

Supplementary Material

Table 1-S: Results of the population structure of *P. ferruginea* and environmental factors for each sector (highest values are marked in green and the lowest are marked in red). For elemental composition only data with percentage of substrate oxides (>3%) are shown. CP: Percentage of calcination.

SECTOR	Mean Density (ind/m)	Adult mean density (ind/m)	Individual > 60 mm (ind/m)	Mean size (mm)	Adult mean size (mm)	Macroscale roughness (m)	Microscale roughness (cm)	Area of <i>P. ferruginea</i> habitat	Inclination of the substratum (degree)	Chl-a (µg/cm ²)	Human activity	Fetch (Fe)	SiO ₂ (%)	Al ₂ O ₃ (%)	Fe ₂ O ₃ (%)	MgO (%)	CaO (%)	K ₂ O (%)	P.C.
A	1.05	0.87	0.27	30.74	27.48	1.43	30.76	27.48	30.07	0.77	53.83	199.51	36.00	8.70	1.97	6.85	17.00	2.32	25.99
B	3.38	3.38	0.94	42.09	47.55	1.25	31.17	14.62	13.44	1.30	35.50	213.42	42.66	10.57	3.15	5.98	12.92	2.08	20.95
C	5.04	3.88	0.88	42.58	48.00	1.59	32.41	19.82	21.14	0.87	58.83	203.13	0.42	0.19	0.09	17.25	33.64	0.07	48.11
D	6.06	5.30	1.37	41.86	45.27	1.28	31.37	9.00	16.36	1.15	18.17	99.11	1.47	0.15	0.14	7.96	44.03	0.04	45.93
E	4.95	4.68	2.18	58.41	60.29	1.23	31.78	19.43	18.79	0.90	20.67	176.29	41.88	9.86	2.42	7.19	12.72	2.92	21.29
F	5.46	5.01	1.86	49.57	52.54	1.19	31.95	24.25	17.63	0.80	26.00	303.89	70.91	12.84	0.83	0.68	1.78	3.46	6.29
G	5.06	4.39	1.56	51.01	53.64	1.25	31.24	34.55	18.04	1.32	12.17	299.86	63.53	12.69	1.28	0.43	4.99	5.51	8.77
H	8.82	7.89	2.22	51.82	54.17	1.12	32.59	23.14	19.61	0.84	18.83	492.95	64.55	13.24	1.82	0.62	4.06	3.48	8.87
I	10.47	8.81	1.61	45.81	49.25	1.33	30.64	25.50	28.01	0.64	13.83	1003.83	67.87	13.45	2.15	0.46	1.78	5.31	5.97
J	0.84	0.77	0.18	45.66	47.19	1.17	29.60	15.82	21.11	0.67	39.67	54.49	65.57	14.43	4.38	1.45	1.09	3.58	6.99
K	20.29	15.35	1.09	38.73	42.98	1.53	32.80	15.53	17.41	0.68	5.17	71.46	0.09	0.03	0.23	19.59	31.39	0.01	48.53
L	32.20	19.58	4.13	43.83	52.02	1.44	30.29	8.11	15.79	0.69	4.33	1.33	0.14	0.07	0.05	19.17	31.73	0.02	48.71
M	13.33	9.01	0.64	35.82	42.43	1.48	31.72	53.37	26.91	1.00	4.33	278.90	0.35	0.13	0.08	16.28	35.68	0.03	47.32
N	6.68	4.79	1.07	38.23	45.13	1.52	29.57	11.67	33.13	0.37	7.17	86.80	4.44	0.76	0.69	13.34	35.53	0.09	44.39
O	13.22	9.04	1.58	38.88	44.86	1.52	32.32	40.98	23.41	0.60	18.00	22.14	0.18	0.06	0.16	12.14	40.25	0.01	47.04
P	7.27	5.21	0.80	40.67	47.60	1.35	31.11	8.75	12.57	0.95	31.17	204.63	58.74	7.17	2.65	0.98	12.24	1.41	15.46
Q	2.45	1.95	0.31	39.41	42.27	1.19	29.57	16.85	19.37	0.90	19.83	1100.90	71.56	5.68	2.07	1.11	6.57	1.18	10.71
R	0.84	0.77	0.32	41.95	42.55	1.42	31.19	13.10	36.17	2.29	14.33	105.83	50.38	0.90	1.44	6.13	16.06	0.20	24.26

Table 2-S: Impact of human activity in the limpet's habitat (intertidal zone) in each sector. To estimate the used index for the Generalized Linear Model (GLM). The total of each interaction was multiplied by the impact valor on the habitat.

Number of interaction	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
Angling	11	7	2	4	13	5	3	16	19	10	3	5	0	3	12	18	12	11
Shell fishing	0	4	0	0	0	1	11	0	0	0	0	0	0	0	4	2	0	0
Bathing in the intertidal	115	66	132	34	21	35	13	19	10	68	10	4	8	10	28	50	28	24
Bathing near the intertidal	58	48	83	28	31	65	1	27	2	69	2	2	8	14	4	21	27	5
Ecreational boat nearby	0	0	0	0	0	0	0	0	2	0	0	1	1	0	0	0	0	0
Immigrant camp	2	0	0	1	12	3	4	0	2	3	0	0	1	0	0	6	0	0
Interaction value	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
Angling - (x3)	33	21	6	12	39	15	9	48	57	30	9	15	0	9	36	54	36	33
Shell fishing - (x3)	0	12	0	0	0	3	33	0	0	0	0	0	0	0	12	6	0	0
Bathing in the intertidal - (x2)	230	132	264	68	42	70	26	38	20	136	20	8	16	20	56	100	56	48
Bathing near the intertidal - (x1)	58	48	83	28	31	65	1	27	2	69	2	2	8	14	4	21	27	5
Ecreational boat nearby - (x1)	0	0	0	0	0	0	0	0	2	0	0	1	1	0	0	0	0	0
Immigrant camp - (x1)	2	0	0	1	12	3	4	0	2	3	0	0	1	0	0	6	0	0
Indice for the GLM	53.83	35.50	58.83	18.17	20.67	26.00	12.17	18.83	13.83	39.67	5.17	4.33	4.33	7.17	18.00	31.17	19.83	14.33

Table 3-S: Elemental composition of each (transect) sector by X-ray fluorescence. Data shown the percentage of oxides of the substrate (>3%). CP: Calcination Percentage.

Sector-Transect	Substrate	SiO₂ %	Al₂O₃ %	Fe₂O₃ %	MgO %	CaO %	K₂O %	P.C.
A-04	natural	61.06	20.51	2.32	0.72	0.23	5.74	7.87
A-01	rip-rap	0.09	0.07	0.51	19	31.46	0.03	48.61
A-02	natural	46.86	5.53	3.07	0.83	19.3	1.21	21.48
B-16	rip-rap	0.89	0.13	0.3	14.92	36.05	0.03	47.53
B-06	natural	70.83	10.3	3.58	1.19	2.22	1.81	7.61
B-07	natural	56.25	21.28	5.56	1.83	0.47	4.4	7.71
C-02	rip-rap	0.14	0.03	0.06	20.71	30.27	0	48.72
C-03	rip-rap	0.9	0.48	0.16	13.36	36.98	0.18	47.45
C-12	rip-rap	0.22	0.05	0.04	17.7	33.66	0.02	48.17
D-09	rip-rap	0.22	0.09	0.05	19.99	30.87	0.03	48.69
D-12	rip-rap	2.71	0.25	0.2	3.2	48.32	0.07	44.7
D-06	rip-rap	1.49	0.1	0.16	0.7	52.9	0.03	44.4
E-01	natural	56.28	15.35	5.6	1.92	5.09	2.98	10.8
E-21	rip-rap	2.03	0.97	0.53	19.27	30	0.08	46.7
E-07	natural	67.33	13.27	1.12	0.38	3.06	5.71	6.37
F-10	natural	73.23	11.83	0.57	0.99	1.49	2.71	6.67
F-16	natural	70.78	13.6	1.47	0.42	0.7	5.53	4.92
F-07	natural	68.71	13.09	0.44	0.64	3.14	2.14	7.3
G-08	natural	53.83	11.13	1.05	0.6	11.71	4.74	14.6
G-42	natural	66.74	13.54	1.54	0.37	2.1	6	6.86
G-01	natural	70.01	13.39	1.26	0.31	1.14	5.79	4.83
H-29	natural	61.21	12.14	1.46	0.51	6.78	3.35	11.29
H-05	natural	63.11	13.29	2.08	0.72	4.54	4.19	9.16
H-36	natural	69.33	14.27	1.92	0.63	0.86	2.88	6.17
I-02	natural	65.32	13.17	2.24	0.57	3.35	4.28	8.44
I-47	natural	70.62	13.44	2	0.4	0.82	5.4	3.87
I-25	natural	67.67	13.75	2.23	0.4	1.15	6.24	5.59
J-17	natural	68.74	13.71	2.44	0.64	1.05	4.77	6.32
J-13	natural	65.57	15.12	4.95	1.85	0.34	3.11	6.56
J-10	natural	62.4	14.45	5.77	1.86	1.89	2.86	8.1
K-07	rip-rap	0.07	0.03	0.07	18.81	32.55	0	48.41
K-05	rip-rap	0.05	0.04	0.56	19.76	30.67	0	48.7
K-10	rip-rap	0.14	0.03	0.05	20.21	30.96	0.02	48.49
L-20	rip-rap	0.27	0.14	0.06	19.86	30.94	0.05	48.58
L-36	rip-rap	0.05	0.03	0.03	19.34	31.4	0	49.02
L-18	rip-rap	0.1	0.05	0.05	18.32	32.86	0.02	48.54
M-07	rip-rap	0.51	0.3	0.13	14.29	38.8	0.08	45.74
M-10	rip-rap	0.07	0.02	0.04	17.58	33.45	0	48.69
M-19	rip-rap	0.46	0.08	0.07	16.96	34.8	0.02	47.52
N-03	cube	7.52	1.19	1.12	11.11	36.19	0.13	41.83
N-16	cube	2.52	0.42	0.41	11.31	38.73	0.08	45.71
N-14	cube	3.27	0.68	0.54	17.61	31.67	0.06	45.63
O-02	rip-rap	0.07	0.04	0.07	8.34	45.1	0	46.24
O-01	rip-rap	0.41	0.1	0.05	8.08	45.46	0.03	45.69
O-03	rip-rap	0.07	0.04	0.36	19.99	30.19	0	49.2

P-16	natural	79.36	1.1	0.54	0.26	6.71	0.12	11.45
P-09	natural	32.43	11.49	4.38	1.51	22.69	2.24	23.33
P-26	natural	64.43	8.93	3.02	1.16	7.34	1.85	11.61
Q-11	natural	59.2	8.93	3.77	1.75	9.97	1.4	12.87
Q-21	natural	75.79	3.75	0.73	0.45	6.4	1.31	11
Q-32	natural	79.7	4.35	1.72	1.13	3.34	0.84	8.25
R-42	rip-rap	0.13	0.02	0.03	17.87	33.96	0.03	47.62
R-21	natural	85.55	1.41	0.37	0.18	3.47	0.23	8.11
R-40	natural	65.48	1.26	3.92	0.35	10.74	0.35	17.06

Table 4-S: Mineralogical composition of each sector (transect) quantified by interpretation X-ray diffraction (XRD) data using DRIFAC.EVA.4.1. The pattern used and the degree of quality assigned by the ICDD (International Centre for Diffraction Data) is indicated. Star (*): High quality pattern; Indexed: pattern has been indexed, therefore, the material is almost certainly single-phase; Blank: does not meet Star, Indexed, or Low-Precision criteria; PDF: Powder Diffraction File; Mg.: magnesium.

Sector-Transec	Substrate	Quartz	Muscovite	Albite	Feldspar	Biotite	Calcite	Fosterite	Dolomite	Mg. Calcite	Graphite	Mica
A-04	natural	0,29	0,50	0,07		0,08						
A-01	rip-rap								0,82			0,11
A-02	natural	0,24	0,23							0,12	0,05	
B-16	rip-rap								0,70	0,11		
B-06	natural	0,16	0,37	0,12							0,12	
B-07	natural	0,31	0,27	0,09							0,12	
C-02	rip-rap								0,69	0,06		0,10
C-03	rip-rap								0,83			0,09
C-12	rip-rap								0,59	0,15		0,09
D-09	rip-rap						0,11	0,05	0,20	0,39		0,11
D-12	rip-rap						0,23	0,05		0,51		0,07
D-06	rip-rap								0,81			0,09
E-01	natural	0,09	0,72	0,05								
E-21	rip-rap							0,78			0,11	
E-07	natural	0,20	0,08	0,15	0,15						0,05	0,08
F-10	natural		0,33	0,06								0,06
F-16	natural		0,14	0,11								0,09
F-07	natural	0,24		0,15	0,12						0,05	0,06
G-08	natural	0,14	0,08	0,13	0,14						0,06	0,07
G-42	natural	0,06	0,24	0,15	0,16							0,10
G-01	natural	0,29	0,13	0,14	0,08						0,08	0,08
H-29	natural		0,17	0,12								0,08
H-05	natural	0,27	0,10	0,12							0,24	
H-36	natural	0,28	0,15	0,28							0,09	
I-02	natural	0,19	0,11	0,11	0,17	0,10					0,12	
I-47	natural	0,44	0,18	0,20								
I-25	natural	0,18	0,17	0,19							0,07	0,08
J-17	natural	0,27	0,14	0,06		0,05					0,38	
J-13	natural	0,31	0,15	0,14							0,24	
J-10	natural		0,20	0,10	0,05							0,06

K-07	rip-rap								0,78			0,10
K-05	rip-rap				0,05				0,71			0,13
K-10	rip-rap								0,83			0,10
L-20	rip-rap								0,81			0,11
L-36	rip-rap								0,76	0,06		0,10
L-18	rip-rap				0,07				0,69			0,13
M-07	rip-rap				0,05				0,59	0,13		0,12
M-10	rip-rap								0,81			0,09
M-19	rip-rap								0,77	0,05		0,09
N-03	cube						0,07		0,65	0,09		0,08
N-16	cube								0,50	0,18		0,09
N-14	cube			0,11					0,56			0,12
O-02	rip-rap				0,07		0,42		0,23	0,09		0,13
O-01	rip-rap								0,85			0,11
O-03	rip-rap						0,10		0,68	0,07		0,07
P-16	natural	0,28	0,11								0,17	
P-09	natural	0,05	0,22							0,06		
P-26	natural	0,08	0,21	0,06						0,24		0,06
Q-11	natural	0,27	0,39	0,09						0,05	0,06	
Q-21	natural		0,19									
Q-32	natural	0,44	0,13								0,14	
R-42	rip-rap								0,79			0,09
R-21	natural	0,52	0,14								0,09	
R-40	natural	0,43	0,08								0,06	

Mineral	Pattern PDF	Quality	Exact formula of the pattern
Quartz, synthetic	PDF 00-046-1045	Star (*)	SiO ₂
Muscovite	PDF 00-058-2035	Calculated	(Na _{0.37} K _{0.60})(Al _{1.84} Ti _{0.02} Fe _{0.10} Mg _{0.06})(Si _{3.03} Al _{0.97})O ₁₀ (OH) ₂
Albite (Heat treated)	PDF 04-017-1022	Calculated	Na(AlSi ₃ O ₈)
Feldspar	PDF 01-076-8038	Star (*)	Sr Sr _{0.854} (Al _{1.7} Si _{2.3} O ₈)
Biotite	PDF 01-076-8347	Star (*)	(K _{0.98} Na _{0.01})(Fe _{0.61} Mg _{0.16} Mn _{0.04} Zn _{0.02})(Fe _{0.38} Al _{0.335} Mg _{0.21} Ti _{0.075}) ₂ ((Si _{2.72} Al _{1.15} Fe _{0.13})O _{10.32})(OH) _{1.57} F _{0.11}
Calcite, synthetic	PDF 00-066-0867	Star (*)	CaCO ₃
Fosterite	PDF 01-083-1485	Star (*)	(Mg _{1.727} Fe _{0.273})(SiO ₄)
Dolomite	PDF 00-005-0622	Blank	CaMg(CO ₃) ₂
Mg. calcite synthetic	PDF 04-012-6930	Star (*)	(Mg _{0.03} Ca _{0.97})(CO ₃)
Graphite	PDF 00-056-0159	Star (*)	C
Mica	PDF 01-083-6012	Star (*)	(Na _{0.23} Ca _{0.77})Li _{0.41} Al ₂ (Al _{1.76} Si ₂ Be _{0.24})O ₁₂ H _{1.69}

