

Supplementary Materials

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Supplementary Table S1. Details for all three species collected for the salt stress experiment

Species	Location	Collection date	Salinity (S _A)
<i>Bostrychia arbuscula</i>	Moa Point, Wellington (41°20'31.6" S, 174°48'35.4" E)	Jun 17, 2019	37
<i>Champia novae-zelandiae</i>	Moa Point, Wellington (41°20'31.6" S, 174°48'35.4" E)	Jul 15, 2019	36
<i>Schizymenia</i> spp.	Wellington harbour, Whairepo Lagoon (41°17'17.86" S, 174°46'47.26" E)	Jun 3, 2019	32

Supplementary Table S2. Mean (n = 3) of the *in vivo* chlorophyll *a* fluorescence of *Bostrychia arbuscula* during 5 days of salt treatment at 7 salinities and one *in situ* sample (no treatment)

Sample	Day 1 (start)		Day 2		Day 3		Day 4		Day 5 (end)	
	F _v /F _m	SD	F _v /F _m	SD	F _v /F _m	SD	F _v /F _m	SD	F _v /F _m	SD
S _A 1	0.70	0.03	0.68	0.02	0.69	0.01	0.67	0.02	0.63	0.02
S _A 5	0.71	0.02	0.69	0.02	0.69	0.02	0.67	0.02	0.68	0.03
S _A 15	0.70	0.01	0.70	0.01	0.70	0.01	0.70	0.01	0.69	0.02
S _A 20	0.71	0.01	0.66	0.03	0.69	0.02	0.68	0.02	0.67	0.02
S _A 38	0.73	0.01	0.69	0.01	0.68	0.02	0.65	0.03	0.68	0.01
S _A 45	0.72	0.03	0.68	0.02	0.66	0.01	0.67	0.00	0.66	0.02
S _A 60	0.71	0.02	0.66	0.01	0.67	0.00	0.64	0.01	0.63	0.03
<i>In situ</i>	0.73	-	-	-	-	-	-	-	-	-

Maximum quantum yield (F_v/F_m) values with standard deviation (SD) measured with red underwater pulse-amplitude-modulated fluorometer.

Supplementary Table S3. Mean (n = 3) of the *in vivo* chlorophyll *a* fluorescence of *Champia novae-zelandiae* during 5 days of salt treatment at 7 salinities and one *in situ* sample (no treatment)

Sample	Day 1 (start)		Day 2		Day 3		Day 4		Day 5 (end)	
	F _v /F _m	SD	F _v /F _m	SD	F _v /F _m	SD	F _v /F _m	SD	F _v /F _m	SD
S _A 1	0.59	0.04	0.38	0.02	0.28	0.07	0.21	0.00	NS	NS
S _A 5	0.58	0.01	0.40	0.01	0.41	0.01	0.35	0.01	0.26	0.06
S _A 15	0.57	0.02	0.58	0.05	0.44	0.02	0.47	0.05	0.38	0.05
S _A 20	0.60	0.04	0.61	0.05	0.59	0.05	0.58	0.05	0.62	0.06
S _A 38	0.60	0.02	0.61	0.03	0.61	0.05	0.55	0.06	0.65	0.02
S _A 45	0.54	0.05	0.53	0.03	0.45	0.03	0.51	0.08	0.48	0.09
S _A 60	0.55	0.05	0.37	0.06	0.40	0.08	0.32	0.02	0.31	0.04
<i>In situ</i>	0.67	-	-	-	-	-	-	-	-	-

Maximum quantum yield (F_v/F_m) values with standard deviation (SD) measured with red underwater pulse-amplitude-modulated fluorometer.

NS, no signal.

Supplementary Table S4. Mean (n = 3) of the *in vivo* chlorophyll *a* fluorescence of *Schizymenia* spp. during 5 days of salt treatment at 7 salinities and one *in situ* sample (no treatment)

Sample	Day 1 (start)		Day 2		Day 3		Day 4		Day 5 (end)	
	F _v /F _m	SD	F _v /F _m	SD	F _v /F _m	SD	F _v /F _m	SD	F _v /F _m	SD
S _A 1	0.65	0.07	NS	NS	NS	NS	NS	NS	NS	NS
S _A 5	0.58	0.02	NS	NS	NS	NS	NS	NS	NS	NS
S _A 15	0.57	0.04	0.19	0.08	0.18	0.04	0.2	0.03	0.25	0.06
S _A 20	0.56	0.05	0.41	0.15	0.4	0.14	0.38	0.2	0.31	0.11
S _A 38	0.51	0.05	0.55	0.07	0.48	0.03	0.55	0.07	0.49	0.06
S _A 45	0.57	0.05	0.51	0.06	0.43	0.12	0.55	0.07	0.44	0.03
S _A 60	0.59	0.03	0.32	0.10	0.23	0.06	0.36	0.06	0.23	0.02
<i>In situ</i>	0.52	-	-	-	-	-	-	-	-	-

Maximum quantum yield (F_v/F_m) values with standard deviation (SD) measured with red underwater pulse-amplitude-modulated fluorometer.

NS, no signal.

Supplementary Table S5. Overview of the different pulse-amplitude-modulated fluorometer (PAM) settings measured with Diving-PAM for all three algae

Species	Output gain	Saturation pulse intensity	Measure intensity	Saturation pulse width
<i>Bostrychia arbuscula</i>	2	6	4	0.6 s
<i>Champia novae-zelandiae</i>	3	8	6	0.6 s
<i>Schizymenia</i> spp.	3	8	6	0.6 s

Supplementary Table S6. Detailed statistical analysis of the maximum quantum yield (F_v/F_m) of the salt stress experiment of *Bostrychia arbuscula*

	F	p	Significant differences
Mixed ANOVA			
Treatment vs. day	(6,14) = 0.997	0.464	No significantly interaction
Day (start vs. end)	(1,14) = 30.69	0.001	Start value (day 1) to end value (day 5) significantly different, regardless of salinity
Treatment	(6,14) = 2.421	0.081	Treatments not significantly different, regardless of day
Levene's test			
Start F_v/F_m	-	0.115	-
End F_v/F_m	-	0.326	-

Results of Levene's test ($p > 0.05$), mixed ANOVA (significant: $p < 0.05$) with day (start F_v/F_m , end F_v/F_m) as dependent variable and treatment (salinity) as independent variable.

Supplementary Table S7. Detailed statistical analysis of the maximum quantum yield (F_v/F_m) of the salt stress experiment of *Champia novae-zelandiae*

	F	p	Significant differences
Mixed ANOVA			
Treatment vs. day	(6,14) = 30.204	0.001	Significant interaction
Day (start vs. end)	(1,14) = 150.928	0.001	Start value (day 1) to end value (day 5) significantly different, regardless of salinity
One-way ANOVA			
Treatment start F_v/F_m	(6,20) = 0.747	0.622	Post-hoc Turkey's test No significant differences between the different salinities
Treatment end F_v/F_m	(6,20) = 36.708	0.001	Significant of F_v/F_m between the different salinities 5 S_A to 20 S_A ($p = 0.001$) 5 S_A to 38 S_A ($p = 0.001$) 5 S_A to 45 S_A ($p = 0.013$) 15 S_A to 20 S_A ($p = 0.006$) 15 S_A to 38 S_A ($p = 0.002$) 60 S_A to 20 S_A ($p = 0.001$) 60 S_A to 38 S_A ($p = 0.001$)
Levene's test			
Start F_v/F_m	-	0.098	-
End F_v/F_m	-	0.105	-

Results of Levene's test ($p > 0.05$), mixed ANOVA (significant: $p < 0.05$) with day (start F_v/F_m , end F_v/F_m) as dependent variable and treatment (salinity) as independent variable and results one-way ANOVA and *post-hoc* Turkey's test (only significant differences, $p < 0.05$).

Supplementary Table S8. Detailed statistical analysis of the maximum quantum yield (F_v/F_m) of the salt stress experiment of *Schizymenia* spp.

	F	p	Significant differences (Games-Howell <i>post-hoc</i> test)
Welch-ANOVA			
Treatment start F_v/F_m	(4,4.909) = 0.661	0.646	No significant differences between the different salinities
Treatment end F_v/F_m	(4,4.709) = 13.575	0.008	Significant of F_v/F_m between the different salinities 45 S_A to 60 S_A ($p = 0.01$)
Levene's test			
Start F_v/F_m	-	0.740	-
End F_v/F_m	-	0.023	Violation, interpretation of Welch-ANOVA and Games-Howell <i>post-hoc</i> test

Results of Levene's test ($p > 0.05$), Welch-ANOVA (significant: $p < 0.05$) with day (start F_v/F_m , end F_v/F_m) as dependent variable and treatment (salinity) as independent variable and results of Games-Howell *post-hoc* test (only significant differences, $p < 0.05$).

Supplementary Table S9. Detailed statistical analysis of the total organic osmolyte, digeneaside, and sorbitol concentrations of *Bostrychia arbuscula* from the salt stress experiment

Dependent variable	Levene's test	One-way ANOVA		
		F	p	Significant differences (<i>post-hoc</i> Turkey's test)
Total organic osmolyte concentration	0.066	(6,14) = 8.263	0.001	Significant between the different salinities
Digeneaside concentration	0.846	(6,14) = 5.410	0.004	1 S _A to 45 S _A (p = 0.021) 5 S _A to 45 S _A (p = 0.023) 15 S _A to 45 S _A (p = 0.025)
Sorbitol concentration	0.051	(6,14) = 21.046	0.001	1 S _A to 38 S _A (p = 0.003) 1 S _A to 45 S _A (p = 0.003) 1 S _A to 60 S _A (p = 0.001) 5 S _A to 38 S _A (p = 0.003) 5 S _A to 45 S _A (p = 0.003) 5 S _A to 60 S _A (p = 0.001) 15 S _A to 38 S _A (p = 0.007) 15 S _A to 45 S _A (p = 0.009) 15 S _A to 60 S _A (p = 0.001) 20 S _A to 38 S _A (p = 0.013) 20 S _A to 45 S _A (p = 0.018) 20 S _A to 60 S _A (p = 0.001)

Results of Levene's test (p > 0.05), ANOVA (significant: p < 0.05), and the *post-hoc* Turkey's test (only significant differences, p < 0.05).

Supplementary Table S10. Detailed statistical analysis of the floridoside concentration of *Champia novae-zelandiae* from the salt stress experiment

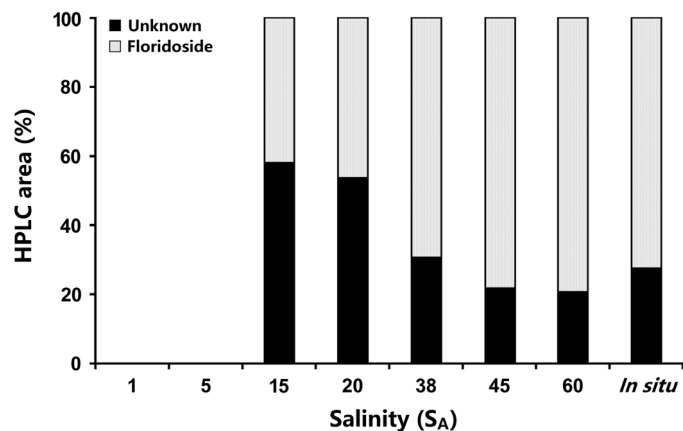
Dependent variable	Levene's test	ANOVA		
		F	p	Significant differences (<i>post-hoc</i> Turkey's test)
Floridoside concentration	0.089	(5,12) = 62.831	0.001	5 S _A to 20 S _A (p = 0.006) 5 S _A to 38 S _A (p = 0.001) 5 S _A to 45 S _A (p = 0.001) 5 S _A to 60 S _A (p = 0.001) 15 S _A to 20 S _A (p = 0.01) 15 S _A to 38 S _A (p = 0.001) 15 S _A to 45 S _A (p = 0.001) 15 S _A to 60 S _A (p = 0.001) 20 S _A to 38 S _A (p = 0.001) 20 S _A to 45 S _A (p = 0.001) 20 S _A to 60 S _A (p = 0.001)

Results of Levene's test (p > 0.05), ANOVA (significant: p < 0.05), and the *post-hoc* Turkey's test (only significant differences, p < 0.05).

Supplementary Table S11. Detailed statistical analysis of the floridoside concentration of *Schizymenia* spp. from the salt stress experiment

Dependent variable	Levene's test	Welch-ANOVA		
		F	p	Significant differences (Games-Howell <i>post-hoc</i> test)
Floridoside concentration	0.018	(4,4.855) = 169.78	0.001	15 S _A to 45 S _A (p = 0.001) 15 S _A to 60 S _A (p = 0.001) 20 S _A to 45 S _A (p = 0.003) 20 S _A to 60 S _A (p = 0.002)

Results of Levene's test (p > 0.05), Welch-ANOVA (significant: p < 0.05), and the Games-Howell *post-hoc* test (only significant differences, p < 0.05).



Supplementary Fig. S1. Percentage proportions of floridoside and the unknown compound of the total produced compounds of *Schizymenia* spp. at the end of the salt stress experiment. The x-axis shows the seven different salinities (absolute salinity, S_A) and the *in situ* measurement (no treatment). The y-axis shows the integrated area in %, measured with the high performance liquid chromatography (HPLC).