

Supplementary Tables

Supplementary Table S1. List of strains isolated during the MALINA cruise and deposited to the Roscoff Culture Collection (RCC). Cultures were enriched by either Tangential Flow Filtration (TFF) or dilution into sterile medium. Flow Cytometry Sorting targets were mostly defined on cytograms of side scatter (a function of cell size) vs. red fluorescence (a function of chlorophyll content). Size corresponds to average cell diameter of the cultures.

Division	Class	Order	Putative identification	RCC #	Strain name	Lost	Enrichment step*	Isolation technique	Purified by single CTD	Station	Depth	Size (µm)	Morphology	Partial 18S *	full 18S	28S	ITS	
Alveolata	Dinophyceae	Lophodiales	<i>Baccharera cincta</i>	2013	MALINA FT56.6 PG2		TFF concentrated	Micropipette	1 F/2	56	110 3 m		15 LM, SEM, TEM		JF784059		JQ413373	
Alveolata	Dinophyceae	Lophodiales	<i>Baccharera cincta</i>	2013	MALINA FT56.6 PG8	yes	TFF concentrated	Micropipette	1 F/2	56	110 3 m			Z20044543	JN934687		JQ413374	
Chlorophyta	Chlorophyceae	Volvocales	<i>Carneria</i> sp.	2487	MALINA FT99.6 PG8		TFF concentrated	Micropipette	1 F/2	39	620 3 m		20 LM		JN934685			
Chlorophyta	Chlorophyceae	Volvocales	<i>Chlamydomonas</i> sp. I	2488	MALINA FT89.6 PG5		TFF concentrated	Micropipette	1 K/2	89	670 3 m		10 LM		JN934686			
Chlorophyta	Chlorophyceae	Volvocales	<i>Chlamydomonas</i> sp. II	2041	MALINA FT34.3 PG2		TFF concentrated	Micropipette	1 K/2	35	680 40 m		15 LM		JN934674			
Chlorophyta	Chlorophyceae	Volvocales	<i>Chlamydomonas</i> sp. II	2512	MALINA FT34.3 PG4		TFF concentrated	Micropipette	1 K/2	35	680 40 m			Z20044526			Z20044994	
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2259	MALINA S666		Pico sorting	Pico sorting	200 K/2	191	236 3 m			Z20044411			Z20045002	
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2310	MALINA S664		Pico sorting	Pico sorting	200 K/2	191	236 3 m			Z20044437			Z20044995	
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Bathycoccus prasinos</i>	2318	MALINA S625	yes	Pico sorting	Pico sorting	200 K/2	125	345 70 m				JF784058			
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2318	MALINA S625		Pico sorting	Pico sorting	100 K/2	125	345 70 m			Z20044561			Z20045007	
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2307	MALINA S544		Nano sorting	Pico sorting	20 K/2	38	394 3 m			Z20044271				
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2307	MALINA S544		Pico sorting	Pico sorting	20 K/2	145	430 65 m			Z20044429				
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2317	MALINA S596C		Pico sorting	Pico sorting	100 K/2	138	430 65 m			Z20044521			Z20045008	
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2308	MALINA S623		Pico sorting	Pico sorting	20 K/2	145	460 56 m		2 LM		JN934683			
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2309	MALINA S625		Pico sorting	Pico sorting	100 K/2	145	460 56 m			Z20044531				
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2309	MALINA S625		Pico sorting	Pico sorting	100 K/2	145	460 56 m			Z20044436				
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2514	MALINA S664	yes	Pico sorting	Pico sorting	100 K/2	134	540 70 m			Z20044561				
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2263	MALINA S463		Pico sorting	Pico sorting	5000 K/2	99	620 0 m		2 LM				Z20044988	
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2264	MALINA S464		Pico sorting	Pico sorting	5000 K/2	99	620 3 m			Z20044372			Z20044989	
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2311	MALINA FT93.1P1		TFF concentrated	Pico sorting	800 K/2	99	620 65 m			Z20044416				
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2314	MALINA S448		Pico sorting	Pico sorting	1000 K/2	99	620 65 m			Z20044515			Z20045005	
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2314	MALINA S448	yes	Pico sorting	Pico sorting	5000 K/2	99	620 3 m			Z20044373				
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2314	MALINA S448		Pico sorting	Pico sorting	5000 K/2	99	620 3 m			Z20044374				
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2314	MALINA S466		Pico sorting	Pico sorting	5000 K/2	99	620 3 m			Z20044404				
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2314	MALINA S466	yes	Pico sorting	Pico sorting	5000 K/2	99	620 65m			Z20044404				
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2312	MALINA S412		Pico sorting	Pico sorting	10000 K/2	89	670 70 m			Z20044510			Z20045003	
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2313	MALINA S413		Pico sorting	Pico sorting	10000 K/2	89	670 70 m			Z20044511			Z20045004	
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2291	MALINA S172		Pico sorting	Pico sorting	20 K/2	31	690 3 m			Z20044357			Z20044986	
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2292	MALINA S493		Pico sorting	Pico sorting	5000 K/2	106	760 3 m			Z20044377			Z20044990	
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2296	MALINA S494		Pico sorting	Pico sorting	5000 K/2	106	760 3 m		2 LM				Z20044991	
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2297	MALINA S609		Pico sorting	Pico sorting	100 K/2	106	760 3 m			Z20044388			JQ413367	
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2298	MALINA S643		Pico sorting	Pico sorting	100 K/2	106	760 3 m			Z20044362			Z20044992	
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2304	MALINA S479		Pico sorting	Pico sorting	10000 K/2	106	760 70 m			Z20044421				
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2305	MALINA S482		Pico sorting	Pico sorting	10000 K/2	106	760 70 m			Z20044428				
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2315	MALINA S484		Pico sorting	Pico sorting	10000 K/2	106	760 70 m			Z20044570			Z20045006	
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2315	MALINA S484	yes	Pico sorting	Pico sorting	5000 K/2	106	760 3 m			Z20044378				
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2315	MALINA S484		Pico sorting	Pico sorting	5000 K/2	106	760 3 m			Z20044379				
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2292	MALINA E31.N1		Medium enrichment (ESM2 + Ge)	Nano sorting	5000 K/2	106	760 3 m		2 LM					JQ413366
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2292	MALINA E31.N1		Medium enrichment (ESM2 + Ge)	Micro sorting	400 K/2	106	760 3 m			Z20044478			Z20044985	
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2243	MALINA S88		Pico sorting	Pico sorting	20 K/2	20	620 0 m		2 LM				Z20044983	
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2244	MALINA S89		Pico sorting	Pico sorting	20 K/2	20	620 0 m			Z20044348				
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2244	MALINA S89	yes	Pico sorting	Pico sorting	20 K/2	20	620 0 m			Z20044348			Z20044982	
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2245	MALINA S109		Pico sorting	Pico sorting	20 K/2	20	620 0 m			Z20044355			Z20044984	
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2245	MALINA S110		Pico sorting	Pico sorting	20 K/2	20	620 0 m		2 LM					
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2247	MALINA S115		Pico sorting	Pico sorting	20 K/2	20	620 0 m			Z20044392				
Chlorophyta	Mamiellophyceae	Mamielliales	Undescribed Mamiellophyceae	2285	MALINA E43.N1		Medium enrichment (ESM2 + Ge)	Nano sorting	2000 K/2	106	760 3 m		LM		JF784053			JQ413368
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2248	MALINA S126		Pico sorting	Pico sorting	20 K/2	20	620 0 m			Z20044480			Z20044986	
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2249	MALINA S130		Pico sorting	Pico sorting	20 K/2	20	620 0 m			Z20044354				
Chlorophyta	Mamiellophyceae	Mamielliales	Undescribed Mamiellophyceae	2288	MALINA E47.P2		Pico sorting	Pico sorting	20000 K/2	106	760 3 m		4 LM		JN934679			JQ413369
Chlorophyta	Mamiellophyceae	Mamielliales	Undescribed Mamiellophyceae	2407	MALINA E47.P1		Medium enrichment (JM2 + Ge)	Pico sorting	2000 K/2	106	760 3 m			Z20044402			JQ413370	
Chlorophyta	Mamiellophyceae	Mamielliales	<i>Arctic Micromonas</i>	2242	MALINA S51		Pico sorting	Pico sorting	20 K/2	20	620 0 m			Z20044369				
Chlorophyta	Nephroselmoidophyceae	Nephroselmoidales	<i>Nephroselmis pyriformis</i>	2490	MALINA E28.N1.P20C6		Medium enrichment (K2 + Ge)	Pico sorting	1 K/2	yes	BER100709.0 0 m		4 LM				JN934688	
Chlorophyta	Nephroselmoidophyceae	Nephroselmoidales	<i>Nephroselmis pyriformis</i>	2490	MALINA E28.N1.P20C7		Medium enrichment (K2 + Ge)	Pico sorting	1 K/2	yes	BER100709.0 0 m		3 LM					JF784048
Chlorophyta	Nephroselmoidophyceae	Nephroselmoidales	<i>Nephroselmis pyriformis</i>	2490	MALINA E28.N1.P20C8		Medium enrichment (K2 + Ge)	Pico sorting	1 K/2	yes	BER100709.0 0 m		4 LM					JN934670
Chlorophyta	Prasinophyceae	Pyramimonadales	<i>Pyramimonas</i> sp. II	2015	MALINA FT56.6 PG4		TFF concentrated	Micropipette	1 F/2	56	110 3 m		9 LM					
Chlorophyta	Prasinophyceae	Pyramimonadales	<i>Pyramimonas</i> sp. II	2047	MALINA FT56.6 PG5		TFF concentrated	Micropipette	1 F/2	56	110 3 m			Z20044506				
Chlorophyta	Prasinophyceae	Pyramimonadales	<i>Pyramimonas</i> sp. III	1987	MALINA FT42.3 PG8		TFF concentrated	Micropipette	1 F/2	42	280 30 m							
Chlorophyta	Prasinophyceae	Pyramimonadales	<i>Pyramimonas</i> sp. II	2048	MALINA FT99.6 PG4		TFF concentrated	Micropipette	1 F/2	56	620 3 m			Z20044508				
Chlorophyta	Prasinophyceae	Pyramimonadales	<i>Pyramimonas</i> sp. II	2502	MALINA FT99.6 PG6		TFF concentrated	Micropipette	1 F/2	39	620 3 m			Z20044421				
Chlorophyta	Prasinophyceae	Pyramimonadales	<i>Pyramimonas</i> sp. IV	2500	MALINA E62.P1		Medium enrichment (F2)	Micropipette	1 F/2	31	690 29 m		6 LM		JN934689			
Chlorophyta	Prasinophyceae	Pyramimonadales	<i>Pyramimonas</i> sp. IV	2501	MALINA E62.P5		Medium enrichment (F2)	Micropipette	1 F/2	31	690 29 m		5 LM					
Chlorophyta	Prasinophyceae	Pyramimonadales	<i>Pyramimonas</i> sp. I	2009	MALINA FT161.6.P1		TFF concentrated	Micropipette	1 K/2	106	760 3 m		7 LM		JF784047			
Chlorophyta	Prasinophyceae	Pyramimonadales	<i>Pyramimonas</i> sp. II	2296	MALINA E36.2.P18.E8		Medium enrichment (K2 + Ge)	Pico sorting	1 K/2	yes	ARC120709.0 0 m			Z20044489				
Chlorophyta	Prasinophyceae	Pyramimonadales	<i>Pyramimonas</i> sp. II	2297	MALINA E36.2.P18.F10		Medium enrichment (K2 + Ge)	Pico sorting	1 K/2	yes	ARC120709.0 0 m			Z20044489			Same as above	
Chlorophyta	Prasinophyceae	Pyramimonadales	<i>Pyramimonas</i> sp. II	2296	MALINA E43.MP18D1		Medium enrichment (K2 + Ge)	Micro sorting	1 K/2	yes	BEA130709.0 0 m		8 LM					
Cryptophyta	Cryptophyceae	Rhodomonadales	<i>Rhodomonas</i> sp.	2044	MALINA FT42.3 PG12		TFF concentrated	Micropipette	1 F/2	42	280 30 m		15 LM					
Cryptophyta	Cryptophyceae	Rhodomonadales	<i>Rhodomonas</i> sp.	2045	MALINA FT42.3 PG13		TFF concentrated	Micropipette	1 F/2	42	280 30 m			Z20044470				
Cryptophyta	Cryptophyceae	Rhodomonadales	<i>Rhodomonas</i> sp.	2503	MALINA FT99.6 PG7		TFF concentrated	Micropipette	1 F/2	39	620 3 m			Z20044567				
Cryptophyta	Cryptophyceae	Rhodomonadales	<i>Rhodomonas</i> sp.	2019	MALINA FT34.4 PG1		TFF concentrated	Micropipette	1 F/2	35	680 3 m		12 LM					
Cryptophyta	Cryptophyceae	Rhodomonadales	<i>Rhodomonas</i> sp.	2020	MALINA FT34.4 PG2		TFF concentrated	Micropipette	1 F/2	35	680 3 m		15 LM				JN934672	
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926 **List of Supplementary Figures**

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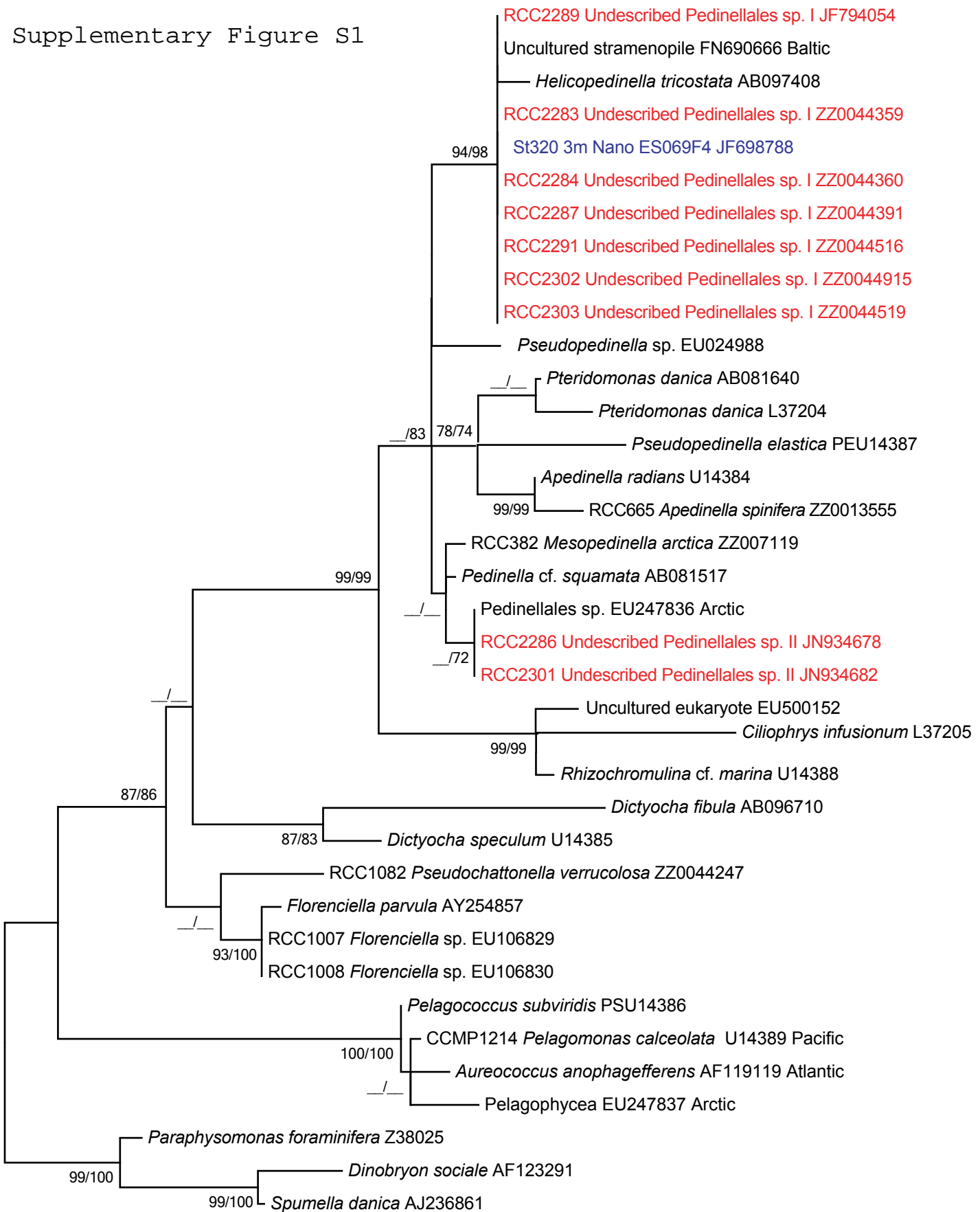
929 **Supplementary Figure S1.** Phylogenetic tree of the partial 18S rRNA gene sequence for the
930 Pedinellales strains isolated during the MALINA cruise. 434 unambiguously aligned
931 positions were considered from an alignment of 37 nucleotide sequences. The evolutionary
932 history was inferred by using the Maximum Likelihood method based on the Kimura 2-
933 parameter model (Nei and Kumar, 2000). Please note that the sequences with a code starting
934 with ZZ are not available in the Genbank but are deposited in the RCC database and available
935 at <http://www.sb-roscoff.fr/Phyto/RCC>. The tree with the highest log likelihood (-2090.1471)
936 is shown. The percentage of trees in which the associated taxa clustered together is shown
937 next to next to the branches from left (ML, 1000 replicates) to right (NJ, 1000 replicates).
938 Initial tree(s) for the heuristic search were obtained automatically as follows. A discrete
939 Gamma distribution was used to model evolutionary rate differences among sites [5
940 categories (+G, parameter = 0.4258)]. The tree is drawn to scale, with branch lengths
941 measured in the number of substitutions per site. Evolutionary analyses were conducted in
942 MEGA5 (Tamura 2011). The tree was rooted with Chrysophyceae (*Paraphysomonas*
943 *foraminifera*, *Dinobryon sociale* and *Spumella danica*) as outgroups. The tree has been edited
944 and includes ML and NJ bootstrap values as described in Figure 2.

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946 **Supplementary Figure S2.** Rarefaction curve for the strains isolated during the Leg 2b of the
947 MALINA cruise indicating the number of distinct genotypes found as function of the number
948 of strains sequenced. The curve is based on partial 18S rRNA gene sequences.

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Supplementary Figure S1



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Supplementary Figure S2

