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Data Article

Dataset of seasonal mean volumes of phytoplankton cell size classes in Mediterranean shallow coastal lagoons

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ABSTRACT

In this article, the floristic lists and the seasonal mean cell volumes of phytoplankton taxa observed in three Mediterranean lagoons are reported. These datasets include 40 species, 67 other taxa identified at least at genus level, and further 13 taxa attributed only at order or class level. These data are associated with Pulina et al. "Seasonal variations of phytoplankton size structure in relation to environmental variables in three Mediterranean shallow coastal lagoons" (Pulina et al., 2018) [1], where phytoplankton taxa were included in two different cell size classes (Utermöhl fraction of phytoplankton, cell size $> 3\,\mu m$; Picophytoplankton, cell size $< 3\,\mu m$) and in which their seasonal variations were interpreted and discussed.

Specifications Table

Subject area	Biology
More specific subject area	Phytoplankton ecology
Type of data	Tables, text file

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How data was acquired	Inverted microscope (Zeiss, Axiovert 25), epifluorescence microscope (Zeiss, Axiovert 100)
Data format	Analyzed
Experimental factors	Water samples were collected and immediately fixed in 2% acid Lugol's solution and in 2% formaldehyde for microscopic analyses
Experimental features	Phytoplankton cells were identified at microscope and measured with a manual micrometer. Cell volumes were calculated approximating the shape of each taxon to known solids or to solid compositions and applying the corresponding calculation formula
Data source location	University of Sassari, Sassari, Italy
Data accessibility	Data is with this article
Related research article	S. Pulina, C.T. Satta, B.M. Padedda, N. Sechi, A. Lugliè, Seasonal variations of phytoplankton size structure in relation to environmental variables in three Mediterranean shallow coastal lagoons, Estuar Coast Shelf Sci [1].

Value of the data

- Seasonal mean volumes of taxa from two different phytoplankton size classes were shown for the first time for Mediterranean transitional ecosystems.
- Floristic lists reported improve the overview on phytoplankton biodiversity in transitional ecosystems worldwide.
- The data presented can be compared to those of other transitional ecosystems worldwide for further insights on effects of seasonal environmental variations on phytoplankton size structure.

1. Data

In this paper, we report phytoplankton floristic lists and mean cell volumes from three shallow costal lagoons located in north west Mediterranean Sea: Calich (CA), Santa Giusta (SG) and Corru S'Ittiri (CI) lagoons (Sardinia, Italy) [2] (Tables 1–3). These datasets include information on 40 species (10 species in CA, 19 in SG and 23 in CI), 67 taxa identified at least at genus level (25 genera in CA, 30 in SG and 35 in CI), and further 13 taxa attributed only at order or class level (6 taxa in CA, 9 in SG and 7 in CI). These data are associated with Pulina et al. "Seasonal variations of phytoplankton size structure in relation to environmental variables in three Mediterranean shallow coastal lagoons" [1]. Two cell size classes were considered, Utermöhl fraction of phytoplankton (UFP, cell size $> 3\,\mu m$) and picophytoplankton (Pico, cell size $< 3\,\mu m$). For each site, seasonal mean cell volume of every taxon observed was reported to show seasonal variation in values. The means were accompanied by standard deviations of different sampling stations in each lagoon and different months in each season.

2. Experimental design, materials and methods

Monthly samplings were performed from May 2011 to April 2012 in the three lagoons. Water was collected from superficial layers ($-$ 0.20 m) in different sampling stations (3 in CA and CI, 5 in SG) located following the salinity gradient in each site. Part of samples was immediately fixed with a 2% acid Lugol's solution for UFP analyses, and with 2% formaldehyde for Pico analyses.

Lugol fixed samples were prepared according to Utermöhl tecnique [3] and were observed with an inverted microscope (Zeiss, Axiovert 25), using 100X and 200X of magnifications for the smaller UFP species, and 400X for the larger ones. UFP species were identified observing both fresh and fixed samples, following the taxonomic guides listed in Ref. [4]. Flagellate and not flagellate cells from 5 to

Table 1
Mean volume (V, μm^3) and standard deviation (SD) of Uthermöhl fraction of phytoplankton and picophytoplankton taxa observed in Calich Lagoon during the study period (- = the taxon has been observed once). BAC, Bacillariophyceae; CHL, Chlorophyceae; CHR, Chrysophyceae; CRY, Cryptophyceae; CYA, Cyanophyceae; DIC, Dictyochophyceae; DIN, Dinophyceae; EUG, Euglenophyceae; PRA, Prasinophyceae; RAP, Raphidophyceae; FLA, Flagellates; PICO, picophytoplankton.

		Summer		**Autumn**		**Winter**		**Spring**	
		V	SD	*V*	SD	*V*	SD	*V*	SD
BAC	*Asterionella formosa* Hassall					1274	–		
BAC	*Cerataulina pelagica* (Cleve) Hendey					13,528	–		
BAC	*Chaetoceros peruvianus* Brightwell					524	–		
BAC	*Chaetoceros* sp.	21	–	697	–	3414	–	144	–
BAC	*Cyclotella* sp. 1	152	–						
BAC	*Cyclotella* sp. 2	70	12			30	–	48	36
BAC	*Cylindrotheca closterium* (Ehrenberg) Reimann & J.C. Lewin	114	–						
BAC	*Dactyliosolen* sp.					16,934	–		
BAC	*Diploneis* sp.					14,977	–		
BAC	*Leptocilindrus danicus* Cleve					2842	–		
BAC	*Licmophora* sp.							13,930	–
BAC	*Nitzschia* sp.					389	–		
BAC	*Pseudo-nitzschia* spp.					1123	–		
BAC	*Rhizosolenia setigera* Brightwell					4786	–		
BAC	*Rhizosolenia* sp.	2085	–						
BAC	*Skeletonema* sp. 1	198	–	228	–	207	227	153	148
BAC	*Skeletonema* sp. 2	63	–	111	–			278	–
BAC	*Synedra* sp.							2958	–
BAC	*Thalassionema nitzschioides* (Grunow) Mereschkowsky			11,546	–	327	–		
BAC	*Thalassiosira* sp.	866	68	914	–				
BAC	Pennales undetermined	513	46			724	–	1919	2089
CHL	*Carteria* sp.	88	64	65	–	63	2	65	19
CHL	*Chlamydomonas* sp.			315	–				
CHR	Chrysophyceae undetermined	224	–						
CRY	*Hemiselmis* sp.	9	6	26	–			15	–
CRY	Cryptophyceae undetermined	165	153	265	127	130	35	219	25
CYA	*Aphanizomenon* sp.							26	–
CYA	*Spirulina* sp.							4	–
CYA	Oscillatoriales undetermined			43	–				
DIC	*Apedinella* sp.					175	67	174	–
DIN	*Heterocapsa* sp.			307	–	233	–		
DIN	*Kryptoperidinium foliaceum* (F. Stein) Lindemann			6593	21	7044	2514	5189	121
DIN	*Prorocentrum micans* Ehrenberg							6367	–
DIN	*Prorocentrum* spp.	3062	–					942	–
DIN	*Peridinium quinquecorne* Abé	3640	1057					1564	–
DIN	*Scrippsiella* sp.							3757	–
DIN	Dinophyceae undetermined	1192	496	290	–			2451	95
EUG	Euglenophyceae undetermined							1757	1433
PRA	*Pyramimonas* sp.					103	35		
PRA	*Tetraselmis* sp.	75	23			87	0	66	30
RAP	*Heterosigma* sp.							1362	–
FLA	Flagellates	38	21	144	77	130	55	100	116
PICO	Picocyanobacteria	1.96	0.62	0.72	0.11	0.57	0.14	0.46	0.12
PICO	Picoeukariotes							0.34	0.07

20 μm in size, not identified at least at class level, were grouped as Flagellates and Nanoplankton, respectively. For each sample, at least 20 randomly selected cells of each taxon were measured with a manual micrometer. Mean cell volume of each taxon was obtained associating its shape to a known solid or to a solid composition and applying the corresponding calculation formula [5].

Formaldehyde fixed samples were filtered onto 0.2-μm black-stained polycarbonate membranes (Nucleopore) to observe Pico with a microscope (Zeiss, Axiovert 100) equipped with green (BP520–560 nm/FT580 nm/LP590 nm) and blue (BP450–490 nm/FT510 nm/LP520 nm) filters set. For

Table 2
Mean volume (V, μm^3) and standard deviation (SD) of Uthermöhl fraction of phytoplankton and picophytoplankton taxa observed in Santa Giusta Lagoon during the study period (– = the taxon has been observed once). BAC, Bacillariophyceae; CHL, Chlorophyceae; CHR, Chrysophyceae; CRY, Cryptophyceae; CYA, Cyanophyceae; DIC, Dictyochophyceae; DIN, Dinophyceae; EUG, Euglenophyceae; PRA, Prasinophyceae; RAP, Raphidophyceae; FLA, Flagellates; NAN, Nanoplankton; PICO, picophytoplankton.

		Summer		Autumn		Winter		Spring	
		V	SD	*V*	SD	*V*	SD	*V*	SD
BAC	*Biddulphia* cf. *antediluviana* (Ehrenberg) Van Heurck	246,274	–						
BAC	*Cerataulina* sp.							34,127	–
BAC	*Chaetoceros curvisetus* Cleve							62	–
BAC	*Chaetoceros* spp.			184	–			139	134
BAC	*Cyclotella* sp.	17	7	46	44			44	44
BAC	*Cylindrotheca closterium* (Ehrenberg) Reimann & J. C. Lewin	107	46	42	–	212	0	36	18
BAC	*Guinardia striata* (Stoltherfoth) Hasle	8831	–						
BAC	*Leptocylindrus* sp.							654	0
BAC	*Licmophora* sp.			7293	683	7720	–		
BAC	*Nitzschia* sp.	2072	–					1268	888
BAC	*Pleurosigma/ Gyrosigma* sp.	12,953	–	66,382	75,560			250,501	–
BAC	*Pseudo-nitzschia* sp.	170	–	170	–			260	269
BAC	*Rhizosolenia* sp.			13,620	–			4661	1041
BAC	*Skeletonema* sp.					147	–	71	–
BAC	*Striatella* sp.			63,016	–			62,724	–
BAC	*Synedra* sp.	44,438	–	101,750	99,349	172,000	–		
BAC	*Tabellaria* sp.					7546	–	2044	–
BAC	*Tenuicylindrus belgicus* (Meunier) D. Nanjappa & A. Zingone							147	–
BAC	*Thalassionema* sp.	745	–						
BAC	*Thalassiosira* sp.							956	–
BAC	Pennales undetermined 1	2012	553	5273	5896	23,617	–		
BAC	Pennales undetermined 2	49	34	21	10			46	61
CHL	*Carteria* sp.			28	–			38	22
CHL	*Crucigenia tetrapedia* (Kirchner) Kuntze							8	–
CHL	*Monoraphydium* sp. 1			12	–			35	–
CHL	*Monoraphydium* sp. 2	20	–	12	4	20	–	18	–
CHL	*Monoraphydium* sp. 3			17	–				
CHL	*Oocystis* sp.	15	1	13	–			15	9
CHL	*Pediastrum duplex* Meyen							8	–
CHL	Chlorophyceae undetermined	481	153			66	–	300	274
CRY	Cryptophyceae undetermined	51	15	55	6	49	6	89	44
CYA	*Aphanizomenon* sp.							48	51
CYA	Nostocales undetermined	38	40					41	–
CYA	Oscillatoriales undetermined	14	–					201	–

DIC	*Apedinella* sp.	66	–			53	–	101	5
DIN	*Akashiwo sanguinea* (K. Hirasaka) G. Hansen & Moestroup	8341	3419	14,364	–			12,291	8378
DIN	*Alexandrium* sp. 1	6455	657						
DIN	*Alexandrium* sp. 2			16,689	–				
DIN	*Dinophysis* cf. *acuminata* Claparède & Lachmann			6449	–			6264	320
DIN	*Gonyaulax* sp.	7533	–	11,484	–				
DIN	*Gyrodinium impudicum* S. Fraga & I. Bravo	2665	535					3429	2463
DIN	*Heterocapsa* cf. *rotundata* (Lohmann) G. Hansen	136	60	112	78	102	46	89	11
DIN	*Levanderina fissa* (Levander) Moestrup, Hakanen, G. Hansen, N. Daugbjerg & M. Ellegaard	4495	0					11,083	–
DIN	*Peridinium quinquecorne* Abé							1206	–
DIN	*Prorocentrum arcuatum* Issel							6632	–
DIN	*Prorocentrum cordatum* (= *Prorocentrum minimum*) (Ostenfeld) J.D. Dodge	351	–	1013	–	1013	–	1792	–
DIN	*Prorocentrum micans* Ehrenberg			3919	0			4407	1539
DIN	*Prorocentrum triestinum* J. Schiller	243	64	338	0			154	57
DIN	*Prorocentrum* spp.							2747	–
DIN	*Pyrophacus* sp.	16,245	0						
DIN	*Scrippsiella* spp.	5076	2128	3640	1736	12,592	–	3846	172
DIN	Dinophyceae undetermined 1	3623	5925	324	69	1631	–	2011	1171
DIN	*Tripos fusus* (= *Ceratium fusus*) (Ehrenberg) F.Gómez	6514	–						
DIN	*Tripos* sp.							20,991	–
DIN	Dinophyceae undetermined 2	3479	–			4178	–	2914	944
EUG	*Eutreptiella* sp.	2538	0	950	–	950	–	778	916
PRA	Prasinophyceae undetermined	43	32	108	32	73	–	81	21
RAP	*Chattonella subsalsa* B. Biecheler	1900	–						
FLA	Flagellates	79	19	110	72	79	11	70	37
NAN	Nanoplancton	13	1	20	–	38	–	28	18
PICO	Picocyanobacteria	0.83	0.35	0.62	0.11	0.57	0.10	0.80	0.34
PICO	Picoeukariotes	1.62	1.34	1.59	0.21			1.89	0.30

Table 3
Mean volume (V, μm^3) and standard deviation (SD) of Uthermöhl fraction of phytoplankton and picophytoplankton taxa observed in Corru S'Ittiri Lagoon during the study period (- = the taxon has been observed once). BAC, Bacillariophyceae; CHL, Chlorophyceae; CHR, Chrysophyceae; CRY, Cryptophyceae; CYA, Cyanophyceae; DIC, Dictyochophyceae; DIN, Dinophyceae; EUG, Euglenophyceae; PRA, Prasinophyceae; RAP, Raphidophyceae; FLA, Flagellates; PICO, picophytoplankton.

		Summer		**Autumn**		**Winter**		**Spring**	
		V	SD	*V*	SD	*V*	SD	*V*	SD
BAC	*Amphiprora* spp.	11,038	3740						
BAC	*Amphora* sp.	4329	255					6857	–
BAC	*Chaetoceros minimus* (Levander) D. Marino et al.							231	–
BAC	*Chaetoceros* spp.	132	139	2273	0			145	121
BAC	*Chaetoceros tenuissimus* Meunier	231	0					231	–
BAC	*Cyclotella* sp.	57	0	57	–		–	57	–
BAC	*Cylindrotheca closterium* (Ehrenberg) Reimann & J.C. Lewin	230	249	793	548	415	243	555	–
BAC	*Cocconeis* sp.	833	0	833	–			971	–
BAC	*Diploneis* sp.	14,977	–						
BAC	*Fragilaria* sp.	492	0	492	–			492	–
BAC	*Grammatophora* sp.	2007	0					2244	–
BAC	*Licmophora* sp.	4348	–			9139	6776		
BAC	*Navicula* spp.	345	92	395	12	708	–	498	128
BAC	*Nitzschia* cf. *sigma* (Kützing) W. Smith	417	–					939	–
BAC	*Nitzschia longissima* (Brébisson) Ralfs	822	0	822	–			822	–
BAC	*Nitzschia* spp.	349	0	585	334	1316	1577	349	–
BAC	*Pleurosigma/ Gyrosigma* sp.	38,244	27,533	47,286	–				
BAC	*Pseudo-nitzschia* sp.	140	51	296	137	156	–	110	–
BAC	*Rhizosolenia setigera* Brightwell	2146	1374	998	766	324	–	2728	1420
BAC	*Skeletonema* sp.					152	–		
BAC	*Synedra* sp.	8233	9080	2828	–	99	–	7194	–
BAC	*Thalassiosira* sp.					3683	–		
BAC	Pennales undetermined	363	–			1332	113	542	252
CHL	*Carteria* sp.	73	74	158	0			62	26
CHL	*Chlorella* sp.	39	0	31	–			40	–
CHL	*Dictyospherium pulchellum* H. C. Wood	113	–						
CHL	*Kirchneriella* sp.	15	0	19	–			17	–
CHL	*Monoraphidium minutum* (Nägeli) Komárková-Legnerová			11	–				
CHL	*Monoraphidium arcuatum* (Korshikov) Hindák			20	1				
CHL	*Pediastrum boryanum* (Turpin) Meneghini	77	–						
CHL	*Pediastrum tetras* (Ehrenberg) Ralfs			77	–				
CHL	*Scenedesmus* spp.	207	0	158	69	69	–		
CHL	*Tetraedron minimum* (A. Braun) Hansgirg			361	–				
CHR	*Kephyrion* sp.	36	–	40	–			32	–
CHR	Chrysophyceae undetermined	56	34	37	–			2477	–

CRY	*Cryptomonas* sp.	526	275					721	–
CRY	*Plagioselmis* sp.	37	8	44	–			44	–
CRY	Cryptophyceae undetermined	35	8	139	138	140	58	47	3
CYA	*Anabaena* sp.	87	0					76	16
CYA	*Anabenopsis* sp.	58	0	58	–				
CYA	*Chroococcus* sp.	31	13	24	–				
CYA	*Pseudanabaena* sp.	10	7	11	5			4	–
CYA	Oscillatoriales undetermined	37	0	37	–			37	–
DIC	*Apedinella* sp.			218	2	220	–		
DIN	*Akashiwo sanguinea* (K. Hirasaka) G. Hansen & Moestroup	8537	0	12,291	8378	8537	–	8341	3419
DIN	*Alexandrium minutum* Halim	6141	0						
DIN	*Alexandrium* sp.	5672	0						
DIN	*Bysmatrum* sp.	2449	–						
DIN	*Dinophysis* cf. *acuminata* Claparède & Lachmann	3956	1040	6726	2295	8348	921	7523	–
DIN	*Gonyaulax spinifera* (Claparède & Lachmann) Diesing	13,582	0					13,582	–
DIN	*Gymnodinium litoralis* A. Reñé	1474	192	1593	–			2174	562
DIN	*Gymnodinium* sp.	980	351					1165	–
DIN	*Heterocapsa* sp.	371	57	319	21	164	50	813	–
DIN	*Peridinium quinquecorne* Abé	3543	963	5605	1345	4850	–	4719	798
DIN	*Prorocentrum cordatum* (= *Prorocentrum minimum*) (Ostenfeld) J.D. Dodge	569	0						
DIN	*Prorocentrum micans* Ehrenberg	3881	464					6367	–
DIN	*Prorocentrum triestinum* J. Schiller	821	119	334	143			1072	22
DIN	*Prorocentrum* sp.	6214	–					6214	–
DIN	*Scrippsiella* spp.	3393	202	4331	998	3908	–	5044	–
DIN	Dinophyceae undetermined	4629	311	4954	–	4601	–	332	–
EUG	*Eutreptiella marina* da Cunha	668	306					999	–
EUG	Euglenophyceae undetermined	1076	647	1421	–			1965	–
PRA	*Tetraselmis* sp.					59	32	80	–
PRA	Prasinophyceae undetermined	62	22	38	–			78	–
RAP	*Chattonella subsalsa* B. Biecheler	3185	0					2820	–
FLA	Flagellates	265	69	173	22			386	–
PICO	Picocyanobacteria	1.06	0.40	0.99	0.57	0.79	0.55	0.52	0.21
PICO	Picoeukariotes			0.71	0.16	1.52	0.11	0.77	0.22

each sample, about 200 randomly selected cells of each group (autotrophic picocyanobacteria and autotrophic picoeukaryotes) were measured with a manual micrometer. Mean volume was calculated assuming the shape of cell spherical or cylindrical with hemispheric ends, using the formulas described in [6].

Transparency document. Supplementary material

Transparency document associated with this article can be found in the online version at https://doi.org/10.1016/j.dib.2018.08.001.

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