

## 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>Carnaria</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                 | 106     | 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 |     |               | Z20045000 |
| Chlorophyta | Mamiellophyceae       | Mamielliales      | <i>Arctic Micromonas</i>       | 2309  | MALINA S625          |      | Pico sorting                  | Pico sorting        | 100 K/2                | 145     | 460 56 m |           |                 | Z20044531      |          |     | JQ413371      |           |
| 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>       | 2252  | MALINA E31.N1        |      | Medium enrichment (ESM2 + Ge) | Nano sorting        | 5000 K/2               |         | 1070 0 m |           | 2 LM            |                |          |     | JQ413366      |           |
| Chlorophyta | Mamiellophyceae       | Mamielliales      | <i>Arctic Micromonas</i>       | 2262  | MALINA E31.M1        |      | Medium enrichment (ESM2 + Ge) | Micro sorting       | 400 K/2                |         | 1070 0 m |           |                 | Z20044478      |          |     | Z20044985     |           |
| Chlorophyta | Mamiellophyceae       | Mamielliales      | <i>Arctic Micromonas</i>       | 2243  | MALINA S88           |      | Pico sorting                  | Pico sorting        | 20 K/2                 |         | 1070 0 m |           |                 | Z20044381      |          |     | Z20044983     |           |
| Chlorophyta | Mamiellophyceae       | Mamielliales      | <i>Arctic Micromonas</i>       | 2244  | MALINA S89           |      | Pico sorting                  | Pico sorting        | 20 K/2                 |         | 1070 0 m |           | 2 LM            |                |          |     |               |           |
| Chlorophyta | Mamiellophyceae       | Mamielliales      | <i>Arctic Micromonas</i>       | 2244  | MALINA S89           | yes  | Pico sorting                  | Pico sorting        | 20 K/2                 |         | 1070 0 m |           |                 | Z20044381      |          |     | Z20044983     |           |
| Chlorophyta | Mamiellophyceae       | Mamielliales      | <i>Arctic Micromonas</i>       | 2245  | MALINA S109          |      | Pico sorting                  | Pico sorting        | 20 K/2                 |         | 1070 0 m |           |                 | Z20044382      |          |     | Z20044982     |           |
| Chlorophyta | Mamiellophyceae       | Mamielliales      | <i>Arctic Micromonas</i>       | 2245  | MALINA S109          |      | Pico sorting                  | Pico sorting        | 20 K/2                 |         | 1070 0 m |           |                 | Z20044355      |          |     | Z20044984     |           |
| Chlorophyta | Mamiellophyceae       | Mamielliales      | <i>Arctic Micromonas</i>       | 2246  | MALINA S110          |      | Pico sorting                  | Pico sorting        | 20 K/2                 |         | 1070 0 m |           | 2 LM            |                |          |     |               |           |
| Chlorophyta | Mamiellophyceae       | Mamielliales      | <i>Arctic Micromonas</i>       | 2247  | MALINA S115          |      | Pico sorting                  | Pico sorting        | 20 K/2                 |         | 1070 0 m |           |                 | Z20044392      |          |     |               |           |
| Chlorophyta | Mamiellophyceae       | Mamielliales      | Undescribed Mamiellophyceae    | 2285  | MALINA E43.N1        |      | Medium enrichment (ESM2 + Ge) | Nano sorting        | 2000 K/2               |         | 1070 0 m |           | LM              |                | JF784053 |     | JQ413368      |           |
| Chlorophyta | Mamiellophyceae       | Mamielliales      | <i>Arctic Micromonas</i>       | 2248  | MALINA S126          |      | Pico sorting                  | Pico sorting        | 20 K/2                 |         | 1070 0 m |           |                 | Z20044480      |          |     | Z20044986     |           |
| Chlorophyta | Mamiellophyceae       | Mamielliales      | <i>Arctic Micromonas</i>       | 2249  | MALINA S130          |      | Pico sorting                  | Pico sorting        | 20 K/2                 |         | 1070 0 m |           |                 | Z20044354      |          |     |               |           |
| Chlorophyta | Mamiellophyceae       | Mamielliales      | Undescribed Mamiellophyceae    | 2288  | MALINA E47.P2        |      | Pico sorting                  | Pico sorting        | 20000 K/2              |         | 1070 0 m |           | 4 LM            |                | JN934679 |     | JQ413369      |           |
| Chlorophyta | Mamiellophyceae       | Mamielliales      | Undescribed Mamiellophyceae    | 2407  | MALINA E47.P1        |      | Medium enrichment (JM2 + Ge)  | Pico sorting        | 2000 K/2               |         | 1070 0 m |           |                 | Z20044402      |          |     | JQ413370      |           |
| Chlorophyta | Mamiellophyceae       | Mamielliales      | <i>Arctic Micromonas</i>       | 2242  | MALINA S51           |      | Pico sorting                  | Pico sorting        | 20 K/2                 |         | 1070 0 m |           |                 | Z20044369      |          |     |               |           |
| Chlorophyta | Nephroselmidiophyceae | Nephroselmidiales | <i>Nephroselmis pyriformis</i> | 2490  | MALINA E28.N1.P20C6  |      | Medium enrichment (K2 + Ge)   | Pico sorting        | 1 K/2                  | yes     |          |           |                 | BER100709A 0 m |          |     | Z20044917     |           |
| Chlorophyta | Nephroselmidiophyceae | Nephroselmidiales | <i>Nephroselmis pyriformis</i> | 2490  | MALINA E28.N1.P20C7  |      | Medium enrichment (K2 + Ge)   | Pico sorting        | 1 K/2                  | yes     |          |           |                 | BER100709A 0 m |          |     | Z20044548     |           |
| Chlorophyta | Nephroselmidiophyceae | Nephroselmidiales | <i>Nephroselmis pyriformis</i> | 2490  | MALINA E28.N1.P20C8  |      | Medium enrichment (K2 + Ge)   | Pico sorting        | 1 K/2                  | yes     |          |           |                 | BER100709A 0 m |          |     | Z20044523     |           |
| Chlorophyta | Prasinophyceae        | Pyramimonadales   | <i>Pyramimonas</i> sp. II      | 2015  | MALINA FT56.6 PG4    |      | TFF concentrated              | Micropipette        | 1 F/2                  | 56      | 110 3 m  |           | 4 LM            |                | JN934688 |     |               |           |
| Chlorophyta | Prasinophyceae        | Pyramimonadales   | <i>Pyramimonas</i> sp. II      | 2047  | MALINA FT56.6 PG5    |      | TFF concentrated              | Micropipette        | 1 F/2                  | 56      | 110 3 m  |           | 9 LM            |                | JF784048 |     |               |           |
| Chlorophyta | Prasinophyceae        | Pyramimonadales   | <i>Pyramimonas</i> sp. III     | 1987  | MALINA FT42.3 PG8    |      | TFF concentrated              | Micropipette        | 1 F/2                  | 42      | 280 30 m |           |                 | Z20044006      |          |     | JN934670      |           |
| Chlorophyta | Prasinophyceae        | Pyramimonadales   | <i>Pyramimonas</i> sp. II      | 2048  | MALINA FT99.6 PG4    |      | TFF concentrated              | Micropipette        | 1 F/2                  | 39      | 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.P51       |      | 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.P52       |      | Medium enrichment (F2)        | Micropipette        | 1 F/2                  | 31      | 690 29 m |           | 5 LM            |                |          |     | Z20044442     |           |
| 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      | 2286  | MALINA E36.2.P18.E8  |      | Medium enrichment (K2 + Ge)   | Pico sorting        | 1 K/2                  | yes     |          |           |                 | Z20044489      |          |     |               |           |
| Chlorophyta | Prasinophyceae        | Pyramimonadales   | <i>Pyramimonas</i> sp. II      | 2287  | MALINA E36.2.P18.F10 |      | Medium enrichment (K2 + Ge)   | Pico sorting        | 1 K/2                  | yes     |          |           |                 | Z20044490      |          |     | 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     |          |           |                 | BEA130709A 0 m |          |     | Z20044914     |           |
| Cryptophyta | Cryptophyceae         | Rhodomonadales    | <i>Rhodomonas</i> sp.          | 2044  | MALINA FT42.3 PG12   |      | TFF concentrated              | Micropipette        | 1 F/2                  | 42      | 280 30 m |           | 15 LM           |                |          |     | Z20044504     |           |
| 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           |                |          |     | Z20044458     |           |
| Cryptophyta | Cryptophyceae</       |                   |                                |       |                      |      |                               |                     |                        |         |          |           |                 |                |          |     |               |           |

## 926 **List of Supplementary Figures**

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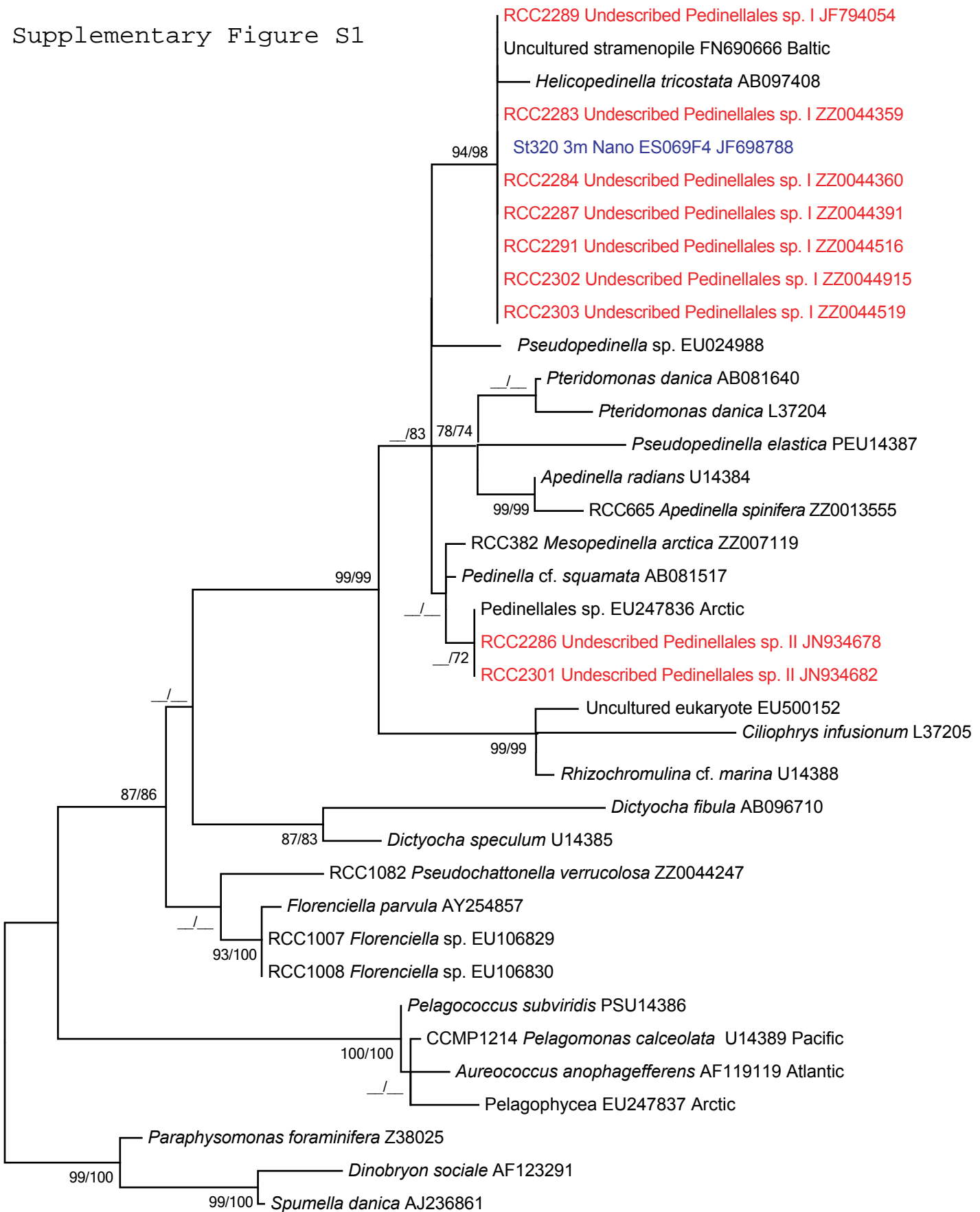
929 **Supplementary Figure S1.** Phylogenetic tree of the partial 18S rRNA gene sequence for the  
930 Pedinellales strains isolated during the MALINA cruise. 434 unambiguously aligned  
931 positions were considered from an alignment of 37 nucleotide sequences. The evolutionary  
932 history was inferred 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.

945

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.

949

Supplementary Figure S1



0.02

Supplementary Figure S2

