

Resistance of rocky shore assemblages of algae and invertebrates to changes in intensity and temporal variability of aerial exposure

Iacopo Bertocci^{1,2,*}, Elena Maggi¹, Stefano Vaselli¹, Lisandro Benedetti-Cecchi¹

¹Dipartimento di Biologia, University of Pisa, CoNISMa, Via Derna 1, 56126 Pisa, Italy

²Present address: CIIMAR (Centro Interdisciplinar de Investigação Marinha & Ambiental), Rua dos Bragas 289, 4050-123 Porto, Portugal

*Email: ibertocci@ciimar.up.pt

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Supplement 1. Experimental design

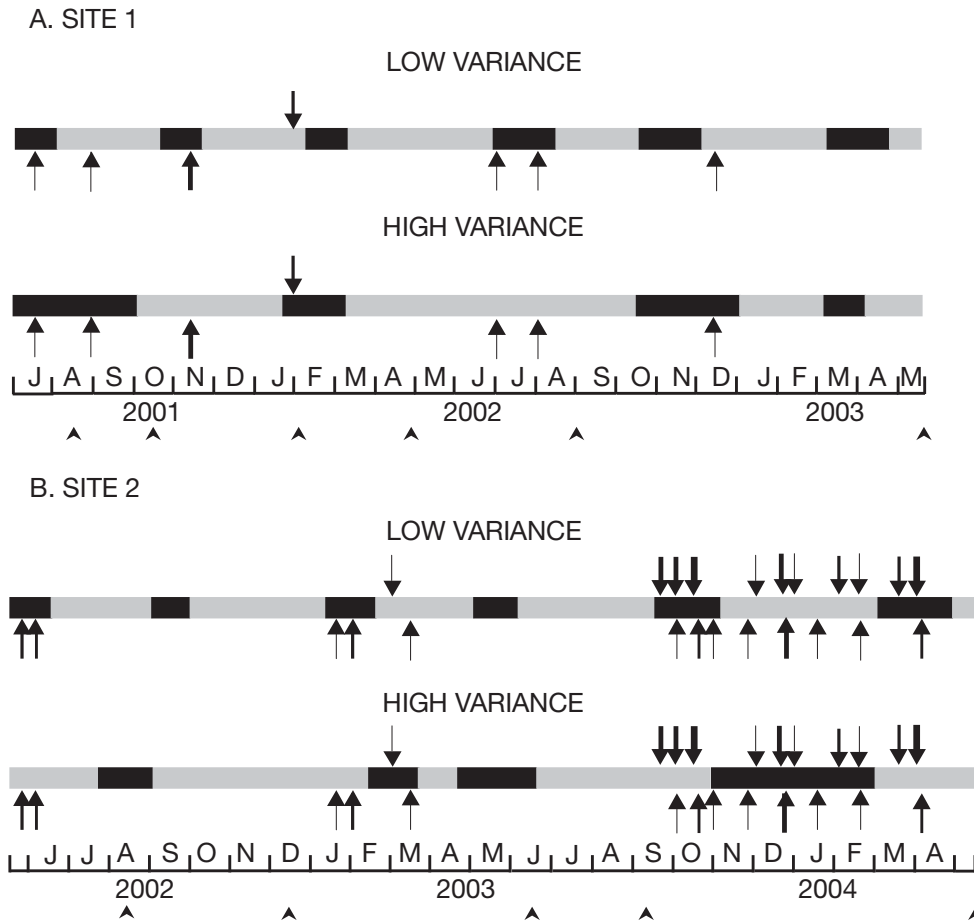


Fig. S1. Schematic representation of the experimental design. Black and grey bars indicate periods in which cores were in upper (mid- and highshore) and lowshore positions, respectively. Downwards-pointing arrows indicate periods in which high barometric pressure (average daily value equal to or larger than 570 and 574 hPa in winter and summer, respectively, to correct for the effects of seasonal changes in the mean aerial temperature) and calm sea conditions (wind absent or blowing seawards, i.e. from the eastern quadrant for the study sites) likely exposed the lowshore habitat to air. Upwards-pointing arrows indicate periods in which all habitats were submersed due to rough sea (daily average speed of winds was equal to or larger than 2.5 kn (1.286 m s⁻¹), in directions ranging from southeast to north). The thickness of the arrows indicates the temporal duration of those periods in which the intended experimental conditions could not be maintained (thinnest and thickest arrows corresponding to 1 and 5 d, respectively). Only events occurring within the periods of transplantations are illustrated. Arrowheads at the bottom of each panel indicate the sampling timepoints

Supplement 2. Multivariate (Fig. S2) and univariate (Fig. S3) results from procedural controls (RL: reference assemblages in the lowshore habitat; DLV, DHV: disturbed treatments at low and high variability, respectively; TLV, THV: translocated treatments at low and high variability, respectively)

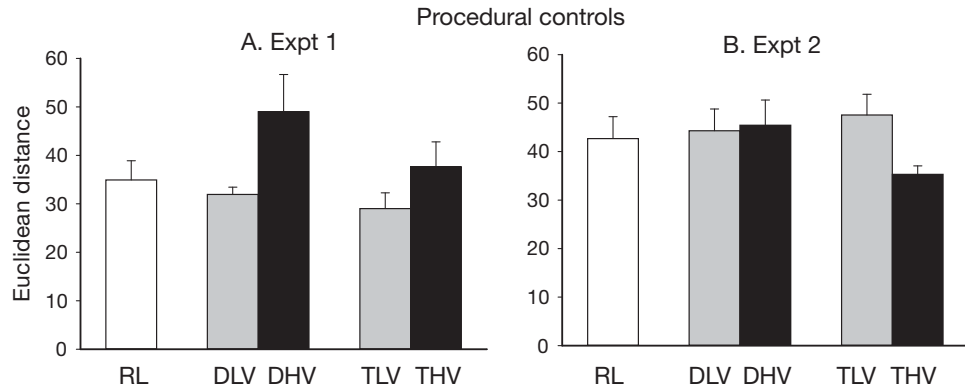


Fig. S2. Euclidean distances (mean + SE, $n = 4$ replicates) between procedural controls and RL assemblages (in this case, distances were calculated between 4 pairs of unmanipulated assemblages) in (A) Expt 1 ($MS = 237.24$, $F = 2.61$, $p > 0.05$) and (B) Expt 2 ($MS = 87.41$, $F = 1.23$, $p > 0.3$)

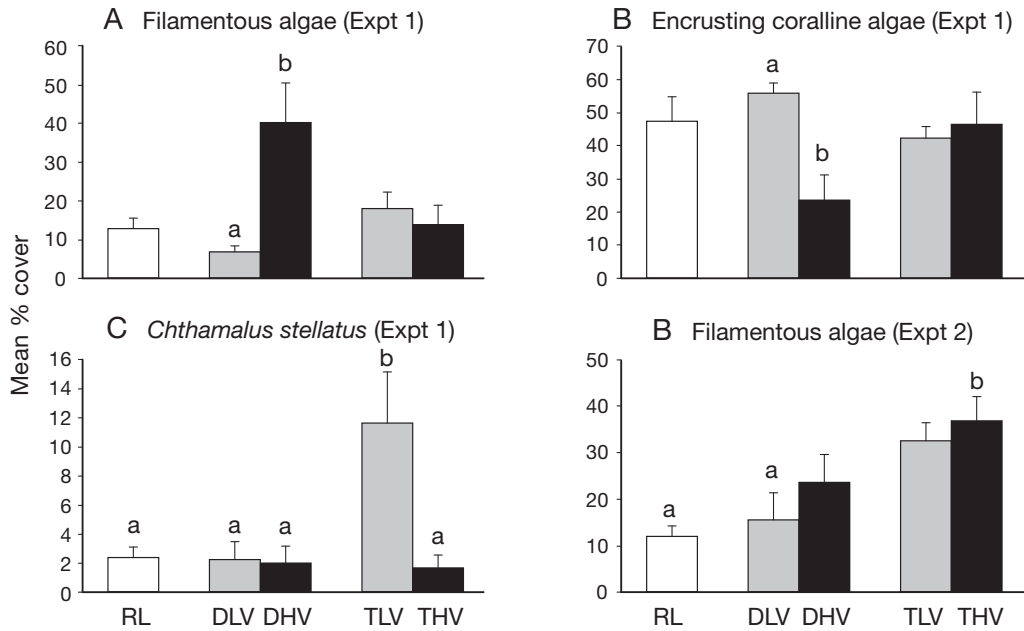


Fig. S3. Abundance of common taxa in procedural controls and in RL quadrats. Values are mean + SE, $n = 4$ replicates. Different letters above bars indicate means that differed significantly (Student-Newman-Keuls test, at $p = 0.05$)

Supplement 3. ANOVA examining the convergence of transplanted organisms. Abbreviations as in Fig. S1 (Supplement 1)

Table S1. ANOVA comparing the abundance of individual taxa and total number of taxa on transplanted cores and RM quadrats in Expt 1 (*p < 0.05, **p < 0.01, ***p < 0.001; ns: not significant). *Patella* spp.: *P. aspera* + *P. caerulea*

Source	df	Filamentous algae		Encrusting corallines		<i>Ralfsia verrucosa</i>		Coarsely branched algae		<i>Rivularia</i> spp.		<i>Chthamalus stellatus</i>		<i>Patella</i> spp.		Taxa	
		MS	F	MS	F	MS	F	MS	F	MS	F	MS	F	MS	F	MS	F
Treatment	2	185.24	10.9**	0.42	6.8*	36.55	10.2**	5.12	0.5	0.04	0.0	110.02	6.2*	0.29	4.1*	0.32	0.8
Residual	9	16.96		0.06		3.58		11.00		3.38		7.86		0.07		0.38	
Cochran's test: Transformation:		C = 0.719, ns None		C = 0.660, ns Ln(x+1)		C = 0.741, ns None		C = 0.596, ns None		C = 0.720, ns None		C = 0.466, ns None		C = 0.443, ns None		C = 0.777, ns None	

Table S2. ANOVA comparing the abundance of individual taxa and total number of taxa on transplanted cores and in RM quadrats in Expt 2. Symbols as in Table S1

Source	df	Filamentous algae		Encrusting corallines		<i>Laurencia obtusa</i>		<i>Chondria boryana</i>		<i>Rivularia</i> spp.		<i>Chthamalus stellatus</i>		Taxa	
		MS	F	MS	F	MS	F	MS	F	MS	F	MS	F	MS	F
Treatment	2	197.34	2.6	429.05	2.8	1.51	4.9*	38.43	7.4*	11.64	0.4	94.14	2.9	4.74	7.8*
Residual	9	75.63	154.95	0.31	5.19	29.07	32.43	0.61							
Cochran's test: Transformation:		C = 0.509, ns None		C = 0.566, ns None		C = 0.645, ns Ln(x+1)		C = 0.825, ns None		C = 0.441, ns None		C = 0.487, ns None		C = 0.398, ns None	

Table S3. ANOVA comparing the abundance of individual taxa and total number of taxa on transplanted cores and in RH quadrats in Expt 1. Symbols as in Table S1; *Patella* spp.: *P. aspera* + *P. caerulea*

Source	df	Filamentous algae		Encrusting corallines		<i>Ralfsia verrucosa</i>		Coarsely branched algae		<i>Rivularia</i> spp.		<i>Chthamalus stellatus</i>		<i>Patella</i> spp.		Taxa	
		MS	F	MS	F	MS	F	MS	F	MS	F	MS	F	MS	F	MS	F
Treatment	2	359.38	3.5	932.62	5.9*	0.34	0.0	0.23	0.4	1.41	0.1	998.73	8.6**	0.49	8.0*	2.30	6.6*
Residual	9	103.23		158.82		11.75		0.55		26.06		116.87		0.06		0.35	
Cochran's test: Transformation:		C = 0.647, ns None		C = 0.641, ns None		C = 0.381, ns None		C = 0.751, ns Ln(x+1)		C = 0.515, ns None		C = 0.791, ns None		C = 0.911, ns None		C = 0.683, ns None	

Table S4. ANOVA comparing the abundance of individual taxa and total number of taxa on transplanted cores and in RH quadrats in Expt 2. Symbols as in Table S1

Source	df	Filamentous algae		Encrusting corallines		<i>Laurencia obtusa</i>		<i>Chondria boryana</i>		<i>Rivularia</i> spp.		<i>Chthamalus stellatus</i>		Taxa	
		MS	F	MS	F	MS	F	MS	F	MS	F	MS	F	MS	F
Treatment	2	27.62	31.7***	233.35	11.7**	8.52	5.3*	4.28	5.5*	36.73	7.8*	1242.67	5.4*	8.65	44.7***
Residual	9	0.87		19.98		1.59		0.78		4.71		230.66		0.19	
Cochran's test: Transformation:		C = 0.519, ns Ln(x+1)		C = 0.612, ns None		C = 0.979, ns None		C = 0.599, ns Ln(x+1)		C = 0.439, ns None		C = 0.711, ns None		C = 0.638, ns None	

Supplement 4. ANOVA examining the resistance of transplanted organisms. Abbreviations as in Supplement 1Table S5. ANOVA comparing the abundance of individual taxa and total number of taxa on transplanted cores and RL quadrats in Expt 1 (*p < 0.05, **p < 0.01, ***p < 0.001; ns: not significant). *Patella* spp.: *P. aspera* + *P. caerulea*

Source	df	Filamentous algae		Encrusting corallines		<i>Ralfsia verrucosa</i>		Coarsely branched algae		<i>Rivularia</i> spp.		<i>Chthamalus stellatus</i>		<i>Patella</i> spp.		Taxa	
		MS	F	MS	F	MS	F	MS	F	MS	F	MS	F	MS	F	MS	F
Treatment	4	218.77	2.9	369.77	2.7	9.09	1.4	12.85	1.0	0.32	1.7	20.02	0.9	0.28	32.7***	0.60	1.9
Residual	15	76.25		135.71		6.37		13.40			0.19	21.73		0.01		0.31	
Cochran's test:		C = 0.526, ns		C = 0.450, ns		C = 0.422, ns		C = 0.337, ns		C = 0.434, ns		C = 0.397, ns		C = 0.584, ns		C = 0.569, ns	
Transformation:		None		None		None		None		Ln(x+1)		None		Ln(x+1)		None	

Table S6. ANOVA comparing the abundance of individual taxa and total number of taxa on transplanted cores and in RL quadrats in Expt 2. Symbols as in Table S5

Source	df	Filamentous algae		Encrusting corallines		<i>Laurencia obtusa</i>		<i>Chondria boryana</i>		<i>Rivularia</i> spp.		<i>Chthamalus stellatus</i>		Taxa	
		MS	F	MS	F	MS	F	MS	F	MS	F	MS	F	MS	F
Treatment	4	555.88	4.7**	483.55	2.5	0.88	3.1*	1.96	3.1*	50.63	2.4	247.34	2.3	4.55	10.9***
Residual	14 ^a	116.43		190.52		0.28		0.63		21.34		107.93		0.42	
Cochran's test:		C = 0.286, ns		C = 0.532, ns		C = 0.453, ns		C = 0.428, ns		C = 0.386, ns		C = 0.868, p < 0.01		C = 0.342, ns	
Transformation:		None		None		Ln(x+1)		Ln(x+1)		None		None		None	

^aDegrees of freedom corrected for missing data