

Figure S1. Experimental set up with two tanks per water bath basin, allowing the manipulation of water temperature (left). Schematic drawing of the setup of an experimental unit. The lower section was kept large enough to allow rapid mixing and upward diffusion. Algae solution was injected in the organic matter addition treatments and allowed to diffuse into the upper chamber through a perforated shelf and porous 0.1-mm polyester-cotton membrane (right).

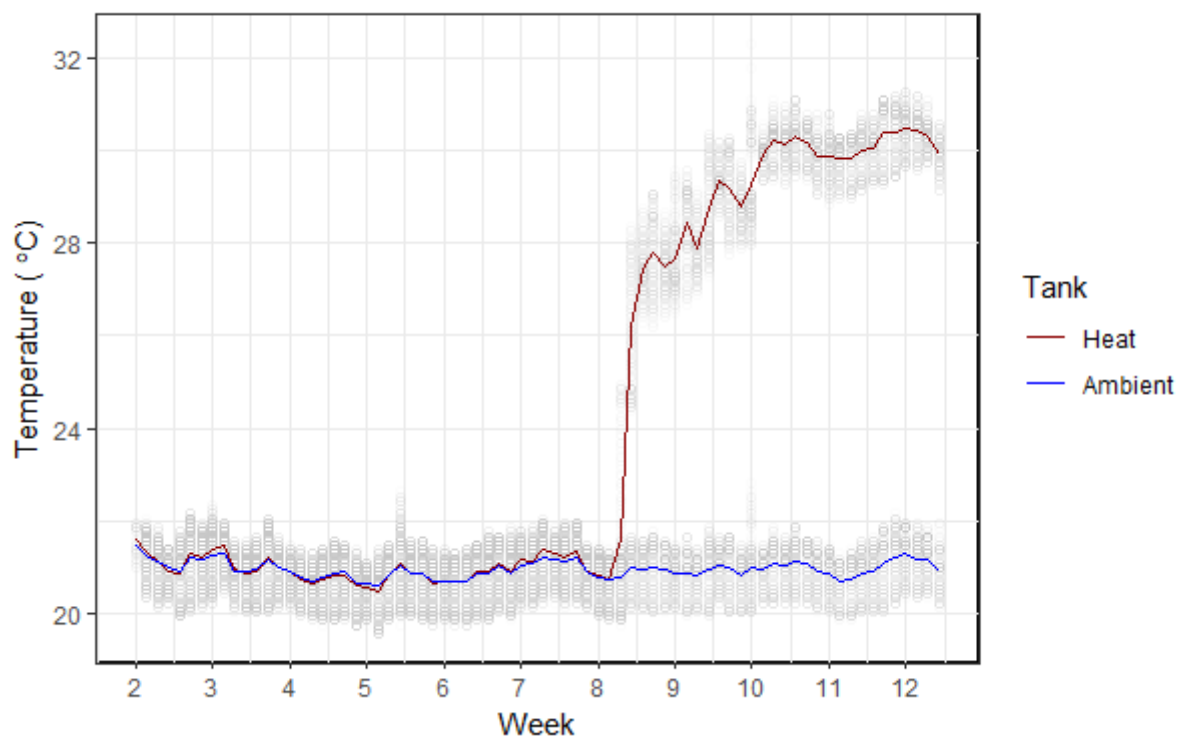


Figure S2. Water temperatures throughout the experiment averaged by day (solid line) and individual measurements per tank (open dots), logged with HOBO Pendant loggers (Onset). The x-axis shows the experimental week; the y-axis represents the water temperature (°C). The red graph represents mean temperatures of the increased temperature treatment, while the blue graph represents mean temperatures of the control treatment, kept at ambient temperatures.

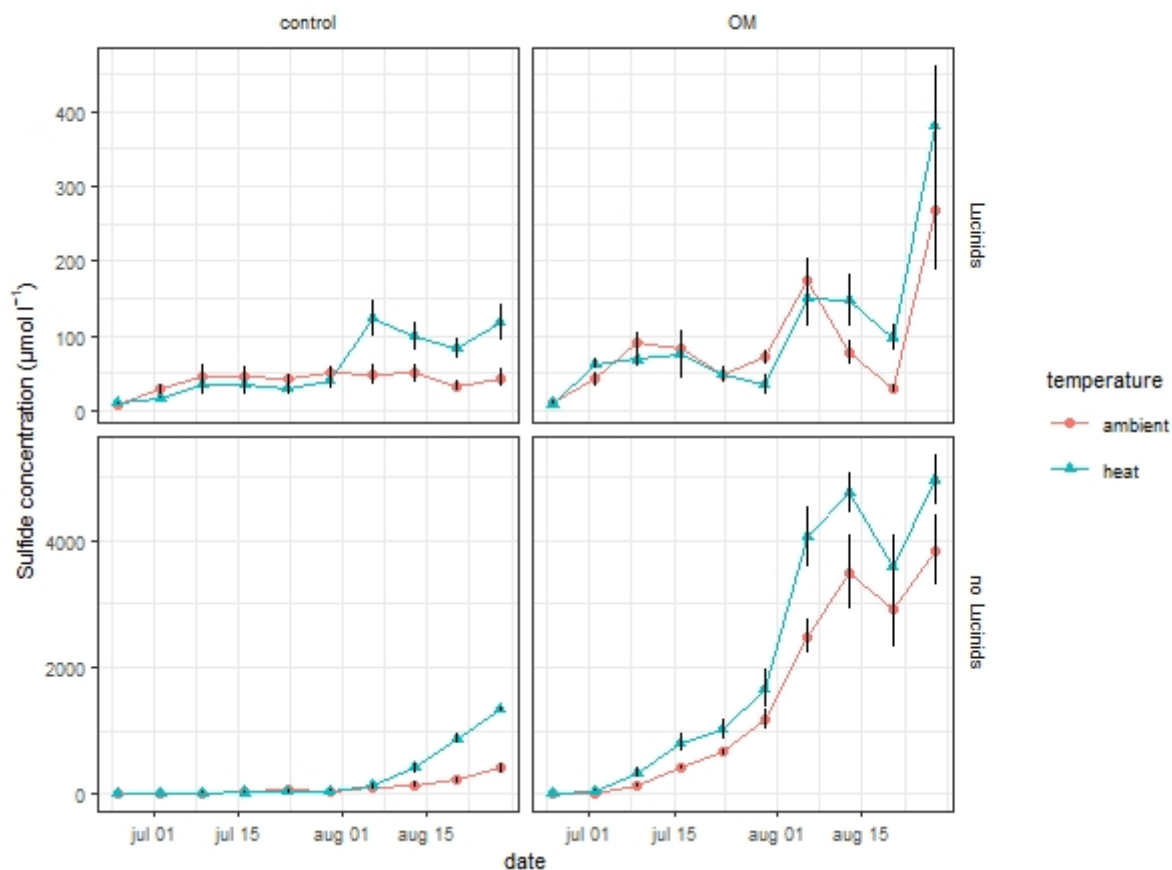


Figure S3. Sediment porewater sulfide concentrations in *Z. noltii* mesocosms over duration of the experiment with and without organic matter addition (OM, control), ambient and temperature increase (ambient, heat) and with and without the lucinid bivalves *L. orbiculatus*. Sulphide concentrations were averaged at 0-5 cm depth. Displayed values are means \pm SE, $n = 5$ mesocosms.

Table S1 Average (\pm sd) values for all treatments ($n=5$) of analyses of seagrass (mg), porewater sulfide, ammonium and phosphate ($\mu\text{mol l}^{-1}$), leaf nitrogen and phosphate (mg) and carbon (%).

Lucinids	Temperature	Injection	mean	sd
<i>Belowground seagrass</i>				
Lucinids	ambient	control	0,23	0,03
Lucinids	ambient	OM	0,32	0,09
Lucinids	heat	control	0,19	0,08
Lucinids	heat	OM	0,21	0,04
no Lucinids	ambient	control	0,15	0,03
no Lucinids	ambient	OM	0,18	0,06
no Lucinids	heat	control	0,14	0,04
no Lucinids	heat	OM	0,15	0,04
<i>Aboveground seagrass</i>				
Lucinids	ambient	control	0,10	0,01
Lucinids	ambient	OM	0,27	0,06
Lucinids	heat	control	0,10	0,02
Lucinids	heat	OM	0,14	0,05
no Lucinids	ambient	control	0,07	0,02
no Lucinids	ambient	OM	0,11	0,03
no Lucinids	heat	control	0,09	0,03
no Lucinids	heat	OM	0,10	0,04
<i>Sulfide concentration</i>				
Lucinids	ambient	control	43,86	28,18
Lucinids	ambient	OM	267,18	179,34
Lucinids	heat	control	117,92	54,72
Lucinids	heat	OM	380,78	178,73
no Lucinids	ambient	control	410,88	193,21
no Lucinids	ambient	OM	3851,20	1234,44
no Lucinids	heat	control	1326,48	63,74
no Lucinids	heat	OM	4961,24	905,98
<i>Porewater NH₄</i>				
Lucinids	ambient	control	3,09	0,89
Lucinids	ambient	OM	15,53	9,38
Lucinids	heat	control	9,56	3,73
Lucinids	heat	OM	39,32	13,17
no Lucinids	ambient	control	11,81	5,86
no Lucinids	ambient	OM	475,42	131,91
no Lucinids	heat	control	117,72	37,47
no Lucinids	heat	OM	791,04	206,46

Lucinids	Temperature	Injection	mean	sd
<i>Porewater PO₄</i>				
Lucinids	ambient	control	0,36	0,44
Lucinids	ambient	OM	4,47	1,45
Lucinids	heat	control	0,87	0,38
Lucinids	heat	OM	4,30	1,88
no Lucinids	ambient	control	14,99	5,66
no Lucinids	ambient	OM	44,71	3,20
no Lucinids	heat	control	23,82	4,90
no Lucinids	heat	OM	48,02	13,03
<i>Total leaf nitrogen</i>				
Lucinids	ambient	control	0,078	0,011
Lucinids	ambient	OM	0,333	0,085
Lucinids	heat	control	0,102	0,021
Lucinids	heat	OM	0,163	0,053
no Lucinids	ambient	control	0,039	0,008
no Lucinids	ambient	OM	0,066	0,023
no Lucinids	heat	control	0,053	0,019
no Lucinids	heat	OM	0,064	0,030
<i>Total leaf phosphorus</i>				
Lucinids	ambient	control	0,020	0,003
Lucinids	ambient	OM	0,077	0,024
Lucinids	heat	control	0,016	0,004
Lucinids	heat	OM	0,027	0,011
no Lucinids	ambient	control	0,017	0,003
no Lucinids	ambient	OM	0,021	0,008
no Lucinids	heat	control	0,018	0,006
no Lucinids	heat	OM	0,017	0,008
<i>Total leaf carbon</i>				
Lucinids	ambient	control	37,92	0,21
Lucinids	ambient	OM	36,86	1,08
Lucinids	heat	control	36,56	0,73
Lucinids	heat	OM	36,56	0,34
no Lucinids	ambient	control	36,87	1,80
no Lucinids	ambient	OM	37,51	1,00
no Lucinids	heat	control	36,82	0,52
no Lucinids	heat	OM	35,37	1,11