Table S1. Mean values (± st. error) of enzyme activity, soil chemical variables and microbial biomasses recorded in hydrated samples covered (+BSC) or uncovered (-BSC) with soil biological crust dominated by *Cladonia rangiformis*.

	Hydrated soils							
	Sampling 1		**Sampling 2**		**Sampling 3**		**Sanpling 4**	
	+BSC	**-BSC**	**+BSC**	**-BSC**	**+BSC**	**-BSC**	**+BSC**	**-BSC**
NAG ($\mu molPNP.g^{-1}.dw.h^{-1}$)	0.31±0.13	0.36±0.18	0.4±0.11	0.45±0.09	0.18±0.03	0.26±0.03	0.45±0.05	0.39±0.1
BG ($\mu molPNP.g^{-1}.dw.h^{-1}$)	0.18±0.07	0.15±0.07	0.17±0.02	0.15±0.07	0.1±0.06	0.12±0.06	0.11±0.06	0.16±0.06
UREA ($\mu molNH_4^+.g^{-1}.dw.h^{-1}$)	0.60±0.16	0.79±0.18	0.64±0.1	0.83±0.06	0.44±0.11	0.93±0.19	0.47±0.08	0.26±0.1
PPO ($\mu mol\ L\text{-}DOPA.g^{-1}.dw.h^{-1}$)	0.19±0.08	0.07±0.04	0.15±0.06	0.09±0.05	0.23±0.09	0.15±0.08	0.09±0.03	0.03±0.01
AP ($\mu molPNP.g^{-1}.dw.h^{-1}$)	0.19±0.03	0.26±0.07	0.15±0.02	0.17±0.02	0.18±0.05	0.23±0.05	0.13±0.02	0.15±0.03
NH_4^+ ($\mu g.g^{-1}$)	122.79±28.16	112.98±29.38	100.08±33.34	153.5±4.66	49.5±10.12	49.26±11.88	70.93±4.97	78.15±10.75
NO_3^- ($\mu g.g^{-1}$)	13.31±1.5	9.41±1.32	11.99±1.01	11.02±0.49	6.15±2.27	5.95±2.2	6.49±6.1	1.03±1.03
Organic C (%)	2.74±0.42	2.17±0.11	2.36±0.17	2.61±0.25	2.57±0.24	2.48±0.07	2.36±0.13	2.43±0.09
Organic N ($\mu g.g^{-1}$)	498.5±172.61	510.25±21.53	481±6.06	550.25±28.76	602±44.83	576.75±35.15	608.25±6.79	584.5±37.35
Mg ($\mu g.g^{-1}$)	165.25±9.83	151.75±4.91	158.5±4.66	163.75±3.57	171.5±3.23	165.25±7.38	168.25±6.5	173.25±8.14
K ($\mu g.g^{-1}$)	77.75±9.8	71.25±5.11	83±10.95	73.25±6.02	81±5.58	66.75±5.22	75.25±2.53	69.5±4.94
Ca ($\mu g.g^{-1}$)	1133.5±87.52	994±50.49	1036.75±43.97	1171.75±40.31	1047±47.53	1081±112.39	909±39.42	996.75±44.13
P ($\mu g.g^{-1}$)	6.87±1.53	7.31±2.41	8.9±5.13	4.35±0.28	7.44±3.33	4.54±0.85	5.43±0.3	8.91±3.44
Total microbial biomass ($nmol.g^{-1}$)	56.78±5.09	49.85±9.3	50.87±3.49	49.88±1.69	36.44±8.62	43.81±3.29	22±4.96	38.35±3.53
Bacterial biomass ($nmol.g^{-1}$)	36.22±3.48	31.64±6.15	32.7±2.17	30.94±1.25	23.01±5.56	27.72±2.15	14.14±3.37	23.98±2.1
Fungal biomass ($nmol.g^{-1}$)	15.76±1.23	12.85±2.35	13.44±1.09	14.15±0.36	10.02±2.53	12.15±0.91	4.7±1.49	10.66±1.06

Table S2. Mean values (± st. error) of enzyme activity, soil chemical variables and microbial biomasses recorded in non- hydrated samples covered (+BSC) or uncovered (-BSC) with soil biological crust dominated by *Cladonia rangiformis*.

	Non-hydrated soils							
	Sampling 1		**Sampling 2**		**Sampling 3**		**Sampling 4**	
	+BSC	**-BSC**	**+BSC**	**-BSC**	**+BSC**	**-BSC**	**+BSC**	**-BSC**
NAG (µmolPNP.g^{-1}.dw.h^{-1})	0.30±0.07	0.42±0.12	0.35±0.12	0.3±0.08	0.48±0.02	0.73±0.03	0.34±0.08	0.46±0.1
BG (µmolPNP.g^{-1}.dw.h^{-1})	0.3±0.06	0.21±0.01	0.25±0.05	0.07±0.04	0.07±0.03	0.1±0.04	0.15±0.05	0.16±0.1
UREA (µmolNH_4^+.g^{-1}.dw.h^{-1})	1.06±0.3	1.12±0.27	0.56±0.07	0.58±0.06	0.83±0.07	0.39±0.1	0.46±0.06	0.59±0.12
PPO (µmol L-DOPA.g^{-1}.dw.h^{-1})	0.3±0.06	0.21±0.07	0.22±0.07	0.06±0.03	0.08±0.05	0±0	0.08±0.04	0.09±0.05
AP (µmolPNP.g^{-1}.dw.h^{-1})	0.23±0.01	0.32±0.02	0.21±0.02	0.23±0.06	0.12±0.04	0.34±0.15	0.12±0.02	0.16±0.03
NH_4^+ (µg.g^{-1})	141.1±10.48	108.54±11.22	148.36±42.14	135.9±45.45	19.49±0.97	22.81±2.72	76.21±7.79	71.9±1.7
NO_3^- (µg.g^{-1})	11.02±0.41	13.21±3.58	19.65±10.29	12.34±1.11	7.46±2.52	6.97±0.54	1.37±0.78	3.71±2.51
Organic C (%)	3.04±0.37	2.89±0.1	2.52±0.04	2.65±0.24	2.47±0.27	2.63±0.15	2.57±0.19	2.28±0.13
Organic N (µg.g^{-1})	617.25±66.16	573±7.59	548±11.71	579.75±11.21	570.25±41.7	560.75±9.76	618.75±29.1	541±43.17
Mg (µg.g^{-1})	159.5±7.31	161±2.35	170.75±7.26	169±4.49	149±7.33	163.5±5.56	172±4.42	165.25±8.98
K (µg.g^{-1})	82.5±11.39	72.25±2.5	86.75±16.86	85±8.79	86±9.68	99.25±8.05	67.5±3.57	73.75±8.61
Ca (µg.g^{-1})	1077.25±64.79	1047.25±16.28	1091.25±15.83	1111.75±49.94	972.75±69.11	1066.75±48.89	940.25±54.43	909.5±86.99
P (µg.g^{-1})	8.75±3.17	5.18±0.37	4.06±0.29	4.62±0.33	3.55±0.63	4.37±1.08	5.1±0.32	7.49±2.95
Total microbial biomass (nmol.g^{-1})	71.07±12.27	55.86±11.69	55.61±6.75	42.12±1.58	49.95±7.95	28.66±8.41	39.27±2.52	45.25±5.01
Bacterial biomass (nmol.g^{-1})	45.24±8.01	35.51±7.98	35.24±4.46	26.12±1.11	32.68±5.27	18.19±5.67	25.27±1.53	28.91±3.18
Fungal biomass (nmol.g^{-1})	18.43±2.8	14.97±2.51	13.93±1.15	11.74±0.58	12.48±1.82	7.75±2.08	10.32±0.93	12.1±1.27

Table S3. Values of centrality (percent of the maximum possible) at the level of the entire network (Net) and at the level of the first main sub network (SubNet). Average, STDEV and CV: Average, Standard deviation and Coefficient of Variation of nodes centrality respectively.

Sampling	Treatments	Average	STDEV	CV
1st	Net (+BSC+H)	0.142	0.125	0.88
	SubNet	0.308	0.011	0.04
	Net (+BSC-H)	0.172	0.086	0.50
	SubNet	0.200	0.076	0.38
	Net (-BSC+H)	0.166	0.091	0.55
	SubNet	0.252	0.020	0.08
	Net (-BSC-H)	0.184	0.044	0.24
	SubNet	0.196	0.003	0.01
2nd	Net (+BSC+H)	0.125	0.146	1.17
	SubNet			
	Net (+BSC-H)	0.188	0.040	0.21
	SubNet	0.201	0.002	0.01
	Net (-BSC+H)	0.103	0.163	1.58
	SubNet			
	Net (-BSC-H)	0.108	0.159	1.47
	SubNet	0.319	0.100	0.32
3rd	Net (+BSC+H)	0.164	0.094	0.57

	SubNet	0.222	0.020	0.09
	Net (+BSC-H)	0.179	0.061	0.34
	SubNet	0.192	0.037	0.19
	Net (-BSC+H)	0.167	0.089	0.53
	SubNet	0.235	0.035	0.16
	Net (-BSC-H)	0.183	0.046	0.25
	SubNet	0.198	0.003	0.01
4th	Net (+BSC+H)	0.155	0.109	0.70
	SubNet	0.235	0.032	0.14
	Net (+BSC-H)	0.062	0.179	2.89
	SubNet			
	Net (-BSC+H)	0.143	0.123	0.86
	SubNet	0.220	0.050	0.24
	Net (-BSC-H)	0.140	0.127	0.91
	SubNet	0.291	0.055	0.19