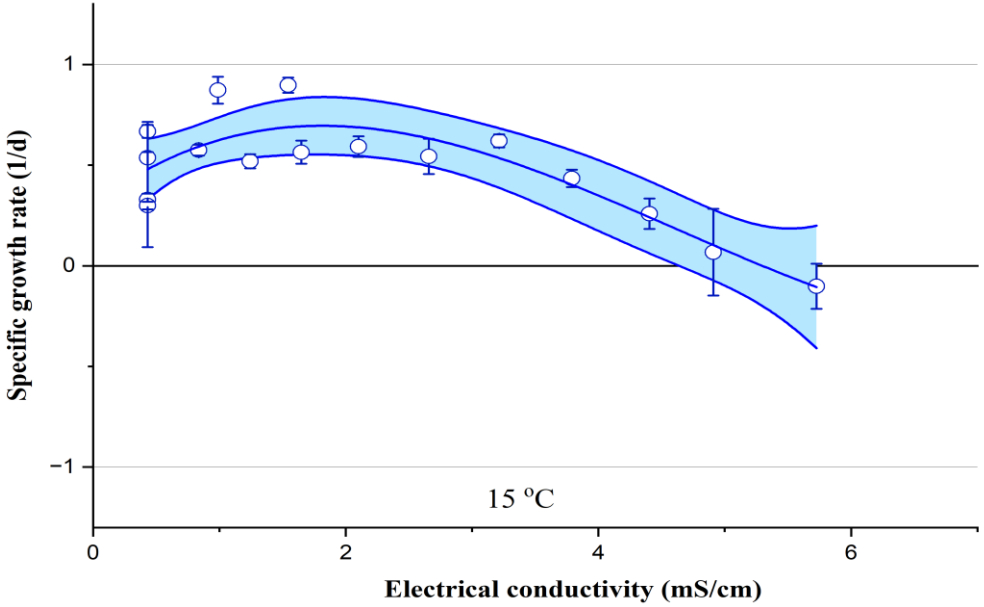


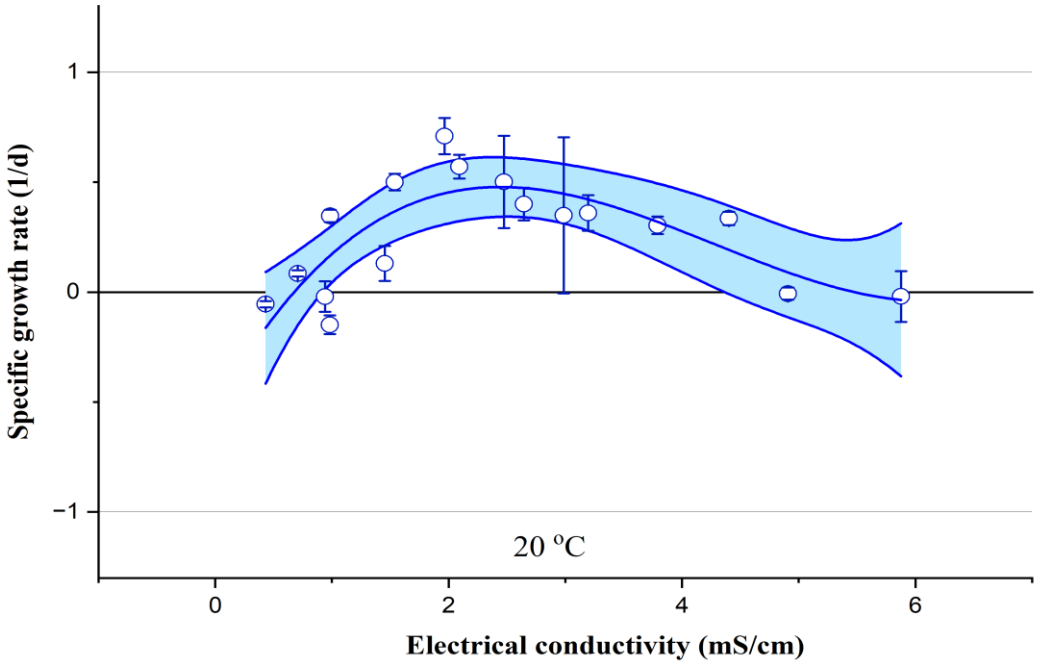


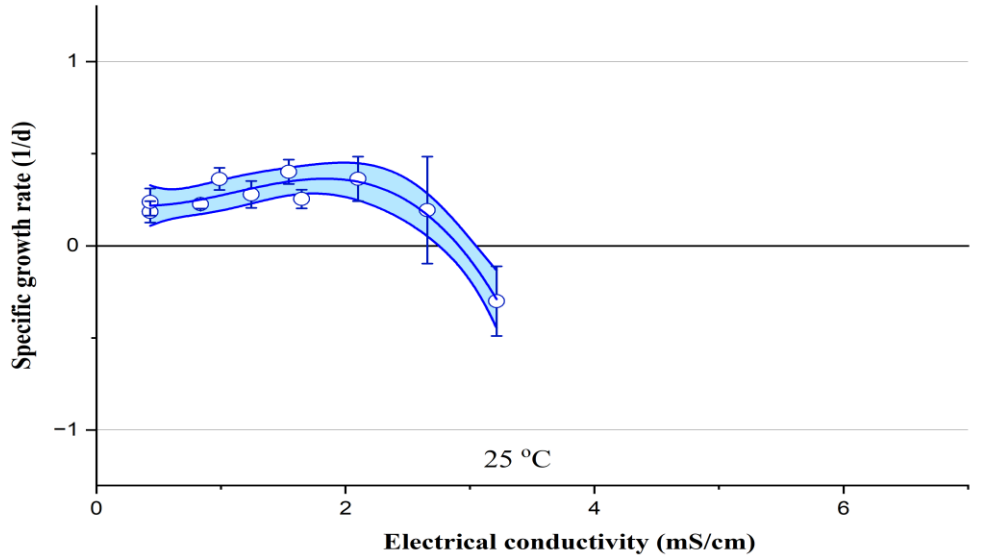


Nitzschia linearis (B)

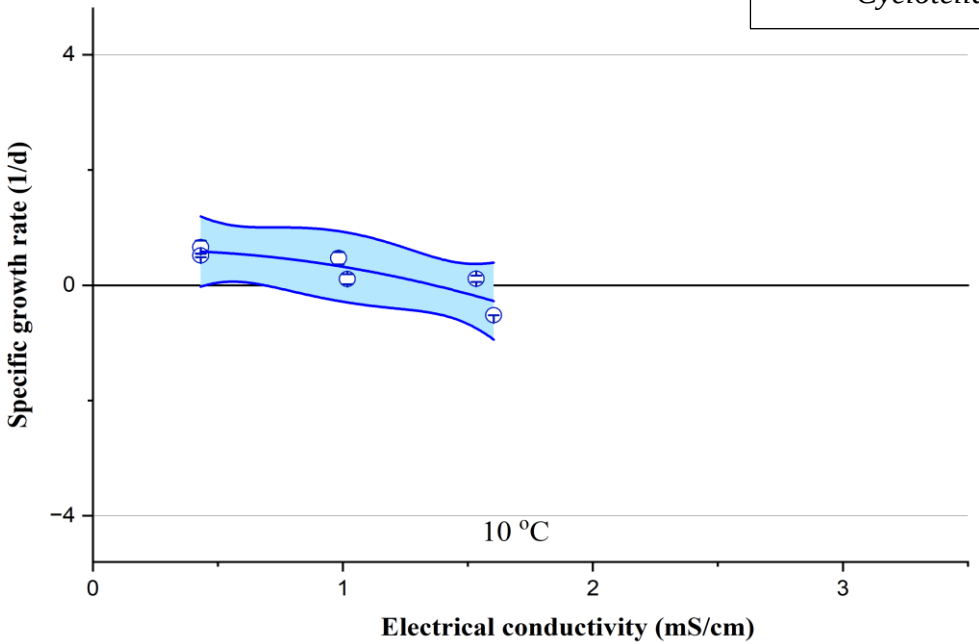


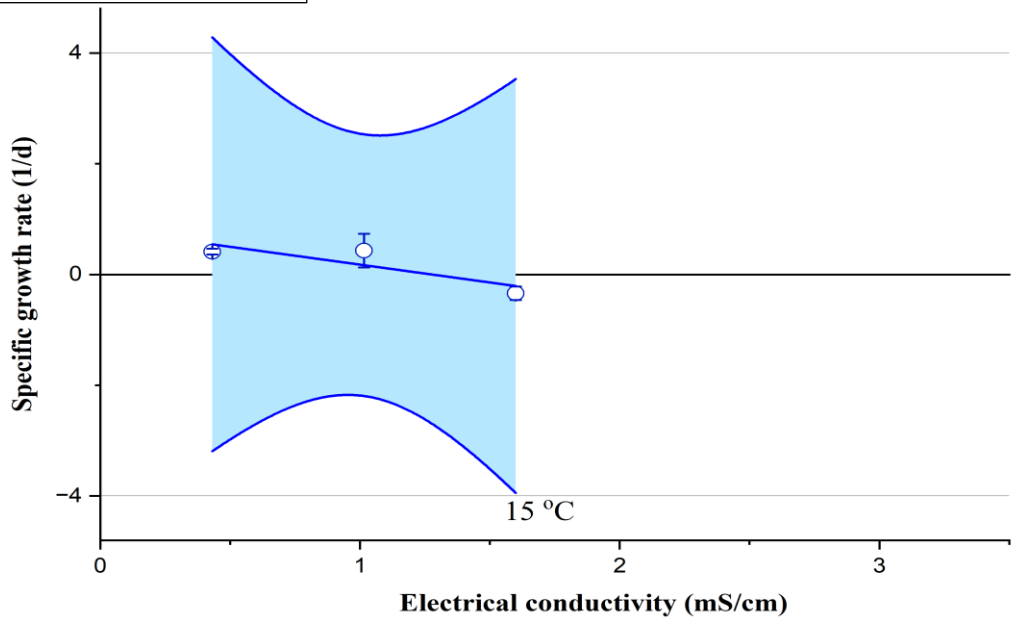


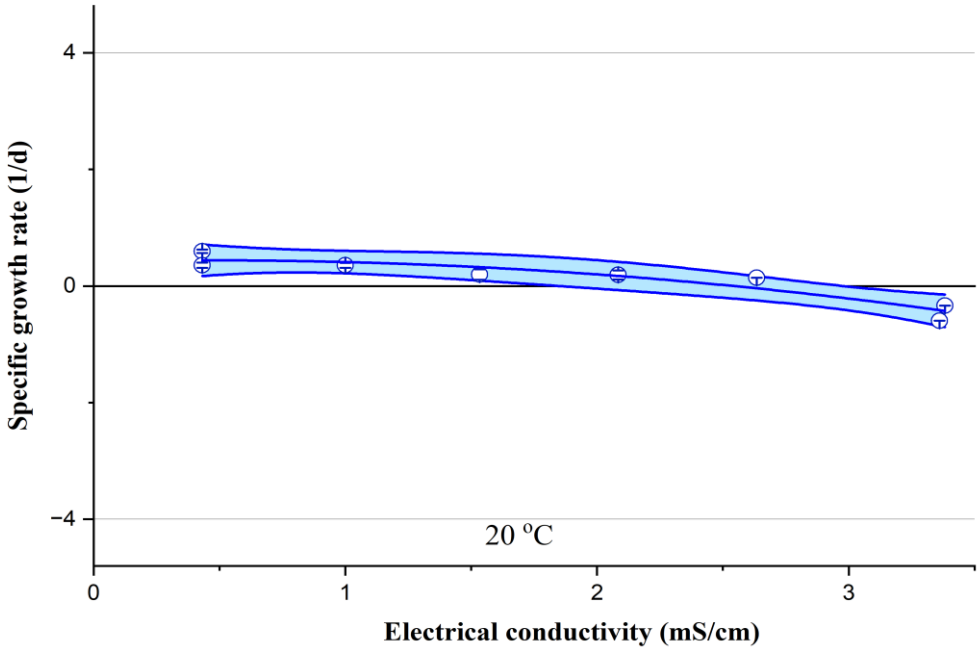


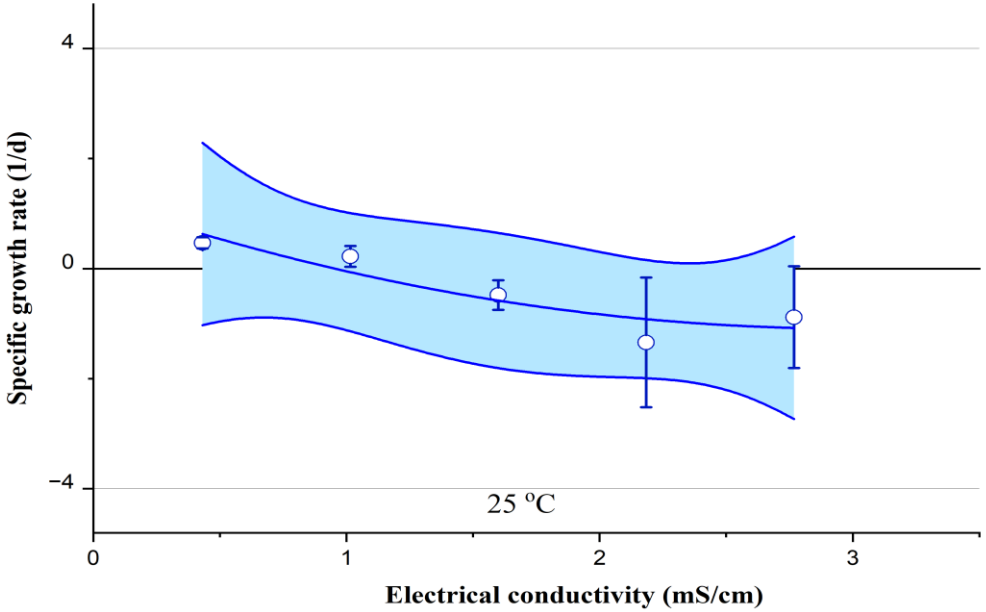


Cyclotella meneghiniana (C)

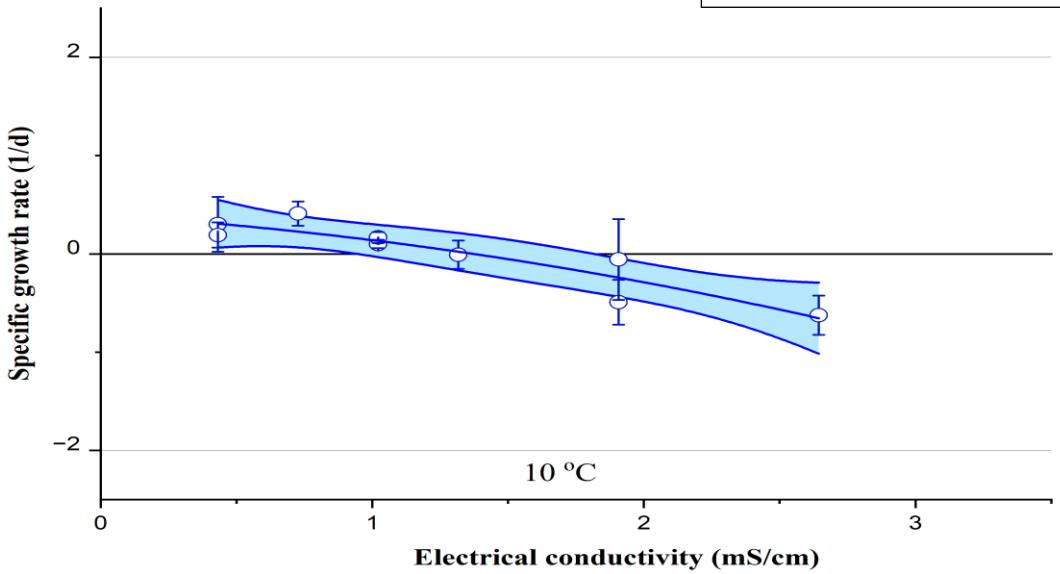


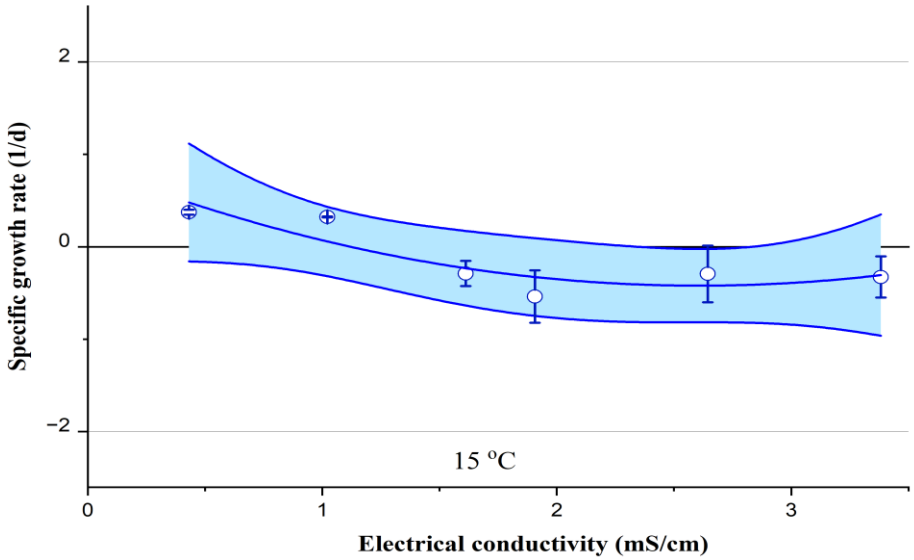


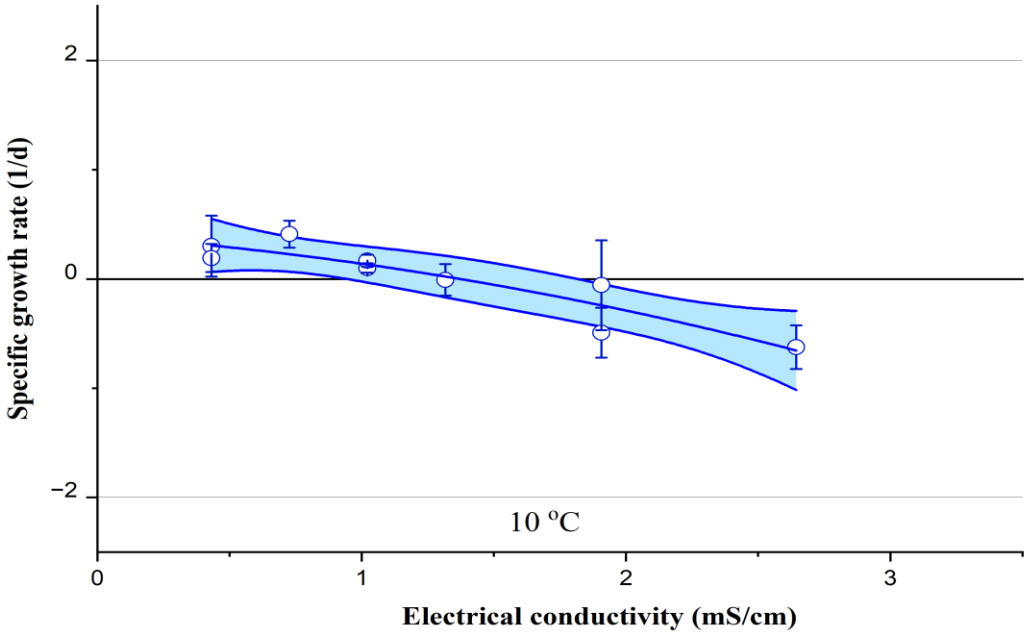


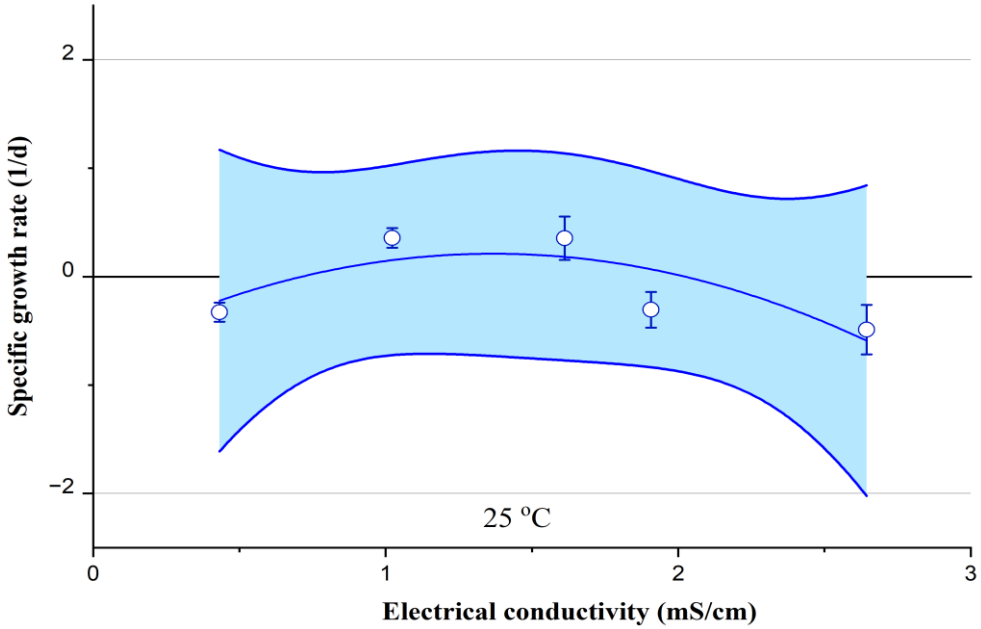


Melosira varians (D)

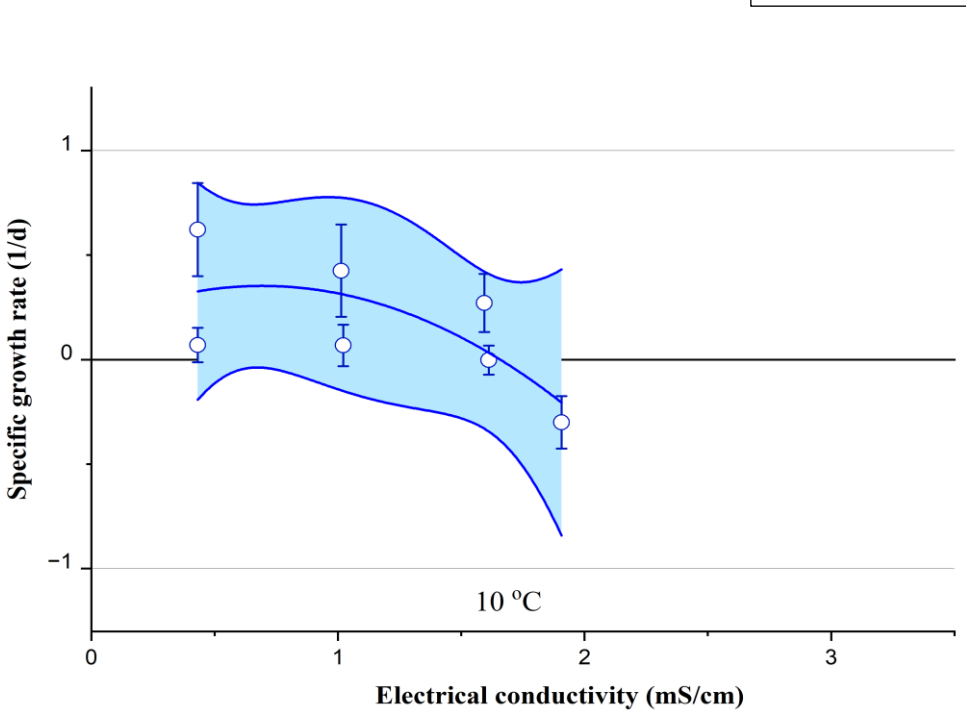


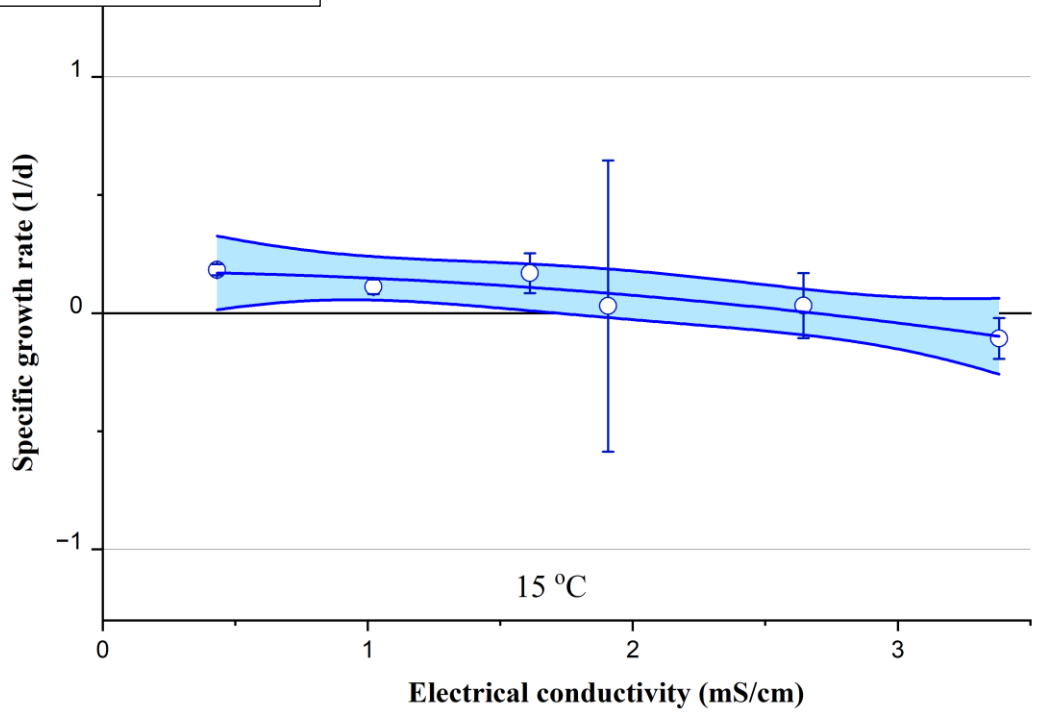


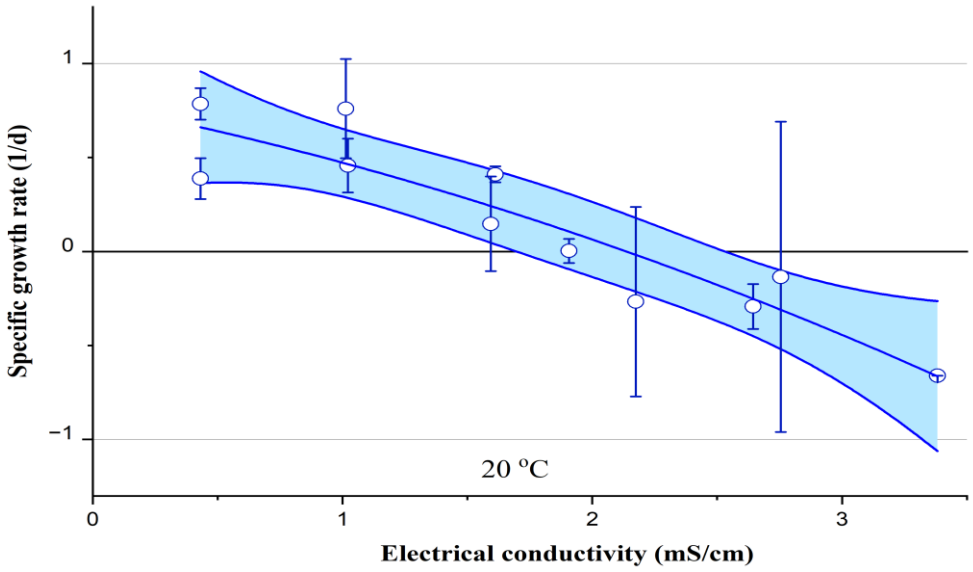


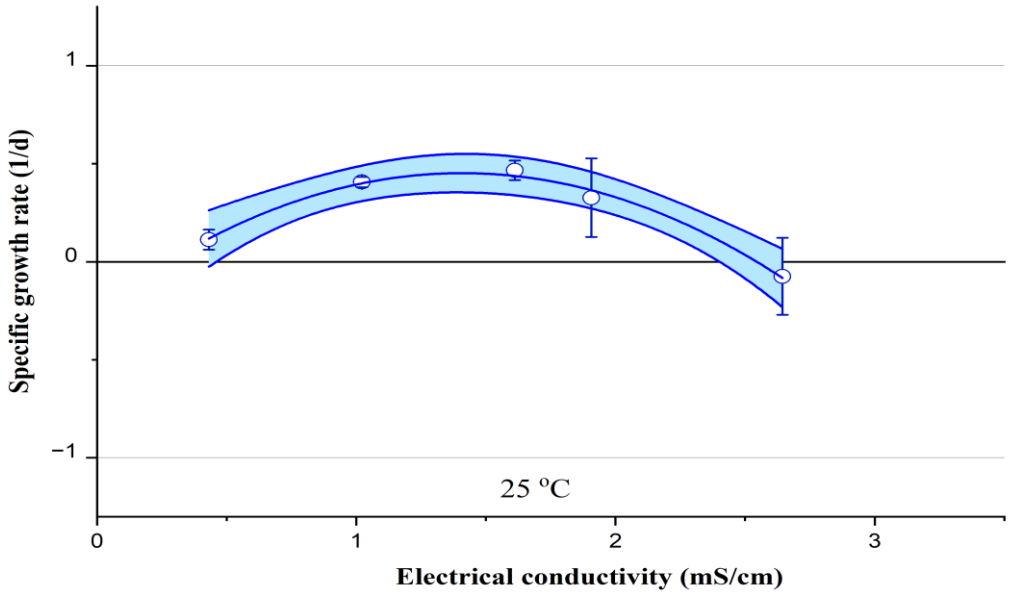


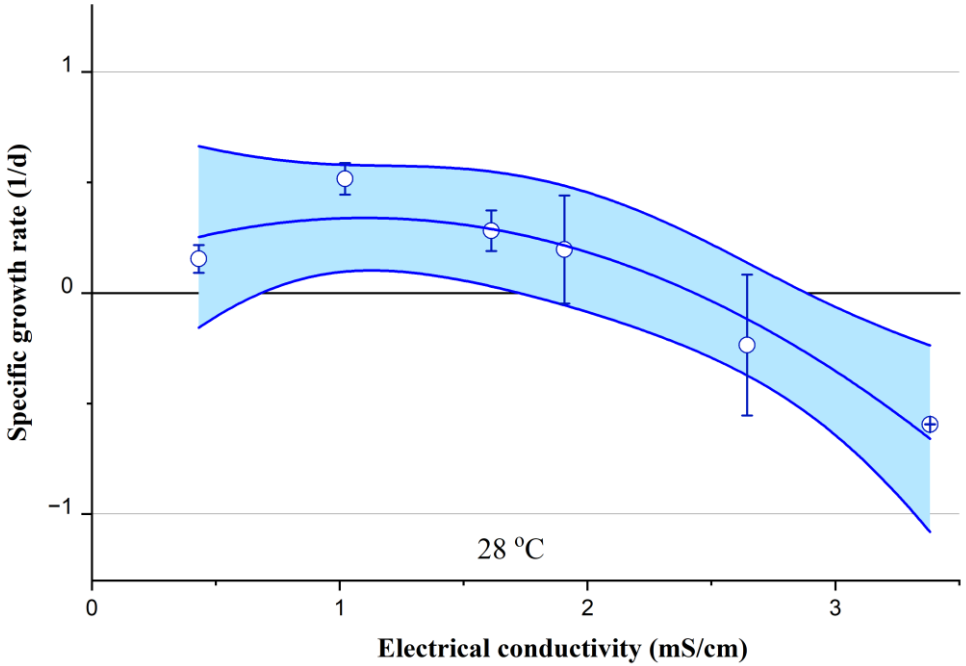
Ulnaria acus (E)



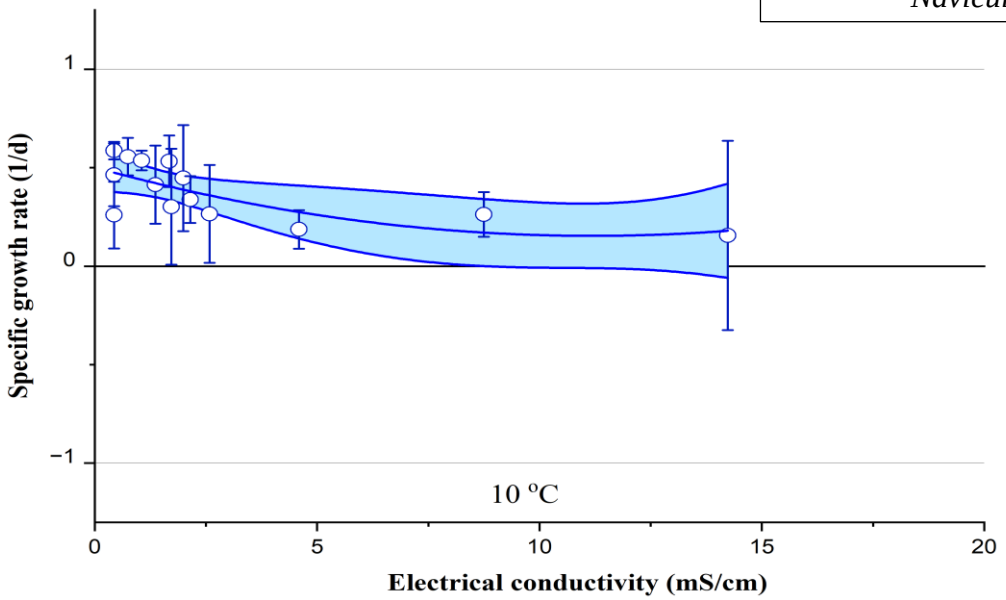


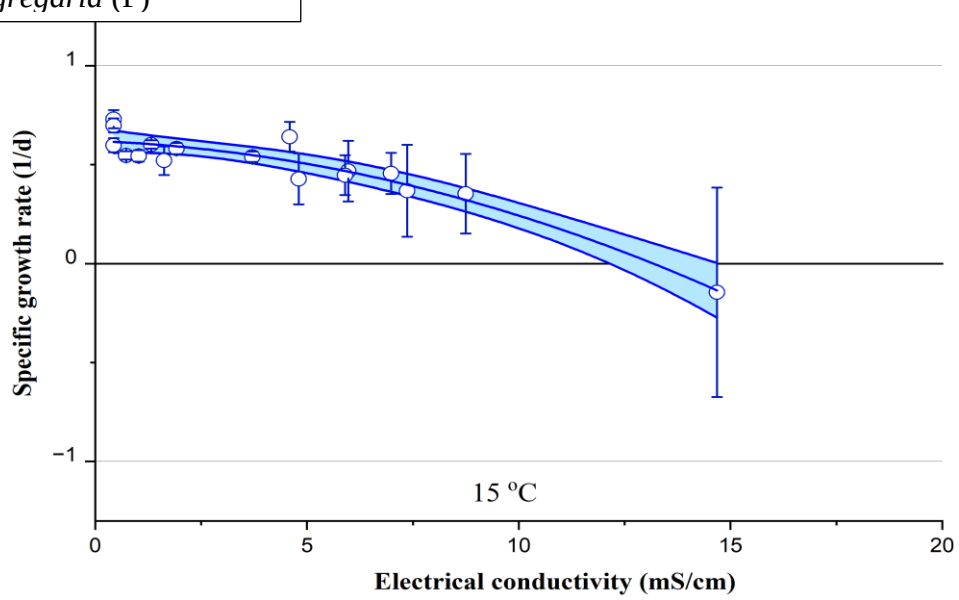


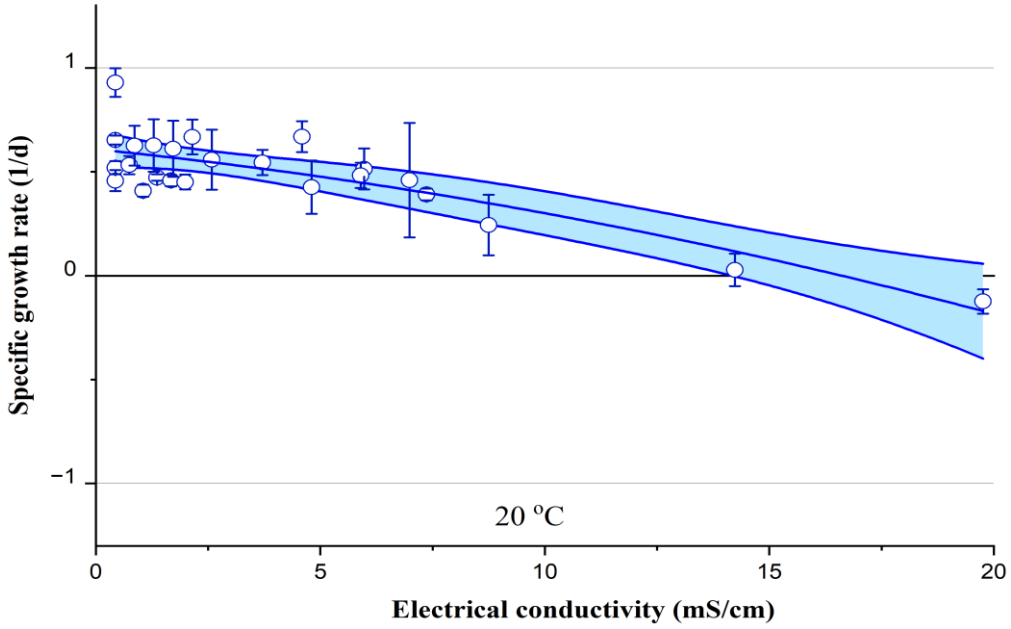



Specific growth rate (1/d)
1
0
−1
28 °C
0
1
2
3
Electrical conductivity (mS/cm)

Navicula gregaria (F)







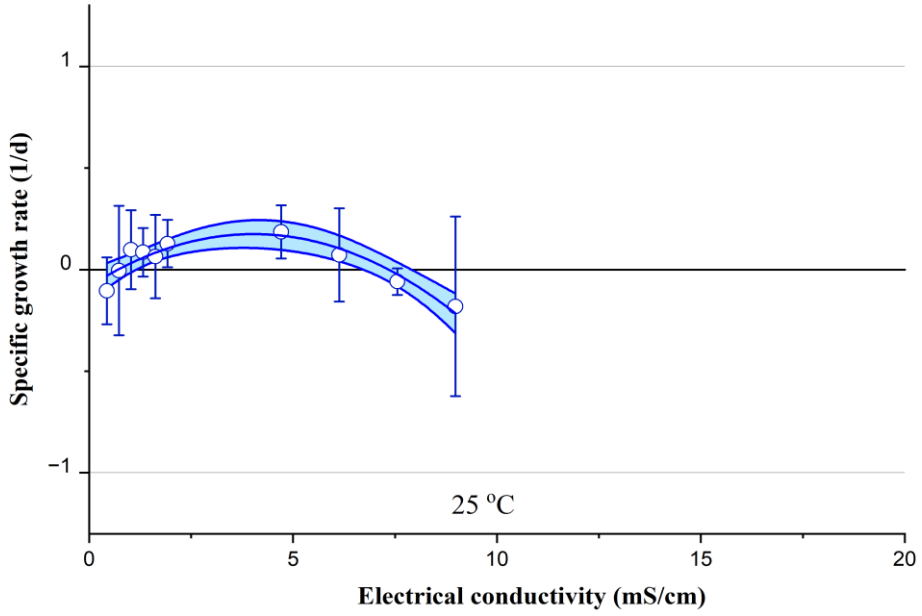


Figure S1. The salinity response curve describing the specific growth rate (1/d) of *Cymbella cf. incurvata*, *Nitzschia linearis*, *Cyclotella memeghiniana*, *Melosira varians*, *Ulnaria acus*, and *Navicula gregaria* with changing salinity represented by the electrical conductivity (mS/cm) at the temperature range of 10 - 28 ^{o}C. *Cymbella incurvate*: 25^{o}C not included as the diatom did not grow regardless of the conductivity level.

Empirical modelling for *Cymbella cf. incurvata*

Table S4. Results of empirical modelling the growth rate of *Cymbella cf. incurvate* at various temperature and electrical conductivity

ID	Equation	Interaction	Estimated coefficients				*p*	R^2	AIC
			Parameter	Mean	Low-95% confidence interval	Up-95% confidence interval			
ST1	$\mu = \left(c \times e^{d \times T} \times \left(1 - \left(\frac{T - z}{w/2} \right)^2 \right) \right) \times e^{-k_S \times (S - S_{opt})^2}$	Non-interactive	Sopt	0.6797	0.2594	1.0999	<0.005	0.82	-57.67
			kS	1.7703	-1.0215	4.5622	0.19		
			c	0.1891	-0.2884	0.6665	0.40		
			d	0.0692	-0.0704	0.2087	0.30		
			z	15.4599	12.9659	17.9539	<0.0001		
			w	14.6980	8.5812	20.8148	<0.0005		
ST2	$\mu = \left(c \times e^{d \times T} \times \left(1 - \left(\frac{T - z}{w \times (1 + a_{ST} \times S)/2} \right)^2 \right) \right) \times e^{-k_S \times (S - S_{opt})^2}$	Interactive	Sopt	0.6746	-0.0415	1.3906	0.06	0.88	-62.08
			kS	0.8619	-0.5651	2.2890	0.1		
			c	0.0575	-0.0479	0.1630	0.25		
			d	0.1363	0.0333	0.2393	<0.05		
			z	14.8642	12.8883	16.8402	<0.0001		
			w	20.0451	14.7159	25.3744	<0.0001		
			aST	-0.3243	-0.4186	-0.2301	<0.0001		
ST3	$\mu = \left(c \times e^{d \times T} \times \left(1 - \left(\frac{T - z}{w/2} \right)^2 \right) \right) \times \frac{Stox^2}{Stox^2 + S^2}$	Non-interactive	Stox	0.8209	-0.0396	1.6814	0.06	0.72	-51.94
			c	0.2882	-0.6794	1.2557	0.53		
			d	0.0591	-0.1178	0.2360	0.48		
			z	15.5601	12.6621	18.4581	<0.0001		
			w	14.6458	7.3730	21.9185	0.0009		
ST4	$\mu = \left(c \times e^{d \times T} \times \left(1 - \left(\frac{T - z}{w \times (1 + a_{ST} \times S)/2} \right)^2 \right) \right) \times \frac{Stox^2}{Stox^2 + S^2}$	Interactive	Stox	1.2682	0.1920	2.3443	<0.05	0.85	-60.63
			c	0.0764	-0.0748	0.2275	0.29		
			d	0.1275	0.0252	0.2297	<0.05		
			z	14.8729	13.0040	16.7417	<0.0001		
			w	19.7513	14.8052	24.6975	<0.0001		
			aST	-0.2991	-0.3643	-0.2339	<0.0001		
ST5			gmax	0.6348	0.3835	0.8861	0.0001	0.79	-57.24

	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2}\right)^2\right) \times e^{-k_S \times (S - S_{opt})^2}$	Non-interactive	Sopt	0.6355	0.1377	1.1333	0.0166		
			kS	1.6390	-1.1215	4.3995	0.2201		
			T_{opt}	15.7838	14.7589	16.8086	<0.0001		
			w	13.0584	11.1560	14.9608	<0.0001		
ST6	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2}\right)^2\right) \times \frac{Stox^2}{Stox^2 + S^2}$	Non-interactive	gmax	0.8225	0.1558	1.4893	<0.05	0.70	-52.95
			Stox	0.8106	0.0121	1.6091	<0.05		
			T_{opt}	15.7990	14.5127	17.0852	<0.0001		
			w	13.1725	10.9274	15.4176	<0.0001		
ST7	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w \times (1 + a_{ST} \times S)/2}\right)^2\right) \times \frac{Stox^2}{Stox^2 + S^2}$	Interactive	gmax	0.7361	0.2325	3.1656	<0.01	0.73	-52.53
			Stox	0.9954	0.4312	2.3083	<0.05		
			Topt	15.2369	0.5413	28.1496	<0.0001		
			w	15.8511	1.6392	9.6701	<0.0001		
			aST	-0.2526	0.0616	-4.0991	<0.005		
ST8	$\mu = \left(c \times e^{d \times T} \times \left(1 - \left(\frac{T - z}{w/2}\right)^2\right)\right) \times (1 + a \times S)$	Non-interactive	a	-0.5667	-0.6347	-0.4987	<0.0001	0.90	-69.45
			c	0.2730	-0.2239	0.7698	0.25		
			d	0.0707	-0.0307	0.1721	0.15		
			z	15.5559	13.6688	17.4429	<0.0001		
			w	15.2115	10.6102	19.8128	<0.0001		
ST9	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2}\right)^2\right) \times (1 + a \times S)$	Non-interactive	gmax	0.9461	0.7206	1.1717	<0.0001	0.87	-67.26
			a	-0.5629	-0.6346	-0.4913	<0.0001		
			T_{opt}	15.9167	15.1802	16.6532	<0.0001		
			w	13.4226	12.1193	14.7259	<0.0001		
ST10	$\mu = (\mu_{20} \times \theta^{T-20}) \times \left(1 - \left(\frac{S - S_{opt}}{S_{max} - S_{opt}}\right)^2\right)$	Non-interactive	Sopt	1.0703	0.7420	1.3986	<0.0001	0.36	-40.15
			Smax	1.8702	1.5902	2.1502	<0.0001		
			g20	0.3023	-0.0210	0.6255	0.06		
			theta	1.0099	0.8432	1.1765	<0.0001		
ST11	$\mu = (\mu_{20} \times \theta^{T-20}) \times \left(1 - \left(\frac{S - S_{opt}}{S_{max} \times (1 + a_{ST} \times T) - S_{opt}}\right)^2\right)$	Interactive	Sopt	0.7557	0.0721	1.4392	<0.05	0.79	-56.91
			Smax	4.8760	0.8776	8.8743	<0.05		
			g20	0.4320	0.2209	0.6430	<0.001		
			theta	1.1124	0.9809	1.2438	<0.0001		
			aST	-0.0319	-0.0481	-0.0157	<0.005		
ST12			gmax	0.5998	0.4882	0.7114	<0.0001	0.94	-77.93

	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2}\right)^2\right) \times \left(1 - \left(\frac{S - S_{opt}}{S_{max} - S_{opt}}\right)^2\right)$	Non-interactive	Sopt	0.5520	0.0917	1.0124	<0.05		
			Smax	1.8054	1.7106	1.9003	<0.0001		
			Topt	15.8168	15.3170	16.3166	<0.0001		
			w	13.1184	12.1456	14.0911	<0.0001		
ST13	$\mu = \left(c \times e^{d \times T} \times \left(1 - \left(\frac{T - z}{w/2}\right)^2\right)\right) \times \left(1 - \left(\frac{S - S_{opt}}{S_{max} - S_{opt}}\right)^2\right)$	Non-interactive	Sopt	0.6251	0.3543	0.8959	<0.0005	0.97	-91.06
			Smax	1.8138	1.7483	1.8793	<0.0001		
			c	0.1660	0.0218	0.3103	<0.05		
			d	0.0721	0.0241	0.1200	<0.01		
			z	15.4559	14.5913	16.3205	<0.0001		
			w	14.7773	12.6568	16.8978	<0.0001		
ST14	$\mu = \mu_{max} \times e^{-k_T \times (T - T_{opt})^2} \times \left(1 - \left(\frac{S - S_{opt}}{S_{max} - S_{opt}}\right)^2\right)$	Non-interactive	gmax	0.6117	0.1852	1.0383	<0.01	0.66	-46.78
			Sopt	0.6812	-0.1403	1.5026	0.10		
			Smax	1.8124	1.5894	2.0354	<0.0001		
			Topt	16.8735	14.9965	18.7506	<0.0001		
			kT	0.0476	-0.0359	0.1311	0.24		
4	$\mu = a + b_1 \times S + c_1 \times T + b_2 \times S^2 + c_2 \times T^2$	Non-interactive	a	-1.8402	-2.8436	-0.8367	<0.01	0.82	-59.42
			b1	0.2813	-0.4242	0.9868	0.40		
			c1	0.2980	0.1607	0.4352	<0.001		
			b2	-0.2281	-0.4945	0.0384	0.09		
			c2	-0.0099	-0.0142	-0.0056	<0.001		
5	$\mu = a + b_1 \times S + c_1 \times T + b_2 \times S^2 + c_2 \times T^2 + d \times S \times T$	Interactive	a	-2.3513	-3.8114	-0.8912	<0.01	0.83	-59.09
			b1	0.5161	-0.3428	1.3750	0.21		
			c1	0.3482	0.1756	0.5208	<0.001		
			b2	-0.2292	-0.4969	0.0385	0.09		
			c2	-0.0109	-0.0157	-0.0061	<0.001		
			d	-0.0152	-0.0465	0.0162	0.31		

*w=Tmax-Tmin (thermal breadth)

Empirical modelling for *Nitzschia linearis*

Table S5. Results of empirical modelling the growth rate of *Nitzschia linearis* at various temperature and electrical conductivity

ID	Equation	Interaction	Estimated coefficients				*p*	R^2	AIC
			Parameter	Mean	Low-95% confidence interval	Up-95% confidence interval			
ST5	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2}\right)^2\right) \times e^{-k_S \times (S - S_{opt})^2}$	Non-interactive	μ_{max}	0.5657	0.4129	0.7186	<0.0001	0.46	-125.01
			Sopt	2.1893	1.7197	2.6590	<0.0001		
			kS	0.2143	0.0515	0.3770	<0.05		
			Topt	15.8861	13.9856	17.7865	<0.0001		
			w	22.1174	15.8478	28.3870	<0.0001		
ST15	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w \times (1 + a_{ST} \times S)/2}\right)^2\right) \times e^{-k_S \times (S - S_{opt})^2}$	Interactive	μ_{max}	0.5876	0.4568	0.7184	<0.0001	0.59	-133.49
			Sopt	2.4391	2.0223	2.8560	<0.0001		
			kS	0.1964	0.0722	0.3207	<0.005		
			Topt	15.9085	14.7319	17.0851	<0.0001		
			w	31.7550	24.1289	39.3810	<0.0001		
			aST	-0.1437	-0.1664	-0.1210	<0.0001		
ST6	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2}\right)^2\right) \times \frac{S_{tox}^2}{S_{tox}^2 + S^2}$	Non-interactive	μ_{max}	0.4833	0.3058	0.6608	<0.0001	0.26	-114.49
			Stox	4.6024	1.1666	8.0382	<0.05		
			Topt	14.6649	10.0600	19.2698	<0.0001		
			w	26.2367	11.1795	41.2939	<0.005		
ST9	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2}\right)^2\right) \times (1 + a \times S)$	Non-interactive	gmax	0.5688	0.3896	0.7480	<0.0001	0.28	-115.34
			a	-0.1453	-0.2069	-0.0838	<0.0001		
			Topt	13.8935	7.8031	19.9839	<0.0001		
			w	28.0140	9.2629	46.7651	<0.005		
ST10	$\mu = (\mu_{20} \times \theta^{T-20}) \times \left(1 - \left(\frac{S - S_{opt}}{S_{max} - S_{opt}}\right)^2\right)$	Non-interactive	Sopt	2.0719	1.2661	2.8777	<0.0001	0.39	-122.01
			Smax	5.2591	4.6683	5.8499	<0.0001		
			g20	0.3467	0.2507	0.4427	<0.0001		
			theta	0.9694	0.9322	1.0067	<0.0001		
ST12		Non-interactive	gmax	0.5179	0.4033	0.6326	<0.0001	0.50	-128.04
			Sopt	2.2804	1.7511	2.8097	<0.0001		

	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2}\right)^2\right) \times \left(1 - \left(\frac{S - S_{opt}}{S_{max} - S_{opt}}\right)^2\right)$		Smax	5.2670	4.7976	5.7364	<0.0001		
			Topt	15.5533	13.4107	17.6960	<0.0001		
			w	22.9844	15.9500	30.0188	<0.0001		
ST14	$\mu = \mu_{max} \times e^{-k_T \times (T - T_{opt})^2} \times \left(1 - \left(\frac{S - S_{opt}}{S_{max} - S_{opt}}\right)^2\right)$	Non-interactive	gmax	0.5677	0.4363	0.6992	<0.0001	0.53	-130.43
			Sopt	2.2623	1.7312	2.7935	<0.0001		
			Smax	5.2897	4.8400	5.7395	<0.0001		
			Topt	15.1495	13.5533	16.7458	<0.0001		
			kT	0.0145	0.0046	0.0244	<0.01		
ST16	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2}\right)^2\right) \times \begin{cases} e^{-k_{S1} \times (S - S_{opt})^2} \; for \; S \leq S_{opt} \\ e^{-k_{S2} \times (S - S_{opt})^2} \; for \; S > S_{opt} \end{cases}$	Non-interactive	μmax	0.5699	0.4105	0.7292	<0.0001	0.46	-123.02
			Sopt	2.0956	0.7744	3.4168	<0.005		
			kS1	0.2545	-0.3431	0.8522	0.39		
			kS2	0.1976	-0.1064	0.5016	020		
			Topt	15.9072	13.9811	17.8332	<0.0001		
			w	22.1147	15.7464	28.4830	<0.0001		
ST17	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w \times (1 + a_{ST} \times S)/2}\right)^2\right) \times \begin{cases} e^{-k_{S1} \times (S - S_{opt})^2} \; for \; S \leq S_{opt} \\ e^{-k_{S2} \times (S - S_{opt})^2} \; for \; S > S_{opt} \end{cases}$	Interactive	μmax	0.5837	0.4492	0.7183	<0.0001	0.59	-131.76
			Sopt	2.8697	1.5426	4.1968	0.0001		
			kS1	0.1179	-0.0643	0.3002	0.20		
			kS2	0.3161	-0.2465	0.8786	0.26		
			Topt	15.8588	14.6890	17.0286	<0.0001		
			w	32.8157	23.9205	41.7109	<0.0001		
			aST	-0.1497	-0.1809	-0.1184	<0.0001		
ST18	$\mu = \mu_{max} \times e^{-k_T \times (T - T_{opt})^2} \times \begin{cases} e^{-k_{S1} \times (S - S_{opt})^2} \; for \; S \leq S_{opt} \\ e^{-k_{S2} \times (S - S_{opt})^2} \; for \; S > S_{opt} \end{cases}$	Non-interactive	μmax	0.6153	0.4352	0.7954	<0.0001	0.50	-125.52
			Sopt	2.5556	1.1274	3.9838	<0.001		
			kS1	0.1192	-0.1403	0.3788	0.36		
			kS2	0.3014	-0.2630	0.8658	0.29		
			Topt	15.3173	13.8052	16.8293	<0.0001		
			kT	0.0163	0.0053	0.0273	<0.005		
ST19	$\mu = \mu_{max} \times e^{-k_T \times (T - T_{opt})^2} \times e^{-k_S \times (S - S_{opt})^2}$	Non-interactive	μmax	0.6270	0.4522	0.8018	<0.0001	0.50	-127.49
			Sopt	2.1865	1.7372	2.6358	<0.0001		
			kS	0.2139	0.0587	0.3691	<0.01		
			Topt	15.3972	13.8789	16.9156	<0.0001		
			kT	0.0159	0.0053	0.0264	<0.005		

ST20	$\mu = \mu_{max} \times e^{-k_T \times (T-T_{opt})^2} \times (1 + a \times S)$	Non-interactive	gmax	0.6399	0.4268	0.8530	<0.0001	0.31	-117.07
			a	-0.1464	-0.2042	-0.0887	<0.0001		
			Topt	14.3144	11.7006	16.9282	<0.0001		
			kT	0.0123	-2.6719E-05	0.0246	0.05		
ST21	$\mu = \mu_{max} \times e^{-k_T \times (T-T_{opt})^2} \times (1 + a \times (1 + a_{ST} \times T) \times S)$	Interactive	gmax	0.6749	0.4800	0.8698	<0.0001	0.40	-120.46
			a	-0.4000	-0.6236	-0.1764	<0.001		
			Topt	12.2481	7.8229	16.6734	<0.0001		
			kT	0.0119	-0.0003	0.0241	0.05		
			aST	-0.0453	-0.0649	-0.0256	<0.0001		
ST22	$\mu = \mu_{max} \times e^{-(k_T \times (1 + a_{ST} \times S)) \times (T-T_{opt})^2} \times (1 + a \times S)$	Interactive	gmax	0.7827	0.5550	1.0105	<0.0001	0.35	-117.83
			a	-0.1797	-0.2167	-0.1427	<0.0001		
			Topt	13.6861	11.9385	15.4337	<0.0001		
			kT	0.0338	0.0049	0.0628	<0.05		
			aST	-0.2589	-0.3991	-0.1187	<0.001		
ST23	$\mu = \mu_{max} \times \begin{cases} e^{-k_T \times (T-T_{opt})^2} & for\ T \le T_{opt} \\ e^{-(k_T \times (1 + a_{ST} \times S)) \times (T-T_{opt})^2} & for\ T > T_{opt} \end{cases} \times (1 + a \times S)$	Interactive	gmax	0.7984	0.5493	1.0474	<0.0001	0.37	-118.88
			a	-0.1728	-0.2163	-0.1293	<0.0001		
			Topt	13.3368	11.8580	14.8156	<0.0001		
			kT	0.0309	0.0068	0.0549	<0.05		
			aST	-0.2553	-0.3898	-0.1208	<0.001		
4	$\mu = a + b_1 \times S + c_1 \times T + b_2 \times S^2 + c_2 \times T^2$	Non-interactive	a	-0.4642	-1.1551	0.2268	0.18	0.51	-128.74
			b1	0.1897	0.0468	0.3326	<0.05		
			c1	0.1007	0.0170	0.1844	<0.05		
			b2	-0.0457	-0.0694	-0.0220	<0.0005		
			c2	-0.0033	-0.0057	-0.0009	<0.01		
5	$\mu = a + b_1 \times S + c_1 \times T + b_2 \times S^2 + c_2 \times T^2 + d \times S \times T$	Interactive	a	-0.3481	-1.2761	0.5799	0.45	0.51	-126.9
			b1	0.1494	-0.1068	0.4057	0.24		
			c1	0.0916	-0.0059	0.1891	0.06		
			b2	-0.0437	-0.0699	-0.0175	<0.005		
			c2	-0.0032	-0.0057	-0.0006	<0.05		
			d	0.0019	-0.0079	0.0116	0.70		

Empirical modelling for *Cyclotella meneghiniana*

Table S6. Results of empirical modelling the growth rate of *Cyclotella meneghiniana* at various temperature and electrical conductivity

ID	Equation	Interaction	Estimated coefficients				*p*	R^2	AIC
			Parameter	Mean	Low-95% confidence interval	Up-95% confidence interval			
ST5	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2}\right)^2\right) \times e^{-k_S \times (S - S_{opt})^2}$	Non-interactive	gmax	0.7941	-12.3711	13.9593	0.90	0.52	-32.35
			Sopt	0.6714	-0.5517	1.8946	0.25		
			kS	8.1865	-197.4462	213.8192	0.93		
			Topt	17.5724	-5.6624	40.8073	0.12		
			w	43.7472	-165.1991	252.6935	0.65		
ST15	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w \times (1 + a_{ST} \times S)/2}\right)^2\right) \times e^{-k_S \times (S - S_{opt})^2}$	Interactive	gmax	0.8862	-0.3230	2.0953	0.13	0.80	-43.90
			Sopt	0.6946	0.5815	0.8078	<0.0001		
			kS	8.3844	-5.5104	22.2793	0.21		
			Topt	17.3311	13.9071	20.7551	<0.0001		
			w	59.5962	-1.7673	120.9596	0.06		
			aST	-0.6176	-0.6478	-0.5873	<0.0001		
ST6	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2}\right)^2\right) \times \frac{S_{tox}^2}{S_{tox}^2 + S^2}$	Non-interactive	gmax	1.1435	-3.6159	5.9028	0.61	0.40	-31.06
			Stox	0.3837	-0.9310	1.6985	0.54		
			Topt	17.4092	-10.7580	45.5764	0.20		
			w	44.8950	-220.6810	310.4711	0.72		
ST7	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w \times (1 + a_{ST} \times S)/2}\right)^2\right) \times \frac{S_{tox}^2}{S_{tox}^2 + S^2}$	Interactive	gmax	0.7028	-0.0270	1.4327	0.06	0.54	-33.02
			Stox	1.0195	-0.5274	2.5664	0.17		
			Topt	17.9600	14.8567	21.0634	<0.0001		
			w	23.8644	12.1770	35.5518	<0.001		
			aST	-0.2767	-0.3190	-0.2343	<0.0001		
ST14	$\mu = \mu_{max} \times e^{-k_T \times (T - T_{opt})^2} \times \left(1 - \left(\frac{S - S_{opt}}{S_{max} - S_{opt}}\right)^2\right)$	Non-interactive	gmax	0.7245	-0.0195	1.4684	0.06	0.36	-28.09
			Sopt	0.5586	-0.7045	1.8217	0.35		
			Smax	1.3806	1.0554	1.7058	<0.0001		
			Topt	12.6795	10.4587	14.9002	<0.0001		
			kT	0.0672	-0.0165	0.1509	0.10		

ST19	$\mu = \mu_{max} \times e^{-k_T \times (T-T_{opt})^2} \times e^{-k_S \times (S-S_{opt})^2}$	Non-interactive	gmax	0.7947	-12.3438	13.9332	0.90	0.52	-32.35
			Sopt	0.6714	-0.5487	1.8915	0.25		
			kS	8.1857	-196.8737	213.2450	0.93		
			Topt	17.5680	-6.6448	41.7808	0.14		
			kT	0.0022	-0.0207	0.0252	0.83		
ST21	$\mu = \mu_{max} \times e^{-k_T \times (T-T_{opt})^2} \times (1 + a \times (1 + a_{ST} \times T) \times S)$	Interactive	gmax	0.8313	0.2452	1.4174	<0.01	0.53	-32.72
			a	-1.2154	-1.8982	-0.5327	<0.005		
			Topt	12.8148	0.3357	25.2938	<0.05		
			kT	0.0090	-0.0186	0.0367	0.49		
			aST	-0.0317	-0.0479	-0.0154	<0.005		
ST24	$\mu = (\mu_{20} \times \theta^{T-20}) \times \frac{S_{tox}^2}{S_{tox}^2 + S^2}$	Non-interactive	Stox	0.3559	-0.9458	1.6576	0.56	0.40	-33.02
			g20	1.1736	-4.2259	6.5731	0.65		
			theta	0.9995	0.8859	1.1130	<0.0001		
ST25	$\mu = (\mu_{20} \times \theta^{T-20}) \times e^{-k_S \times (S-S_{opt})^2}$	Non-interactive	Sopt	0.6694	-0.5749	1.9137	0.26	0.52	-34.29
			kS	8.2553	-194.4516	210.9622	0.93		
			g20	0.7449	-11.4302	12.9200	0.90		
			theta	1.0004	0.9014	1.0995	<0.0001		
ST26	$\mu = \mu_{max} \times \begin{cases} e^{-k_{T1} \times (T-T_{opt})^2} \; for \; T \leq T_{opt} \\ e^{-k_{T2} \times (T-T_{opt})^2} \; for \; T > T_{opt} \end{cases} \times e^{-k_S \times (S-S_{opt})^2}$	Non-interactive	gmax	0.7977	-14.8652	16.4607	0.91	0.52	-30.35
			Sopt	0.6719	-0.7588	2.1025	0.32		
			kS	8.2306	-235.4385	251.8998	0.94		
			Topt	16.6194	-108.7584	141.9971	0.77		
			kT1	0.0030	-0.1183	0.1243	0.96		
			kT2	0.0017	-0.0599	0.0633	0.95		
4	$\mu = a + b_1 \times S + c_1 \times T + b_2 \times S^2 + c_2 \times T^2$	Non-interactive	a	-0.4788	-2.3141	1.3564	0.58	0.58	-34.25
			b1	-0.6477	-1.2981	0.0026	0.05		
			c1	0.1530	-0.0676	0.3736	0.15		
			b2	0.0993	-0.0852	0.2839	0.26		
			c2	-0.0043	-0.0107	0.0020	0.16		
5	$\mu = a + b_1 \times S + c_1 \times T + b_2 \times S^2 + c_2 \times T^2 + d \times S \times T$	Non-interactive	a	-0.2161	-2.5808	2.1486	0.84	0.58	-32.52
			b1	-0.8278	-1.9867	0.3312	0.14		
			c1	0.1341	-0.1180	0.3861	0.26		
			b2	0.0859	-0.1203	0.2922	0.38		

			c2	-0.0041	-0.0109	0.0026	0.20		
			d	0.0119	-0.0498	0.0735	0.68		

Empirical modelling for *Melosira varians*

Table S7. Results of empirical modelling the growth rate of *Melosira varians* at various temperature and electrical conductivity

ID	Equation	Interaction	Estimated coefficients				*p*	R^2	AIC
			Parameter	Mean	Low-95% confidence interval	Up-95% confidence interval			
ST1	$\mu = \left(c \times e^{d \times T} \times \left(1 - \left(\frac{T - z}{w/2} \right)^2 \right) \right) \times e^{-k_S \times (S - S_{opt})^2}$	Non-interactive	Sopt	0.7009	0.5012	0.9007	<0.0001	0.22	-38.86
			kS	10.7096	-25.7643	47.1835	0.53		
			c	9.8975	-112.3689	132.1639	0.86		
			d	-0.1603	-0.9052	0.5847	0.65		
			z	16.2469	9.6120	22.8819	<0.0005		
			w	14.0388	-0.6229	28.7004	<0.06		
ST27	$\mu = \left(c \times e^{d \times T} \times \left(1 - \left(\frac{T - z}{w/2} \right)^2 \right) \right) \times e^{-k_S \times (1 + a_{ST} \times T) \times (S - S_{opt})^2}$	Interactive	Sopt	0.6952	0.4181	0.9724	<0.0005	0.42	-42.19
			kS	23.0454	-42.1546	88.2454	0.45		
			c	0.6979	-10.5736	11.9695	0.89		
			d	-0.0259	-1.0230	0.9713	0.96		
			z	14.2371	-36.2649	64.7390	0.55		
			w	21.5227	-79.4530	122.4984	0.65		
			aST	-0.0493	-0.0528	-0.0459	<0.0001		
ST28	$\mu = \left(c \times e^{d \times T} \times \left(1 - \left(\frac{T - z}{w/2} \right)^2 \right) \right) \times \begin{cases} e^{-k_S \times (S - S_{opt})^2} & for\ S \le S_{opt} \\ e^{-(k_S \times (1 + a_{ST} \times T)) \times (S - S_{opt})^2} & for\ S > S_{opt} \end{cases}$	Interactive	Sopt	0.6265	0.4383	0.8146	<0.0001	0.44	-42.85
			kS	20.4467	-35.3825	76.2759	0.44		
			c	0.7362	-12.4101	13.8825	0.90		
			d	-0.0160	-1.0697	1.0377	0.97		
			z	14.6268	-30.5048	59.7584	0.49		
			w	20.7437	-69.4902	110.9775	0.62		
			aST	-0.0492	-0.0526	-0.0458	<0.0001		
ST5	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2} \right)^2 \right) \times e^{-k_S \times (S - S_{opt})^2}$	Non-interactive	gmax	0.6177	0.7566	0.8164	0.43	0.20	-40.51
			Sopt	0.6650	0.1179	5.6421	<0.0001		
			kS	10.5056	15.3963	0.6823	0.51		
			Topt	14.7192	3.8790	3.7946	<0.005		
			w	17.0222	7.1947	2.3659	<0.05		

ST29	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2}\right)^2\right) \times e^{-(k_S \times (1 + a_{ST} \times T)) \times (S - S_{opt})^2}$	Interactive	gmax	0.4661	0.0558	0.8763	<0.05	0.31	-44.10
			Sopt	0.6955	0.4175	0.9736	<0.0001		
			kS	22.2406	-30.2970	74.7781	<0.37		
			Topt	13.3857	0.7004	26.0710	<0.05		
			w	23.2249	-2.1592	48.6091	0.07		
			aST	-0.0493	-0.0523	-0.0463	<0.0001		
ST30	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2}\right)^2\right) \times \begin{cases} e^{-k_S \times (S - S_{opt})^2} & for\ S \le S_{opt} \\ e^{-(k_S \times (1 + a_{ST} \times T)) \times (S - S_{opt})^2} & for\ S > S_{opt} \end{cases}$	Interactive	gmax	0.5710	0.2618	2.1811	<0.05	0.44	-44.78
			Sopt	0.6297	0.0843	7.4710	<0.0001		
			kS	19.9064	18.5801	1.0714	0.31		
			Topt	14.5019	3.6303	3.9947	<0.005		
			w	20.9930	7.2639	2.8900	<0.05		
			aST	-0.0491	0.0013	-37.3647	<0.0001		
ST9	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2}\right)^2\right) \times (1 + a \times S)$	Non-interactive	gmax	0.4424	0.0130	0.8718	<0.05	0.21	-42.61
			a	-0.4636	-0.7679	-0.1593	<0.01		
			Topt	15.5378	9.5430	21.5326	<0.0001		
			w	18.7660	3.8308	33.7012	<0.05		
ST31	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2}\right)^2\right) \times (1 + a \times (1 + a_{ST} \times T) \times S)$	Interactive	gmax	0.5720	0.2018	2.8349	<0.05	0.31	-43.25
			a	-1.2476	0.4318	-2.8893	<0.05		
			Topt	13.9414	5.3215	2.6198	<0.05		
			w	22.4565	11.5582	1.9429	0.07		
			aST	-0.0345	0.0087	-3.9466	<0.005		
ST10	$\mu = (\mu_{20} \times \theta^{T-20}) \times \left(1 - \left(\frac{S - S_{opt}}{S_{max} - S_{opt}}\right)^2\right)$	Non-interactive	Sopt	0.9647	-0.9309	2.8603	0.29	0.19	-42.15
			Smax	2.3719	1.3568	3.3871	<0.0005		
			g20	0.1683	-0.0172	0.3537	0.07		
			theta	0.9977	0.8230	1.1724	<0.0001		
ST11	$\mu = (\mu_{20} \times \theta^{T-20}) \times \left(1 - \left(\frac{S - S_{opt}}{S_{max} \times (1 + a_{ST} \times T) - S_{opt}}\right)^2\right)$	Interactive	Sopt	1.1997	1.0606	1.3387	<0.0001	0.57	-51.79
			Smax	6.4062	3.8139	8.9986	<0.0001		
			g20	0.3011	0.1457	0.4564	<0.005		
			theta	1.1050	0.9782	1.2319	<0.0001		
			aST	-0.0289	-0.0337	-0.0240	<0.0001		
ST12		Non-interactive	gmax	0.2704	-0.0230	0.5639	0.07	0.23	-41.18
			Sopt	0.8225	-1.9686	3.6136	0.54		

	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2}\right)^2\right) \times \left(1 - \left(\frac{S - S_{opt}}{S_{max} - S_{opt}}\right)^2\right)$		Smax	2.5164	1.4672	3.5657	<0.0005		
			Topt	16.8897	11.9248	21.8545	<0.0001		
			w	18.9713	3.8990	34.0437	<0.05		
ST 14	$\mu = \mu_{max} \times e^{-k_T \times (T - T_{opt})^2} \times \left(1 - \left(\frac{S - S_{opt}}{S_{max} - S_{opt}}\right)^2\right)$	Non-interactive	gmax	0.5562	-0.0313	1.1437	0.06	0.28	-42.44
			Sopt	0.6749	-0.1424	1.4922	0.10		
			Smax	1.4095	1.0967	1.7223	<0.0001		
			Topt	13.1191	11.1943	15.0439	<0.0001		
			kT	0.0745	-0.0029	0.1520	0.06		
ST20	$\mu = \mu_{max} \times e^{-k_T \times (T - T_{opt})^2} \times (1 + a \times S)$	Non-interactive	gmax	0.4828	-0.1428	1.1084	0.12	0.19	-42.36
			a	-0.5014	-0.8531	-0.1496	<0.01		
			Topt	14.7842	8.3267	21.2417	<0.0005		
			kT	0.0193	-0.0421	0.0807	0.51		
ST21	$\mu = \mu_{max} \times e^{-k_T \times (T - T_{opt})^2} \times (1 + a \times (1 + a_{ST} \times T) \times S)$	Interactive	gmax	0.6549	0.0038	1.3060	<0.05	0.30	-42.93
			a	-1.2786	-2.2884	-0.2687	<0.05		
			Topt	14.2074	8.1574	20.2575	<0.0005		
			kT	0.0191	-0.0260	0.0641	0.38		
			aST	-0.0345	-0.0555	-0.0135	<0.005		
ST25	$\mu = (\mu_{20} \times \theta^{T-20}) \times e^{-k_S \times (S - S_{opt})^2}$	Non-interactive	Sopt	0.7950	0.5379	1.0520	<0.0001	0.17	-41.72
			kS	10.1546	-18.1701	38.4792	0.45		
			g20	0.3707	-0.5337	1.2752	0.39		
			theta	0.9843	0.7747	1.1939	<0.0001		
ST32	$\mu = (\mu_{20} \times \theta^{T-20}) \times \begin{cases} e^{-k_S \times (S - S_{opt})^2} & for\ S \le S_{opt} \\ e^{-(k_S \times (1 + a_{ST} \times T)) \times (S - S_{opt})^2} & for\ S > S_{opt} \end{cases}$	Interactive	Sopt	0.7315	0.4242	1.0388	<0.0005	0.22	41.02
			kS	11.6803	-17.6607	41.0212	0.41		
			g20	0.3220	-0.1691	0.8131	0.18		
			theta	0.9704	0.8098	1.1311	<0.0001		
			aST	-0.0362	-0.0582	-0.0142	<0.005		
4	$\mu = a + b_1 \times S + c_1 \times T + b_2 \times S^2 + c_2 \times T^2$	Non-interactive	a	-0.7675	-2.5157	0.9808	0.36	0.26	-41.89
			b1	0.2077	-0.4333	0.8488	0.50		
			c1	0.1104	-0.1008	0.3215	0.28		
			b2	-0.1053	-0.2883	0.0777	0.24		
			c2	-0.0032	-0.0093	0.0028	0.27		
5	$\mu = a + b_1 \times S + c_1 \times T + b_2 \times S^2 + c_2 \times T^2 + d \times S \times T$	Interactive	a	-0.0452	-1.7954	1.7050	0.96	0.45	-45.37

			b1	-0.5535	-1.5422	0.4353	0.25		
			c1	0.0791	-0.1141	0.2723	0.39		
			b2	-0.1438	-0.3137	0.0261	0.09		
			c2	-0.0038	-0.0093	0.0017	0.16		
			d	0.0460	-0.0025	0.0945	0.06		

Empirical modelling for *Ulnaria acus*

Table S8. Results of empirical modelling the growth rate of *Ulnaria acus* at various temperature and electrical conductivity

ID	Equation	Interaction	Estimated coefficients				*p*	R^2	AIC
			Parameter	Mean	Low-95% confidence interval	Up-95% confidence interval			
ST1	$\mu = \left(c \times e^{d \times T} \times \left(1 - \left(\frac{T - z}{w/2} \right)^2 \right) \right) \times e^{-k_S \times (S - S_{opt})^2}$	Non-interactive	Sopt	1.1139	0.9000	1.3278	<0.0001	0.63	-85.89
			kS	1.7753	0.3045	3.2461	<0.05		
			c	0.1400	-0.4962	0.7762	0.65		
			d	0.0598	-0.1566	0.2761	0.57		
			z	21.1944	13.5530	28.8357	<0.0001		
			w	22.4107	9.4089	35.4124	<0.005		
ST5	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2} \right)^2 \right) \times e^{-k_S \times (S - S_{opt})^2}$	Non-interactive	gmax	0.5126	0.3207	0.7044	<0.0001	0.62	-87.46
			Sopt	1.1098	0.8986	1.3210	<0.0001		
			kS	1.7636	0.3249	3.2023	<0.05		
			Topt	25.3855	14.7656	36.0054	<0.0001		
			w	30.3894	6.5777	54.2012	<0.05		
ST9	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2} \right)^2 \right) \times (1 + a \times S)$	Non-interactive	gmax	0.5382	0.1127	4.7770	<0.0001	0.45	-80.17
			a	-0.3909	0.0575	-6.7949	<0.0001		
			Topt	23.2167	3.5740	6.4960	<0.0001		
			w	26.5510	8.6327	3.0756	<0.01		
ST10	$\mu = (\mu_{20} \times \theta^{T-20}) \times \left(1 - \left(\frac{S - S_{opt}}{S_{max} - S_{opt}} \right)^2 \right)$	Non-interactive	Sopt	1.0659	0.5744	1.5574	<0.0005	0.52	-83.31
			Smax	2.4044	2.1342	2.6747	<0.0001		
			g20	0.2182	0.1145	0.3219	<0.0005		
			theta	1.0953	1.0147	1.1759	<0.0001		
ST12	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2} \right)^2 \right) \times \left(1 - \left(\frac{S - S_{opt}}{S_{max} - S_{opt}} \right)^2 \right)$	Non-interactive	gmax	0.4201	0.1488	2.8225	<0.05	0.58	-84.93
			Sopt	1.0699	0.2164	4.9446	<0.0001		
			Smax	2.4110	0.1228	19.6302	<0.0001		
			Topt	30.7213	13.5810	2.2621	<0.05		
			w	38.8488	28.4200	1.3670	0.19		
ST33		Interactive	gmax	0.4144	0.3021	0.5266	<0.0001	0.68	-89.72

	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt} \times (1 + a_{ST} \times S)}{w/2}\right)^2\right) \times \left(1 - \left(\frac{S - S_{opt}}{S_{max} - S_{opt}}\right)^2\right)$		Sopt	1.0940	0.7758	1.4123	<0.0001		
			Smax	2.3372	2.1360	2.5385	<0.0001		
			Topt	21.9813	14.8409	29.1216	<0.0001		
			w	28.0536	11.7264	44.3808	<0.005		
			aST	0.0901	0.0033	0.1768	<0.05		
ST34	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w \times (1 + a_{ST} \times S)/2}\right)^2\right) \times \left(1 - \left(\frac{S - S_{opt}}{S_{max} - S_{opt}}\right)^2\right)$	Interactive	gmax	0.4122	0.2976	0.5269	<0.0001	0.67	-88.75
			Sopt	1.1035	0.7959	1.4111	<0.0001		
			Smax	2.3344	2.1254	2.5435	<0.0001		
			Topt	24.9932	16.5586	33.4278	<0.0001		
			w	33.7671	13.2334	54.3008	<0.005		
			aST	-0.1141	-0.2029	-0.0253	<0.05		
ST14	$\mu = \mu_{max} \times e^{-k_T \times (T - T_{opt})^2} \times \left(1 - \left(\frac{S - S_{opt}}{S_{max} - S_{opt}}\right)^2\right)$	Non-interactive	gmax	0.4609	0.2773	0.6445	<0.0001	0.61	-86.65
			Sopt	1.0714	0.6744	1.4684	<0.0001		
			Smax	2.3671	2.1350	2.5993	<0.0001		
			Topt	24.0609	21.1765	26.9454	<0.0001		
			kT	0.0182	-0.0021	0.0384	0.08		
ST35	$\mu = \mu_{max} \times e^{-k_T \times \left(T - T_{opt} \times (1 + a_{ST} \times S)\right)^2} \times \left(1 - \left(\frac{S - S_{opt}}{S_{max} - S_{opt}}\right)^2\right)$	Interactive	gmax	0.5160	0.3603	0.6717	<0.0001	0.74	-94.70
			Sopt	1.0790	0.7930	1.3650	<0.0001		
			Smax	2.2884	2.0209	2.5559	<0.0001		
			Topt	17.1164	12.2437	21.9892	<0.0001		
			kT	0.0151	0.0007	0.0295	<0.05		
			aST	0.3433	0.0059	0.6807	<0.05		
ST16	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2}\right)^2\right) \times \begin{cases} e^{-k_{S1} \times (S - S_{opt})^2} & for\ S \le S_{opt} \\ e^{-k_{S2} \times (S - S_{opt})^2} & for\ S > S_{opt} \end{cases}$	Non-interactive	gmax	0.5004	0.2844	0.7164	0.0001	0.65	-87.68
			Sopt	1.4053	0.9841	1.8264	<0.0001		
			kS1	0.6698	-0.6005	1.9401	0.28		
			kS2	5.2452	-6.2038	16.6942	0.35		
			Topt	24.3653	16.4759	32.2547	<0.0001		
			w	28.5753	10.3970	46.7535	<0.005		
ST17		Interactive	gmax	0.4829	0.2867	0.6790	<0.0001	0.71	-90.30
			Sopt	1.4185	0.9223	1.9147	<0.0001		
			kS1	0.7024	-0.5589	1.9637	0.26		
			kS2	3.8025	-4.9454	12.5504	0.37		

	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w \times (1 + a_{ST} \times S)/2}\right)^2\right) \times \begin{cases} e^{-k_{S1} \times (S - S_{opt})^2} & for\ S \le S_{opt} \\ e^{-k_{S2} \times (S - S_{opt})^2} & for\ S > S_{opt} \end{cases}$		Topt	26.6723	14.4455	38.8992	<0.0005		
			w	55.5781	8.9274	102.2287	<0.05		
			aST	-0.2959	-0.2983	-0.2935	<0.0001		
ST36	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2}\right)^2\right) \times \begin{cases} e^{-k_{S1} \times (S - S_{opt})^2} & for\ S \le S_{opt} \\ e^{-(k_{S2} \times (1 + a_{ST} \times T)) \times (S - S_{opt})^2} & for\ S > S_{opt} \end{cases}$	Interactive	gmax	0.4929	0.2645	0.7213	<0.0005	0.68	-87.56
			Sopt	1.4313	1.0258	1.8367	<0.0001		
			kS1	0.5814	-0.5494	1.7123	0.29		
			kS2	21.6426	-55.8491	99.1343	0.56		
			Topt	22.8616	17.0034	28.7197	<0.0001		
			w	26.6421	12.0932	41.1911	<0.005		
			aST	-0.0310	-0.0506	-0.0113	<0.005		
ST18	$\mu = \mu_{max} \times e^{-k_T \times (T - T_{opt})^2} \times \begin{cases} e^{-k_{S1} \times (S - S_{opt})^2} & for\ S \le S_{opt} \\ e^{-k_{S2} \times (S - S_{opt})^2} & for\ S > S_{opt} \end{cases}$	Non-interactive	gmax	0.5744	0.2948	0.8541	<0.0005	0.67	-88.67
			Sopt	1.4137	1.0174	1.8100	<0.0001		
			kS1	0.6544	-0.5520	1.8608	0.27		
			kS2	5.6557	-6.2633	17.5747	0.33		
			Topt	23.2647	20.4988	26.0307	<0.0001		
			kT	0.0143	-0.0024	0.0311	0.09		
ST37	$\mu = \mu_{max} \times \begin{cases} e^{-k_T \times (T - T_{opt})^2} & for\ T \le T_{opt} \\ e^{-(k_T \times (1 + a_{ST} \times S)) \times (T - T_{opt})^2} & for\ T > T_{opt} \end{cases} \times \begin{cases} e^{-k_{S1} \times (S - S_{opt})^2} & for\ S \le S_{opt} \\ e^{-k_{S2} \times (S - S_{opt})^2} & for\ S > S_{opt} \end{cases}$	Interactive	gmax	0.5408	0.2678	0.8137	<0.001	0.69	-88.43
			Sopt	1.3200	0.8528	1.7872	<0.0001		
			kS1	0.4401	-0.7854	1.6657	0.46		
			kS2	4.5380	-4.4478	13.5238	0.30		
			Topt	20.9279	18.0254	23.8305	<0.0001		
			kT	0.0265	-0.0016	0.0545	0.06		
			aST	-0.6768	-1.1140	-0.2395	<0.005		
ST38	$\mu = \mu_{max} \times e^{-k_T \times (T - T_{opt})^2} \times \begin{cases} e^{-k_{S1} \times (S - S_{opt})^2} & for\ S \le S_{opt} \\ e^{-(k_{S2} \times (1 + a_{ST} \times T)) \times (S - S_{opt})^2} & for\ S > S_{opt} \end{cases}$	Interactive	gmax	0.5707	0.2903	0.8512	<0.0005	0.70	-89.24
			Sopt	1.4354	1.0540	1.8169	<0.0001		
			kS1	0.5745	-0.4984	1.6473	0.28		
			kS2	24.0221	-55.9700	104.0143	0.54		
			Topt	22.5906	19.9116	25.2697	<0.0001		
			kT	0.0146	-0.0013	0.0306	0.07		
			aST	-0.0318	-0.0487	-0.0149	<0.001		

ST19	$\mu = \mu_{max} \times e^{-k_T \times (T-T_{opt})^2} \times e^{-k_S \times (S-S_{opt})^2}$	Non-interactive	gmax	0.5798	0.3263	0.8333	0.0001	0.63	-88.08
			Sopt	1.1072	0.9012	1.3132	<0.0001		
			kS	1.7919	0.3716	3.2123	<0.05		
			Topt	23.7021	20.4429	26.9613	<0.0001		
			kT	0.0136	-0.0042	0.0315	0.13		
ST39	$\mu = \mu_{max} \times \begin{cases} e^{-k_T \times (T-T_{opt})^2} & for\ T \le T_{opt} \\ e^{-(k_T \times (1+a_{ST} \times S)) \times (T-T_{opt})^2} & for\ T > T_{opt} \end{cases} \times e^{-k_S \times (S-S_{opt})^2}$	Interactive	gmax	0.5640	0.3092	0.8188	<0.0005	0.66	-88.09
			Sopt	0.9640	0.6789	1.2491	<0.0001		
			kS	1.7272	0.3305	3.1239	<0.05		
			Topt	20.8431	17.8762	23.8099	<0.0001		
			kT	0.0272	-0.0021	0.0564	0.07		
			aST	-0.7481	-1.1783	-0.3179	<0.005		
ST20	$\mu = \mu_{max} \times e^{-k_T \times (T-T_{opt})^2} \times (1 + a \times S)$	Non-interactive	gmax	0.6201	0.2860	0.9541	<0.001	0.46	-80.50
			a	-0.3976	-0.5182	-0.2770	<0.0001		
			Topt	22.6926	19.2135	26.1716	<0.0001		
			kT	0.0141	-0.0067	0.0349	0.17		
ST22	$\mu = \mu_{max} \times e^{-(k_T \times (1+a_{ST} \times S)) \times (T-T_{opt})^2} \times (1 + a \times S)$	Interactive	gmax	0.6555	0.3010	1.0100	<0.001	0.47	-78.93
			a	-0.3984	-0.5056	-0.2912	<0.0001		
			Topt	22.3147	19.4505	25.1788	<0.0001		
			kT	0.0220	-0.0104	0.0544	0.17		
			aST	-0.2246	-0.8248	0.3756	0.44		
ST23	$\mu = \mu_{max} \times \begin{cases} e^{-k_T \times (T-T_{opt})^2} & for\ T \le T_{opt} \\ e^{-(k_T \times (1+a_{ST} \times S)) \times (T-T_{opt})^2} & for\ T > T_{opt} \end{cases} \times (1 + a \times S)$	Interactive	gmax	0.6462	0.3717	0.9208	<0.0001	0.63	-87.97
			a	-0.4063	-0.4428	-0.3699	<0.0001		
			Topt	20.4412	18.2130	22.6694	<0.0001		
			kT	0.0279	0.0042	0.0515	<0.05		
			aST	-0.7746	-1.1365	-0.4127	<0.0005		
ST25	$\mu = (\mu_{20} \times \theta^{T-20}) \times e^{-k_S \times (S-S_{opt})^2}$	Non-interactive	Sopt	1.1107	0.8856	1.3357	<0.0001	0.55	-85.18
			kS	1.8729	0.2306	3.5152	<0.05		
			g20	0.3342	0.1703	0.4980	<0.0005		
			theta	1.0716	1.0009	1.1422	<0.0001		
ST40	$\mu = \left(c \times e^{d \times T} \times \left(1 - \left(\frac{T-z}{w/2} \right)^2 \right) \right) \times \begin{cases} e^{-k_{S1} \times (S-S_{opt})^2} & for\ S \le S_{opt} \\ e^{-k_{S2} \times (S-S_{opt})^2} & for\ S > S_{opt} \end{cases}$	Non-interactive	Sopt	1.4103	0.2021	6.9778	<0.0001	0.66	-86.24
			kS1	0.6720	0.6141	1.0943	0.29		
			kS2	5.3392	5.6106	0.9516	0.35		

			c	0.1439	0.2841	0.5063	0.62		
			d	0.0588	0.0946	0.6214	0.54		
			z	20.8947	3.1121	6.7140	<0.0001		
			w	22.1589	5.0735	4.3676	<0.0005		
ST41	$\mu = \left(c \times e^{d \times T} \times \left(1 - \left(\frac{T - z}{w/2} \right)^2 \right) \right) \times \begin{cases} e^{-k_{S1} \times (S - S_{opt})^2} & for\ S \le S_{opt} \\ e^{-(k_{S2} \times (1 + a_{ST} \times T)) \times (S - S_{opt})^2} & for\ S > S_{opt} \end{cases}$	Interactive	Sopt	1.4375	1.0286	1.8464	<0.0001	0.69	-86.34
			kS1	0.5832	-0.5644	1.7309	0.30		
			kS2	22.9481	-59.7759	105.6721	0.57		
			c	0.1348	-0.4245	0.6942	0.62		
			d	0.0632	-0.1365	0.2629	0.51		
			z	20.0013	13.3508	26.6518	<0.0001		
			w	22.4198	13.6289	31.2107	<0.0001		
			aST	-0.0314	-0.0507	-0.0121	<0.005		
ST42	$\mu = (\mu_{20} \times \theta^{T-20}) \times \begin{cases} e^{-k_{S1} \times (S - S_{opt})^2} & for\ S \le S_{opt} \\ e^{-k_{S2} \times (S - S_{opt})^2} & for\ S > S_{opt} \end{cases}$	Non-interactive	Sopt	1.3703	0.9185	1.8221	<0.0001	0.58	-84.54
			kS1	0.8330	-0.7334	2.3993	0.28		
			kS2	5.1125	-7.3548	17.5798	0.40		
			g20	0.3438	0.1644	0.5232	<0.001		
			theta	1.0661	0.9990	1.1332	<0.0001		
ST43	$\mu = (\mu_{20} \times \theta^{T-20}) \times \begin{cases} e^{-k_{S1} \times (S - S_{opt})^2} & for\ S \le S_{opt} \\ e^{-(k_{S2} \times (1 + a_{ST} \times T)) \times (S - S_{opt})^2} & for\ S > S_{opt} \end{cases}$	Interactive	Sopt	1.4036	0.9287	1.8786	<0.0001	0.60	-84.32
			kS1	0.6944	-0.7087	2.0975	0.31		
			kS2	18.0529	-61.4811	97.5869	0.64		
			g20	0.3522	0.1644	0.5400	<0.001		
			theta	1.0497	0.9804	1.1190	<0.0001		
			aST	-0.0294	-0.0557	-0.0030	<0.05		
ST44	$\mu = \mu_{max} \times \begin{cases} e^{-k_{T1} \times (T - T_{opt})^2} & for\ T \le T_{opt} \\ e^{-k_{T2} \times (T - T_{opt})^2} & for\ T > T_{opt} \end{cases} \times e^{-k_S \times (S - S_{opt})^2}$	Non-interactive	gmax	0.5295	0.1987	0.8602	<0.005	0.64	-86.77
			Sopt	1.0945	0.8858	1.3032	<0.0001		
			kS	1.7912	0.3700	3.2124	<0.05		
			Topt	20.3877	-2.0796	42.8551	0.07		
			kT1	0.0358	-0.2468	0.3183	0.79		
			kT2	0.0015	-0.0205	0.0236	0.89		
ST45		Non-interactive	gmax	0.5349	0.2325	0.8372	<0.005	0.68	-87.48
			Sopt	1.4061	1.0054	1.8068	<0.0001		
			kS1	0.6458	-0.5638	1.8554	0.28		

	$\mu = \mu_{max} \times \begin{cases} e^{-2.3\times\left(\frac{T-T_{opt}}{T_{low}-T_{opt}}\right)^2} & for\ T \le T_{opt} \\ e^{-2.3\times\left(\frac{T-T_{opt}}{T_{high}-T_{opt}}\right)^2} & for\ T > T_{opt} \end{cases} \times \begin{cases} e^{-k_{S1}\times(S-S_{opt})^2} & for\ S \le S_{opt} \\ e^{-k_{S2}\times(S-S_{opt})^2} & for\ S > S_{opt} \end{cases}$		kS2	5.6009	-6.3413	17.5431	0.34		
			Topt	20.2828	0.0966	40.4690	<0.05		
			Tlow	12.3246	2.3590	22.2902	<0.05		
			Thigh	48.5449	-54.5579	151.6477	0.34		
ST46	$\mu = \mu_{max} \times \begin{cases} e^{-2.3\times\left(\frac{T-T_{opt}}{T_{low}-T_{opt}}\right)^2} & for\ T \le T_{opt} \\ e^{-2.3\times\left(\frac{T-T_{opt}}{T_{high}-T_{opt}}\right)^2} & for\ T > T_{opt} \end{cases} \times e^{-k_S\times(S-S_{opt})^2}$	Non-interactive	gmax	0.5294	0.1987	0.8602	<0.005	0.64	-86.77
			Sopt	1.0945	0.8858	1.3032	<0.0001		
			kS	1.7912	0.3700	3.2124	<0.05		
			Topt	20.3874	-2.0884	42.8632	0.07		
			Tlow	12.3679	2.0638	22.6720	<0.05		
			Thigh	59.3284	-205.2985	323.9552	0.64		
4	$\mu = a + b_1 \times S + c_1 \times T + b_2 \times S^2 + c_2 \times T^2$	Non-interactive	a	-0.6098	-1.4728	0.2532	0.16	0.51	-80.87
			b1	0.0178	-0.3352	0.3709	0.92		
			c1	0.0858	-0.0068	0.1784	0.07		
			b2	-0.0555	-0.1587	0.0477	0.28		
			c2	-0.0019	-0.0043	0.0005	0.11		
5	$\mu = a + b_1 \times S + c_1 \times T + b_2 \times S^2 + c_2 \times T^2 + d \times S \times T$	Interactive	a	-0.7052	-1.6648	0.2544	0.14	0.52	-79.24
			b1	0.1178	-0.4181	0.6536	0.65		
			c1	0.0879	-0.0070	0.1829	0.07		
			b2	-0.0606	-0.1680	0.0468	0.25		
			c2	-0.0018	-0.0042	0.0007	0.15		
			d	-0.0043	-0.0212	0.0127	0.60		

Empirical modelling for *Navicula gregaria*

Table S9. Results of empirical modelling the growth rate of *Navicula gregaria* at various temperature and electrical conductivity.

ID	Equation	Interaction	Estimated coefficients				p	R^2	AIC
			Parameter	Mean	Low-95% confidence interval	Up-95% confidence interval			
ST1	$\mu = \left(c \times e^{d \times T} \times \left(1 - \left(\frac{T - z}{w/2} \right)^2 \right) \right) \times e^{-k_S \times (S - S_{opt})^2}$	Non-interactive	Sopt	2.1278	0.2914	3.9642	<0.05	0.86	-229.82
			kS	0.0143	0.0035	0.0252	<0.05		
			c	0.2905	-0.0151	0.5960	0.06		
			d	0.0469	-0.0217	0.1155	0.17		
			Topt	14.0473	9.7561	18.3385	<0.0001		
			w	22.4574	14.1012	30.8135	<0.0001		
ST3	$\mu = \left(c \times e^{d \times T} \times \left(1 - \left(\frac{T - z}{w/2} \right)^2 \right) \right) \times \frac{Stox^2}{Stox^2 + S^2}$	Non-interactive	Stox	9.0106	6.6543	11.3668	<0.0001	0.82	-218.52
			c	0.2965	-0.0605	0.6536	0.10		
			d	0.0479	-0.0312	0.1269	0.23		
			Topt	13.9489	8.8530	19.0449	<0.0001		
ST5	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2} \right)^2 \right) \times e^{-k_S \times (S - S_{opt})^2}$	Non-interactive	gmax	0.6215	0.5687	0.6743	<0.0001	0.86	-228.92
			Sopt	2.1486	0.3365	3.9608	<0.05		
			kS	0.0148	0.0035	0.0261	<0.05		
			Topt	15.8391	15.3257	16.3525	<0.0001		
			w	19.2565	17.8957	20.6173	<0.0001		
ST15	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w \times (1 + a_{ST} \times S)/2} \right)^2 \right) \times e^{-k_S \times (S - S_{opt})^2}$	Interactive	gmax	0.5918	0.4638	0.7198	<0.0001	0.57	-173.43
			Sopt	3.6056	2.8524	4.3588	<0.0001		
			kS	0.0416	0.0166	0.0666	<0.005		
			Topt	15.8663	14.1372	17.5955	<0.0001		
			w	34.8507	25.1704	44.5310	<0.0001		
			aST	-0.0759	-0.0845	-0.0673	<0.0001		
ST6	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2} \right)^2 \right) \times \frac{S_{tox}^2}{S_{tox}^2 + S^2}$	Non-interactive	gmax	0.6427	0.5772	0.7082	<0.0001	0.81	-218.23
			Stox	8.9467	6.5930	11.3004	<0.0001		
			Topt	15.8077	15.2285	16.3870	<0.0001		
			w	19.2604	17.7325	20.7883	<0.0001		

ST8	$\mu = \left(c \times e^{d \times T} \times \left(1 - \left(\frac{T - z}{w/2} \right)^2 \right) \right) \times (1 + a \times S)$	Non-interactive	a	-0.0604	-0.0688	-0.0519	<0.0001	0.86	-229.79
			c	0.3145	-0.0193	0.6484	0.06		
			d	0.0489	-0.0208	0.1186	0.16		
			z	13.9515	9.4685	18.4346	<0.0001		
			w	22.5795	13.8178	31.3411	<0.0001		
ST9	$\mu = \mu_{max} \times \left(1 - \left(\frac{T - T_{opt}}{w/2} \right)^2 \right) \times (1 + a \times S)$	Non-interactive	gmax	0.6942	0.6377	0.7508	<0.0001	0.85	-228.74
			a	-0.0609	-0.0696	-0.0522	<0.0001		
			Topt	15.8302	15.3234	16.3371	<0.0001		
			w	19.1860	17.8537	20.5183	<0.0001		
ST19	$\mu = \mu_{max} \times e^{-k_T \times (T - T_{opt})^2} \times e^{-k_S \times (S - S_{opt})^2}$	Non-interactive	gmax	0.6490	0.5726	0.7254	<0.0001	0.80	-213.24
			Sopt	2.3113	0.4571	4.1654	<0.05		
			kS	0.0165	0.0022	0.0308	<0.05		
			Topt	15.6753	15.0242	16.3264	<0.0001		
			kT	0.0172	0.0123	0.0222	<0.0001		
ST20	$\mu = \mu_{max} \times e^{-k_T \times (T - T_{opt})^2} \times (1 + a \times S)$	Non-interactive	gmax	0.7224	0.6421	0.8026	<0.0001	0.79	-212.62
			a	-0.0617	-0.0723	-0.0512	<0.0001		
			Topt	15.6475	14.9979	16.2971	<0.0001		
			kT	0.0175	0.0125	0.0224	<0.0001		
ST24	$\mu = (\mu_{20} \times \theta^{T-20}) \times \frac{S_{tox}^2}{S_{tox}^2 + S^2}$	Non-interactive	Stox	9.8855	4.2324	15.5387	<0.005	0.38	-161.19
			g20	0.3688	0.2828	0.4548	<0.0001		
			theta	0.9622	0.9341	0.9903	<0.0001		
ST25	$\mu = (\mu_{20} \times \theta^{T-20}) \times e^{-k_S \times (S - S_{opt})^2}$	Non-interactive	Sopt	3.0271	0.6310	5.4232	<0.05	0.42	-162.80
			kS	0.0179	-0.0070	0.0428	0.15		
			g20	0.3728	0.2813	0.4644	<0.0001		
			theta	0.9634	0.9360	0.9907	<0.0001		
ST26	$\mu = \mu_{max} \times \begin{cases} e^{-k_{T1} \times (T - T_{opt})^2} \; for \; T \leq T_{opt} \\ e^{-k_{T2} \times (T - T_{opt})^2} \; for \; T > T_{opt} \end{cases} \times e^{-k_S \times (S - S_{opt})^2}$	Non-interactive	gmax	0.6255	0.5527	0.6983	<0.0001	0.86	-229.82
			Sopt	2.1278	0.2915	3.9642	<0.05		
			kS	0.0143	0.0035	0.0252	<0.05		
			Topt	18.3656	17.3358	19.3954	<0.0001		
			kT1	0.0062	0.0025	0.0100	<0.005		
			kT2	0.0595	0.0155	0.1035	<0.01		
ST46			gmax	0.6255	0.5527	0.6983	<0.0001	0.86	-229.82

	$\mu = \mu_{max} \times \begin{cases} e^{-2.3\times\left(\frac{T-T_{opt}}{T_{low}-T_{opt}}\right)^2} & for\ T \le T_{opt} \\ e^{-2.3\times\left(\frac{T-T_{opt}}{T_{high}-T_{opt}}\right)^2} & for\ T > T_{opt} \end{cases} \times e^{-k_S\times(S-S_{opt})^2}$	Non-interactive	Sopt	2.1278	0.2913	3.9642	<0.05		
			kS	0.0143	0.0035	0.0252	<0.05		
			Topt	18.3656	17.3358	19.3954	<0.0001		
			Tlow	-0.8214	-5.9783	4.3355	0.75		
			Thigh	24.5823	22.9018	26.2627	<0.0001		
ST47	$\mu = \mu_{max} \times \begin{cases} e^{-k_{T1}\times(T-T_{opt})^2} & for\ T \le T_{opt} \\ e^{-k_{T2}\times(T-T_{opt})^2} & for\ T > T_{opt} \end{cases} \times \frac{S_{tox}^2}{S_{tox}^2 + S^2}$	Non-interactive	gmax	0.6468	0.5574	0.7363	<0.0001	0.82	-218.52
			Stox	9.0106	6.6543	11.3668	<0.0001		
			Topt	18.3902	17.2218	19.5587	<0.0001		
			kT1	0.0061	0.0019	0.0103	<0.01		
			kT2	0.0617	0.0080	0.1154	<0.05		
ST48	$\mu = \mu_{max} \times e^{-k_T\times(T-T_{opt})^2} \times \frac{S_{tox}^2}{S_{tox}^2 + S^2}$	Non-interactive	gmax	0.6681	0.5803	0.7559	<0.0001	0.76	-205.29
			Stox	8.8514	6.1899	11.5128	<0.0001		
			Topt	15.6228	14.9097	16.3360	<0.0001		
			kT	0.0173	0.0119	0.0226	<0.0001		
ST49	$\mu = \mu_{max} \times \begin{cases} e^{-k_{T1}\times(T-T_{opt})^2} & for\ T \le T_{opt} \\ e^{-k_{T2}\times(T-T_{opt})^2} & for\ T > T_{opt} \end{cases} \times (1 + a \times S)$	Non-interactive	gmax	0.6984	0.6182	0.7786	<0.0001	0.86	-229.79
			a	-0.0604	-0.0688	-0.0519	<0.0001		
			Topt	18.4222	17.3974	19.4470	<0.0001		
			kT1	0.0633	0.0140	0.1126	<0.05		
			kT2	0.0062	0.0025	0.0099	<0.005		
ST50	$\mu = \mu_{max} \times \begin{cases} e^{-2.3\times\left(\frac{T-T_{opt}}{T_{low}-T_{opt}}\right)^2} & for\ T \le T_{opt} \\ e^{-2.3\times\left(\frac{T-T_{opt}}{T_{high}-T_{opt}}\right)^2} & for\ T > T_{opt} \end{cases} \times \frac{S_{tox}^2}{S_{tox}^2 + S^2}$	Non-interactive	gmax	0.6468	0.5574	0.7363	<0.0001	0.82	-218.52
			Stox	9.0106	6.6543	11.3668	<0.0001		
			Topt	18.3902	17.2218	19.5587	<0.0001		
			Tlow	-0.9866	-6.9257	4.9524	0.74		
			Thigh	24.4958	22.5474	26.4441	<0.0001		
ST51	$\mu = \mu_{max} \times \begin{cases} e^{-2.3\times\left(\frac{T-T_{opt}}{T_{low}\times(1+a_{ST}\times S)-T_{opt}}\right)^2} & for\ T \le T_{opt} \\ e^{-2.3\times\left(\frac{T-T_{opt}}{T_{high}-T_{opt}}\right)^2} & for\ T > T_{opt} \end{cases} \times \frac{S_{tox}^2}{S_{tox}^2 + S^2}$	Interactive	gmax	0.5731	0.4944	0.6519	<0.0001	0.80	-211.67
			Stox	9.1908	6.6570	11.7246	<0.0001		
			Topt	19.1177	17.4523	20.7831	<0.0001		
			Tlow	-56.5669	-105.6187	-7.5151	<0.05		
			Thigh	24.7317	22.7942	26.6692	<0.0001		
			aST	-0.4243	-0.4933	-0.3553	<0.0001		
ST52		Interactive	gmax	0.6221	0.5370	0.7071	<0.0001	0.83	-219.61
			Stox	10.1490	6.9823	13.3156	<0.0001		

	$\mu = \mu_{max} \times \begin{cases} e^{-2.3\times\left(\frac{T-T_{opt}}{T_{low}-T_{opt}}\right)^2} & for\ T \le T_{opt} \\ e^{-2.3\times\left(\frac{T-T_{opt}}{T_{high}\times(1+a_{ST}\times S)-T_{opt}}\right)^2} & for\ T > T_{opt} \end{cases} \times \frac{S_{tox}^2}{S_{tox}^2 + S^2}$		Topt	18.7591	17.6079	19.9102	<0.0001		
			Tlow	-2.1924	-9.0213	4.6365	0.52		
			Thigh	25.1020	23.0000	27.2041	<0.0001		
			aST	-0.0114	-0.0224	-0.0004	<0.05		
4	$\mu = a + b_1 \times S + c_1 \times T + b_2 \times S^2 + c_2 \times T^2$	Non-interactive	a	-0.8217	-1.1482	-0.4953	<0.0001	0.84	-224.10
			b1	-0.0116	-0.0300	0.0069	0.21		
			c1	0.1821	0.1419	0.2222	<0.0001		
			b2	-0.0013	-0.0024	-0.0002	<0.02		
			c2	-0.0058	-0.0069	-0.0046	<0.0001		
5	$\mu = a + b_1 \times S + c_1 \times T + b_2 \times S^2 + c_2 \times T^2 + d \times S \times T$	Interactive	a	-0.7817	-1.1260	-0.4373	<0.0001	0.84	-222.78
			b1	-0.0205	-0.0502	0.0092	0.17		
			c1	0.1793	0.1382	0.2203	<0.0001		
			b2	-0.0013	-0.0025	-0.0002	<0.05		
			c2	-0.0058	-0.0069	-0.0046	<0.0001		
			d	0.0005	-0.0009	0.0020	0.44		

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