Supplementary Materials Table S1. GenBank Accession numbers corresponding to the *rbcL* region of the sequences retrieved from GenBank to build the phylogenetic tree.

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| Species | Strain | Accession number |
| *Chloroidium lichenum*  | SAG 2115 | KR154339 |
| *Chloroidium ellipsoideum*  | SAG 3.95 | MH545949 |
| *Chloroidium lichenum*  | FACHB-2421 | MN938481 |
| *Chloroidium saccharophilum*  | FACHB-1796 | KX024693 |
| *Chloroidium saccharophilum*  | SAG 211- 9-a | HF674884 |
| *Chloroidium engadinensis*  | SAG 812-1 | KR154340 |
| *Calidiella yingdensis*  | FACHB-2405 | MN938466 |
| *Calidiella epiphylla*  | FACHB- 2406 | MN938467 |
| *Calidiella californica*  | BCP-EM2VF32 | KF693819 |
| *Kalinella bambusicola*  | CAUP H7901 | HE984581 |
| *Kalinella sinensis*  | FACHB-2412 | MN938472 |
| *Kalinella pachyderma*  | FACHB-2410 | MN938471 |
| *Jaagichlorella hainangensis*  | FACHB-2416 | MN938476 |
| *Jaagichlorella nagensis*  | FACHB-2415 | MN938475 |
| *Jaagichlorella africana*  | FACHB-2423 | MN970102 |
| *Jaagichlorella colocana*  | FACHB-2417 | MN938477 |
| *Massjukichlorella minus*  | FACHB-2373 | MK830083 |
| *Massjukichlorella minus*  | FACHB-2372 | MK830082 |
| *Massjukichlorella orientale* | FACHB-2374 | MK858180 |
| *Massjukichlorella epiphytica*  | FACHB-2369 | MK830079 |
| *Mysteriochloris nanningensis*  | FACHB-2402 | MN508186 |
| *Mysteriochloris nanningensis*  | FACHB-1787 | KT950845 |
| *Phyllosiphon duini*  | 4A 2 | KY977526 |
| *Phyllosiphon arisari*  | AV1 | KR154334 |
| *Phyllosiphon ari*  | N8 | KU640391 |
| *Phyllosiphon coccidium*  | FACHB-1786 | KT950844 |
| *Polulichloris yunnanensis*  | FACHB-2401 | MN508187 |
| *Polulichloris ovale*  | FACHB-2367 | MK830077 |
| *Polulichloris maxima*  | FACHB-2407 | MN938468 |
| *Watanabea sichuanensis*  | FACHB-1794 | KX077899 |
| *Watanabea patagonica*  | CCAP 6091/1 | KR154343 |
| *Viridiella fridericiana*  | SAG 10.92 | KR154344 |
| *Diplosphaera mucosa*  | SAG 48.86 | AM260444 |
| *Stichococcus bacillaris*  | SAG 379-1b | AM260442 |
| *Symbiochloris tschermakiae*  | SAG 46.85 | KC333574 |
| *Symbiochloris reticulata*  | SAG 53.87 | KF960688 |
| *Symbiochloris handae*  | CCHU 5616 | KC333590 |