

Mediterranean Marine Science

Vol 19, No 3 (2018)



Opportunistic seaweeds replace *Cystoseira* forests on an industrialised coast in Cyprus

DEMETRIS KLETOU, IOANNIS SAVVA,
KONSTANTINOS TSIAMIS, JASON M. HALL-SPENCER

doi: [10.12681/mms.16891](https://doi.org/10.12681/mms.16891)

To cite this article:

KLETOU, D., SAVVA, I., TSIAMIS, K., & HALL-SPENCER, J. M. (2018). Opportunistic seaweeds replace *Cystoseira* forests on an industrialised coast in Cyprus. *Mediterranean Marine Science*, 19(3), 598–610.
<https://doi.org/10.12681/mms.16891>

Supplementary Data

Opportunistic seaweeds replace *Cystoseira* forests on an industrialised coast in Cyprus

DEMETRIS KLETOU, IOANNIS SAVVA, KONSTANTINOS TSIAMIS and JASON M. HALL-SPENCER

Mediterranean Marine Science, 2018, 19 (3)

Table S1. Taxa recorded, and % coverage in 8-10 quadrats at each site, sampled on hard substrata at 0.3 - 1.5 m depth across Vasiliko Bay in late summer 2012 and early spring 2013. Late-successional Ecological State Group I and opportunistic species Ecological State Group II are separated in five categories based on their sensitivity to pressures (Orfanidis *et al.*, 2011).

Species/Taxa	Functional Group	Sampling Site																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
<i>Cystoseira cf. elegans</i> Sauvageau	IA	0.6																
<i>Cystoseira barbatula</i> Kützing emend. Cormaci, Furnari & Giaccone	IA	47.1	83.5	45.8	29.4	51.0	42.4	26.3	26.4		1.3	23.8	2.4	2.6	3.1	44.0		
<i>Cystoseira crinitophylla</i> Ercegovic	IA									11.9	6.4							
<i>Cystoseira foeniculacea</i> Linnaeus Greville f. <i>foeniculacea</i>	IA				12.3		7.8		28.0	12.1	1.5	0.7	5.1	9.1	2.8			
<i>Posidonia oceanica</i> Linnaeus Delile	IA				5.8		3.4								0.3			
<i>Cymodocea nodosa</i> Ucria Ascherson	IB				0.5											5.4		
<i>Cystoseira barbata</i> Stackhouse C. Agardh var. <i>barbata</i>	IB									2.9		3.1	0.9	1.0	7.6	1.0		
<i>Cystoseira compressa</i> Esper Gerloff & Nizamuddin f. <i>compressa</i>	IB	1.6					8.9			3.1	0.5	2.8						
<i>Padina pavonica</i> Linnaeus Thivy	IB		0.7	2.6	1.4	8.8	8.6	4.9	7.2	0.7	1.5	2.5	1.6	21.4	37.5	2.9	5.4	
<i>Rytiphlaea tinctoria</i> Clemente C. Agardh	IB	9.7	1.3			0.1												
<i>Sargassum vulgare</i> C. Agardh	IB									0.5	12.5	0.4	0.3					
<i>Acetabularia mediterranea</i> J.V.Lamouroux	IC															1.6		
<i>Anadyomene stellata</i> Wulfen C. Agardh	IC	0.3	1.5	3.1	3.4			0.2	0.2					1.9	1.2	0.6		
<i>Flabellia petiolata</i> Turra Nizamuddin	IC								0.6									
<i>Jania spp. J. rubens</i> Linnaeus J.V.Lamouroux + <i>J. virgata</i> Zanardini Montagne	IC	6.2	3.3	16.7	1.7	3.6	46.4	1.7	7.4	13.6		7.2	15.6	25.8	6.3	1.8		
<i>Lithophyllum sp.</i>	IC	1.9	3.8	3.3	0.6	3.4	1.5											
<i>Peyssonnelia sp.</i>	IC				0.6				0.1	0.3								
<i>Taonia atomaria</i> Woodward J. Agardh	IC															0.7		
<i>Botryocladia botryoides</i> Wulfen Feldmann	IIA				0.1													
<i>Caulerpa racemosa</i> var. <i>cylindracea</i> Sonder Verlaque, Huisman & Boudouresque	IIA	0.6		0.4	2.7	0.4		1.9				0.2	1.3	0.1				

(continued)

Table 1 continued

Species/Taxa	Functional Group	Sampling Site															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Cladostephus spongiosus</i> Hudson C. Agardh	IIA						4.6	1.6	16.4	7.0	0.7	4.5					
<i>Dasycladus vermicularis</i> Scopoli Krasser	IIA	1.1	4.1	1.9	13.5	22.1	7.3	3.5	1.4	0.5	0.9	2.9	1.0				
<i>Dicyopteris polypodioides</i> A.P.De Candolle J.V.Lamouroux	IIA							0.4	4.6	0.4	2.8	0.8	15.1	0.6			0.6
<i>Dicyota dichotoma</i> Hudson Lamouroux var. <i>dichotoma</i>	IIA	1.1			1.3	0.8	5.9	5.3	0.1	5.7	19.0		3.8	2.1	1.5		
<i>Dicyota mediterranea</i> Schiffner Furnari	IIA	44.1	25.2	31.6	26.8	13.6		4.8	15.5		0.3	1.4	3.4	0.1	0.5	8.1	
<i>Dicyota linearis</i> C. Agardh Greville	IIA					5.8											
<i>Dicyota</i> sp.	IIA			0.1													
<i>Halopteris scoparia</i> Linnaeus Sauvageau	IIA		2.7					1.4	26.8	12.6	74.1	21.2	75.8	1.7			
<i>Hydroclathrus clathratus</i> C. Agardh M.A.Howe	IIA		0.3		0.1							0.4					
<i>Laurencia caduciramulosa</i> Masuda & Kawaguchi	IIA		0.8	0.4													0.1
<i>Laurencia obtusa</i> Hudson Lamouroux	IIA	1.0		0.5		0.1											
<i>Sphacelaria cirrosa</i> Roth C. Agardh	IIA	2.3	2.4	1.4	9.7	9.6	1.3	2.2	4.6	6.6		24.5			0.6		
<i>Sypopodium schimperi</i> Kützing M. Verlaque & Boudouresque	IIA			1.1				0.2	1.3			0.6			0.1		
<i>Cladophora</i> spp. <i>C. laetevirens</i> Dillwyn Kützing + <i>C. nigrescens</i> Zanardini ex Frauenfeld	IIB	0.1	2.2	4.2	9.6	3.6		3.5	5.5	1.7	0.2	5.1	0.7	0.5	8.6	12.9	1.0
<i>Chaetomorpha</i> spp. <i>C. aerea</i> Dillwyn Kützing + <i>C. crassa</i> C. Agardh Kützing	IIB		0.1	0.3		3.9									5.9	4.3	16.7
<i>Chondria dasyphylla</i> Woodward C. Agardh	IIB	0.5					0.3	0.3									
<i>Chondrophyucus</i> cf. <i>glandulifer</i> Kützing Lipkin & Silva	IIB							0.8			0.1						
<i>Chrysophyte</i> sp.	IIB		0.4		0.8		0.3	0.2									
<i>Cyanobacteria</i>	IIB		0.3				0.3				1.3		0.1				
<i>Dasya corymbifera</i> J. Agardh	IIB	2.6	2.0	0.7	1.2	0.8	4.8	1.1	1.0	0.9	1.0	1.0	6.9	0.1	0.3		
<i>Feldmannia irregularis</i> Kützing Hamel	IIB				0.1		6.8	0.8		0.6							

(continued)

Table 1 continued

Species/Taxa	Functional Group	Sampling Site															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Feldmannia simplex</i> P.L.Crouan & H.M.Crouan G.Hamel	IIB					0.2						0.7					
<i>Herposiphonia secunda</i> C.Agardh Ambrogn	IIB	0.1				0.3											
<i>Polysiphonia</i> sp.	IIB					0.9											
<i>Scytosiphon lomentaria</i> Lyngbye Link	IIB								0.6								
<i>Spermothamnion flabellatum</i> Bornet	IIB											0.2					
<i>Ulva</i> spp. <i>U. intestinalis</i> Linnaeus + <i>U. linza</i> Linnaeus	IIB		0.3				0.3	27.9	66.4	3.1							
<i>Wrangellia penicillata</i> C. Agardh C. Agardh	IIB		2.6			2.8								1.2			

Table S2. MALUSI index score for each sampling site indicating anthropogenic impact assessed using various stressors.

Site	Urban codes 11	Commercial & Industrial codes 12, 13	Agriculture codes 21-24	Mariculture	Sediment nutrient release	Sewage outfall	Irregular Fresh Water inputs	Harbour	SUM	Background trophic status	Stability of water column	Confinement	MA-LUSI
Site 1	0	0	1	1	0	2	0	0	4	1	1	1	4
Site 2	0	0	1	1	0	0	0	1	3	1	1	1	3
Site 3	0	0	1	1	0	0	0	1	3	1	1	1	3
Site 4	0	0	1	1	0	0	0	2	4	1	1	1.25	5
Site 5	0	0	1	1	0	0	0	2	4	1	1	1.25	5
Site 6	0	1	1	1	0	0	0	2	5	1	1	1.25	6.25
Site 7	0	1	1	1	0	0	0	2	5	1	1	1.25	6.25
Site 8	0	1	2	1	0	0	0	2	6	1	1	1.25	7.5
Site 9	0	1	2	1	0	0	0	3	7	1	1	1.25	8.75
Site 10	0	1	3	1	0	0	0	3	8	1	1	1.25	10
Site 11	0	1	3	1	0	0	0	3	8	1	1	1.25	10
Site 12	0	1	3	0	0	0	0	3	7	1	1	1.25	8.75
Site 13	0	1	3	1	0	0	0	3	8	1	1	1.25	10
Site 14	0	1	3	1	0	0	0	3	8	1	1	1	8
Site 15	0	1	3	1	0	0	0	3	8	1	1	1	8
Site 16	0	1	3	0	0	0	0	3	7	1	1	1	7