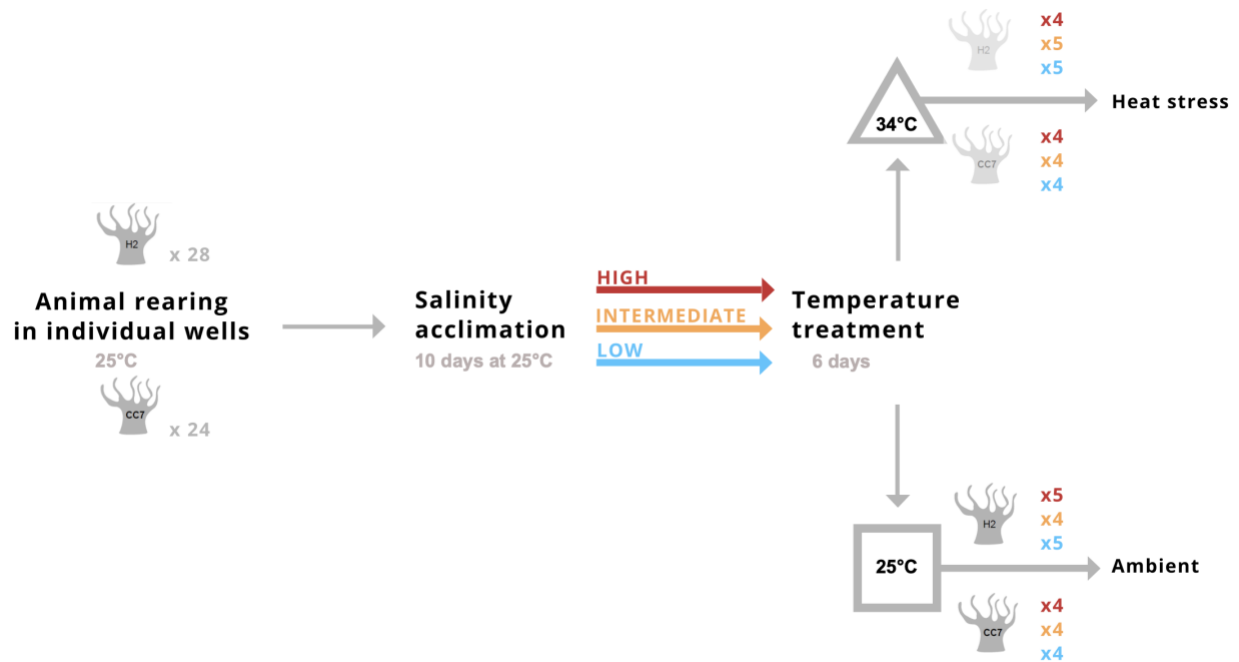
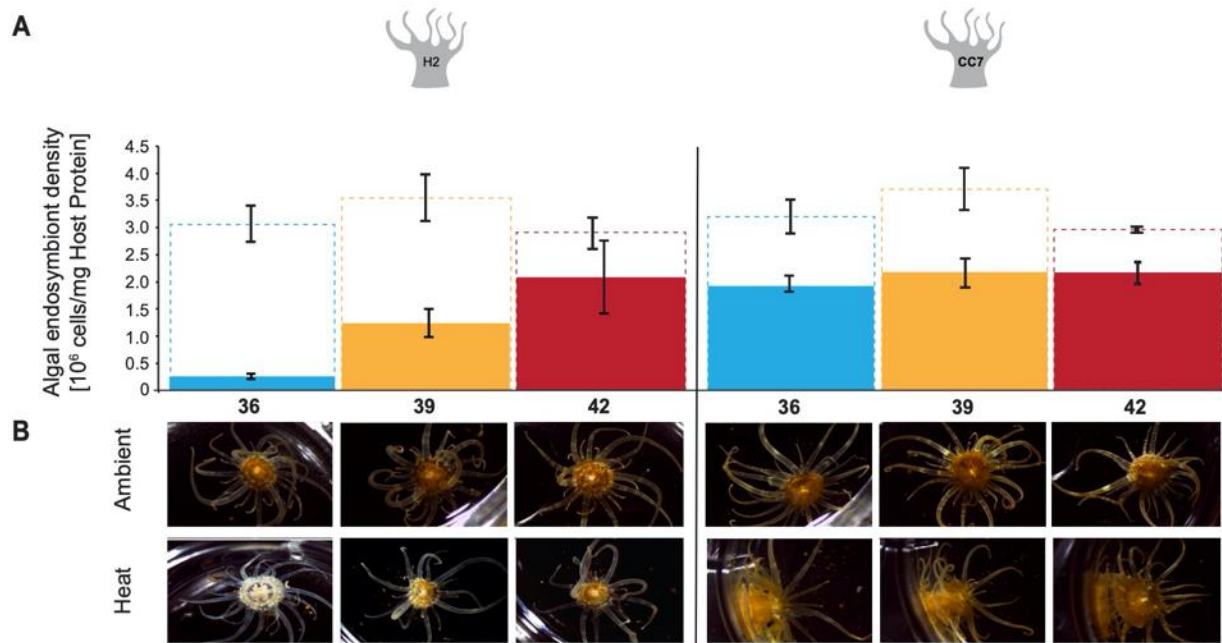


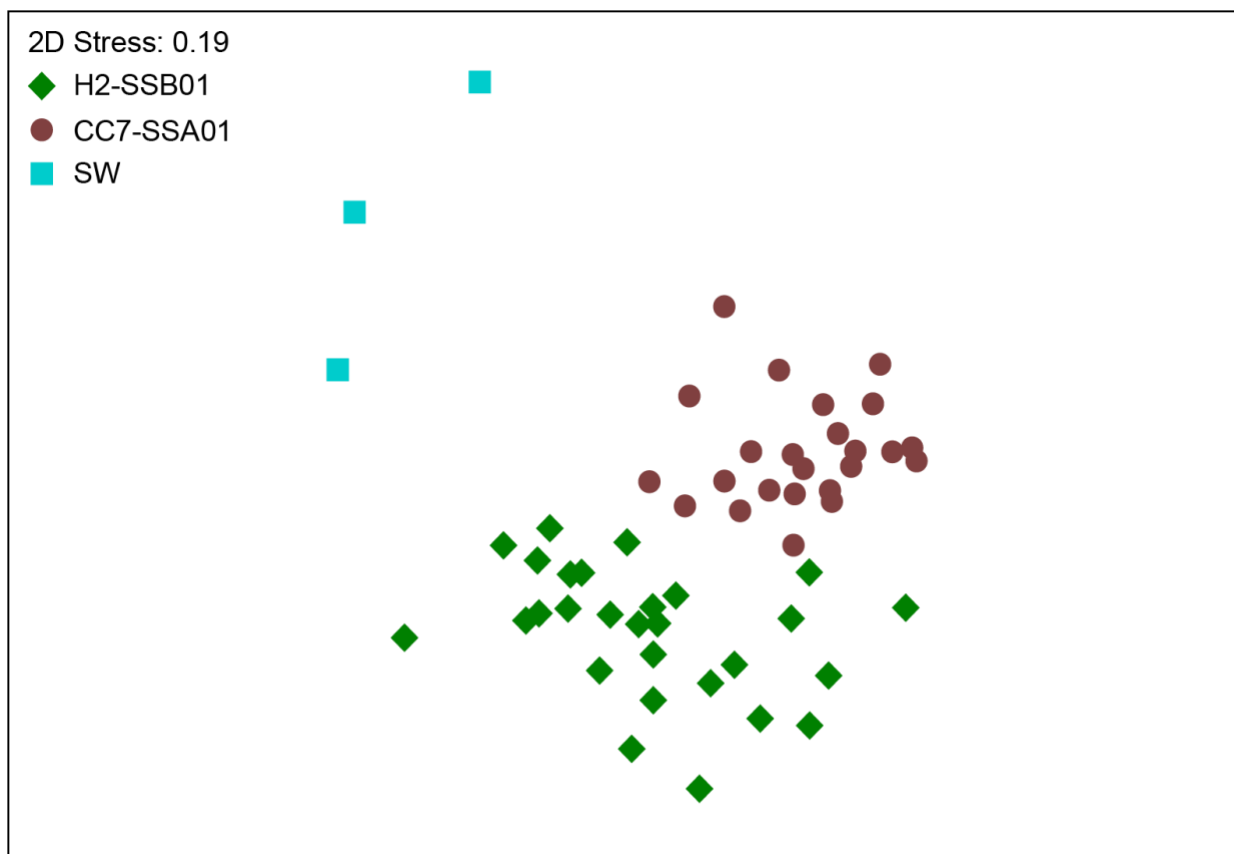
Supplementary Information



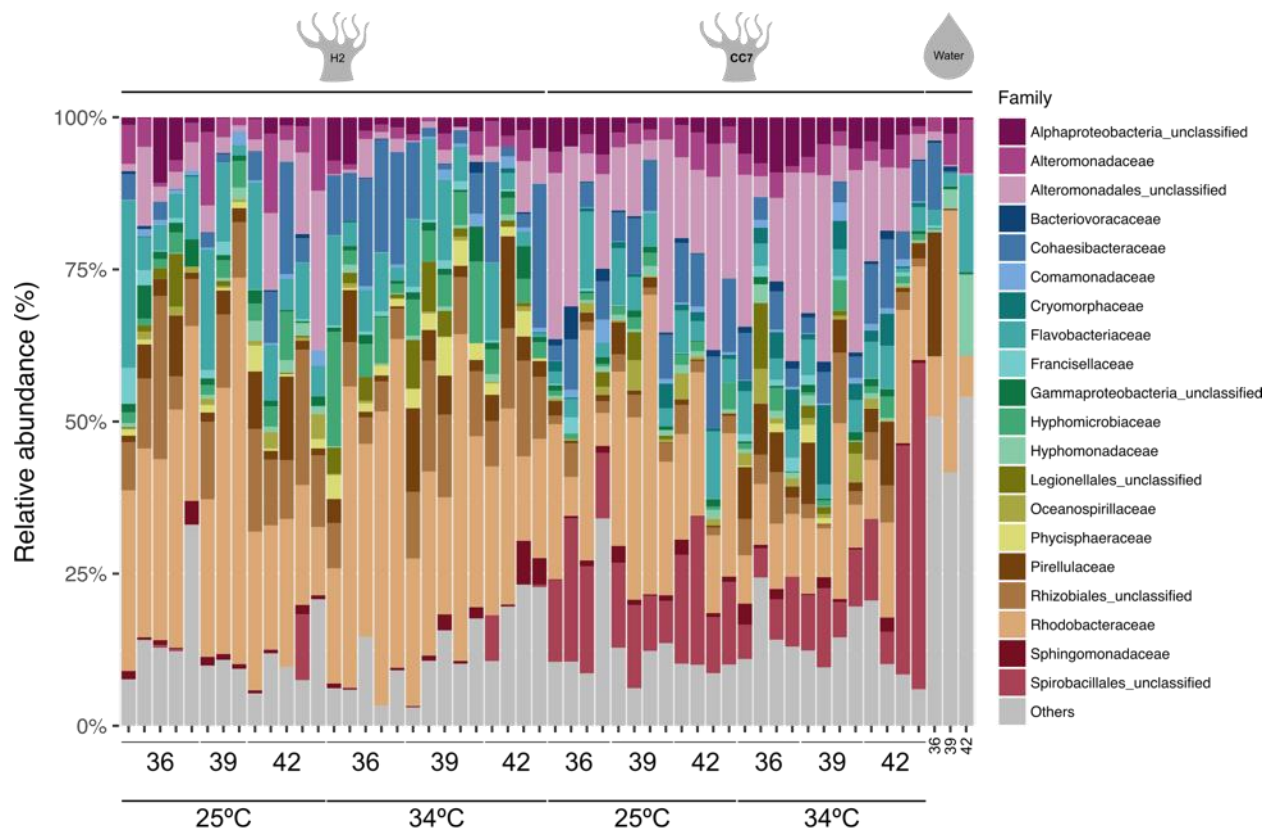
Supplementary Figure 1. Overview of the experimental setup. Two Aiptasia host-algal symbiont pairings (H2-SSB01 and CC7-SSA01) were acclimated for 10 days at low (36 PSU), intermediate (39 PSU), and high (42 PSU) salinities at ambient temperature (25°C), before subjected to a 6-day long heat stress experiment (34°C). A control for each salinity was kept at ambient temperature throughout the experiment. Total number of animals and respective number of replicates at each salinity are indicated.



Supplementary Figure 2. Effect of low (36 PSU), intermediate (39 PSU), and high (42 PSU) salinity on (A) host-algal symbiont density and (B) host phenotype, as shown by photographic documentation for ambient (25 °C) and heat stressed (34 °C) Aiptasia host-algal symbiont pairings H2-SSB01 and CC7-SSA01 (adapted from Gegner *et al.*, 2019 who additionally assessed photosynthetic efficiency). (A) Dashed lines depict animals at ambient temperature (25 °C); solid lines depict animals under heat stress (34 °C). Error bars show the standard error of the mean (SE). (B) Pictures of representative symbiotic and aposymbiotic anemones at ambient and at heat stress temperatures across different salinities after 6 days of the experiment.



Supplementary Figure 3. Non-metric multidimensional scaling (nMDS) of bacterial communities from H2-SSB01 (diamond), CC7-SSA01 (circle), and seawater (square). Each symbol represents one sample. The plot is based on based on Bray-Curtis dissimilarities of relative OTU abundances.



Supplementary Figure 4. Taxonomy bar chart of bacterial families (Greengenes database, bootstrap ≥ 60) of Aiptasia host-algal symbiont pairings H2-SSB01, CC7-SSA01, and seawater samples across temperatures and salinities. Each bar denotes the percentage of 16S rRNA gene sequences across samples. Each color represents one of the twenty most abundant families across samples. The ‘Others’ category groups the less abundant families.

Supplementary Table 1. Average alpha diversity indices (Chao1 denoted as mean \pm SE, Inverse Simpson and Simpson's Evenness as mean \pm SD) of bacterial communities associated with H2-SSB01 and CC7-SSA01 across temperature and salinity treatments.

Host-algal symbiont	Temp	Salinity	No. of OTUs	Chao1	Inverse Simpson	Simpson's evenness	n
H2-SSB01	25	36	521	1174.58 (\pm 104.48)	13.32 (\pm 6.6)	0.00057 (\pm 0.0003)	5
H2-SSB01	25	39	404	738.82 (\pm 61.07)	10.09 (\pm 4.95)	0.00078 (\pm 0.0005)	4
H2-SSB01	25	42	516	1014 (\pm 79.45)	10.77 (\pm 4.9)	0.00068 (\pm 0.0003)	5
H2-SSB01	34	36	508	1198.61 (\pm 117.14)	17.14 (\pm 6.64)	0.00036 (\pm 0.0001)	5
H2-SSB01	34	39	506	1042.81 (\pm 90.37)	11.69 (\pm 4.44)	0.00054 (\pm 0.0003)	5
H2-SSB01	34	42	488	1016.15 (\pm 83.87)	12.32 (\pm 5.45)	0.00042 (\pm 0.0001)	4
CC7-SSA01	25	36	593	1143.92 (\pm 81.35)	13.98 (\pm 4.38)	0.00034 (\pm 0.0001)	4
CC7-SSA01	25	39	535	876 (\pm 54.34)	12.22 (\pm 7.19)	0.00059 (\pm 0.0004)	4
CC7-SSA01	25	42	526	930.25 (\pm 66.2)	15.93 (\pm 10.36)	0.00035 (\pm 0.0002)	4
CC7-SSA01	34	36	577	1288.4 (\pm 110.1)	9.57 (\pm 2.66)	0.00054 (\pm 0.0001)	4
CC7-SSA01	34	39	515	1181.18 (\pm 111.51)	17.29 (\pm 5.1)	0.00029 (\pm 0.0001)	4
CC7-SSA01	34	42	413	803.62 (\pm 73.31)	14.32 (\pm 3.16)	0.0004 (\pm 0.00007)	4
seawater	25	36	165	165	12.24	0.0005	1
seawater	25	39	282	282	10.93	0.00032	1
seawater	25	42	200	200	11.38	0.00044	1

Supplementary Table 2. Summary statistics of pairwise PERMANOVAs. Analysis based on Bray-Curtis dissimilarities of relative bacterial OTU abundances.

Host-algal symbiont pairing	<i>t</i> statistic	<i>P</i> (perm)	Permutations
H2-SSB01; 36, 39	1.1282	0.19	999
H2-SSB01; 36, 42	2.1243	0.001	999
H2-SSB01; 39, 42	2.172	0.001	997
CC7-SSA01; 36, 39	1.0623	0.303	999
CC7-SSA01; 36, 42	1.6938	0.002	999
CC7-SSA01; 39, 42	1.7328	0.002	998

Supplementary Data S1. Bacterial OTU abundance counts, taxonomic annotation, and representative OTU sequences from Aiptasia host-algal symbiont pairings (H2-SSB01 and CC7-SSA01) and seawater samples across all temperatures and salinities.

Supplementary Data S2. Bacterial OTUs that contributed up to 50% of the cumulative differences in pairwise comparisons between salinities of H2-SSB01 and CC7-SSA01 under ambient temperature and heat stress.