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Supplementary Data

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Table S1. The main steps used to apply STAR procedure.

1.	vertical substrate (85-90°) at around 35 m depth was selected in each sampling site;
2.	the sampling design expected to characterize a site consisted of 3 areas about 4 m^2 in size, 10 m apart;
3.	10 photographic samples (0.2 m^2 in surface) were collected in each area as replicates;
4.	thickness of the calcareous layer was measured through a hand-held penetrometer with 6 replicated measures per each area;
5.	size (mean height), necrosis and epibiosis (percentage) of erect anthozoans were assessed through an RVA approach;
6.	percent cover of the conspicuous taxa/morphological groups and sediment was evaluated for each sample through ImageJ software;
7.	the overall Sensitivity Level (SL) was calculated by multiplying the value of the SL of each taxon/group for its class of abundance and then summing up all the final values. The cover value of each taxon/morphological group was divided in eight classes of abundance: 1) 0<%<0.01; 2) 0.01<%<0.1; 3) 0.1<%<1; 4) 1<%<5; 5) 5<%<25; 6) 25<%<50; 7) 50<%<75; 8) 75<%<100);
8.	richness (α-diversity), i.e. the mean number of the taxa/groups per photographic sample, was calculated;
9.	β-diversity was evaluated through PERMDISP analysis as the mean distance of all photographic samples from centroids;
10.	ESCA, ISLA and COARSE indices were calculated.

Table S2. Sensitivity Level (SL) of the main taxa/morphological groups in the coralligenous assemblages for ESCA index (from Piazzi *et al*., 2017a).

Taxa/Groups	**SL**
Algal turf	1
Hydrozoans (e.g. *Eudendrium* spp.)	2
Pseudochlorodesmis furcellata	2
Perforating sponges (e.g. *Cliona* spp.)	2
Dictyotales	3
Encrusting sponges	3
Encrusting bryozoans	3
Encrusting ascidians (also epibiotic)	3
Encrusting Corallinales, articulated Corallinales	4
Peyssonnelia spp.	4
Valonia spp., *Codium* spp.	4
Sponges prostrate (e.g. *Chondrosia reniformis*, *Petrosia ficiformis*)	5
Large serpulids (e.g. *Protula tubularia*, *Serpula vermicularis*)	5
Parazoanthus axinellae	5
Leptogorgia sarmentosa	5
Flabellia petiolata	6
Erect corticated terete Ochrophyta (e.g. *Sporochnus pedunculatus*)	6
Encrusting Ochrophyta (e.g. *Zanardinia typus*)	6
Azooxantellate individual scleractinians (e.g. *Leptopsammia pruvoti*)	6
Ramified bryozoans (e.g. *Caberea boryi*, *Cellaria fistulosa*)	6
Palmophyllum crassum	7
Arborescent and massive sponges (e.g. *Axinella polypoides*)	7
Salmacina-Filograna complex	7
Myriapora truncata	7
Erect corticated terete Rodophyta (e.g. *Osmundea pelagosae*)	8
Bushy sponges (e.g. *Axinella damicornis*, *Acanthella acuta*)	8
Eunicella verrucosa, *Alcyonium acaule*	8
Erect ascidians	8
Corallium rubrum, *Paramuricea clavata*, *Alcyonium coralloides*	9
Zooxantellate scleractinians (e.g. *Cladocora caespitosa*)	9
Pentapora fascialis	9
Flattened Rhodophyta with cortication (e.g. *Kallymenia* spp.)	10
Halimeda tuna	10
Fucales (e.g. *Cystoseira* spp., *Sargassum* spp.), *Phyllariopsis brevipes*	10
Eunicella singularis, *Eunicella cavolini*, *Savalia savaglia*	10
Aedonella calveti, *Reteporella grimaldii*, *Smittina cervicornis*	10

Table S3. Descriptors used to calculate ESCA index $EQR=((EQR_{SL}+EQR_{\alpha}+EQR_{\beta})\times 3^{-1})$. Individual EQRs were calculated as the ratios of the values of the three descriptors to the values of the same descriptors of the reference location for the north-western Mediterranean Sea.

Descriptor	Calculation method
α-diversity	The α-diversity of the assemblages was evaluated as the number of taxa/morphological group per sample
β-diversity	The β-diversity was evaluated based on the spatial heterogeneity of assemblages as calculated by PERMDISP analysis (Primer 6+ PERMANOVA)
Sensitivity Level	The total Sensitivity Level of photographic sample (SL_{sa}) was calculated as the mean of values of all the samples. The Sensitivity Level of each sample was obtained by multiplying the sensitivity value of each taxa/groups (see Table S2) for its class of abundance (from 1 to 8), and finally adding values of all taxa/groups present in the sample

Table S4. Scores of the Integrated Sensitivity Level (ISL) for the main taxa/morphological groups in the coralligenous assemblages, as obtained combining the values of sensitivity to disturbance (DSL) and of sensitivity to stress (SSL) (Montefalcone *et al., 2*017). In the case of alien species, the ISL score is put to -1 *a priori*.

Taxa/Groups	**DSL**	**SSL**	**ISL**
Alien species (e.g. *Caulerpa cylindracea*, *Womersleyella setacea*)	na	na	-1
Algal turf	6	0	0
Small hydroids	7	1	0
Pseudochlorodesmis furcellata	8	1	1
Siphonous with vesicle-like thallus (*Valonia* spp., *Codium* spp.)	8	2	1
Encrusting sponges	8	3	1
Dictyotales	8	3	2
Encrusting Corallinales	8	4	2
Encrusting Ochrophyta (e.g. *Zanardinia typus*)	6	6	2
Peyssonnelia spp.	8	4	2
Perforating sponges (e.g. *Cliona* spp.)	9	2	2
Large hydroids (e.g. *Eudendrium* spp.)	11	1	2
Encrusting bryozoans	11	2	2
Encrusting ascidians (also epibiotic)	10	2	2
Erect corticated Ochrophyta (e.g. *Nereia filiformis*, *Sporochnus*	9	6	3
Flabellia petiolata	8	6	3
Palmophyllum crassum	7	8	3
Erect corticated Rhodophyta (e.g. *Botryocladia* spp., *Osmundea pelagosa*)	9	9	4
Macroforaminifera (e.g. *Miniacina miniacea*)	11	6	4
Sponges prostrate (e.g. *Chondrosia reniformis*, *Petrosia ficiformis*)	12	4	4
Parazoanthus axinellae	12	4	4
Stolonifera (e.g. *Cornularia cornucopiae*)	12	6	4
Flattened Rhodophyta with cortication (*Kallymenia* spp., *Acrodiscus vidovichii*)	9	10	5
Halimeda tuna	9	10	5
Laminariales (e.g. *Phyllariopsis brevipes*)	10	10	5
Bushy sponges (e.g. *Axinella damicornis*, *Acanthella acuta*)	13	7	5
Leptogorgia sarmentosa	16	4	5
Azooxantellate solitary scleractinians (e.g. *Leptopsammia pruvoti*)	15	4	5
Bivalve molluscs	15	5	5
Large serpulids (e.g. *Protula tubularia*, *Serpula vermicularis*)	14	5	5
Salmacina-Filograna complex	13	6	5
Ramified bryozoans (e.g. *Caberea boryi*, *Cellaria fistulosa*)	14	5	5
Fucales (e.g. *Sargassum* spp., *Cystoseira* spp.)	10	11	6
Arborescent and massive sponges (e.g. *Axinella polypoides*, *Sarcotragus*	16	6	6
Actinians	15	7	6
Eunicella cavolini	16	7	6
Azooxantellate colonial scleractinians (e.g. *Phyllangia americana*)	16	5	6
Vermetids	16	5	6
Erect ascidians	15	7	6

Alcyonium acaule	16	8	7
Alcyonium coralloides	16	9	7
Corallium rubrum	17	8	7
Eunicella verrucosa	16	7	7
Paramuricea clavata	16	8	7
Zooxantellate individual scleractinians (e.g. *Balanophyllia europea*)	15	9	7
Myriapora truncata	17	6	7
Pentapora fascialis	17	8	7
Savalia savaglia	16	11	8
Zooxantellate colonial scleractinians (e.g. *Cladocora caespitosa*)	17	9	8
Eunicella singularis	16	12	9
Aedonella calveti, Reteporella grimaldii, Smittina cervicornis	17	12	9

Table S5. Criteria for the assignment of quality scores to each descriptor for each replicate in COARSE index. ECR= encrusting coralline algae, NCEA= non calcified encrusting algae, EA= encrusting animals. L = the maximum height found in literature for each species. The necrosis is evaluated as the mean percentage of necrosis of each individual colony.

Layer	**Descriptor**	**score 3**	**score 2**	**score 1**
BASAL	% cover (cover x score / 100)	ECR	NCEA, EA	Turf, sediment
	Penetration	<1	>1	0
	Borer marks	absent	occasional	common
INTERMEDIATE	Species Richness (SR)	SR >8	8 >SR >5	SR < 5
	Erect calcified organisms	ECO>3	1<ECO≤3	ECO≤1 2
	Sensitivity of bryozoans	*S.cervicornis*, *R. grimaldii*	*P. fascialis*, *A. calveti*	*M. truncata*
ERECT	% cover	% > 25	25 > % > 5	% < 5
	Maximum height(MH)	MH > 0.6xL	0.6xL > MH > 0.3xL	MH < 0.3xL
	Necrosis (N)	N < 10%	75%> N >10%	N > 75%