Nestedness and turnover unveil inverse spatial patterns of compositional and functional β-diversity at varying depth in marine benthos

Supplementary material

Appendix S1. List of sessile taxa recorded in the study area.

Appendix S2. Full list of functional traits.

Appendix S3. Functional trait values.

Appendix S4. Principal Coordinates Analysis (PCoA) for functional dimensions.

Appendix S5. PERMDISP tests at the scale of sites.

Appendix S6. PCoA ordination of islands × depths centroids.

Appendix S7. Pairwise values of compositional β-diversity and components.

Appendix S8. Pairwise values of functional β-diversity and components.

Appendix S9. Patterns of β-diversity vs. geographic distance at the scale of sites.

Appendix S10. Data.

Appendix S1. List of sessile taxa recorded in the study area.

Foraminifera	*Miniacina miniacea* (Pallas, 1766)	
Chlorophyta	*Acetabularia acetabulum* (Linnaeus) P.C. Silva, 1952	
	Anadyomene stellata (Wulfen) C. Agardh, 1823	
	Caulerpa cylindracea Sonder, 1845	
	Codium bursa (Olivi) C. Agardh, 1817	
	Codium coralloides (Kützing) P.C. Silva, 1960	
	Dasycladus vermicularis (Scopoli) Krasser, 1898	
	Flabellia petiolata (Turra) Nizamuddin, 1987	
	Green Filamentous Algae	*Bryopsis*, *Cladophora*
	Halimeda tuna (J. Ellis & Solander) J.V. Lamouroux, 1816	
	Palmophyllum crassum (Naccari) Rabenhorst, 1868	
	Valonia macrophysa Kützing, 1843	
Rhodophyta	*Amphiroa* spp.	*A. rigida* J.V. Lamouroux, 1816; *A. cryptarthrodia* Zanardini, 1844; *A. beauvoisii* J.V. Lamouroux, 1816
	Botryocladia sp.	
	Dudresnaya verticillata (Withering) Le Jolis, 1863	
	Ellisolandia elongata (J. Ellis & Solander) K.R. Hind & G.W. Saunders, 2013	
	Encrusting Rhodophytes	*Lithophyllum*, *Lithothamnion*, *Neogoniolithon*, *Mesophyllum*
	***Gloiocladia repens* (C. Agardh) Sánchez & Rodríguez-Prieto, 2007	
	Halopteris scoparia (Linnaeus) Sauvageau, 1904	
	Jania rubens (Linnaeus) J.V. Lamouroux, 1816	
	**Jania virgata* (Zanardini) Montagne, 1846	
	Laurencia spp.	*L. obtusa* (Hudson) J.V. Lamouroux, 1813; *L. microcladia* Kützing, 1865; *Chondrophycus* sp.; *P. rubra* (Greville) J. Agardh, 1851; *P. squamaria* (S.G. Gmelin) Decaisne, 1842; *P. rosa-marina* Boudouresque & Denizot, 1973
	Peyssonnelia spp.	
	***Tricleocarpa fragilis* (Linnaeus) Huisman & R.A. Townsend, 1993	

Ochrophyta	***Colpomenia sinuosa* (Mertens ex Roth) Derbès & Solier, 1851	
	Cutleria sp.	
	Cystoseira compressa(Esper) Gerloff & Nizamuddin, 1975	
	Dictyopteris polypodioides (A.P. De Candolle) J.V. Lamouroux, 1809	
	Dictyota spp.	*D. dichotoma* (Hudson) J.V. Lamouroux, 1809; *D. spiralis* Montagne, 1846; *D. fasciola* (Roth) J.V. Lamouroux, 1809
	Discosporangium mesarthrocarpum (Meneghini) Hauck, 1885	
	Padina pavonica (Linnaeus) Thivy, 1960	
	Sargassum sp.	
Porifera	***Agelas oroides* (Schmidt, 1864)	
	Aplysina aerophoba (Nardo, 1833)	
	Chondrosia reniformis Nardo, 1847	
	**Cliona rhodensis* Rützler & Bromley, 1981	
	Cliona schmidti (Ridley, 1881)	
	Cliona viridis (Schmidt, 1862)	
	Crambe crambe (Schmidt, 1862)	
	***Dysidea avara* (Schmidt, 1862)	
	Hemimycale columella (Bowerbank, 1874)	
	Ircinia variabilis (Schmidt, 1862)	
	**Oscarella lobularis* (Schmidt, 1862)	
	Petrosia (Petrosia) ficiformis (Poiret, 1789)	
	Phorbas fictitius (Bowerbank, 1866)	
	Sarcotragus spinosulus Schmidt, 1862	
	**Scalarispongia scalaris* (Schmidt, 1862)	
Cnidaria	**Balanophyllia (Balanophyllia) europaea* (Risso, 1826)	
	**Cornularia cornucopiae* (Pallas, 1766)	
	Hydroids	
	***Leptopsammia pruvoti* Lacaze-Duthiers, 1897	
Annelida	Serpulidae	*Serpula vermicularis* Linnaeus, 1767; *Hydroides dianthus* (Verrill, 1873); *Pomatocerus, Spirorbis*
Mollusca	*Rocellaria dubia* (Pennan, 1777)	

	Vermetidae	*Dendropoma petraeum* (Monterosato, 1884); *Vermetus triquetrus* Bivona-Bernardi, 1832; *Thylacodes arenarius* (Linnaeus, 1758)
Crustacea	**Perforatus perforatus* (Bruguière, 1789)	
Bryozoa	**Chlidonia pyriformis* (Bertoloni, 1810)	
	Encrusting Bryozoans	*Schizobrachiella sanguinea* (Norman, 1868); *Calpensia*. *Schizomavella* sp., *Schizoporella* sp. *Bugula* spp.; *Margaretta cereoides* (Ellis & Solander, 1786); *Hornera frondiculata* (Lamarck, 1816)
	Erect Bryozoans	
	***Myriapora truncata* (Pallas, 1766	
	Nolella gigantea (Busk, 1856)	
	***Smittina cervicornis* (Pallas, 1766)	
Tunicata	*Ascidia mentula* Müller, 1776	
	**Ascidia* sp.	
	Didemnidae	*Didemnum lahillei* Hartmeyer, 1909; *D. maculosum* (Milne-Edwards, 1841); *D. fulgens* (Milne-Edwards, 1841); *Trididemnum cereum* (Giard, 1872)
	**Diplosoma listerianum* (Milne Edwards, 1841)	
	***Halocynthia papillosa* (Linnaeus, 1767)	
Other	Filamentous Algae	*Polysiphonia*, *Ceramium*, *Sphacelaria*, *Feldmannia*, *Hincksia*

* = taxa found only at 5 m depth; ** = taxa found only at 15 m depth.

Appendix S2. Full list of functional traits.

The list of functional traits was compiled based on the framework proposed by Bremner et al. (2006, 2008), which identified 28 biological traits as key indicators of main ecosystem processes, properties and activities, including energy and elemental cycling (carbon, nitrogen, phosphorus, sulphur), silicon cycling, calcium carbonate cycling, food supply/export, productivity, habitat/shelter provision, temporal pattern (population variability, community resistance and resilience), propagule supply/export, adult immigration/emigration, and modification of physical processes. The processes of trait identification and selection integrated a recent reviews of biological and ecological species traits listing 42 traits defined specifically for benthic invertebrates (Costello et al. 2015).

Since our study focused on subtidal sessile assemblages on bedrock, traits that did not apply to this condition were not considered (e.g., bioturbation). Traits referring to physiography, hydrodynamic and tidal regimes, and biological zone of the benthic realm were also discarded, because the study exclusively concerned assemblages from open coast, exposed rocky reefs in the subtidal.

Traits that are difficult to quantify in the real world such as, for instance, the predictability of population dynamics, were excluded (Bremner et al. 2006). In some cases, multiple aspects where here condensed into a single trait; for example, information of growth form, shape, and habit was resumed into the single trait *Body Complexity*, accounting for both body shape and three-dimensional structure.

A total of 48 functional traits were selected (see Table A1). Information for each taxon recorded (see Appendix S1) and each functional trait was searched in the scientific literature, using the main search engines (i.e., Web of Science, Scopus, Google Scholar), and in several authoritative online databases (accessed in July 2018, see below for bibliographic and web references).

About 10% of organisms were identified only as genera, families or morphological groups. For genera and families, trait values were assigned based on information at these taxonomic levels, if available. In many cases the collection of destructive samples allowed the identification of intra-taxon species composition (see Appendix S1). Therefore, after checking intra-taxon similarity, it was possible to ascribe a common trait value for categorical and ordinal variables, whereas the average value was assigned for numeric variables. The same approach was used for morphological groups. When a common value could not be identified (i.e., when trait values largely differed among grouped species), 'NA' (not available) was inserted in the matrix. More generally, 'NA' was used also when no information was found on a given trait. For traits *Biomass*, *Caloric content*, and *$CaCO_3$ content*, when data on the species was not available, trait values of a similar congeneric was used.

For six traits, data were found only for 1/3 taxa or less. These traits were not considered in the analysis of functional diversity due to the substantial lack of information. Also, nine traits were not included in the analysis (see Table A1) because all taxa accounted for the same value and, therefore, did not contribute to differences in functional diversity between depth or among islands.

Data for the 48 functional traits were provided in Appendix S3.

Table S1. Full list of selected functional traits. The 48 traits were grouped in seven categories involving key biological and ecological features referring to morphology, life cycles and growth, reproduction, dispersal and colonization, interactions with the environment, biological interactions, matter and energy flow. “Type” column indicates whether traits are expressed as a numeric, ordinal, or categorical variable. A short description of traits and the range of trait values is reported. The % of taxa for which functional trait values were available is also provided (“Data availability”). Traits considered in functional diversity analysis (33) are given in grey.

Category	Trait	Description	Type	Values	Notes	Data availability
Morphology	*Body complexity*	Body shape and three-dimensional structure	Ordinal	1 (Crustose, flat); 2 (Filamentous, tubular); 3 (globose, lobate); 4 (Shrub-like); 5 (Erect - coarsely branched); 6 (Erect - arborescent)	–	100%
	Body size	Dimension of the body/colony (cm)	Ordinal	1 (1<); 2 (1-2); 3 (3-10); 4 (11-20); 5 (21-50); 6 (>50)	–	100%
	Flexibility	Quality of bending without breaking (angle)	Ordinal	1 (Rigid, <10°); 2 (Intermediate, >10° and <45°); 3 (Flexible, >45°)	–	100%
	Fragility	Likelihood to break as a result of physical impact	Ordinal	1 (Fragile); 2 (Intermediate); 3 (Robust)	–	100%
Life cycle and growth	*Growth form*	Individual or modular life form	Categorical	S (Individual); M (Modular)	–	100%
	Life cycle	Type of life cycle: haplontic (multicellular haploid stage, unicellular diploid stage), diplontic (the opposite of haplontic), or haplo-diplontic (presence of multicellular haploid and diploid stages)	Categorical	H (haplontic); D (diplontic); HD (haplo-diplontic)	–	94%

	Developmental mechanism	Development of the organism through spores, planktotrophic larvae, or lecitotrophic larvae	Categorical	S (Spores); P (Planktotrophic); L (Lecithotrophic)	–	91%
	Growth rate	Rate of increasing in size (mm mo^{-1})	Ordinal	1 (very slow: <0.1); 2 (slow: up to 1-2); 3 (moderate: up to 5); 4 (fast: up to 10); 5 (very fast: >10)	–	87%
	Life span	Approximate duration of life (years)	Ordinal	1 (1 or less); 2 (few); 3 (10-30); 4 (>30)	–	91%
Reproduction	*Reproductive type (sexual)*	Type of sexual reproduction	Categorical	H (Hermaphrodite/Monoecious); G (Gonochoristic/Dioecious)	–	85%
	Gamete type	Morphology of male and female gametes	Categorical	I (Isogamous); A (Anisogamous); O (Oogamous)	–	91%
	Reproductive season	Range of months or season(s) for reproduction	Categorical	Spring; Summer; Winter; Autumn; Combinations (e.g., Spring-Summer)	–	61%
	Reproductive strategy	Type of life strategy encompassing a single (semelparous) or multiple (iteroparous) reproductive events during life	Categorical	S (Semelparous); I (Iteroparous)	–	90%
	Generation time	Time between two generations (years)	Ordinal	1 (<1); 2 (1); 3 (2-5); 4 (6-10); 5 (11-20); 6 (21-50); 7 (51-100); 8 (>100)	Insufficient information for most of taxa	28%
	Time to maturity	Time to sexual maturity (years)	Ordinal	1 (<1); 2 (1); 3 (2-5); 4 (6-10); 5 (11-20); 6 (21-50); 7 (51-100); 8 (>100)	Insufficient information for most of taxa	34%

	Fecundity-Egg size	Size of eggs	Numeric	µm	Insufficient information for most of the taxa	27%
	Fecundity-Number of eggs	Number of eggs	Numeric	Number of eggs	Insufficient information for most of the taxa	13%
	Fertilization type	External or internal fertilization	Categorical	I (Internal); E (External)	All taxa have external fertilization	100%
Dispersal and colonization	*Spatial distribution*	Distribution range at basin scale (Mediterranean Sea)	Categorical	A (Central Mediterranean); B (Western and Central Mediterranean); C (Mediterranean basin-scale); D (Alien)	–	94%
	Duration of larval stage (pelagic)	Time spent by larval stages in the water column before settlement (days)	Categorical	1 (<7); 2 (7-15); 3 (15-30); 4 (>30)	–	97%
	Asexual reproduction	Presence or absence of any type of asexual reproduction	Categorical	Y (Present); N (Absent)	–	100%
	Recruitment success	Rate of post-settlement survival	Numeric/ Ordinal	Number or % of surviving recruits	Insufficient information for most of the taxa	0%
	Migration	Ability to migrate	Ordinal	1 (Resident); 2 (Passive); 3 (Active)	All taxa are resident	100%
	Mobility	Movement type	Categorical	S (Swimmer); C (Crawler); B (Burrower); D (Drifter); A (Attached)	All taxa are sessile (Attached)	100%
	Regeneration potential	Potential of surviving after injury or damage through regeneration of lost tissues	Categorical	Y (Present); N (Absent)	All taxa have regeneration potential	100%

	Dispersal potential (larval)	Distance of larval dispersal	Ordinal	1 (very low: <1 m); 2 (low: 10s m); 3 (medium: 100s m); 4 (high: 1000s m); 5 (very high: 10s km)	Insufficient information for most of the taxa	30%
	Dispersal potential (adult)	Distance of adult dispersal	Ordinal	1 (very low: <1 m); 2 (low: 10s m); 3 (medium: 100s m); 4 (high: 1000s m); 5 (very high: 10s km)	None for all taxa (all are sessile)	100%
Interactions with the environment	*Living habit/environmental position*	Position with respect to the substrate	Categorical	ENDO (Endobenthic); EPI (Epibenthic)	–	100%
	Strength of attachment to substrate	Difficulty of being detached from the substrate	Ordinal	1 (Low); 2 (Moderate); 3 (High)	–	100%
	Min depth	Approximate upper limit of depth distribution range (m)	Ordinal	1 (0-2); 2 (3-5); 3 (5-15)	–	96%
	Max depth	Approximate lower limit of depth distribution range (m)	Ordinal	1 (<15); 2 (15-50); 3 (50-100); 4 (100-200); 5 (>200)	–	93%
	Min salinity	Approximate lower limit of the salinity range	Numeric	PSU	–	85%
	Max temperature	Approximate upper limit of temperature range	Numeric	°C	–	88%
	Max N	Approximate upper limit of nitrogen range	Numeric	µmol/L	–	79%
	Max P	Approximate upper limit of phosphorous range	Numeric	µmol/L	–	78%

	Min O% saturation	Approximate lower limit of oxygen saturation range	Numeric	% O_2 saturation	–	73%
	Degree of attachment to substrate	Quality of being permanently or temporary attached to the substrate	Categorical	P (Permanently); T (Temporary)	All taxa are permanently attached	100%
	Substratum preferences	Type of typical substrate	Categorical	e.g., bedrock, sand, mud, boulders	All taxa are typical of bedrock	100%
Biological interactions	*Sociability*	Aptitude to live with conspecific or to form colonies	Ordinal	1 (Solitary); 2 (Gregarious); 3 (Colonial)	–	100%
	Defence	Presence of defence against predators, competitors	Categorical	None; Physical; Chemical; Physical-chemical	–	85%
	Biogenic habitat provision	Quality of providing shelter or secondary substrate for other organisms	Ordinal	1 (None); 2 (Shelter); 3 (Substrate); 4 (Substrate + Shelter)	–	99%
	Scale of habitat provision	Persistence in providing shelter, secondary substrate or forming biogenic habitat	Ordinal	1 (None); 2 (Ephemeral); 3 (Moderate); 4 (Long-lasting)	–	100%
	Food type/diet	Type of food ingested	Categorical	Chemical uptake; Suspended matter (including living matter)		100%
	Dependency	Presence of symbiotic interactions	Categorical	e.g., independent, parasitic, commensal, mutualistic	All taxa are independent	100%

Matter and energy flow	*Feeding habit*	Strategy employed for food collection/production	Ordinal	1 (Producer); 2 (Passive suspension feeder); 3 (Active suspension feeders); 4 (Predators)	–	100%
	Biomass	Biomass	Numeric	g of dry weight per 100 g of fresh weight	–	97%
	Caloric content	Energy content of tissues	Numeric	KJ g^{-1} ash-free weight	–	99%
	$CaCO_3$ content	Amount $CaCO_3$ in tissues (% per g dry weight)	Ordinal	1 (None/low: <30%); 2 (Intermediate: 30-60%); 3 (High: 60-80%); 4 (Very high: >80%)	–	100%

Reference for traits

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Appendix S3. Functional trait values for all taxa found in the study (see Appendix S1). Values are reported for all the 48 functional traits listed in Table S1 (Appendix S2). NA = not available/not found.

	Morphology				Life cycle and growth				
	Body complexity	**Body size**	**Flexibility**	**Fragility**	**Growth form**	**Life cycle**	**Developmental mechanism**	**Growth rate**	**Life span**
Jania rubens	6	3	2	1	M	HD	S	5	1
Acetabularia acetabulum	2	3	3	1	I	D	S	5	2
Agelas oroides	3	4	2	2	M	D	L	4	3
Amphiroa spp.	6	3	1	1	M	HD	S	NA	2
Anadyomene stellata	4	2	3	1	M	D	S	4	1
Aplysina aerophoba	5	5	2	2	M	D	L	1	2
Ascidia mentula	3	3	2	2	I	D	L	NA	3
Ascidia sp. 1	3	3	2	2	I	D	L	NA	3
Perforatus perforatus	3	2	1	3	I	D	P	5	2
Balanophyllia (Balanophyllia) europaea	3	3	1	2	I	D	NA	1	3
Botryocladia sp.	3	2	2	1	M	HD	S	4	2
Caulerpa cylindracea	5	6	3	1	M	H	S	5	2
Chlidonia pyriformis	2	1	2	1	M	D	L	NA	NA
Chondrosia reniformis	3	5	2	2	M	D	L	1	4
Cliona schmidti	1	3	1	1	M	D	L	4	2
Codium bursa	3	4	2	3	M	D	S	4	2
Codium coralloides	3	5	2	2	M	D	S	4	2
Colpomenia sinuosa	3	4	2	1	M	HD	S	4	1
Ellisolandia elongata	6	3	3	2	M	HD	S	2	2
Cutleria sp.	1	3	1	1	M	HD	S	4	1
Cystoseira compressa	6	5	3	3	M	D	S	3	2
Dasycladus vermicularis	3	3	2	1	M	D	S	NA	1

Dictyopteris polypodioides	5	5	3	2	M	HD	S	4	1
Dictyota spp.	5	5	3	2	M	HD	S	4	1
Didemnidae	1	2	1	1	M	D	L	4	2
Diplosoma listerianum	1	4	1	1	M	D	L	5	1
Dudresnaya verticillata	6	3	3	1	M	HD	S	4	1
Dysidea avara	3	4	2	2	M	D	L	2	3
Erect Bryozoans	6	3	1	1	M	D	L	5	1
Encrusting Rhodophytes	1	4	1	2	M	HD	S	2	4
Encrusting Bryozoans	1	4	1	1	M	D	L	5	1
Crambe crambe	1	5	1	2	M	D	L	2	3
Gloiocladia repens	5	3	3	2	M	NA	S	4	NA
Filamentous Algae	2	2	3	1	M	NA	S	5	1
Discosporangium mesarthrocarpum	4	3	3	1	M	NA	S	4	1
Flabellia petiolata	5	3	2	2	M	D	S	4	2
Rocellaria dubia	3	2	1	1	I	D	NA	NA	2
Green Filamentous Algae	2	2	2	1	M	D	S	5	1
Cliona viridis	1	4	1	1	M	D	L	4	2
Halimeda tuna	5	4	2	1	M	D	S	4	1
Jania virgata	6	3	2	1	M	HD	S	4	1
Halocynthia papillosa	3	4	2	1	M	D	L	1	2
Hemimycale columella	1	4	1	1	M	D	L	2	2
Hydroids	2	2	2	1	M	D	NA	NA	2
Ircinia variabilis	3	5	2	3	M	D	L	1	3
Laurencia obtusa	6	4	3	2	M	HD	S	4	1
Leptopsammia pruvoti	3	3	1	1	I	D	L	1	4
Scalarispongia scalaris	3	5	2	3	M	D	L	2	4
Miniacina miniacea	3	1	1	1	I	HD	NA	5	1
Myriapora truncata	5	3	1	1	M	D	L	1	NA

Nolella gigantea	2	1	1	1	M	D	L	NA	NA
Oscarella lobularis	3	4	2	1	M	D	L	2	3
Padina pavonica	4	3	2	2	M	HD	S	4	1
Palmophyllum crassum	1	4	1	1	M	NA	S	4	2
Petrosia (Petrosia) ficiformis	3	5	1	3	M	D	L	1	4
Peyssonnelia spp.	4	3	2	2	M	HD	S	2	2
Cliona rhodensis	1	3	1	1	M	D	L	4	2
Phorbas fictitius	1	4	1	1	M	D	L	2	NA
Sarcotragus spinosulus	3	6	2	3	M	D	L	2	3
Sargassum sp.	6	6	3	2	M	D	S	3	2
Serpulidae	2	3	1	1	I	D	NA	4	2
Smittina cervicornis	5	3	1	1	M	D	L	2	2
Cornularia cornucopiae	2	1	1	1	M	D	NA	NA	NA
Halopteris scoparia	6	4	3	2	M	HD	S	4	2
Tricleocarpa fragilis	5	3	2	1	M	HD	S	4	1
Valonia macrophysa	3	2	1	1	M	HD	S	4	1
Vermetidae	2	3	1	2	I	D	L	3	2

Appendix S3. (continued).

	Reproduction								
	Reproductive type	**Gamete type**	**Fertilization type**	**Reproductive season**	**Reproductive strategy**	**Generation time**	**Time to maturity**	**Fecundity -Egg size**	**Fecundity-Number of eggs**
Jania rubens	G	O	E	Spring-Summer	S	1	1	20-90 µm	NA
Acetabularia acetabulum	H	I	E	NA	I	NA	3	NA	NA
Agelas oroides	G	O	E	NA	I	NA	NA	NA	NA
Amphiroa spp.	G	O	E	Spring-Summer	I	NA	NA	NA	NA
Anadyomene stellata	G	A	E	NA	S	1	1	NA	NA
Aplysina aerophoba	G	O	E	NA	I	NA	NA	NA	NA
Ascidia mentula	H	O	E	Spring-Summer	I	NA	NA	0.15 nm	6-8 mm^{-3}
Ascidia sp. 1	H	O	E	Spring-Summer	NA	NA	NA	NA	NA
Perforatus perforatus	H	O	E	Spring-Summer	I	1	1	221 µm	100s to
Balanophyllia (Balanophyllia) europaea	H	O	E	Summer-Winter	I	NA	3	400 µm	8-14 mm^{-3}
Botryocladia sp.	G	NA	E	Summer	I	NA	NA	NA	NA
Caulerpa cylindracea	H	I	E	Summer	I	NA	NA	NA	NA
Chlidonia pyriformis	H	O	E	NA	NA	NA	NA	NA	NA
Chondrosia reniformis	G	O	E	Summer	I	NA	NA	NA	NA
Cliona schmidti	G	O	E	Summer	I	NA	NA	NA	NA
Codium bursa	G	A	E	NA	I	NA	NA	NA	NA
Codium coralloides	G	A	E	NA	I	NA	NA	NA	NA
Colpomenia sinuosa	G	A	E	Spring	S	1	1	NA	NA
Ellisolandia elongata	G	O	E	Winter-Spring	I	NA	NA	20-90 µm	NA
Cutleria sp.	G	A	E	NA	S	1	1	NA	NA
Cystoseira compressa	G	O	E	NA	I	NA	NA	60-250 µm	NA
Dasycladus vermicularis	G	I	E	NA	S	1	1	NA	NA

Dictyopteris polypodioides	G	O	E	NA	S	1	1	20-90 µm	NA
Dictyota spp.	G	O	E	Summer	S	1	1	20-90 µm	NA
Didemnidae	H	O	E	Spring-Summer	S	NA	2	NA	1-20 per zoid
Diplosoma listerianum	H	O	E	Summer-Autumn	S	1	1	NA	NA
Dudresnaya verticillata	G	O	E	Spring-Summer	S	1	1	NA	NA
Dysidea avara	H	O	E	Summer	I	NA	NA	NA	NA
Erect Bryozoans	NA	O	E	Summer-Autumn	S	1	1	NA	very high
Encrusting Rhodophytes	G	O	E	Autumn-Winter-Spring	I	NA	3	NA	high
Encrusting Bryozoans	H	O	E	Spring-Summer	S	NA	NA	NA	NA
Crambe crambe	H	O	E	Summer	I	NA	NA	NA	NA
Gloiocladia repens	H	NA	E	Summer-Autumn	NA	NA	NA	NA	NA
Filamentous Algae	NA	NA	E	NA	S	1	1	NA	NA
Discosporangium mesarthrocarpum	NA	NA	E	NA	S	1	1	NA	NA
Flabellia petiolata	G	A	E	NA	I	NA	NA	NA	NA
Rocellaria dubia	NA	O	E	NA	I	NA	NA	NA	NA
Green Filamentous Algae	G	A	E	NA	S	1	1	<20 µm	NA
Cliona viridis	H	O	E	Summer	I	NA	NA	NA	NA
Halimeda tuna	G	A	E	Summer-Autumn	S	1	1	NA	NA
Jania virgata	G	O	E	Spring-Summer	S	1	1	20-90 µm	NA
Halocynthia papillosa	H	O	E	Summer-Autumn	I	NA	NA	NA	NA
Hemimycale columella	H	O	E	Summer	I	NA	NA	26 µm	4 mm^{-3}
Hydroids	G	O	E	NA	I	NA	NA	NA	NA
Ircinia variabilis	H	O	E	Spring-Summer	I	NA	NA	200 µm	NA
Laurencia obtusa	G	O	E	NA	S	1	1	NA	NA
Leptopsammia pruvoti	G	O	E	Summer	I	NA	NA	400 µm	38-114 mm^{-3}
Scalarispongia scalaris	G	O	E	NA	I	NA	NA	NA	NA
Miniacina miniacea	NA	I	E	NA	I	NA	NA	NA	NA
Myriapora truncata	G	O	E	Spring	NA	NA	NA	NA	NA

Nolella gigantea	NA	O	E	NA	NA	NA	NA	NA	NA
Oscarella lobularis	H	O	E	Spring-Summer	I	NA	NA	150 µm	NA
Padina pavonica	H	O	E	Spring-Summer	S	1	1	180 µm	NA
Palmophyllum crassum	NA	NA	E	NA	I	NA	NA	NA	NA
Petrosia (Petrosia) ficiformis	G	O	E	Spring-Summer	I	NA	NA	200 µm	4 mm^{-3}
Peyssonnelia spp.	H	O	E	NA	I	NA	NA	NA	NA
Cliona rhodensis	H	O	E	Summer	I	NA	NA	NA	NA
Phorbas fictitius	NA	O	E	NA	NA	NA	NA	NA	NA
Sarcotragus spinosulus	H	O	E	Summer	I	NA	NA	NA	NA
Sargassum sp.	H	O	E	Summer	I	NA	NA	60-250 µm	NA
Serpulidae	H	O	E	Spring-Summer	I	1	1	40-230 µm	NA
Smittina cervicornis	H	O	E	NA	I	NA	NA	NA	NA
Cornularia cornucopiae	NA	O	E	Spring-Summer	NA	NA	NA	NA	NA
Halopteris scoparia	H	O	E	Autumn-Winter	I	NA	NA	NA	NA
Tricleocarpa fragilis	G	O	E	NA	S	NA	NA	NA	NA
Valonia macrophysa	NA	NA	E	Spring-Summer	S	NA	NA	NA	NA
Vermetidae	G	O	E	Spring-Summer	I	NA	NA	NA	NA

Appendix S3. (continued).

	Dispersal and colonization								
	Spatial distribution	**Duration of larval stage**	**Asexual reproduction**	**Recruitment success**	**Migration**	**Mobility**	**Regeneration potential**	**Dispersal potential (larval)**	**Dispersal potential (adult)**
Jania rubens	C	1	Y	NA	1	A	Y	NA	1
Acetabularia acetabulum	C	1	Y	NA	1	A	Y	NA	1
Agelas oroides	C	2	Y	NA	1	A	Y	NA	1
Amphiroa spp.	C	1	Y	NA	1	A	Y	NA	1
Anadyomene stellata	C	1	Y	NA	1	A	Y	NA	1
Aplysina aerophoba	C	2	Y	NA	1	A	Y	NA	1
Ascidia mentula	C	2	N	NA	1	A	Y	4	1
Ascidia sp. 1	NA	NA	N	NA	1	A	Y	4	1
Perforatus perforatus	C	2	N	NA	1	A	Y	5	1
Balanophyllia (Balanophyllia) europaea	C	4	N	NA	1	A	Y	5	1
Botryocladia sp.	C	1	Y	NA	1	A	Y	NA	1
Caulerpa cylindracea	D	1	Y	NA	1	A	Y	NA	1
Chlidonia pyriformis	B	2	Y	NA	1	A	Y	NA	1
Chondrosia reniformis	C	1	Y	NA	1	A	Y	5	1
Cliona schmidti	C	2	Y	NA	1	A	Y	NA	1
Codium bursa	C	1	Y	NA	1	A	Y	4	1
Codium coralloides	C	1	Y	NA	1	A	Y	4	1
Colpomenia sinuosa	C	1	Y	NA	1	A	Y	2	1
Ellisolandia elongata	C	1	Y	NA	1	A	Y	NA	1
Cutleria sp.	C	1	Y	NA	1	A	Y	NA	1
Cystoseira compressa	C	1	Y	NA	1	A	Y	NA	1
Dasycladus vermicularis	C	1	Y	NA	1	A	Y	NA	1

Dictyopteris polypodioides	C	1	Y	NA	1	A	Y	NA	1
Dictyota spp.	C	1	Y	NA	1	A	Y	NA	1
Didemnidae	C	1	Y	NA	1	A	Y	3	1
Diplosoma listerianum	A	3	Y	NA	1	A	Y	NA	1
Dudresnaya verticillata	C	1	Y	NA	1	A	Y	NA	1
Dysidea avara	C	2	Y	NA	1	A	Y	NA	1
Erect Bryozoans	B	2	Y	NA	1	A	Y	3	1
Encrusting Rhodophytes	C	1	Y	NA	1	A	Y	3	1
Encrusting Bryozoans	B	2	Y	NA	1	A	Y	NA	1
Crambe crambe	C	1	Y	NA	1	A	Y	5	1
Gloiocladia repens	C	1	Y	NA	1	A	Y	NA	1
Filamentous Algae	NA	1	Y	NA	1	A	Y	5	1
Discosporangium mesarthrocarpum	C	1	Y	NA	1	A	Y	NA	1
Flabellia petiolata	C	1	Y	NA	1	A	Y	NA	1
Rocellaria dubia	C	2	N	NA	1	A	Y	NA	1
Green Filamentous Algae	C	1	Y	NA	1	A	Y	NA	1
Cliona viridis	C	2	Y	NA	1	A	Y	NA	1
Halimeda tuna	C	1	Y	NA	1	A	Y	NA	1
Jania virgata	C	1	Y	NA	1	A	Y	NA	1
Halocynthia papillosa	C	2	Y	NA	1	A	Y	4	1
Hemimycale columella	A	2	Y	NA	1	A	Y	NA	1
Hydroids	NA	3	Y	NA	1	A	Y	NA	1
Ircinia variabilis	C	1	Y	NA	1	A	Y	5	1
Laurencia obtusa	C	1	Y	NA	1	A	Y	NA	1
Leptopsammia pruvoti	B	4	Y	NA	1	A	Y	4	1
Scalarispongia scalaris	NA	2	Y	NA	1	A	Y	NA	1
Miniacina miniacea	C	NA	Y	NA	1	A	Y	NA	1

Myriapora truncata	B	2	Y	NA	1	A	Y	NA	1
Nolella gigantea	B	2	Y	NA	1	A	Y	NA	1
Oscarella lobularis	C	2	Y	NA	1	A	Y	NA	1
Padina pavonica	C	1	Y	NA	1	A	Y	NA	1
Palmophyllum crassum	C	1	Y	NA	1	A	Y	NA	1
Petrosia (Petrosia) ficiformis	C	2	Y	NA	1	A	Y	NA	1
Peyssonnelia spp.	C	1	Y	NA	1	A	Y	NA	1
Cliona rhodensis	B	2	Y	NA	1	A	Y	NA	1
Phorbas fictitius	C	1	Y	NA	1	A	Y	2	1
Sarcotragus spinosulus	C	2	Y	NA	1	A	Y	NA	1
Sargassum sp.	C	3	Y	NA	1	A	Y	4	1
Serpulidae	C	3	Y	NA	1	A	Y	3	1
Smittina cervicornis	B	2	Y	NA	1	A	Y	NA	1
Cornularia cornucopiae	C	3	Y	NA	1	A	Y	NA	1
Halopteris scoparia	C	1	Y	NA	1	A	Y	NA	1
Tricleocarpa fragilis	C	1	Y	NA	1	A	Y	NA	1
Valonia macrophysa	C	1	Y	NA	1	A	Y	NA	1
Vermetidae	C	3	N	NA	1	A	Y	2	1

Appendix S3. (continued).

	Interactions with the environment										
	Living habit - environmental position	**Substrate preference**	**Degree of attachment to substrate**	**Strength of attachment to substrate**	**Min depth**	**Max depth**	**Min salinity**	**Max Temperature**	**Max N**	**Max P**	**Min O% saturation**
Jania rubens	EPI	Bedrock	P	1	1	50	38.0	26.0	1.69	0.23	97.4
Acetabularia acetabulum	EPI	Bedrock	P	1	1	10	38.0	17.0	1.69	0.23	97.4
Agelas oroides	EPI	Bedrock	P	3	3	40	37.9	17.0	0.54	0.13	99.49
Amphiroa spp.	EPI	Bedrock	P	3	1	40	37.1	26.0	0.70	0.11	103.8
Anadyomene stellata	EPI	Bedrock	P	2	2	30	35.7	27.0	5.24	0.50	85.85
Aplysina aerophoba	EPI	Bedrock	P	3	1	130	35.0	27.5	NA	NA	NA
Ascidia mentula	EPI	Bedrock	P	2	2	200	20.0	28.0	0.12	0.65	94.5
Ascidia sp. 1	EPI	Bedrock	P	2	NA	NA	NA	NA	NA	NA	NA
Perforatus perforatus	EPI	Bedrock	P	3	1	20	NA	NA	NA	NA	NA
Balanophyllia (Balanophyllia) europaea	EPI	Bedrock	P	3	1	100	NA	27.0	0.28	NA	NA
Botryocladia sp.	EPI	Bedrock	P	1	1	NA	34.3	28.7	5.24	0.50	85.9
Caulerpa cylindracea	EPI	Bedrock	P	2	1	70	34.4	29.0	2.38	0.31	87.7
Chlidonia pyriformis	EPI	Bedrock	P	1	2	70	35.2	25.7	0.86	0.13	97.19
Chondrosia reniformis	EPI	Bedrock	P	3	2	80	36.0	24.0	4.13	0.28	79.9
Cliona schmidti	ENDO	Bedrock	P	3	2	80	36.3	26.0	4.13	0.28	79.9
Codium bursa	EPI	Bedrock	P	2	2	30	37.9	17.4	1.69	0.23	97.4
Codium coralloides	EPI	Bedrock	P	2	2	NA	NA	NA	NA	NA	NA
Colpomenia sinuosa	EPI	Bedrock	P	1	1	40	34.9	26.4	5.11	0.71	99.6
Ellisolandia elongata	EPI	Bedrock	P	3	1	20	38.0	17.4	1.42	0.18	101.0
Cutleria sp.	EPI	Bedrock	P	3	2	30	38.2	16.3	7.12	0.45	102.0
Cystoseira compressa	EPI	Bedrock	P	3	1	20	38.0	17.0	1.42	0.18	101.0
Dasycladus vermicularis	EPI	Bedrock	P	2	2	100	37.1	26.0	0.99	0.18	99.9
Dictyopteris polypodioides	EPI	Bedrock	P	2	1	40	35.0	25.3	7.25	0.50	99.7

Dictyota spp.	EPI	Bedrock	P	2	1	40	35.0	26.0	7.25	0.50	97.4
Didemnidae	EPI	Bedrock	P	2	1	20	35.0	25.0	NA	NA	NA
Diplosoma listerianum	EPI	Bedrock	P	2	1	70	31.8	27.7	6.73	1.17	88.7
Dudresnaya verticillata	EPI	Bedrock	P	1	1	20	35.2	11.9	7.12	0.44	100.0
Dysidea avara	EPI	Bedrock	P	3	2	50	35.5	15.7	1.33	0.25	99.1
Erect Bryozoans	EPI	Bedrock	P	2	1	>200	34.9	27.0	2.79	1.52	71.1
Encrusting Rhodophytes	EPI	Bedrock	P	3	1	70	35.2	28.1	3.23	0.75	NA
Encrusting Bryozoans	EPI	Bedrock	P	3	2	100	34.7	15.6	3.01	0.41	100.0
Crambe crambe	EPI	Bedrock	P	2	2	30	38.0	17.0	1.69	0.23	97.4
Gloiocladia repens	EPI	Bedrock	P	2	2	20	37.5	17.5	NA	NA	NA
Filamentous Algae	EPI	Bedrock	P	1	NA	NA	NA	NA	NA	NA	NA
Discosporangium mesarthrocarpum	EPI	Bedrock	P	1	2	70	NA	NA	NA	NA	NA
Flabellia petiolata	EPI	Bedrock	P	1	1	30	37.9	17.4	1.42	0.18	102.6
Rocellaria dubia	ENDO	Bedrock	P	1	1	40	NA	14.0	7.49	0.54	NA
Green Filamentous Algae	EPI	Bedrock	P	1	1	90	34.4	28.9	7.42	1.03	98.3
Cliona viridis	ENDO	Bedrock	P	1	1	20	36.1	23.7	1.69	0.23	98.5
Halimeda tuna	ENDO	Bedrock	P	1	1	60	37.0	26.4	1.42	0.18	99.5
Jania virgata	EPI	Bedrock	P	1	1	20	37.9	17.1	0.21	0.13	102.6
Halocynthia papillosa	EPI	Bedrock	P	1	2	100	37.9	NA	1.69	0.23	97.4
Hemimycale columella	EPI	Bedrock	P	2	1	50	35.4	12.0	8.32	0.63	97.0
Hydroids	EPI	Bedrock	P	1	NA	NA	NA	NA	NA	NA	NA
Ircinia variabilis	EPI	Bedrock	P	3	1	>200	37.9	24.3	3.96	0.21	98.7
Laurencia obtusa	EPI	Bedrock	P	2	1	30	38.0	26.4	1.42	0.18	103.8
Leptopsammia pruvoti	EPI	Bedrock	P	1	3	>200	38.4	17.3	2.72	0.12	99.5
Scalarispongia scalaris	EPI	Bedrock	P	3	1	70	37.7	16.3	1.05	0.22	101.1
Miniacina miniacea	EPI	Bedrock	P	1	1	200	34.7	28.9	0.83	0.36	94.0
Myriapora truncata	EPI	Bedrock	P	2	2	>200	37.5	20.0	NA	NA	NA
Nolella gigantea	EPI	Bedrock	P	1	3	200	38.4	15.7	0.87	0.13	94.7

Oscarella lobularis	EPI	Bedrock	P	2	1	40	35.0	16.0	7.49	0.54	97.3
Padina pavonica	EPI	Bedrock	P	1	1	40	34.4	28.5	2.38	0.31	97.4
Palmophyllum crassum	EPI	Bedrock	P	2	2	130	36.4	26.1	3.80	0.34	91.2
Petrosia (Petrosia) ficiformis	EPI	Bedrock	P	3	2	80	36.3	23.3	3.01	0.23	94.4
Peyssonnelia spp.	EPI	Bedrock	P	3	2	60	35.4	24.4	2.38	0.31	87.7
Cliona rhodensis	ENDO	Bedrock	P	2	1	20	36.1	23.7	1.69	0.23	98.5
Phorbas fictitius	EPI	Bedrock	P	2	1	40	32.8	27.8	7.25	0.50	99.7
Sarcotragus spinosulus	EPI	Bedrock	P	3	3	>200	37.8	17.1	3.92	0.21	91.3
Sargassum sp.	EPI	Bedrock	P	2	1	30	NA	25.6	NA	NA	NA
Serpulidae	EPI	Bedrock	P	3	1	>200	34.2	23.7	13.30	0.92	89.0
Smittina cervicornis	EPI	Bedrock	P	2	1	120	35.0	25.0	NA	NA	NA
Cornularia cornucopiae	EPI	Bedrock	P	1	2	20	NA	NA	NA	NA	NA
Halopteris scoparia	EPI	Bedrock	P	3	1	20	38.0	30.0	1.42	0.18	101.0
Tricleocarpa fragilis	EPI	Bedrock	P	2	1	100	32.5	27.2	NA	NA	NA
Valonia macrophysa	EPI	Bedrock	P	1	1	110	35.2	26.9	2.09	0.22	94.3
Vermetidae	EPI	Bedrock	P	3	1	>200	35.4	23.3	18.20	1.24	NA

Appendix S3. (continued).

	Biological interactions						Matter and energy flow			
	Sociability	**Dependency**	**Defence**	**Biogenic habitat provision**	**Scale of habitat provision**	**Food type/diet**	**Feeding habit**	**Biomass**	**Caloric content**	**$CaCO_3$ content**
Jania rubens	1	Independent	None	2	2	Chemical uptake	1	25	17.0	2
Acetabularia acetabulum	1	Independent	None	1	1	Chemical uptake	1	25	16.9	1
Agelas oroides	3	Independent	Chemical	2	3	Suspended matter	3	17	22.5	1
Amphiroa spp.	1	Independent	Physical	1	1	Chemical uptake	1	25	17.0	2
Anadyomene stellata	1	Independent	None	1	1	Chemical uptake	1	25	16.9	1
Aplysina aerophoba	3	Independent	Chemical	2	3	Suspended matter	3	17	22.5	1
Ascidia mentula	1	Independent	NA	2	1	Suspended matter	3	6	21.6	1
Ascidia sp. 1	1	Independent	NA	2	1	Suspended matter	3	6	21.6	1
Perforatus perforatus	2	Independent	Physical	1	1	Suspended matter	3	7	22.7	3
Balanophyllia (Balanophyllia) europaea	1	Independent	Chemical	3	4	Suspended matter	4	14	16.1	4
Botryocladia sp.	1	Independent	None	1	1	Chemical uptake	1	25	17.0	1
Caulerpa cylindracea	3	Independent	Chemical	1	1	Chemical uptake	1	21	9.2	1
Chlidonia pyriformis	3	Independent	None	1	1	Suspended matter	3	NA	21.6	3
Chondrosia reniformis	3	Independent	None	2	3	Suspended matter	3	17	22.5	1
Cliona schmidti	3	Independent	Physical	1	1	Suspended matter	3	17	22.5	1
Codium bursa	1	Independent	None	3	1	Chemical uptake	1	25	16.0	1
Codium coralloides	1	Independent	None	1	1	Chemical uptake	1	25	16.0	1
Colpomenia sinuosa	1	Independent	None	1	1	Chemical uptake	1	25	17.6	1
Ellisolandia elongata	1	Independent	Physical-chemical	2	1	Chemical uptake	1	25	20.8	2
Cutleria sp.	1	Independent	None	1	1	Chemical uptake	1	25	17.6	1
Cystoseira compressa	1	Independent	None	4	4	Chemical uptake	1	25	18.9	1
Dasycladus vermicularis	1	Independent	None	2	2	Chemical uptake	1	25	16.9	1
Dictyopteris polypodioides	1	Independent	None	4	3	Chemical uptake	1	25	17.6	1

Dictyota spp.	1	Independent	None	2	2	Chemical uptake	1	25	17.6	1
Didemnidae	3	Independent	Chemical	1	1	Suspended matter	3	6	21.6	1
Diplosoma listerianum	3	Independent	Chemical	1	1	Suspended matter	3	6	21.6	1
Dudresnaya verticillata	1	Independent	None	2	2	Chemical uptake	1	25	17.0	1
Dysidea avara	3	Independent	Chemical	2	3	Suspended matter	3	17	22.5	1
Erect Bryozoans	3	Independent	NA	2	2	Suspended matter	3	18	21.6	3
Encrusting Rhodophytes	3	Independent	Physical	3	4	Chemical uptake	1	52	17.0	2
Encrusting Bryozoans	3	Independent	NA	1	1	Suspended matter	3	18	21.6	3
Crambe crambe	3	Independent	Chemical	2	1	Suspended matter	3	17	22.5	1
Gloiocladia repens	1	Independent	None	1	1	Chemical uptake	1	25	17.0	1
Filamentous Algae	1	Independent	None	1	1	Chemical uptake	1	25	17.0	1
Discosporangium mesarthrocarpum	1	Independent	None	2	2	Chemical uptake	1	25	17.6	1
Flabellia petiolata	1	Independent	None	2	2	Chemical uptake	1	25	16.9	1
Rocellaria dubia	1	Independent	Physical	1	1	Suspended matter	3	9	22.6	4
Green Filamentous Algae	1	Independent	None	1	1	Chemical uptake	1	25	17.8	1
Cliona viridis	3	Independent	Physical	1	1	Suspended matter	3	17	22.5	1
Halimeda tuna	1	Independent	None	4	3	Chemical uptake	1	25	16.9	2
Jania virgata	1	Independent	None	2	2	Chemical uptake	1	25	17.0	2
Halocynthia papillosa	1	Independent	NA	2	1	Suspended matter	3	6	21.6	1
Hemimycale columella	3	Independent	Chemical	1	1	Suspended matter	3	17	22.5	1
Hydroids	3	Independent	Chemical	1	1	Suspended matter	4	NA	20.6	1
Ircinia variabilis	3	Independent	Chemical	2	3	Suspended matter	3	17	22.5	1
Laurencia obtusa	1	Independent	None	4	3	Chemical uptake	1	25	17.0	1
Leptopsammia pruvoti	1	Independent	Chemical	1	1	Suspended matter	4	14	16.1	4
Scalarispongia scalaris	3	Independent	NA	2	3	Suspended matter	3	17	22.5	1
Miniacina miniacea	3	Independent	None	1	1	Suspended matter	2	1	NA	3
Myriapora truncata	3	Independent	Physical-chemical	2	3	Suspended matter	3	18	21.6	3
Nolella gigantea	3	Independent	NA	1	1	Suspended matter	3	18	21.6	3

Oscarella lobularis	3	Independent	NA	2	3	Suspended matter	3	17	22.5	1
Padina pavonica	1	Independent	None	2	2	Chemical uptake	1	25	17.6	1
Palmophyllum crassum	3	Independent	None	1	1	Chemical uptake	1	25	16.9	1
Petrosia (Petrosia) ficiformis	3	Independent	Chemical	2	3	Suspended matter	3	17	22.5	1
Peyssonnelia spp.	3	Independent	None	4	3	Chemical uptake	1	52	17.0	2
Cliona rhodensis	3	Independent	Physical	1	1	Suspended matter	3	17	22.5	1
Phorbas fictitius	3	Independent	NA	1	1	Suspended matter	3	17	22.5	1
Sarcotragus spinosulus	3	Independent	NA	2	3	Suspended matter	3	17	22.5	1
Sargassum sp.	1	Independent	None	4	4	Chemical uptake	1	25	17.6	1
Serpulidae	2	Independent	Physical	3	4	Suspended matter	2	20	22.0	3
Smittina cervicornis	3	Independent	Physical	2	3	Suspended matter	3	18	21.6	3
Cornularia cornucopiae	3	Independent	None	1	1	Suspended matter	3	17	16.1	3
Halopteris scoparia	1	Independent	None	4	3	Chemical uptake	1	25	17.6	1
Tricleocarpa fragilis	1	Independent	None	2	3	Chemical uptake	1	25	17.0	1
Valonia macrophysa	1	Independent	None	1	1	Chemical uptake	1	25	16.9	1
Vermetidae	2	Independent	Physical	3	4	Suspended matter	2	8	22.0	4

Appendix S4. Principal Coordinates Analysis (PCoA) of the 33 functional traits selected (see Appendix S2). The analysis was based on the Gower dissimilarity matrix obtained from the rectangular matrix of 67 taxa × 33 functional traits (Appendix S3).

Axis	Eigenvalue	Variation explained by individual axis (%)	Cumulative %
1	22565.0	44.1%	44.1%
2	8714.1	17.0%	61.1%
3	5418.4	10.6%	71.7%
4	4117.3	8.0%	79.7%
5	3671.4	7.2%	86.9%
6	3505.6	6.9%	93.8%
7	2332.5	4.6%	98.3%

Appendix S5. PERMDISP testing for differences in multivariate dispersion of sites.

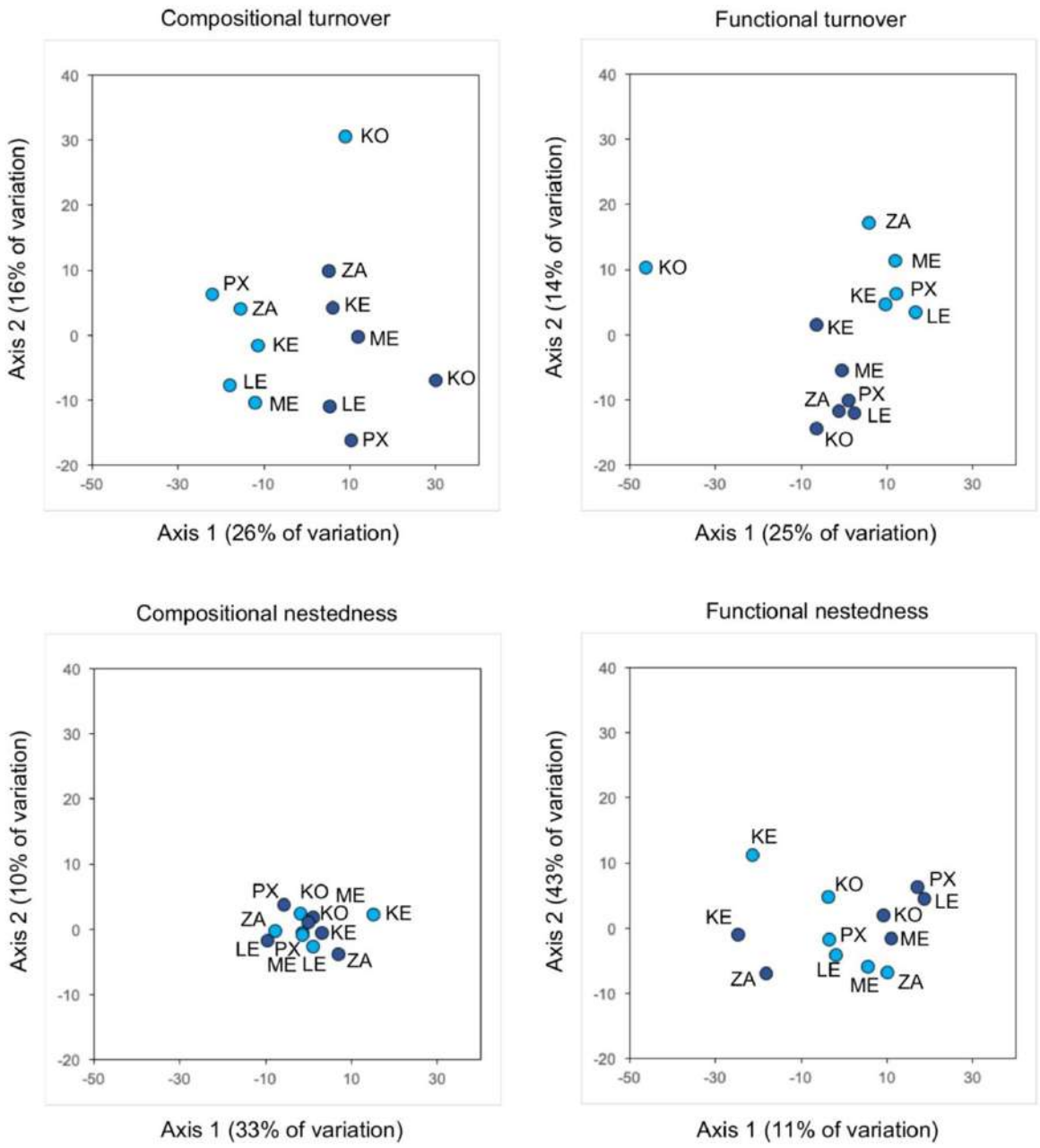
Table S5A. PERMDISP testing for differences among islands in multivariate dispersion of sites. Tests were performed on compositional and functional dissimilarities and their separated components of turnover and nestedness at each depth. Tests were based on 999 permutations.

		F	p(perm)		*F*	p(perm)
5 m	β	1.789	0.384	$^{F}\beta$	1.179	0.591
15 m		2.261	0.293		2.030	0.393
5 m	β_{TURN}	0.546	0.830	$^{F}\beta_{TURN}$	0.232	0.967
15 m		3.537	0.076		0.890	0.708
5 m	β_{NES}	0.738	0.830	$^{F}\beta_{NES}$	0.526	0.906
15 m		2.506	0.196		0.497	0.889

Table S5B. PERMDISP testing for differences between depths in multivariate dispersion of sites. Tests were performed on compositional and functional dissimilarities and their separated components of turnover and nestedness. Pair-wise tests between depths for each island were also provided. All tests were based on 999 permutations. KO = Kerkira, KE = Kefalonia, PX = Paxi, ZA = Zakynthos, LE = Lefkada, ME = Meganisi.

	Overall		Pair-wise tests for each island											
			KE		KO		LE		ME		PX		ZA	
	F	p(perm)	*F*	p	*F*	p	*F*	p	*F*	p	*F*	p	*F*	p
β	3.465	0.055	1.442	0.28	1.017	0.541	1.196	0.219	0.776	0.522	1.619	0.193	5.627	**0.028**
β_{TURN}	2.855	0.072	2.353	0.122	1.742	0.303	0.596	0.488	0.768	0.359	1.703	0.318	1.809	0.144
β_{NES}	1.287	0.715	1.679	0.205	1.145	0.644	0.047	1	0.179	0.953	0.535	0.707	1.422	0.224
$^{F}\beta$	1.546	0.571	0.284	0.822	0.695	0.681	1.437	0.202	1.036	0.398	0.167	0.923	1.494	0.429
$^{F}\beta_{TURN}$	0.544	0.944	0.615	0.709	0.318	0.727	0.26	0.779	0.525	0.335	1.415	0.279	0.266	0.898
$^{F}\beta_{NES}$	0.468	0.984	0.623	0.626	0.252	0.83	0.249	0.822	0.562	0.616	0.744	0.641	1.283	0.551

Appendix S6. PCoA ordination of of islands × depths centroids based on compositional and functional dissimilarities separated for turnover and nestedness components. Light blue = 5 m, dark blue = 15 m. KO = Kerkira, KE = Kefalonia, PX = Paxi, ZA = Zakynthos, LE = Lefkada, ME = Meganisi.



Appendix S7. Pairwise values of compositional β-diversity (β) and its turnover (β_{TURN}) and nestedness-resultant (β_{NES}) components between assemblages from different islands, calculated at the two investigated depths (5 and 15 m).

5 m

β		KE	KO	LE	ME	PX	ZA
	KE						
	KO	0.49					
	LE	0.28	0.51				
	ME	0.35	0.52	0.29			
	PX	0.35	0.55	0.43	0.37		
	ZA	0.29	0.47	0.33	0.38	0.38	
β_{TURN}							
	KE						
	KO	0.35					
	LE	0.15	0.47				
	ME	0.21	0.50	0.25			
	PX	0.21	0.53	0.41	0.37		
	ZA	0.06	0.46	0.26	0.35	0.35	
β_{NES}							
	KE						
	KO	0.14					
	LE	0.13	0.05				
	ME	0.14	0.02	0.04			
	PX	0.15	0.02	0.02	0.00		
	ZA	0.23	0.01	0.07	0.03	0.03	

15 m

β		KE	KO	LE	ME	PX	ZA
	KE						
	KO	0.48					
	LE	0.41	0.40				
	ME	0.38	0.44	0.33			
	PX	0.43	0.35	0.34	0.43		
	ZA	0.32	0.48	0.41	0.42	0.47	
β_{TURN}							
	KE						
	KO	0.44					
	LE	0.32	0.36				
	ME	0.33	0.44	0.27			
	PX	0.32	0.28	0.32	0.37		
	ZA	0.27	0.41	0.27	0.33	0.32	
β_{NES}							
	KE						
	KO	0.03					
	LE	0.09	0.05				
	ME	0.04	0.00	0.05			
	PX	0.11	0.07	0.02	0.06		
	ZA	0.05	0.07	0.14	0.08	0.14	

Appendix S8. Pairwise values of functional β-diversity ($^{F}\beta$) and its turnover ($^{F}\beta_{TURN}$) and nestedness-resultant ($^{F}\beta_{NES}$) components between assemblages from different islands, calculated at the two investigated depths (5 and 15 m).

5 m

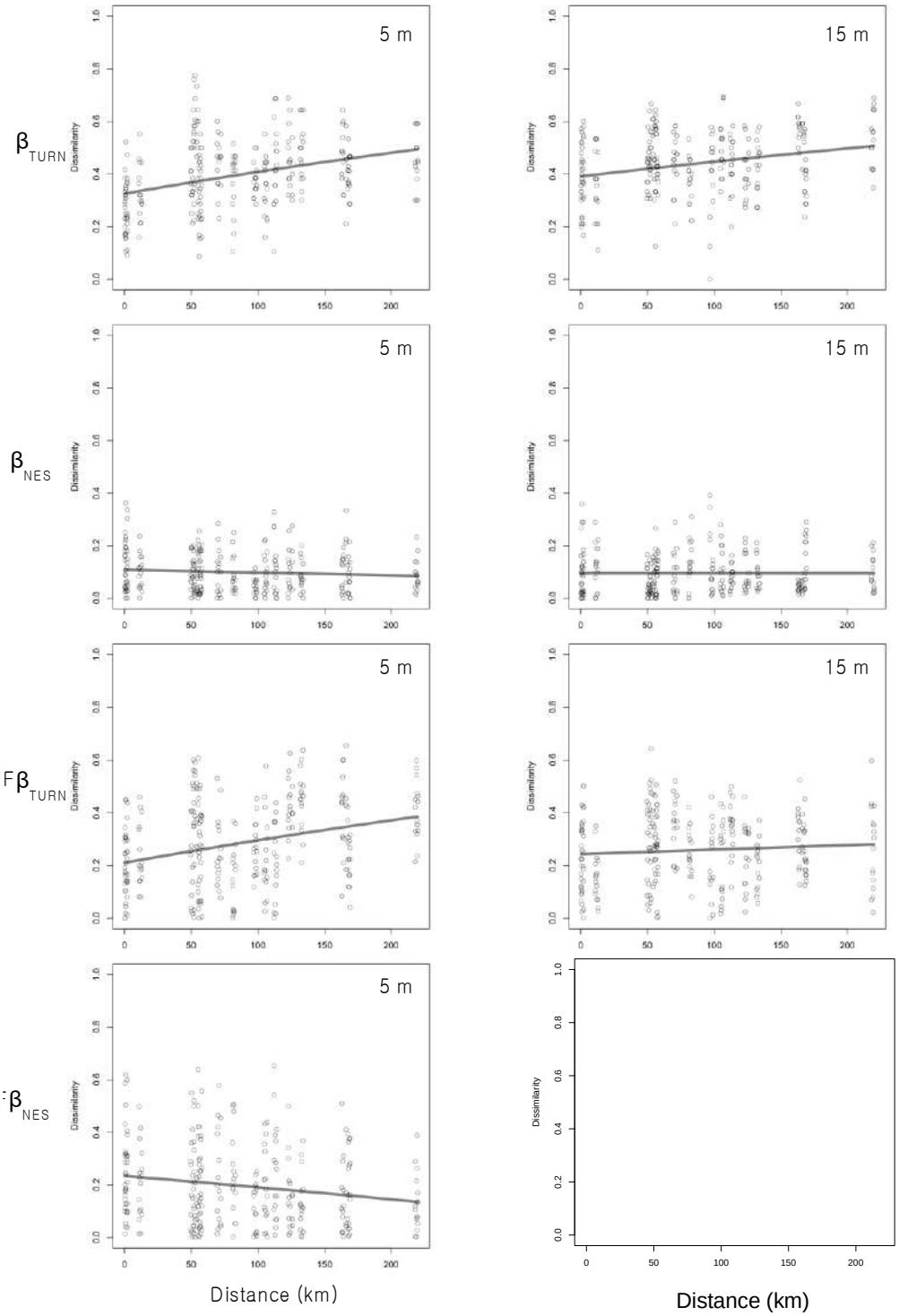
$^{F}\beta$		KE	KO	LE	ME	PX	ZA
	KE						
	KO	0.61					
	LE	0.26	0.66				
	ME	0.34	0.64	0.27			
	PX	0.28	0.62	0.31	0.19		
	ZA	0.37	0.61	0.35	0.30	0.22	
$^{F}\beta_{TURN}$							
	KE						
	KO	0.54					
	LE	0.02	0.64				
	ME	0.02	0.59	0.20			
	PX	0.06	0.61	0.30	0.09		
	ZA	0.01	0.54	0.24	0.26	0.06	
$^{F}\beta_{NES}$							
	KE						
	KO	0.07					
	LE	0.24	0.01				
	ME	0.32	0.05	0.08			
	PX	0.21	0.01	0.01	0.10		
	ZA	0.36	0.07	0.11	0.04	0.16	

15 m

$^{F}\beta$		KE	KO	LE	ME	PX	ZA
	KE						
	KO	0.44					
	LE	0.50	0.32				
	ME	0.45	0.27	0.28			
	PX	0.50	0.22	0.22	0.28		
	ZA	0.28	0.38	0.44	0.40	0.46	
$^{F}\beta_{TURN}$							
	KE						
	KO	0.10					
	LE	0.07	0.24				
	ME	0.11	0.26	0.20			
	PX	0.07	0.10	0.20	0.18		
	ZA	0.22	0.09	0.06	0.11	0.07	
$^{F}\beta_{NES}$							
	KE						
	KO	0.34					
	LE	0.42	0.08				
	ME	0.34	0.01	0.08			
	PX	0.43	0.12	0.02	0.10		
	ZA	0.07	0.29	0.38	0.29	0.39	

Appendix S9. Patterns of β-diversity vs. geographic distance at the scale of sites.

		Intercept	Slope	p	R
β_{TURN}	5 m	0.325	0.0013	0.001	0.115
	15 m	0.391	0.0010	0.001	0.069
β_{NES}	5 m	0.108	-0.0001	0.178	0.007
	15 m	0.096	-0.0001	0.997	0.000
$^{F}\beta_{TURN}$	5 m	0.211	0.0011	0.001	0.090
	15 m	0.243	0.0002	0.214	0.006
$^{F}\beta_{NES}$	5 m	0.234	-0.0006	0.004	0.030
	15 m	0.188	0.0006	0.003	0.032



Appendix S10. Presence/absence data for the six islands at 5m and 15m depth.

	Jania rubens	*Acetabularia acetabulum*	*Agelas oroides*	*Amphiroa* spp.	*Anadyomene stellata*	*Aplysina aerophoba*	*Ascidia mentula*	*Ascidia* sp.	*Perforatus perforatus*	*Balanophyllia (Balanophyllia) europaea*	*Botryocladia* sp.	*Caulerpa cylindracea*	*Chlidonia pyriformis*	*Chondrosia reniformis*	*Cliona schmidti*	*Codium bursa*	*Codium coralloides*	*Colpomenia sinuosa*	*Ellisolandia elongata*	*Cutleria* sp.	*Cystoseira compressa*	*Dasycladus vermicularis*	*Dictyopteris polypodioides*	*Dictyota* spp.	Didemnidae	*Diplosoma listerianum*	*Dudresnaya verticillata*	*Dysidea avara*	Erect Bryozoans	Encrusting Rhodophytes	Encrusting Bryozoans	*Crambe crambe*	*Gloiocladia repens*
KE_5m	1	1	0	1	1	0	0	0	1	0	1	1	1	1	1	0	0	0	1	1	1	0	1	1	0	0	1	0	1	1	1	1	0
KO_5m	1	1	0	0	1	0	1	1	1	1	0	0	0	1	0	1	1	0	0	0	0	0	0	1	0	1	1	0	0	1	1	1	0
LE_5m	1	1	0	1	1	0	0	0	0	0	1	0	0	1	1	1	0	0	1	0	1	0	0	1	0	1	0	0	1	1	1	1	0
ME_5m	1	1	0	1	1	1	0	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	0	1	1	0	0	0	1	1	1	1	0
PX_5m	1	1	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	1	1	0	0	0	1	1	1	1	0
ZA_5m	1	1	0	1	1	0	0	0	0	0	1	0	1	1	0	0	0	0	1	0	1	0	1	1	0	0	0	0	1	1	1	1	0
KE_15m	1	1	1	0	1	0	1	0	0	0	1	0	0	1	1	0	0	0	0	1	1	0	1	1	0	0	0	0	1	1	0	1	1
KO_15m	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	1	0	0	1	0	1	1	1	1	0
LE_15m	1	1	0	1	1	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	1	1	0	1	0	0	0	0	1	1	1	1	0
ME_15m	1	1	1	0	1	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	1	1	1	1	1	0	1	1	1	1	1	1	0
PX_15m	1	1	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	0	1	1	0	0	1	0	1	1	1	1	0
ZA_15m	1	1	1	1	1	1	1	0	0	0	1	1	0	1	0	1	0	0	1	0	1	0	1	1	0	0	1	0	1	1	0	0	0

	Filamentous Algae	*Discosporangium mesarthrocarpum*	*Flabellia petiolata*	*Rocella laria dubia*	Green Filamentous Algae	*Cliona viridis*	*Halimeda tuna*	*Jania virgata*	*Halocynthia papillosa*	*Hemimycale columella*	Hydroids	*Ircinia variabilis*	*Laurencia* spp.	*Leptopsammia pruvoti*	*Scalaris pongia scalaris*	*Miniacina miniacea*	*Myriapora truncata*	*Nolella gigantea*	*Oscarella lobularis*	*Padina pavonica*	*Palmophyllum crassum*	*Petrosia (Petrosia) ficiformis*	*Peyssonnelia* spp.	*Cliona rhodensis*	*Phorbas fictitius*	*Sarcotragus spinosulus*	*Sargassum* sp.	Serpulidae	*Smittina cervicornis*	*Cornularia cornucopiae*	*Halopteris scoparia*	*Tricleocarpa fragilis*	*Valonia macrophysa*	Vermetidae
KE_5m	1	1	1	1	1	1	1	0	0	1	1	1	1	0	1	1	0	0	0	1	1	0	0	1	1	1	1	1	0	1	1	0	1	1
KO_5m	1	1	1	0	1	1	1	0	0	1	1	0	1	0	0	0	0	0	0	1	1	1	0	0	1	1	1	1	0	0	0	0	1	0
LE_5m	0	1	1	1	1	1	1	0	0	1	1	1	1	0	0	1	0	0	1	1	1	0	0	1	1	1	0	1	0	1	1	0	0	1
ME_5m	1	1	1	1	1	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	1	0	1	0	0	1	1
PX_5m	1	0	0	1	1	1	1	1	0	1	1	1	0	0	1	0	0	1	0	1	1	0	1	1	1	1	1	1	0	1	0	0	1	1
ZA_5m	1	1	1	1	1	1	1	0	0	1	1	1	1	0	0	0	0	0	0	1	0	1	0	0	1	1	1	1	0	0	0	0	0	1
KE_15m	1	1	1	1	1	1	1	0	1	1	1	1	1	0	0	0	1	0	0	1	1	0	1	0	0	1	1	1	1	0	0	0	1	1
KO_15m	1	1	1	0	1	0	1	0	1	1	1	0	1	1	0	0	1	0	0	1	1	0	1	0	0	0	1	1	0	0	1	1	1	1
LE_15m	0	1	1	0	1	1	1	0	0	1	1	0	1	0	0	0	1	0	0	1	1	0	0	0	1	1	1	1	1	0	1	0	0	1
ME_15m	1	1	1	0	1	1	1	0	0	0	1	0	1	0	0	0	0	1	0	1	1	0	0	0	0	1	1	1	1	0	0	0	1	1
PX_15m	1	1	1	0	1	0	1	0	0	1	1	0	1	0	0	0	1	0	0	1	1	0	0	0	0	0	1	1	0	0	1	1	0	1
ZA_15m	1	1	1	0	1	1	1	0	0	1	1	1	1	0	0	1	1	0	0	1	1	1	1	0	1	1	1	1	1	0	0	0	1	1