Prior stress by marine heatwaves and micro-habitat fragmentation drive the colonisation of epifaunal assemblages in marine forests

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Figure S1. Detail of synthetic assemblages of *E. selaginoides* mimicking microhabitat fragmentation in two different configurations (Fragmented vs. Non-Fragmented), and detail of the experimental set-up during the MHW experiment under laboratory conditions.

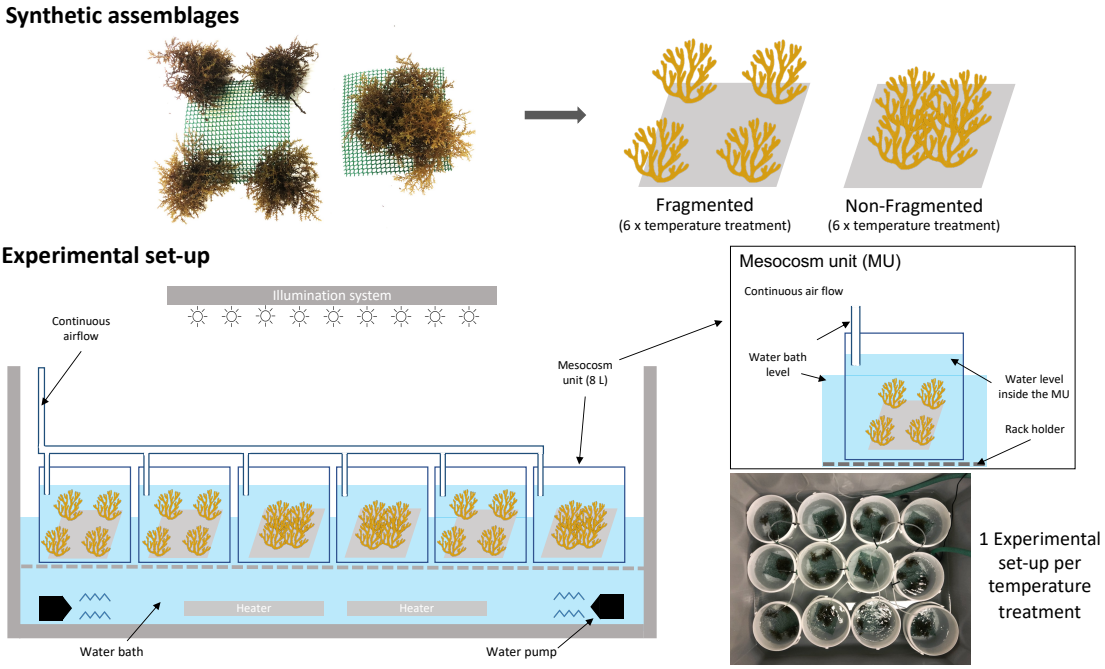

Figure S2. Diagram and scheme with steps of the recruitment field experiment conducted

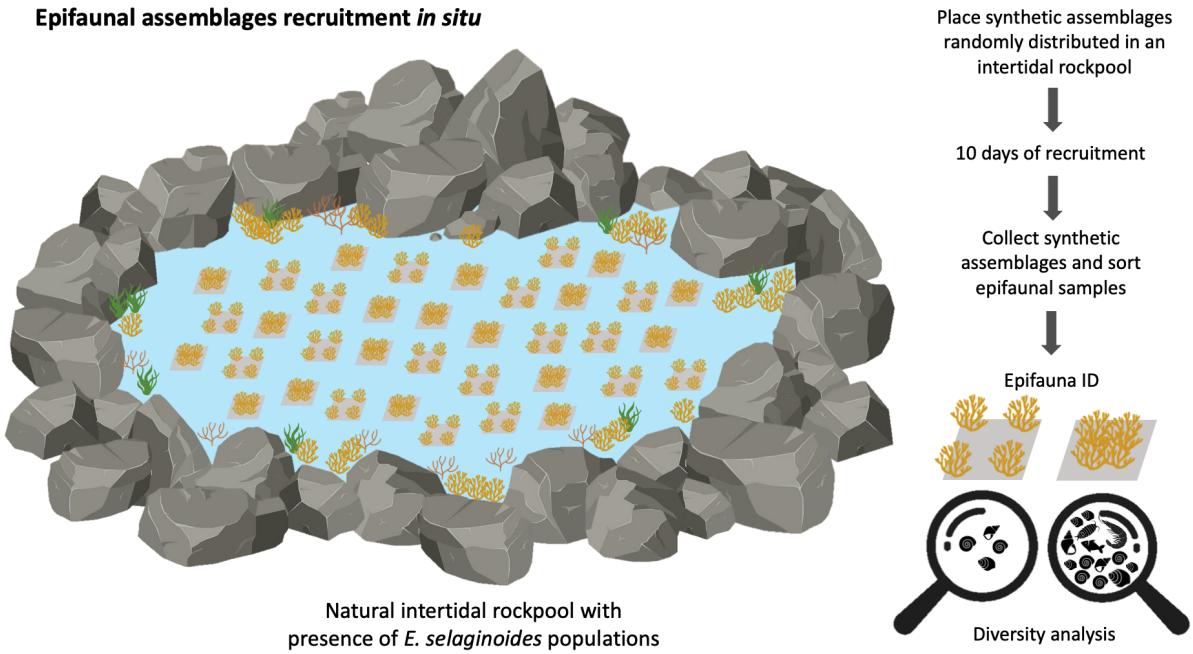

Figure S3. Annual marine heatwaves (MHWs) metrics for the Cantabrian Sea during 1947-2021. Int_cumulative = cumulative intensity, int_max = maximum intensity, int_mean = mean intensity, nevents = number of MHWs, nMHWdays = number of MHW days per year.

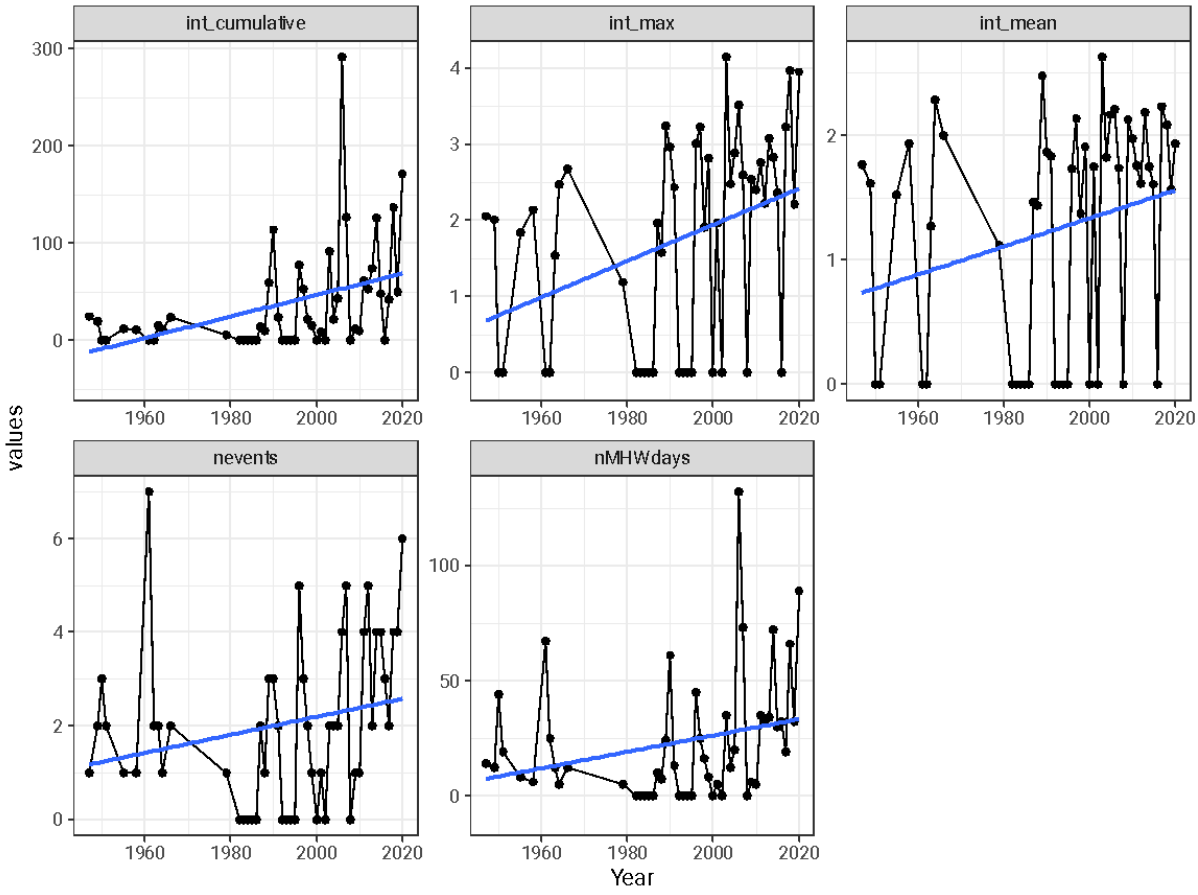

Table S1. PAIR-WISE results showing the interaction effect of Marine Heatwaves (MHW levels: 'Control', 'Current MHW' and 'Future MHW') and Fragmentation (levels: Fragmented (Frag) and Non-Fragmented (Non-Frag)) over the structure and composition of the epifaunal assemblages.

PAIR-WISE test
Structure

	Within level 'Control' of factor 'MHW'		Within level 'Current MHW' of factor 'MHW'		Within level 'Future MHW' of factor 'MHW'	
	MS	F	MS	F	MS	F
Factor 'Fragmentation'						
Frag vs Non-Frag	0.17	4.90**	0.19	3.48*	0.16	1.00

	Withing level 'Frag' of factor 'Fragmentation'		Within level 'Non-Frag' of factor 'Fragmentation'	
	MS	F	MS	F
Factor 'Temperature'				
Control vs Current MHW	0.68	12.59**	0.70	20.11**
Current MHW vs Future MHW	0.48	3.72*	0.45	5.57**
Control vs Future MHW	1.17	9.26**	1.54	24.99**

Sig. codes: ***0.001,**0.01,* 0.05, . 0.1

PAIR-WISE test
Composition

	Within level 'Control' of factor 'MHW'		Within level 'Current MHW' of factor 'MHW'		Within level 'Future MHW' of factor 'MHW'	
	MS	F	MS	F	MS	F
Factor 'Fragmentation'						
Frag vs Non-Frag	0.33	4.16**	0.33	2.76*	0.21	0.92

	Withing level 'Frag' of factor 'Fragmentation'		Within level 'Non-Frag' of factor 'Fragmentation'	
	MS	F	MS	F
Factor 'Temperature'				
Control vs Current MHW	0.94	7.93**	1.03	2.74**
Current MHW vs Future MHW	0.61	3.07*	0.58	3.85**
Control vs Future MHW	1.29	6.57**	1.73	15.04**

Sig. codes: ***0.001,**0.01,* 0.05, . 0.1

Table S2. Results of SIMPER analysis showing taxa that contributed to the similarity between levels of 'MHW' and 'Fragmentation'. SIMPER analysis was based on square-root transformed abundance of the epifaunal assemblage.

Group Control - Fragmented					
Average similarity: 66.62					
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Rissoa parva	6.59	28.73	5.96	43.13	43.13
Barleeia unifasciata	2.61	10.41	5.34	15.63	58.76
Dynamene bidentata	2.52	8.77	2.69	13.16	71.93
Bittium reticulatum	1.8	5.34	1.15	8.02	79.94
Tricolia pullus	1.19	4.91	7.74	7.37	87.31
Steromphala umbilicalis	0.86	1.84	0.78	2.77	90.08

Group Control - Non-Fragmented					
Average similarity: 83.10					
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Rissoa parva	7.89	22.87	26.57	27.52	27.52
Dynamene bidentata	4.38	11.95	6.07	14.38	41.9
Barleeia unifasciata	3.28	9.09	5.77	10.94	52.83
Rissoa guerinii	2.93	8.46	18.92	10.18	63.02
Bittium reticulatum	2.53	6.3	4	7.58	70.6
Tricolia pullus	1.54	3.99	5.1	4.8	75.4
Microdeutopus sp.	1.43	3.61	4.75	4.35	79.75
Microprotopus sp.	1.19	3.13	9.4	3.76	83.51
Xantho pilipes	1.14	3.13	9.92	3.76	87.28
Steromphala umbilicalis	1.28	2.95	1.35	3.55	90.82

Group Current MHW - Fragmented					
Average similarity: 61.51					
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Rissoa parva	3.97	34.88	8.12	56.7	56.7
Rissoa guerinii	1.43	11.21	6.11	18.22	74.93
Dynamene bidentata	1.22	5.74	0.75	9.34	84.26

Barleeia unifasciata	0.8	4.05	0.78	6.59	90.85

Group Current MHW - Non-Fragmented					
Average similarity: 71.54					
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Rissoa parva	4.23	25.29	8.37	35.35	35.35
Dynamene bidentata	3.18	17.7	4.36	24.75	60.09
Rissoa guerinii	1.42	6.57	1.31	9.18	69.28
Tricolia pullus	1.15	5.14	1.33	7.19	76.46
Barleeia unifasciata	1.3	4.63	1.24	6.47	82.93
Steromphala umbilicalis	0.97	4.38	1.34	6.12	89.05
Bittium reticulatum	1.16	3.38	0.76	4.72	93.78

Group Future MHW - Fragmented					
Average similarity: 48.50					
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Rissoa parva	1.68	11.67	0.78	24.07	24.07
Barleeia unifasciata	1.04	10.04	1.27	20.69	44.76
Bittium reticulatum	1.05	6.55	0.75	13.51	58.27
Rissoa guerinii	1.01	6.27	0.77	12.93	71.19
Tricolia pullus	0.79	5.78	0.78	11.91	83.1
Dynamene bidentata	0.94	5.5	0.78	11.33	94.43

Group Future MHW - Non-Fragmented					
Average similarity: 64.12					
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Rissoa parva	2.71	28.45	7	44.37	44.37
Dynamene bidentata	1.76	16.77	3.71	26.15	70.52
Rissoa guerinii	1.11	9.84	1.29	15.35	85.87
Barleeia unifasciata	0.74	5.05	0.78	7.87	93.74