

## Mediterranean Marine Science

Vol 20, No 1 (2019)



### Coralligenous formations dominated by *Eunicella cavolini* (Koch, 1887) in the NE Mediterranean: biodiversity and structure

MARIA SINI, JOAQUIM GARRABOU, VASILIS TRYGONIS, DROSOS KOUTSOUBAS

doi: [10.12681/mms.18590](https://doi.org/10.12681/mms.18590)

#### To cite this article:

SINI, M., GARRABOU, J., TRYGONIS, V., & KOUTSOUBAS, D. (2019). Coralligenous formations dominated by *Eunicella cavolini* (Koch, 1887) in the NE Mediterranean: biodiversity and structure. *Mediterranean Marine Science*, 20(1), 174–188. <https://doi.org/10.12681/mms.18590>

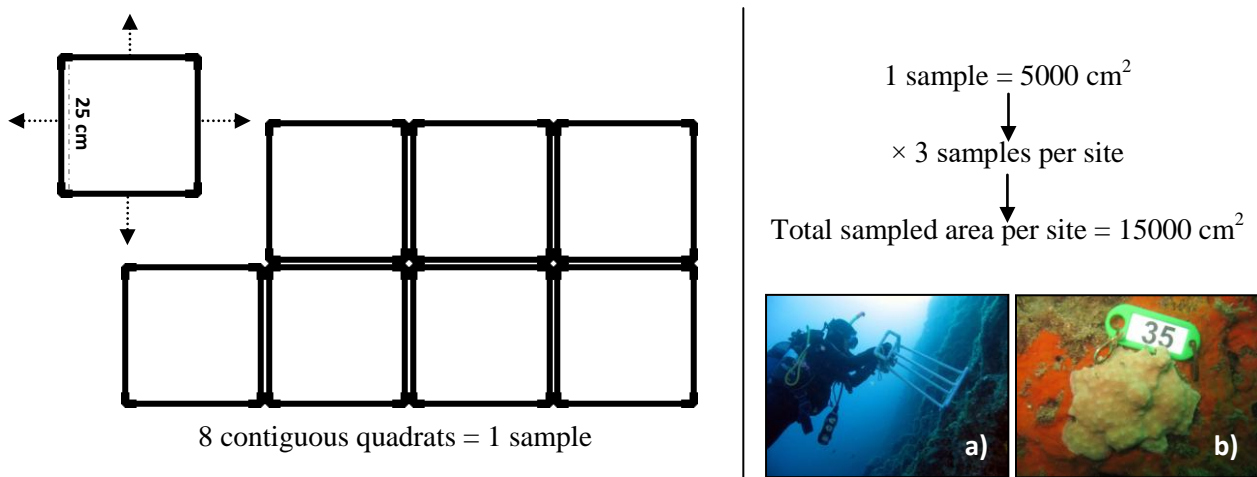
*Supplementary Data*

**Coralligenous formations dominated by *Eunicella cavolini* (Koch, 1887) in the NE Mediterranean: biodiversity and structure**

**Maria SINI, Joaquim GARRABOU, Vasilis TRYGONIS and Drosos KOUTSOUBAS**

*Mediterranean Marine Science, 2019, 20 (1)*

The supplementary material includes additional information on: the sampling methods, the list of species and morpho-functional groups used for the analyses, the statistical results, and a full inventory of all species observed quantitatively or qualitatively during the study.



**Fig. S1** Schematic representation of the sampling protocol used on coralligenous assemblages for the acquisition of photographic quadrat samples. Each sample consisted of eight images. The first image per sample was acquired at a haphazardly chosen position within the coralligenous assemblage, while the remaining seven images were obtained in a contiguous manner following any possible direction (black dotted arrows) in order to avoid potential discontinuities of the assemblage. Inset images illustrate a) the *in situ* use of the quadrat-camera apparatus, and b) a labelled voucher specimen before collection for further analysis in the laboratory.

**Table S1.** Main species/morphological clusters recorded in photoquadrat image samples of coralligenous assemblages in the N Aegean Sea. MFG: morpho-functional group, AV: Ag. Vasso, Lef: Lefteris, Nem: Nemesis, Spi: Spilia, Pal: Palios, Kal: Kalloni. Grey colour indicates species/morphological clusters found at all six sites. Asterisks denotes species/morphological clusters found in all localities.

Taxa	MFG	Generation time	AV	Lef	Nem	Spi	Pal	Kal
<b>Ochrophyta</b>								
<i>Dictyota implexa</i> (Desfontaines) J.V.Lamouroux	Algae erect	Seasonal			+			
Mucilaginous algae indet.	Algae turf/encrusting	Seasonal			+	+		+
<b>Chlorophyta</b>								
<i>Codium effusum</i> (Rafinesque) Delle Chiaje	Algae encrusting	Perennial			+			
<i>Cladophora pellucida</i> (Hudson) Kützing	Algae turf	Perennial	+	+	+	+		
<i>Flabellia petiolata</i> (Turra) Nizamuddin*	Algae erect	Perennial	+		+	+	+	
<i>Halimeda tuna</i> (J.Ellis & Solander) J.V.Lamouroux	Algae erect	Perennial			+	+	+	
<i>Pseudochlorodesmis furcellata</i> (Zanardini) Børgesen	Algae turf	Perennial			+	+		
<i>Valonia macrophysa</i> Kützing	Algae encrusting	Seasonal	+	+	+	+		
Turf indet.	Algae turf	Seasonal	+	+	+	+	+	+
<b>Rhodophyta</b>								
<i>Acrodiscus vidovichii</i> (Meneghini) Zanardini	Algae erect	Seasonal			+	+	+	
<i>Amphiroa rigida</i> J.V.Lamouroux	Algae erect	Perennial			+			
<i>Lithophyllum</i> cf. <i>stictaeforme/cabiochiaie</i> *	Algae encrusting	Perennial	+	+	+	+	+	
<i>Mesophyllum</i> spp.	Algae encrusting	Perennial	+	+	+	+	+	+
<i>Neogoniolithon mamillosum</i> (Hauck) Setchell & L.R.Mason*	Algae encrusting	Perennial	+	+	+	+	+	
<i>Peyssonnelia rosa-marina</i> Boudouresque & Denizot*	Algae encrusting	Perennial	+	+	+	+	+	
<i>Peyssonnelia</i> cf. <i>rubra/bornetii</i>	Algae encrusting	Perennial	+	+	+	+	+	+
<i>Peyssonnelia squamaria</i> (S.G.Gmelin) Decaisne	Algae encrusting	Perennial	+	+	+	+	+	+
<i>Peyssonnelia</i> spp.*	Algae encrusting	Perennial	+	+	+	+	+	
<i>Sphaerococcus coronopifolius</i> Stackhouse	Algae erect	Seasonal			+	+		
Soft red algae indet.*	Algae turf	Seasonal	+	+	+	+	+	
Encrusting calcareous algae.	Algae encrusting	Perennial	+	+	+	+	+	+
<b>Foraminifera</b>								
<i>Miniacina miniacea</i> (Pallas, 1766)	Animal encrusting	Perennial		+	+			
<b>Porifera</b>								
<i>Acanthella acuta</i> Schmidt, 1862	Animal massive	Perennial	+				+	+
<i>Agelas oroides</i> (Schmidt, 1864)*	Animal massive	Perennial	+	+	+	+	+	
<i>Aplysilla sulfurea</i> Schulze, 1878*	Animal encrusting	Perennial	+	+		+	+	+
<i>Axinella cannabina</i> (Esper, 1794)	Animal tree	Perennial						+
<i>Axinella damicornis</i> (Esper, 1794)	Animal tree	Perennial	+	+	+	+	+	+
<i>Axinella verrucosa</i> (Esper, 1794)	Animal tree	Perennial	+	+			+	+
<i>Axinella</i> spp.*	Animal tree	Perennial	+	+	+	+	+	
Black/grey encrusting Porifera	Animal encrusting	Perennial	+	+	+	+	+	+
<i>Cacospongia mollior</i> (Schmidt, 1862)	Animal encrusting	Perennial					+	
<i>Chondrosia reniformis</i> Nardo, 1847*	Animal massive	Perennial		+		+		+
<i>Clathrina clathrus</i> (Schmidt, 1864)	Animal massive	Perennial		+				+
<i>Cliona celata</i> Grant, 1826	Animal borer	Perennial					+	
<i>Cliona schmidti</i> (Ridley, 1881)*	Animal borer	Perennial		+	+		+	
<i>Cliona viridis</i> (Schmidt, 1862)*	Animal borer	Perennial	+	+	+	+		+
<i>Cliona</i> spp.	Animal borer	Perennial		+	+	+		
<i>Crambe crambe/Spirastrella cunctatrix</i>	Animal encrusting	Perennial	+	+	+	+	+	+
<i>Dendroxea lenis</i> (Topsent, 1892)	Animal encrusting	Perennial	+	+			+	
<i>Dictyonella incisa</i> (Schmidt, 1880)*	Animal massive	Perennial	+			+	+	+
<i>Dictyonella</i> sp.	Animal massive	Perennial				+		+

Taxa	MFG	Generation time	AV	Lef	Nem	Spi	Pal	Kal
<i>Dysidea fragilis</i> (Montagu, 1814)	Animal massive	Perennial	+	+			+	
<i>Fasciospongia cavernosa</i> (Schmidt, 1862)	Animal encrusting	Perennial						+
<i>Haliclona (Halichoelona) fulva</i> (Topsent, 1893)*	Animal encrusting	Perennial	+	+		+	+	+
<i>Haliclona (Soestella) mucosa</i> (Griessinger, 1971)*	Animal encrusting	Perennial	+	+	+		+	
<i>Haliclona</i> sp.1	Animal encrusting	Perennial				+		
<i>Haliclona</i> sp.2	Animal encrusting	Perennial						+
<i>Hemimycale columella</i> (Bowerbank, 1874)	Animal encrusting	Perennial					+	
<i>Hexadella racovitzae</i> Topsent, 1896	Animal encrusting	Perennial	+	+	+	+		
<i>Ircinia oros</i> (Schmidt, 1864)*	Animal massive	Perennial	+			+	+	+
<i>Ircinia paucifilamentosa</i> Vacelet, 1961	Animal massive	Perennial				+		
<i>Ircinia variabilis</i> (Schmidt, 1862)	Animal massive	Perennial	+			+		
<i>Oscarella imperialis</i> Muricy, Boury-Esnault, Bézac & Vacelet, 1996	Animal encrusting	Perennial		+				
<i>Petrosia (Petrosia) ficiformis</i> (Poiret, 1789)*	Animal massive	Perennial		+	+		+	+
<i>Phorbas tenacior</i> (Topsent, 1925)	Animal encrusting	Perennial	+	+			+	+
<i>Plakina</i> sp.	Animal encrusting	Perennial		+				
<i>Pleraplysilla spinifera</i> (Schulze, 1879)	Animal encrusting	Perennial					+	
<i>Sarcotragus foetidus</i> Schmidt, 1862*	Animal massive	Perennial	+			+	+	+
<i>Sarcotragus spinosulus</i> Schmidt, 1862	Animal massive	Perennial		+			+	+
Suberitidae indet.	Animal massive	Perennial						+
<i>Tethya aurantium</i> (Pallas, 1766)	Animal massive	Perennial					+	
Yellow encrusting Porifera	Animal encrusting	Perennial	+	+	+	+	+	+
<b>Cnidaria</b>								
Hydrozoa indet.	Animal erect	Seasonal				+	+	
<i>Caryophyllia (Caryophyllia) inornata</i> (Duncan, 1878)	Animal cup	Perennial	+	+	+	+	+	+
<i>Eunicella cavolini</i> (Koch, 1887)	Animal tree	Perennial	+	+	+	+	+	+
<i>Hoplanguia durotrix</i> Gosse, 1860	Animal cup	Perennial		+		+		
<i>Leptopsammia pruvoti</i> Lacaze-Duthiers, 1897*	Animal cup	Perennial	+	+	+	+	+	
<i>Madracis pharensis</i> (Heller, 1868)	Animal encrusting	Perennial	+	+			+	
<i>Paracyathus pulchellus</i> (Philippi, 1842)	Animal cup	Perennial		+		+		
<i>Parazoanthus axinellae</i> (Schmidt, 1862)	Animal encrusting	Perennial	+	+	+	+	+	+
<i>Phyllangia americana mouchezii</i> (Lacaze-Duthiers, 1897)	Animal cup	Perennial		+				
<i>Polycyathus muelleriae</i> (Abel, 1959)	Animal cup	Perennial	+	+				+
Scleractinia indet.*	Animal cup	Perennial	+	+	+	+		+
<b>Annelida</b>								
<i>Eupolymnia nebulosa</i> (Montagu, 1818)	Animal encrusting	Perennial						+
<i>Myxicola infundibulum</i> (Montagu, 1808)	Animal encrusting	Perennial	+	+				
<i>Filograna implexa / Salmacina dysteri</i> *	Animal epibiont	Perennial		+	+	+		+
<i>Serpula vermicularis</i> Linnaeus, 1767	Animal encrusting			+			+	+
Serpulidae indet.*	Animal encrusting	Perennial	+	+	+		+	+
<b>Bryozoa</b>								
<i>Adeonella</i> spp.*	Animal tree	Perennial		+	+	+		+
<i>Beania magellanica</i> (Busk, 1852)	Animal encrusting	Perennial			+	+		
<i>Bugula</i> spp.	Animal tree	Perennial		+	+			
<i>Cellaria</i> sp.	Animal erect	Seasonal			+	+		
<i>Hornera frondiculata</i> (Lamarck, 1816)	Animal tree	Perennial			+	+		
<i>Reteporella grimaldii</i> (Jullien, 1903)	Animal tree	Perennial	+	+		+		
<i>Rhynchozoon neapolitanum</i> Gautier, 1962	Animal encrusting	Perennial	+	+	+	+	+	+
<i>Schizomavella</i> spp. (Hassall, 1842)	Animal encrusting	Perennial	+	+	+	+	+	+
<i>Schizoretepora</i> sp.	Animal tree	Perennial				+		
<i>Smittina cervicornis</i> (Pallas, 1766)	Animal tree	Perennial				+		

Taxa	MFG	Generation time	AV	Lef	Nem	Spi	Pal	Kal
Bryozoa indet.*	Animal encrusting	Perennial	+		+	+	+	
<b>Tunicata</b>								
<i>Aplidium elegans</i> (Giard, 1872)	Animal encrusting	Perennial	+	+				
<i>Clavelina dellavallei</i> (Zirpolo, 1825)	Animal epibiont	Seasonal			+	+		+
<i>Cystodytes dellechiaiei</i> (Della Valle, 1877)	Animal encrusting	Perennial						+
<i>Didemnum</i> sp.1	Animal encrusting	Perennial						+
<i>Didemnum</i> sp.2	Animal encrusting	Perennial						+
<i>Halocynthia papillosa</i> (Linnaeus, 1767)*	Animal massive	Perennial	+	+	+			+
<b>Mollusca</b>								
<i>Lithophaga lithophaga</i> (Linnaeus, 1758)	Animal borer							+
<i>Rocellaria dubia</i> (Pennant, 1777)	Animal borer	Perennial			+			
<i>Thylacodes arenarius</i> (Linnaeus, 1758)	Animal encrusting	Perennial						+
Bivalvia indet.	Animal encrusting	Perennial			+			

**Table S2.** PERMANOVA analyses and pairwise comparisons of coralligenous assemblage structure based on the a) number of species and b) percent cover (square-root transformation) of perennial morpho-functional groups using Bray-Curtis similarity matrices. Statistically significant differences ( $P < 0.05$ ) are noted in bold.

	PERMANOVA						Pairwise comparisons		
	Source	df	SS	MS	Pseudo-F	<i>P</i> (perm)	Sites within Locality	t	<i>P</i> (perm)
Num. species	Locality	2	2987.8	1493.9	4.0	0.09	Ag. Vasso – Lefteris (Pelio)	2.7	<b>0.02</b>
	Site(Locality)	3	1200.2	400.1	2.7	<b>0.04</b>	Nemessis – Spilia (Chalkidiki)	1.0	0.
	Res	12	1813.8	151.2			Palios – Kalloni (Lesvos)	17	0.
	Total	17	6001.8						
Percent cover	Locality	2	5377	2688.5	2.8	0.14	Ag. Vasso – Lefteris (Pelio)	2	<b>0.03</b>
	Site(Locality)	3	2853.2	951.1	3.9	<b>0.01</b>	Nemessis – Spilia (Chalkidiki)	0.7	0.58
	Res	12	2884	240.3			Palios – Kalloni (Lesvos)	4.5	<b>0.01</b>
	Total	17	11114						

**Table S3.** PERMANOVA analyses and pairwise comparisons of coralligenous community composition based on the a) number of species and b) percent cover (square-root transformation) of perennial species using Bray-Curtis similarity matrices. Statistically significant differences ( $P < 0.05$ ) are noted in bold.

	PERMANOVA						Pairwise comparisons		
	Source	df	SS	MS	Pseudo-F	<i>P</i> (perm)	Sites within Locality	t	<i>P</i> (perm)
Num. species	Locality	2	6762.2	3381.1	1.7	0.17	Ag. Vasso – Lefteris (Pelio)	1.9	<b>0.04</b>
	Site(Locality)	3	5897.6	1965.9	5.0	<b>0.00</b>	Nemessis – Spilia (Chalkidiki)	1.6	0.09
	Res	12	4755.9	396.3			Palios – Kalloni (Lesvos)	2.7	<b>0.01</b>
	Total	17	17416.0						
Percent cover	Locality	2	10121.0	5060.7	1.5	0.22	Ag. Vasso – Lefteris (Pelio)	2.3	<b>0.02</b>
	Site(Locality)	3	1017.0	3390.7	4.8	<b>0.00</b>	Nemessis – Spilia (Chalkidiki)	1.1	0.37
	Res	12	8531.7	711.0			Palios – Kalloni (Lesvos)	3.0	<b>0.01</b>
	Total	17	28825.0						

**Table S4.** Summary of similarity percentage analysis (SIMPER) listing species per morpho-functional group (MFG) that cumulatively contribute 80% to the observed dissimilarity (Bray Curtis) of coralligenous assemblages among distinct localities. Analysis was performed on square-root transformed data of perennial species percent cover. Asterisks denote species with the highest percent cover in the first locality appearing per column.

Dissimilarity among localities					
Pelio vs. Chalkidiki (54.3%)	%	Pelio vs. Lesvos (59.8%)	%	Chalkidiki vs. Lesvos (66.2%)	%
<b>Algae encrusting</b>					
<i>P. squamaria</i>	6.3	<i>N. mamillosum</i>	4.8	<i>P. squamaria</i> *	7.3
<i>Mesophyllum</i> spp.	3.6	Encrusting calcareous algae*	4.1	<i>N. mamillosum</i>	4.7
<i>P. rubra/borneti</i> *	3.6	<i>P. squamaria</i> *	4.0	<i>Mesophyllum</i> spp.*	3.6
<i>N. mamillosum</i>	3.4	<i>P. rubra/borneti</i> *	3.3	Encrusting calcareous algae*	3.5
<i>Peyssonnelia</i> indet.	3.4	<i>L. stictaeforme/cabiochiaie</i>	2.7	<i>Peyssonnelia</i> indet.*	3.3
<i>P. rosa-marina</i>	2.9	<i>Peyssonnelia</i> indet.*	2.4	<i>P. rosa-marina</i> *	2.9
Encrusting calcareous algae*	2.6	<i>P. rosa-marina</i> *	2.2	<i>L. stictaeforme/cabiochiaie</i>	2.7
<i>L. stictaeforme/cabiochiaie</i>	1.9	<i>Mesophyllum</i> spp. *	1.9	<i>P. rubra/borneti</i> *	1.6
<b>Algae erect</b>					
<i>F. petiolata</i>	5.9	<i>F. petiolata</i> *	1.2	<i>F. petiolata</i> *	5.7
<i>H. tuna</i>	1.3	–		<i>H. tuna</i> *	1.0
<b>Algae turf</b>					
<i>C. pellucida</i> *	3.1	<i>C. pellucida</i> *	3.1	–	
<b>Animal borer</b>					
<i>C. viridis</i>	1.6	–		<i>C. viridis</i> *	1.2
<b>Animal cup</b>					
<i>P. muelleriae</i> *	1.1	<i>P. muelleriae</i> *	1.1	–	
<b>Animal encrusting</b>					
<i>P. axinellae</i> *	5.9	<i>P. axinellae</i> *	4.1	<i>C. crambe/S. cunctatrix</i>	4.7
<i>H. racovitzai</i> *	2.7	<i>C. crambe / S. cunctatrix</i>	4.0	<i>P. tenacior</i>	3.2
<i>C. crambe/S. cunctatrix</i> *	2.3	<i>P. tenacior</i>	3.1	<i>H. fulva</i>	2.9
<i>H. fulva</i> *	1.7	<i>H. racovitzai</i> *	3.0	<i>C. dellechiajei</i>	2.4
<i>D. lenis</i> *	1.5	<i>C. dellechiajei</i>	2.5	<i>P. axinellae</i>	2.0
<i>B. magellanica</i>	1.4	<i>H. fulva</i>	2.5	<i>Didemnum</i> sp.2	1.7
Black/grey encrusting Porifera*	1.4	<i>Didemnum</i> sp.2	1.8	<i>B. magellanica</i> *	1.2
<i>M. pharensis</i> *	1.3	<i>M. pharensis</i> *	1.2		1.2
–		<i>D. lenis</i> *	1.1	–	
–		Black/grey encrusting Porifera*	1.1	–	
<b>Animal epibiont</b>					
<i>F. implexa/S. dysteri</i>	1.5	–		<i>F. implexa/S. dysteri</i> *	1.3
<b>Animal massive</b>					
<i>A. oroides</i> *	7.6	<i>A. oroides</i> *	5.7	<i>P. ficiformis</i>	3.9
<i>C. reniformis</i> *	5.2	<i>C. reniformis</i> *	4.6	<i>C. reniformis</i> *	3.7
<i>I. oros</i> *	1.3	<i>P. ficiformis</i>	4.0	<i>A. oroides</i>	3.6
<i>S. foetidus</i> *	1.3	<i>S. foetidus</i>	2.6	<i>S. foetidus</i>	2.6
<i>I. paucifilamentosa</i>	1.1	<i>I. oros</i>	1.5	<i>I. oros</i>	1.4
=		<i>D. fragilis</i>	1.3	<i>D. fragilis</i>	1.2
–		<i>S. spinosulus</i>	1.2	<i>S. spinosulus</i>	1.1
<b>Animal tree</b>					
<i>Adeonella</i> spp.	2.0	<i>E. cavolini</i> *	2.1	<i>E. cavolini</i> *	2.2
<i>E. cavolini</i> *	1.8	<i>A. damicornis</i>	1.5	<i>Adeonella</i> spp.*	1.9
<i>A. verrucosa</i> *	1.1	<i>A. verrucosa</i>	1.2	<i>A. damicornis</i>	1.3
–		–		<i>A. verrucosa</i>	1.3

**Table S5.** Summary of similarity percentage analysis (SIMPER) listing species along with their morpho-functional group (MFG) that cumulatively contribute 80% to the dissimilarity (Bray Curtis) between the Ag. Vasso and Lefteris sites (Pelio locality), based on square-root transformed data of perennial species percent cover. Av. Diss.: Average dissimilarity, Diss/SD: Dissimilarity to standard deviation ratio, Contrib. %: Percentage contribution of the different species to the overall dissimilarity, Cum. %: Cumulative percentage contribution of the different species to the overall dissimilarity.

		Pelio					
		Ag. Vasso	Lefteris				
		Av. dissimilarity = 44.1%					
MFG	Species	Av. Abund.		Av. Diss.	Diss./SD	Contrib.%	Cum.%
Animal massive	<i>C. reniformis</i>	0.0	9.3	5.2	3.7	11.7	11.7
Algae encrusting	<i>P. rubra/bornetii</i>	0.5	7.0	3.6	6.7	8.2	19.9
Algae encrusting	<i>P. squamaria</i>	3.6	9.1	3.0	4.1	6.8	26.7
Algae turf	<i>C. pellucida</i>	5.2	1.0	2.4	2.3	5.4	32.1
Animal massive	<i>A. oroides</i>	10.8	7.0	2.1	3.6	4.8	36.9
Algae encrusting	<i>Mesophyllum</i> spp.	1.0	4.2	1.8	3.0	4.0	40.9
Algae erect	<i>F. petiolata</i>	2.3	0.0	1.3	5.9	2.9	43.7
Algae encrusting	Encrusting calcareous algae	9.3	7.6	1.3	1.4	2.8	46.6
Algae encrusting	<i>P. rosa-marina</i>	2.8	2.0	1.2	1.3	2.7	49.2
Animal encrusting	<i>H. fulva</i>	1.3	2.0	1.1	1.2	2.5	51.7
Animal erect	<i>R. grimaldii</i>	0.1	1.9	1.0	1.4	2.3	54.0
Animal massive	<i>S. foetidus</i>	1.8	0.0	1.0	1.1	2.2	56.3
Animal boring	<i>C. viridis</i>	1.9	0.1	1.0	0.9	2.2	58.5
Animal encrusting	<i>P. axinellae</i>	6.1	6.5	0.9	1.6	2.0	60.5
Algae encrusting	<i>L. stictaeforme/cabiociae</i>	2.2	1.7	0.9	1.3	2.0	62.5
Animal massive	<i>I. oros</i>	1.6	0.0	0.9	1.3	2.0	64.5
Algae encrusting	<i>Peyssonnelia</i> spp.	2.8	2.5	0.8	1.3	1.8	66.3
Animal tree	<i>E. cavolini</i>	4.0	4.8	0.8	1.3	1.7	68.0
Algae encrusting	<i>N. mamillosum</i>	0.5	1.5	0.7	1.3	1.7	69.6
Animal cup	<i>P. muelleriae</i>	0.6	1.6	0.6	1.6	1.5	71.1
Animal encrusting	<i>M. pharensis</i>	0.8	1.7	0.6	1.2	1.4	72.5
Animal encrusting	<i>C. crambe/S. cunctatrix</i>	3.3	4.1	0.6	1.3	1.4	73.9
Animal massive	<i>D. incisa</i>	1.1	0.0	0.6	1.3	1.4	75.3
Animal tree	<i>Adeonella</i> spp.	0.0	1.1	0.6	2.5	1.4	76.7
Animal massive	<i>H. papillosa</i>	1.5	0.4	0.6	1.7	1.3	78.0
Animal tree	<i>A. verrucosa</i>	1.3	0.7	0.6	1.8	1.3	79.3
Animal encrusting	Black/grey encrusting Porifera	3.0	2.4	0.6	1.5	1.3	80.6

**Table S6.** Summary of similarity percentage analysis (SIMPER) listing species along with their morpho-functional group (MFG) that cumulatively contribute 80% to the dissimilarity (Bray Curtis) between the Palios and Kalloni sites (Lesvos locality), based on square-root transformed data of perennial species percent cover. Av. Diss.: Average dissimilarity, Diss/SD: Dissimilarity to standard deviation ratio, Contrib. %: Percentage contribution of the different species to the overall dissimilarity, Cum. %: Cumulative percentage contribution of the different species to the overall dissimilarity.

		Lesvos					
		Palios	Kalloni				
		Av. dissimilarity = 75.3%					
MFG	Species	Av. Abund.	Av. Diss.	Diss./SD	Contrib.%	Cum.%	
Algae encrusting	<i>N. mamillosum</i>	9.8	0.0	6.0	2.9	8.0	8.0
Animal encrusting	<i>C. crambe/S. cunctatrix</i>	2.9	10.6	4.7	2.7	6.2	14.2
Animal massive	<i>P. ficiformis</i>	0.5	7.8	4.5	15.2	5.9	20.2
Animal massive	<i>C. reniformis</i>	0.0	6.6	4.0	3.5	5.4	25.6
Animal massive	<i>A. oroides</i>	5.9	0.0	3.6	16.1	4.8	30.4
Algae encrusting	<i>L. stictaeforme/cabiociae</i>	5.6	0.0	3.4	4.6	4.5	34.9
Animal encrusting	<i>C. dellechiajei</i>	0.0	5.2	3.2	4.9	4.2	39.2
Algae encrusting	<i>Peyssonnelia</i> spp.	4.9	0.0	3.1	4.8	4.1	43.2
Animal encrusting	<i>P. tenacior</i>	0.9	6.0	3.0	1.6	4.1	47.3
Algae encrusting	Encrusting calcareous algae	6.7	1.9	2.9	2.7	3.9	51.2
Animal encrusting	<i>Didemnum</i> sp.2	0.0	3.8	2.3	1.3	3.0	54.2
Algae encrusting	<i>P. squamaria</i>	4.2	2.2	2.2	1.6	2.9	57.1
Animal encrusting	<i>H. fulva</i>	4.9	1.6	2.1	1.8	2.7	59.8
Animal massive	<i>S. foetidus</i>	3.6	2.1	2.0	1.3	2.7	62.5
Animal erect	<i>E. cavolini</i>	1.9	5.3	2.0	1.7	2.7	65.2
Animal encrusting	<i>P. axinellae</i>	1.5	3.5	1.9	1.1	2.5	67.7
Animal massive	<i>D. fragilis</i>	2.7	0.0	1.6	2.0	2.1	69.8
Animal erect	<i>A. damicornis</i>	2.9	0.4	1.6	2.8	2.1	71.8
Algae encrusting	<i>P. rubra/bornetii</i>	2.8	0.4	1.5	1.2	1.9	73.8
Animal erect	<i>A. cannabina</i>	0.0	2.0	1.3	0.7	1.7	75.5
Animal encrusting	<i>Didemnum</i> sp.1	0.0	2.1	1.2	1.1	1.6	77.1
Animal massive	<i>I. oros</i>	0.7	1.8	1.2	0.9	1.6	78.7
Algae encrusting	<i>Mesophyllum</i> spp.	1.5	1.2	1.1	4.2	1.4	80.1

**Table S7.** PERMANOVA and PERMDISP analyses for  $\alpha$ - and  $\beta$ -diversity measures, respectively. PERMANOVA was conducted using Euclidean distances of untransformed data, PERMDISP on Jaccard distances of presence/absence data. Statistically significant differences ( $P < 0.05$ ) are noted in bold.

$\alpha$ -diversity					$\beta$ -diversity					$\beta$ -diversity			
PERMANOVA					PERMDISP					PERMIDSP (pairwise comparisons)			
Source	df	SS	MS	Pseudo-F	P (perm)	Source	df1	df2	F	P (perm)	Source	t	P (perm)
Locality	2	124.11	62.06	3.48	0.16	Locality	2	15	20.46	<b>0.00</b>	Pelio – Chalkidiki	1.6	0.20
Site(Locality)	3	53.50	17.83	1.08	0.39	Sites	5	12	4.27	0.12	Pelio – Lesvos	5.9	<b>0.00</b>
Res	12	198.67	16.55								Chalkidiki – Lesvos	4.5	<b>0.00</b>
Total	17	376.3											



**Table S8.** Full list of taxa recorded quantitatively (photoquadrat samples) or qualitatively (visual observations and collection of voucher specimens) in the coralligenous assemblages of the N Aegean Sea, and their current conservation status. 1: Ag. Vasso, 2: Lefteris, 3: Nemessis, 4: Spilia, 5: Palios, 6: Kalloni

Taxa	Authority	Conservation Status	Site
<b>Kingdom Chromista</b>			
<b>Phylum Ochrophyta</b>			
<i>Dictyota implexa</i>	(Desfontaines) J.V.Lamouroux		1,3,4
<i>Dictyota dichotoma</i>	(Hudson) J.V.Lamouroux		3,4,5
Mucilaginous algae indet.			3,4,5,6
<b>Kingdom Protozoa</b>			
<b>Phylum Foraminifera</b>			
<i>Miniacina miniacina</i>	(Pallas, 1766)		2,3
<b>Kingdom Plantae</b>			
<b>Phylum Chlorophyta</b>			
<i>Caulerpa cylindracea</i>	Sonder	A	5,6
<i>Codium bursa</i>	(Olivi) C.Agardh		3,5,6
<i>Codium effusum</i>	(Rafinesque) Delle Chiaje		2,3
<i>Cladophora peullucida</i>	(Hudson) Kützing		1,2,3,4
<i>Flabellia petiolata</i>	(Turra) Nizamuddin		1,3,4,5
<i>Halimeda tuna</i>	(J.Ellis & Solander) J.V.Lamouroux		1,2,3,4,5
<i>Pseudoclorodesmis furcellata</i>	(Zanardini) Børgesen		3,4
<i>Valonia macrophysa</i>	Kützing		1,2,3,4
<b>Phylum Rhodophyta</b>			
<i>Acrodiscus vidovichii</i>	(Meneghini) Zanardini		3,4,5
<i>Acrosymphyton pururiferum</i>	(J.Agardh) Sjöstedt		5
<i>Amphiroa rigida</i>	J.V.Lamouroux		3
<i>Laurencia chondrioides</i>	Børgesen		5
<i>Lithophyllum</i> cf. <i>stictaephorme/cabiochiaie</i>	(J.E. Areschoug) Hauck/(Boudouresque & Verlaque) Athanasiadis		1,2,3,4,5
<i>Mesophyllum</i> spp.	(Foslie) Cabioch & M.L.Mendoza	O/b,c	1,2,3,4,5,6
<i>Neogoniolithon mamillosum</i>	(Hauck) Setchell & L.R.Mason	O/c	1,2,3,4,5
<i>Peyssonnelia rosa-marina</i>	Boudouresque & Denizot	O/c	1,2,3,4,5
<i>Peyssonnelia</i> cf. <i>rubra/bornetii</i>	(Greville) J.Agardh/Boudouresque & Denizot		1,2,3,4,5,6
<i>Peyssonnelia squamaria</i>	(S.G.Gmelin) Decaisne		1,2,3,4,5,6
<i>Sebdenia dichotoma</i>	Berthold		5
<i>Sphaerococcus coronopifolius</i>	Stackhouse		1,3,4
<i>Womersleyella setacea</i>	(Hollenberg) R.E.Norris	A	3
<b>Kingdom Animalia</b>			
<b>Phylum Porifera</b>			
<i>Acanthella acuta</i>	Schmidt, 1862		1,5,6
<i>Agelas oroides</i>	(Schmidt, 1864)		1,2,3,4,5,6
<i>Aplysilla rosea</i>	(Barrois, 1876)		6
<i>Aplysilla sulfurea</i>	Schulze, 1878		1,2,3,4,5,6
<i>Aplysina aerophoba</i>	(Nardo, 1833)	BC/II; O/a	3,4,5,6
<i>Axinella cannabina</i>	(Esper, 1794)	BC/II	1,5,6
<i>Axinella damicornis</i>	(Esper, 1794)		1,2,3,4,5,6
<i>Axinella verucosa</i>	(Esper, 1794)		1,2,4,5,6
<i>Axinyssa aurantiaca</i>	(Schmidt, 1864)		5
<i>Axinyssa digitata</i>	(Cabioch, 1968)		6
<i>Cacospongia molior</i>	Schmidt, 1862		5
<i>Calyx nicaeensis</i>	(Risso, 1826)	O/a	5,6

<b>Taxa</b>	<b>Authority</b>	<b>Conservation Status</b>	<b>Site</b>
<i>Chondrosia reniformis</i>	Nardo, 1847		2,4,5,6
<i>Clathrina clathrus</i>	(Schmidt, 1864)		2,6
<i>Cliona celata</i>	Grant, 1826		1,5
<i>Cliona schmidtii</i>	(Ridley, 1881)		2,3,4,5
<i>Cliona viridis</i>	(Schmidt, 1862)		1,3,4,5,6
<i>Coscinoderma sporadense</i>	Voultsiadou-Koukoura, van Soest & Koukouras, 1991		5
<i>Crambe crambe</i>	(Schmidt, 1862)		1,2,3,4,5,6
<i>Crella (Grayella) pulvinar</i>	(Schmidt, 1868)		4,5,6
<i>Dendroxea lenis</i>	(Topsent, 1892)		1,2,5,6
<i>Diplastrella bistellata</i>	(Schmidt, 1862)		5
<i>Dictyonella incisa</i>	(Schmidt, 1880)		1,3,4,5,6
<i>Dysidea fragilis</i>	(Montagu, 1814)		1,2,5,6
<i>Dysidea avara</i>	(Schmidt, 1862)		1,5
<i>Fasciospongia cavernosa</i>	(Schmidt, 1862)		1,5,6
<i>Geodia cydonium</i>	(Jameson, 1811)	BC/II	6
<i>Halichondria</i> sp.			1
<i>Haliclona (Halichoelona) fulva</i>	(Topsent, 1893)		1,2,4,5,6
<i>Haliclona (Soestella) mucosa</i>	(Griessinger, 1971)		1,2,3,5
<i>Hemimycale columella</i>	(Bowerbank, 1874)		5,6
<i>Hexadella racvitzai</i>	Topsent, 1896		1,2,3,4,5
<i>Ircinia oros</i>	(Schmidt, 1864)		1,3,4,5,6
<i>Ircinia paucifilamentosa</i>	Vacelet, 1961		4
<i>Ircinia variabilis</i>	(Schmidt, 1862)		1,4,5,6
<i>Merlia</i> sp.			4,5
<i>Oscarella imperialis</i>	Muricy, Boury-Esnault, Bézac & Vacelet, 1996		2,5
<i>Penares</i> sp.			5
<i>Penares euastrum</i>	(Schmidt, 1868)		6
<i>Petrosia (Petrosia) ficiformis</i>	(Poiret, 1789)	O/a	1,2,3,5,6
<i>Phorbas fictitius</i>	(Bowerbank, 1866)		5
<i>Phorbas tenacior</i>	(Topsent, 1925)		1,2,5,6
<i>Plakina</i> sp.	Schulze, 1880		2
<i>Pteraplysilla spinifera</i>	(Schulze, 1879)		5
<i>Sarcotragus foetidus</i>	Schmidt, 1862	BC/II	1,3,4,5,6
<i>Sarcotragus spinosulus</i>	Schmidt, 1862		2,5,6
<i>Spirastrella cunctatrix</i>	Schmidt, 1868		1,2,3,4,5,6
<i>Spongia (Spongia) officinalis</i>	Linnaeus, 1759	BC/III; Bern/III	5
<i>Spongia (Spongia) virgultosa</i>	(Schmidt, 1868)		5
<i>Suberites carnosus</i>	(Johnston, 1842)		6
Suberitidae indet.	Schmidt, 1870		6
<i>Terpios gelatinosa</i>	(Bowerbank, 1866)		5
<i>Tethya aurantium</i>	(Pallas, 1766)	BC/II; O/a	6
<b>Phylum Cnidaria</b>			
<i>Antennella secundaria</i>	(Gmelin, 1791)		5
<i>Balanophyllia (Balanophyllia) europaea</i>	(Risso, 1826)	CITES II; IUCN/DD	5
<i>Caryophyllia (Caryophyllia) inornata</i>	(Duncan, 1878)	CITES/II	1,2,3,4,5,6
<i>Cladocora caespitosa</i>	(Linnaeus, 1767)	BC/II; CITES/II; IUCN/En; O/a	6
<i>Cerianthus membranaceus</i>	(Spallanzani, 1784)		3,5
<i>Eudendrium</i> spp.	Ehrenberg, 1834		3,4,5,6
<i>Eunicella singularis</i>	(Esper, 1791)	IUCN/NT	5,6
<i>Eunicella cavolini</i>	(Koch, 1887)	IUCN/NT	1,2,3,4,5,6

<b>Taxa</b>	<b>Authority</b>	<b>Conservation Status</b>	<b>Site</b>
<i>Hoplangia durotrix</i>	Gosse, 1860	CITES/II	2,4,5
<i>Leptopsammia pruvoti</i>	Lacaze-Duthiers, 1897	CITES/II	1,2,3,4,5
<i>Madracis pharesnsis</i>	(Heller, 1868)	CITES/II; IUCN/LC	1,2,5
<i>Paracyathus pulchelus</i>	(Philippi, 1842)	CITES/II	1,2,4,5
<i>Parazoanthus axinellae</i>	(Schmidt, 1862)	O/a	1,2,3,4,5,6
<i>Penaria disticha</i>	Goldfuss, 1820		6
<i>Phyllangia americana mouchezii</i>	(Lacaze-Duthiers, 1897)	CITES/II; O/a	2,3,5,6
<i>Polycyathus muelleriae</i>	(Abel, 1959)	CITES/II	1,2,5,6
<b>Phylum Platyhelminthes</b>			
<i>Prostheceraeus</i> sp.			5
<i>Pseudoceros maximus</i>	Lang, 1884		5
<b>Phylum Annelida</b>			
<b>Class Polychaeta</b>			
<i>Bispira volutacornis</i>	(Montagu, 1804)		1,3,5
<i>Eupolyornia nebulosa</i>	(Montagu, 1819)		5,6
<i>Filograna implexa/Salmacina dysteri</i>	Berkeley, 1835/Claparède, 1870		1,2,3,4,5,6
<i>Hermodice carunculata</i>	(Pallas, 1766)		3,4,5,6
<i>Myxicola infundibulum</i>	(Montagu, 1808)		1,2,3,5
<i>Protula tubularia</i>	(Montagu, 1803)		5
<i>Sabella pavonina</i>	Savigny, 1822		3
<i>Sabella spallanzanii</i>	(Gmelin, 1791)		3,6
<i>Spirobranchus triqueter</i>	(Linnaeus, 1758)		4
<i>Serpula vermicularis</i>	Linnaeus, 1767		2,5,6
Serpulidae indet.			1,2,3,4,5,6
<b>Class Echiura</b>			
<i>Bonellia viridis</i>	Rolando, 1821		5,6
<b>Bryozoa</b>			
<i>Adeonella</i> spp.			2,3,4,6
<i>Beania magellanica</i>	(Busk, 1852)		3,4,5
<i>Bugula</i> spp.			2,3
<i>Cellaria</i> sp.			3,4
<i>Caberea boryi</i>	(Audouin, 1826)		3
<i>Hornera frondiculata</i>	(Lamarck, 1816)		3,4,5,6
<i>Reteporella grimaldii</i>	(Jullien, 1903)		1,2,4
<i>Rhynchozoon neapolitanum</i>	Gautier, 1962		1,2,3,4,5,6
<i>Schizomavella (Schizomavella) mamillata</i>	(Hincks, 1880)		1,2,3,4,5,6
<i>Schizoporella errata</i>	(Waters, 1878)		6
<i>Schizoretepora serratimargo</i>	(Hincks, 1886)		3,4
<i>Schizoretepora</i> sp.			4
<i>Scrupocellaria</i> sp.			5
<i>Smittina cervicornis</i>	(Pallas, 1766)		3,4
<b>Phylum Mollusca</b>			
<b>Class Gasteropoda</b>			
<i>Caloria elegans</i>	(Alder & Hancock, 1845)		5
<i>Calliostoma zizyphinum</i>	(Linnaeus, 1758)		5
<i>Cratena peregrina</i>	(Gmelin, 1791)		5,6
<i>Dondice banyulensis</i>	Portmann & Sandmeier, 1960		5,6
<i>Felimare picta</i>	(Schultz in Philippi, 1836)		5
<i>Felimare tricolor</i>	(Cantraine, 1835)		4,5
<i>Felimida luteorosea</i>	(Rapp, 1827)		2,3,5
<i>Flabellina affinis</i>	(Gmelin, 1791)		5,6

Taxa	Authority	Conservation Status	Site
<i>Flabellina ischinata</i>	Hirano & Thompson, 1990		5,6
<i>Flabellina rubrolineata</i>	(O'Donoghue, 1929)	A	6
<i>Haminoea cyanomarginata</i>	Heller & Thompson, 1983		5
<i>Janolus cristatus</i>	(Delle Chiaje, 1841)		5
<i>Jujubinus exasperatus</i>	(Pennant, 1777)		6
<i>Peltodoris atromaculata</i>	Bergh, 1880		1,5,6
<i>Phyllidia flava</i>	Aradas, 1847		5
<i>Simnia spelta</i>	(Linnaeus, 1758)		3,4
<i>Thuridilla hopei</i>	(Vérany, 1853)		2,3,4
<i>Thylacodes arenarius</i>	(Linnaeus, 1758)		5,6
<i>Tritonia nilsodhneri</i>	Marcus Ev., 1983		2
<i>Umbraculum umbraculum</i>	(Lightfoot, 1786)		5
<b>Class Bivalvia</b>			
<i>Lithophaga lithophaga</i>	(Linnaeus, 1758)	BC/II; Bern/II; CITES/II; HD/IV; O/a	5
<i>Ostrea</i> sp.			5
<i>Pinna nobilis</i>	Linnaeus, 1758	BC/II; HD IV; IUCN/VU; O/a; PD 67/1981	6
<i>Pteria hirundo</i>	(Linnaeus, 1758)		5
<i>Rocellaria dubia</i>	(Pennant, 1777)		3,5
<b>Class Cephalopoda</b>			
<i>Loligo</i> sp. eggs			5
<i>Octopus vulgaris</i>	Cuvier, 1797		5,6
<b>Phylum Arthropoda</b>			
<b>Subphylum Crustacea</b>			
<i>Galathea strigosa</i>	(Linnaeus, 1761)		5
<i>Maja squinado</i>	(Herbst, 1788)	BC/III; Bern/III; O/a	5
<i>Palinurus elephas</i>	(Fabricius, 1787)	BC/III; Bern/III; IUCN/VU; O/a	5,6
<i>Scyllarides latus</i>	(Latreille, 1803)	BC/III; Bern/III; HD/V; IUCN/DD	5
<i>Stenopus spinosus</i>	Risso, 1827		5
<b>Phylum Echinodermata</b>			
<i>Antedon mediterranea</i>	(Lamarck, 1816)		3,4,5
<i>Hacelia attenuata</i>	Gray, 1840	O/a	1,3,4,5,6
<i>Holothuria (Panningothuria) forskali</i>	Delle Chiaje, 1823		6
<i>Holothuria (Platyperona) sanctori</i>	Delle Chiaje, 1823		6
<i>Ophidiaster ophidianus</i>	(Lamarck, 1816)	BC/II; Bern/II; O/a	2
<i>Paracentrotus lividus</i>	(Lamarck, 1816)	BC/II; Bern/III; IUCN/VU	6
<i>Peltaster placenta</i>	(Müller & Troschel, 1842)		3,4
<i>Sphaerechinus granularis</i>	(Lamarck, 1816)		5
<i>Stylocidaris affinis</i>	(Philippi, 1845)		5
<b>Phylum Chordata</b>			
<b>Subphylum Tunicata</b>			
<b>Class Ascidiacea</b>			
<i>Diplosoma spongiforme</i>	(Giard, 1872)		6
<i>Aplidium elegans</i>	(Giard, 1872)		1,2
<i>Cystodytes dellechiajei</i>	(Della Valle, 1877)		6
<i>Clavelina dellavallei</i>	(Zirpolo, 1825)		1,2,3,4,6
<i>Clavelina lepadiformis</i>	(Müller, 1776)		6
<i>Didemnum maculosum</i>	(Milne Edwards, 1841)		6
<i>Didemnum</i> spp.			6

Taxa	Authority	Conservation Status	Site
<i>Halocynthia papillosa</i>	(Linnaeus, 1767)		1,2,3,4,5,6
<i>Lissoclinum perforatum</i>	(Giard, 1872)		2,6
<i>Microcosmus sabatieri</i>	Roule, 1885		5
<i>Polysyncraton lacazei</i>	(Giard, 1872)		5
<i>Pyura dura</i>	(Heller, 1877)		6
<b>Subphylum Vertebrata</b>			
<b>Class Actinopterygii</b>			
<i>Anthias anthias</i>	(Linnaeus, 1758)		2,3,4,5
<i>Chromis chromis</i>	(Linnaeus, 1758)		1,4,6
<i>Conger conger</i>	(Linnaeus, 1758)		
<i>Coris julis</i>	(Linnaeus, 1758)		3,5,6
<i>Dentex dentex</i>	(Linnaeus, 1758)		5
<i>Diplodus puntazzo</i>	(Walbaum, 1792)		6
<i>Diplodus sargus sargus</i>	(Linnaeus, 1758)		4,5,6
<i>Diplodus vulgaris</i>	(Geoffroy Saint-Hilaire, 1817)		3,5,6
<i>Epinephelus costae</i>	(Steindachner, 1878)	IUCN/DD	3,6
<i>Epinephelus marginatus</i>	(Lowe, 1834)	BC/III; Bern/II; IUCN/EN	5,6
<i>Gobius auratus</i>	Risso, 1810		2
<i>Gobius vittatus</i>	Vinciguerra, 1883		5
<i>Labrus viridis</i>	Linnaeus, 1758		5,6
<i>Muraena helena</i>	Linnaeus, 1758		2,5
<i>Oblada melanura</i>	Linnaeus, 1758		6
<i>Phycis phycis</i>	Linnaeus, 1766		4
<i>Sarpa salpa</i>	Linnaeus, 1758		6
<i>Sciaena umbra</i>	Linnaeus, 1758	BC/III; Bern/II; IUCN/VU	3,5
<i>Scorpaena notata</i>	Rafinesque, 1810		3
<i>Scorpaena scrofa</i>	Linnaeus, 1758		1,2,4,5
<i>Seriola dumerili</i>	(Risso, 1810)		5
<i>Serranus cabrilla</i>	(Linnaeus, 1758)		3,5,6
<i>Serranus scriba</i>	(Linnaeus, 1758)		5,6
<i>Sparus aurata</i>	Linnaeus, 1758		5,6
<i>Spicara smaris</i>	(Linnaeus, 1758)		3,4
<i>Spondylisoma cantharus</i>	(Linnaeus, 1758)		3,5,6
<i>Symphodus mediterraneus</i>	(Linnaeus, 1758)		5
<i>Symphodus melanocercus</i>	(Risso, 1810)		5
<i>Thorogobius ephippiatus</i>	(Lowe, 1839)		5
<i>Tripterygion delaisi</i>	Cadenat & Blache, 1970		5
<i>Zeus faber</i>	Linnaeus, 1758		5

**BC:** Barcelona convention – II: Annex of endangered or threatened species, III: Annex of species whose exploitation is regulated. **Bern:** Convention on the conservation of European wildlife and natural habitats – II: Annex of strictly protected fauna species, III: Annex of protected fauna species. **CITES:** Convention on International Trade in Endangered Species of wild fauna and flora, 1973, Council Regulation (EC) No 338/97 – II: Species of Annex II. **HD:** Habitats Directive 92/43/EC on the conservation of natural habitats and of wild fauna and flora – IV: Animal and plant species of community interest in need of strict protection, V: Animal and plant species of community interest whose taking in the wild and exploitation may be subject to management measures. **IUCN:** The IUCN Red List of Threatened Species – DD: Data Deficient, NT: Near Threatened, VU: Vulnerable, EN: Endangered. **O:** Oceana list of threatened species (2009) – a: Species that are regionally threatened and included in regional or national lists, b: Species whose protection is recommended by experts, c: Species that require protection due to their fragility or role as essential habitat creators. **PD 67/1981:** Greek Presidential Decree for the protection of wild flora and fauna. **A:** Allochthonous