Supplementary Information

Figure S1. Sequence of plastid *rnpB* genes. The *rnpB* genes identified in sequenced plastid genomes. See table S1 for the source of the sequences.

Paulinella
>*Paulinella_FK01*
GAAAGCAGGCGAGGTGATCGCGACCAGGTTGTGTTGGTTGAGGAAAGTCCGGGCTCCTAC
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TGGTAACGGTGATCCTAGATAGATGATCGCCCACTGGTACTAACATTTCAGGTTGTAGTA
GTGAACAGAATCCGGCTTATGTCCTGCTTT
>*Paulinella_M0880*
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AAACATACCGCCAATGACCTCGGGAATTTTTCCAAGGTACAGGCAAGGGTGCAAAGGTGT
GGTAAGAGCACACCAGCAATATCGAGAGATATTGACTTGGTAAACCCCAGCCAGGAGTA
AGGCCTAGGGACAACGGTTGGTCCATTTCCCTGTTCCGCTTTTGAGTGCCGCTTGAGATTG
TTGGTAACAGCAGTTCCAGATAGATGATTACCCACTTCCTCTGAATCTTCGTCAGTGGTAG
TGAACAGAATCCGGCTTACGTCCTGCTTT
Glaucophyta
>*Cyanophora_paradoxa*
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Red algae
>*Calliarthron_tuberculosum*
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CTACCCTTAATTAAAAGCTTTATTTAAGAACAGAACCCGGCTTATGTCTTACT
>*Chondrus_crispus_PCG*
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AAACCGCCTATATAAAATTTAGGTAAGGATGCAAAGGTGTGGTAAGAGCGCACCAGAAG
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CTACCCTTTTTGTATCTGTATTTTTATTATAATTACAAATGAAGAACAGAATCCGGCTTAA
GACTTACTCTTT
>*Cyanidiaceae_sp._MX-AZ01*
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AGGGCTATCTAGCTGGAGAAATCCAGTGCCATTAAAAGGTGAGGAAAGTGCCACAGAAA
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>*Cyanidioschyzon_merolae*
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>*Cyanidium_caldarium*
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>*Galdieria_sulphuraria*
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>*Gracilaria_salicornia*
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AACTTTACATTTATTATATCTATCATCAAATAAGTAATTGTATTTTATGGTTTATATTCATT
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TTACTT
>*Gracilaria_tenuistipitata*
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>*Grateloupia_lanceola*
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>*Grateloupia_taiwanensis*
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AAACCGCCTTTTAAGATTGTTAATTAAATAGGTAAGGGTGCAAAGGTATGGTAAGAGCAT
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GAATCTTTTGATTGTACTTATAATCATTTTAATTATATTTATTTTATAACTGCGATTTAATA
CTGCAAGAAGTTTATTTTAATATGAACTCGAGATTAATAACTACCCTTGTTCTATATTATA
GATATATAAATATGAGCAAGAACAGAATCCGGCTTATGACTTACTTGT
>*Porphyra_purpurea*
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>*Porphyra_segregata*
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GAACAAAACCCGGCTTATGTAATACTTTTT
>*Porphyra_umbilicalis*
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>*Porphyridium_purpureum*
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>*Pyropia_fucicola*
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GAACCCGGCTTACGTAGTACTTTTT
>*Pyropia_haitanensis*
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AGAACCCGGCTTATGTAGTACTTTTT
>*Pyropia_kanakaensis*
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>*Pyropia_perforata*
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GCTCCACAAATACAATTTATGCTGGAGAAATCCCAGTGTAGGTAACTACGAGGATAGTAC
CACAGAAATAAACCGCCAGAATAAAACATTTTAGCTGGTAAGGGTGCAAAGGTTAGTTA
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TTACTAAATAGATATTTGTGTATACTCTATATAGTTTAGTTTAAAATACTGCATGAAGTTA
TTGGTAACAATAACTCTAGAGGAATAGCTATCCTTCACAATATGTCTCTATCATATTGAAA
GAACAAAACCCGGCTTATGTAATACTTTTT

>*Pyropia_yezoensis*
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ACAAATACAATTTATGCTGGAGAAATCCCAGTGTAGGTAACTGCGAGGATAGTACCACAG
AAAAAAACCGCCAGAATAAGTTATATTAGCTGGTAAGGGTGCAAAGGCAAGTTAAAAGC
TTACCAAAAGTACTGCAAAGTATTTGTTAGGTAAACCCCTAAAATGGAGCAAAGCTACTA
AACAAATATTTGTGTATATTTTATCTAGTTTAGTTGAAAATACTGCATGAAGTTATTAGTA
ACAATAACTCGAGAGGAATAGCTATCCTTTACAATATATCTCGATTATATTGAAAGAACA
GAACCCGGCTTATGTAGTACTTTTT

Green algae

>*Micromonas_RCC299*
CGAGATATAAGTAGAGTGGTTGCAAGATCAGATGATCTTGAGGAAAGTCCGAACTCTCAC
GACGATGTACCATAATACGAGAATTTCGTATACATTCATTTGGGAGGAAAGTGCCACAGA
AATTAAACTTGCTTTAATATTTTTAAAGTGGAGGTGTAATATTTCAACATTTGTAAGAATG
TTTGTTGGTAGACCCTTATGGAGAGCAAAAGAATATAAATCTCAATGACATCTCTTGGGA
TTAAAATCTTGCTAGAAAATTTCAATAATGAAATTTCCAGATAAATAACCACAAAACAGA
ATTCGGCTTATCTATTTATATCG

>*Monomastix_OKE-1*
CTATGTTCATCTACAAGTGATTACAAAAAAGAATTCTTTTTTGAGGAAAGTCTGGGCTCCC
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AAATATTTTTTTGCAAATAAAGTATACCCTTCTCAGGAGTAAACTCTTTAACGTCTGACAA
TATCTAATTCTAAGTTAAGACGCAAAGAAAAAGTGCTAGAAAGAAAAAGAAATTTTTCTT
CAAGATAAATAATCACTGAAAGTATAGACTAAGGTCCAAAATTTTTGATACAGTGGAAAA
TCCTAATGTTTAAAAGAGCTCATTTCATCGATCTCGTTTAAAAAATAAACAAAAAAAGAA
ATCTTTCCATTAAAACACAACAAACTATGGCCTGAAATCTTTCTTTTAACAAAACCCAGCT
TACAATGAACAAAGTTT

>*Nephroselmis_olivacea*
CTATCTCAAGCAAAGCGATTGCAGAGCAACTAGAAGATGCTCTGAGGAAAGTCCGGGCTC
CCTAACTATTCCAGCTGCTGGATAATTTCCAGTGTGATATAATCACGAGGAAAGTGCCAC
AGAAAGAAACCAATCAAATCTCCATCGAATGGCTCACAAGCTCTAGGAGATCTTGGATTG
GGTGCAAATGTATTCTTGACGTGAGTTAAGCGTCTGGTATACCCCAGTCGGGAGCAAGAT
GAGGTTAGTTTATAGAGAATAGACCATAGACTAATCTATTCCATTGCTCGAGAGGGTTCA
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>*Ostreococcus_tauri*
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AGAATTCGGCTTATACTTTATTTTT

>*Pycnococcus_provasolii*
AGGAAAATTGATGATCGCAGTTAAGTTATTGACTTTTTTACTTGAAAACAAAATTGTCAA
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GGTATACCCTAACACAGAGCAAACAAAATTAAGCGATTTTTTTGGTCGCTTAATTCTTGGT
GCTAGAATAGTATTGTAAAATATTATCAAGATGAATGATCATCGTAAAAAACTCAGATTT
TTTATTACAAAACCCGGCTTATTTTCTT

Figure S2. Secondary structure models of selected algae RPRs. The models for RPR from *C. paradoxa, N. olivacea*, and *P. purpurea* have been previously published [1–2]. The structure of RPR from *O. tauri* is modified with respect to the previously published [3]. An improved alignment with the additional sequences recently available has allowed identification of helices P15–P17, not present in the previous model. Black circles highlight nucleotides universally conserved in bacteria [4]. Lines connect regions involved in tertiary interactions (GNRA tetraloop-helix) as well as helices P4 and P6. Red brackets indicate the loops that do not match the conserved GNRA tetraloops at those positions.

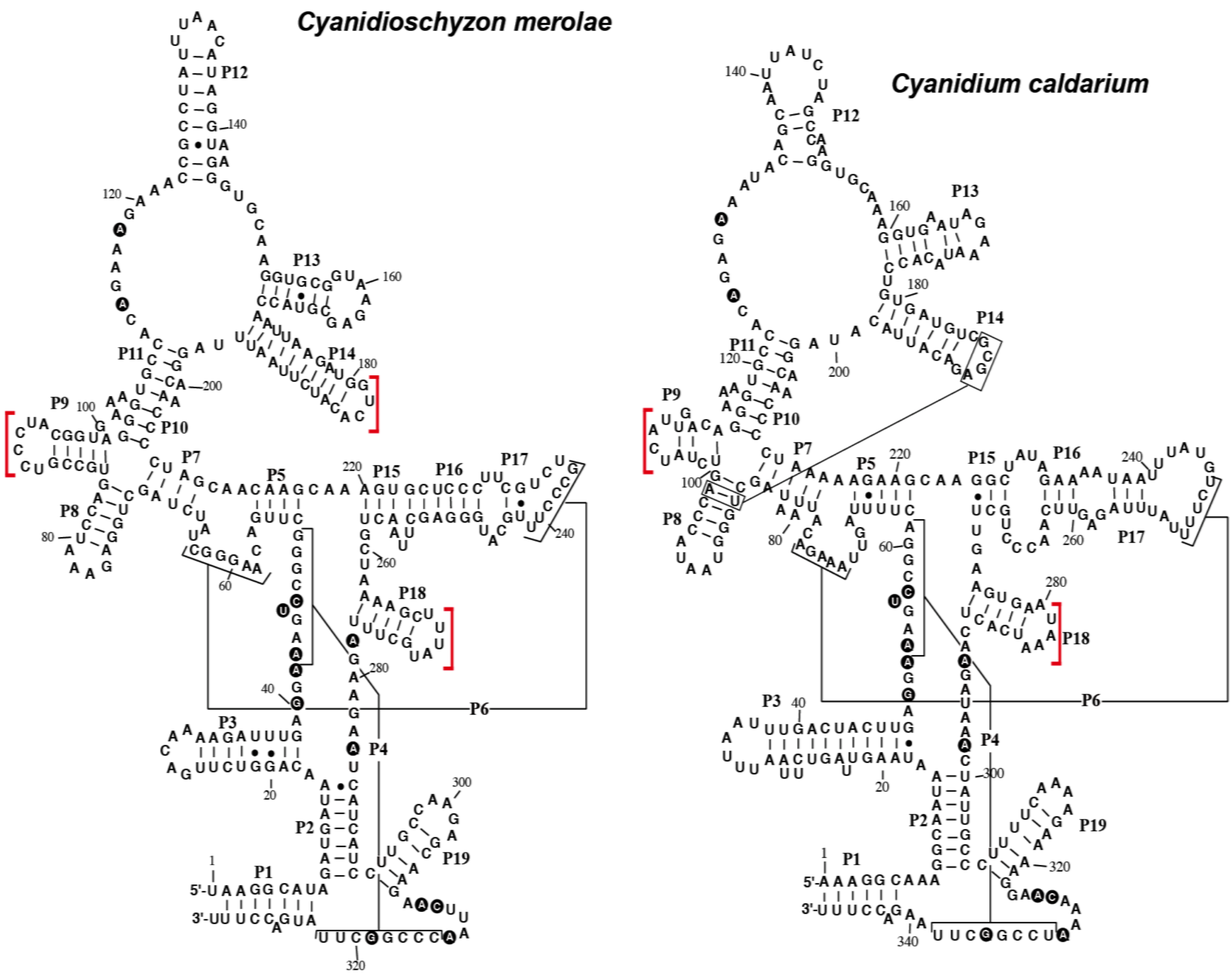

Figure S2. *Cont.*

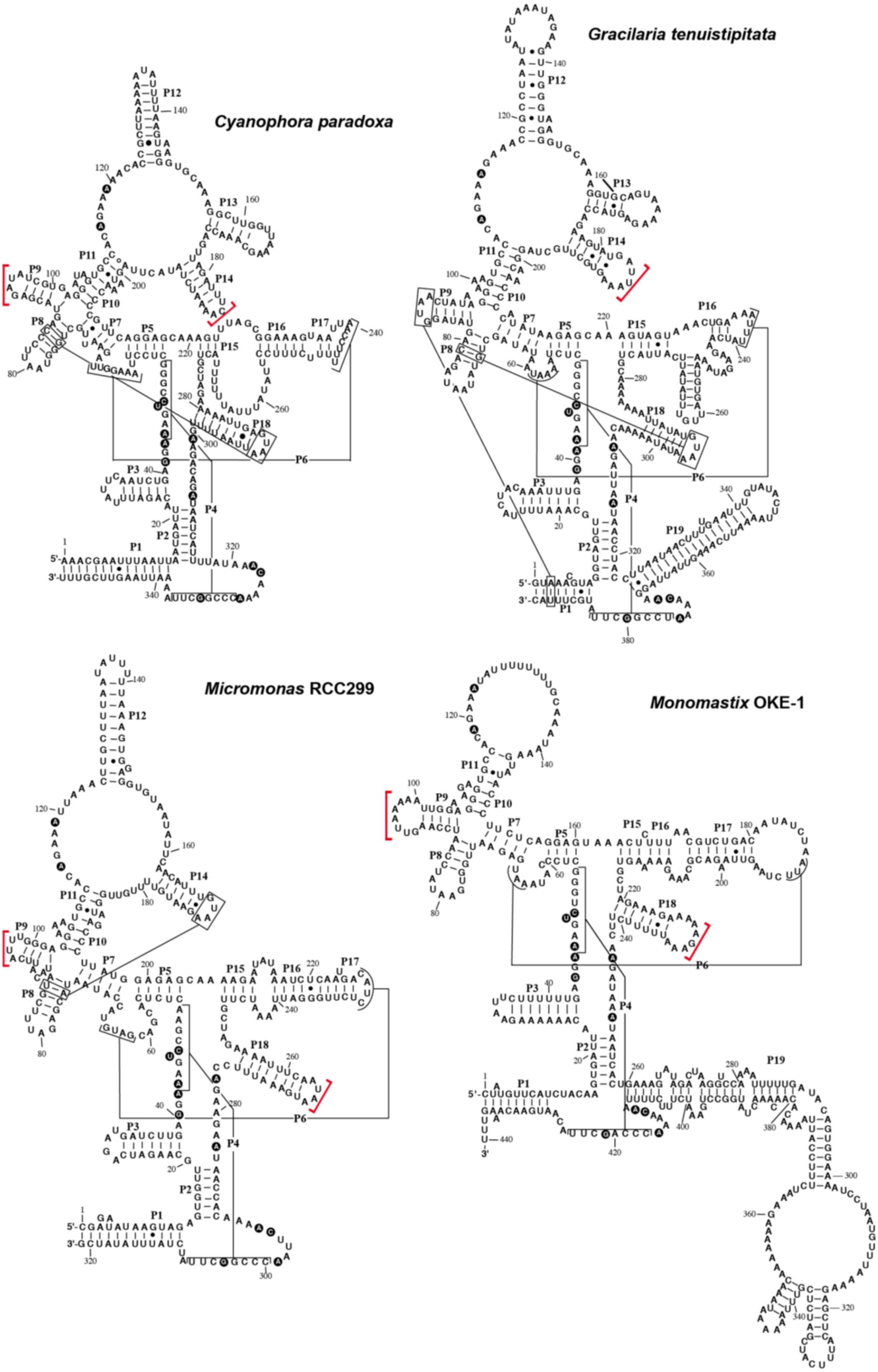

Figure S2. *Cont.*

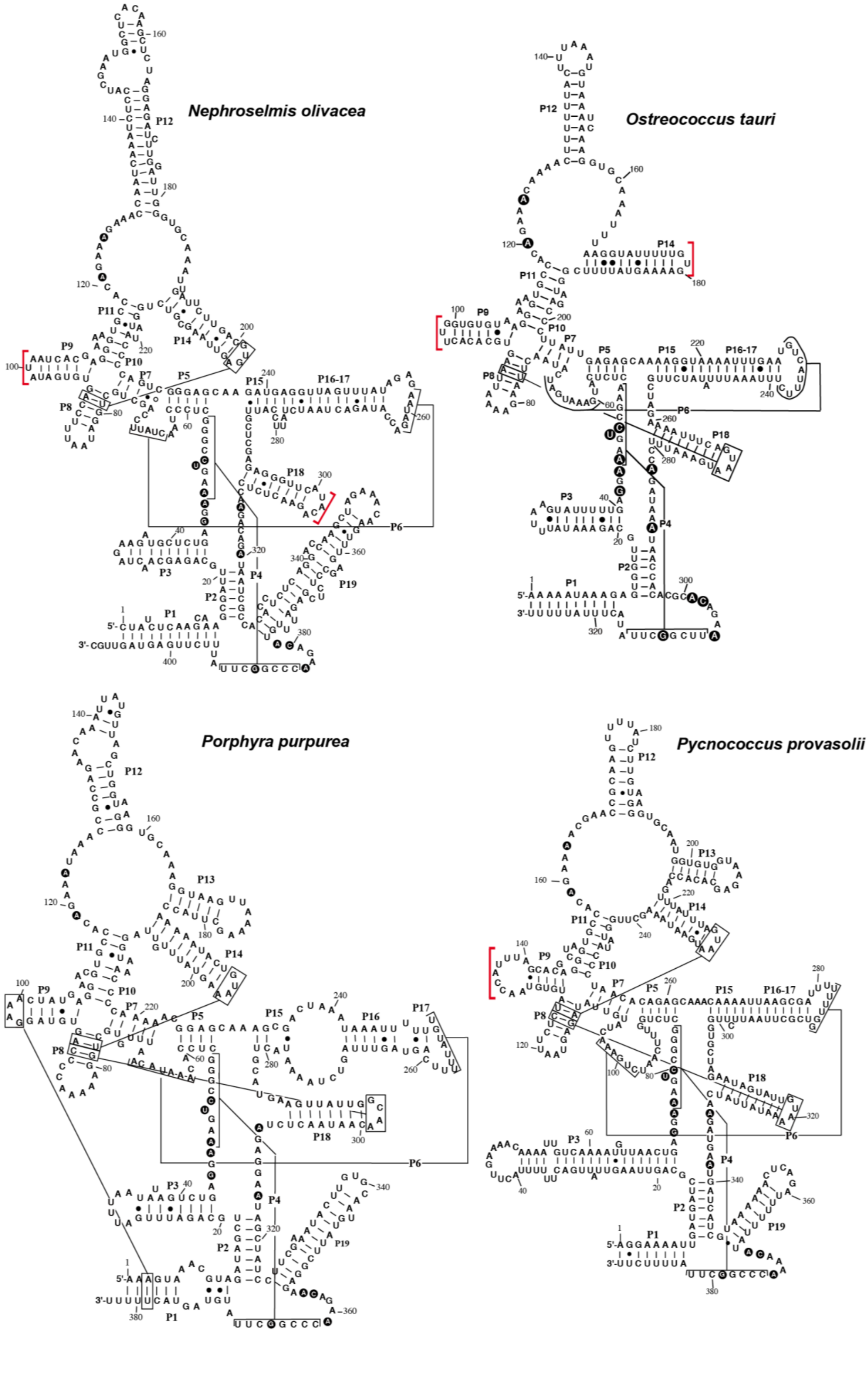

Table S1. *rnpB* containing plastid genomes.

	Accession	Reference	Studied *in Vitro*
Paulinella			
Paulinella chromatophora FK01	PRJNA45921	[5]	This work
Paulinella chromatophora M0880	NC_011087	[6]	This work
Glaucophyta			
Cyanophora paradoxa	NC_001675	[7]	[8–10]
Red algae			
Calliarthron tuberculosum	NC_021075	[11]	
Chondrus crispus PCG	NC_020795	[11]	
Cyanidiaceae sp. MX-AZ01	KJ569775	Unpublished	
Cyanidioschyzon merolae	NC_004799	[12]	This work
Cyanidium caldarium	NC_001840	[13,14]	This work
Galdieira sulphuraria	NC_024665	Unpublished	
Gracilaria salicornia	NC_023785	[15]	
Gracilaria tenuistipitata	NC_006137	[16]	This work
Grateloupia lanceola	HM767138	[11]	
Grateloupia taiwanensis	NC_021618	[17]	
Porphyra purpurea	NC_000925	[18]	[2]
Porphyra segregata	KF515973	[19]	
Porphyra umbilicalis	JQ408795	[20]	
Porphyridium purpureum	NC_023133	[21]	
Pyropia fucicola	KJ776837	[19]	
Pyropia haitanensis	NC_021189	[22]	
Pyropia kanakaensis	KJ776836	[19]	
Pyropia perforata	NC_024050	[19]	
Pyropia yezoensis	NC_007932	[22]	
Green algae			
Micromonas RCC299	NC_012575	[23]	This work
Monomastix OKE-1	NC_012101	[24]	
Nephroselmis olivacea	NC_000927	[2,25]	[2]
Ostreococcus tauri	NC_008289	[3,26]	[3]
Pycnococcus provasolii	NC_012097	[24]	This work

The first two columns indicate the accession number and the reference of the sequences and identification of *rnpB* if applicable. The third column indicates if the corresponding RPR enzymatic activity has been studied i*n vitro* in this work or previously.

Table S2. Oligonucleotides used.

Name	Sequence (5'→3')
Cloning of *rnpB* [a]	
PchrRPR_F	CGGGATCC*TAATACGACTCACTATAG*AAAGCAGGCGAGGTGATCGCG
PchrRPR_R	GTCCCCAAGCTTGTTTAAAGCAGGACGTAAGCCG
PFK01RPR_R	GTCCCCGAATTCGTTTAAAGCAGGACATAAGCCGGATTC
TeloRPR_F	CCGGAATTC*TAATACGACTCACTATAG*AATGAGTTAGCGTGGTGG
TeloRPR_R	CGCGGATCCTTTAAATGAGTTAGACGTAAGC
Ccal_F1	CCGGAATTC*TAATACGACTCACTATAG*AAAGGCAAAGGCAAUAAUAAG
Ccal_R1	CGCGGATCCTTTAAAAGGTCTTAAGCCGG
Cmer_F1	CCGGAATTC*TAATACGACTCACTATAG*GTAAGGCATAGATGATAACAGG
Cmer_R1	CGCGGATCCTTTAAAGGTCATAAGCCGGG
Gten_F1	CCGGAATTC*TAATACGACTCACTATAG*TAAACGTAGGTAGTTGC
Gten_R1	CGCGGATCCTTTAAAAAAGTAAAGCATAAGCCGG
M299_F1	CGGGATCC*TAATACGACTCACTATAG*CGAGATATAAGTAGAGTGG
M299_R1	GTCCCCAAGCTTCGCGATATAAATAGATAAGCCG
Ppro_F2	CGGGATCC*TAATACGACTCACTATAG*AGGGTAAGGAAAATTGATGATCG
Ppro_R1	GTCCCCGAATTCGTTTAAACTAGCAGGGAAGAAAATAAGC
Mutagenesis [b]	
PchrC55A_F	GGAAAGTCCGGACTCCTTAATGACC
PchrC55A_R	GGTCATTAAGGAGTCCGGACTTTCC
PchrC55G_F	GGAAAGTCCGGGCTCCTTAATGACC
PchrC55G_R	GGTCATTAAGGAGCCCGGACTTTCC
PchrU370C_F	GGTAGTGAACAGAACCCGGCTTACG
PchrU370C_R	CGTAAGCCGGGTTCTGTTCACTACC
PchrU237C_F	CCAGCCAGGAGCAAGGCCTAGGGAC
PchrU237C_R	GTCCCTAGGCCTTGCTCCTGGCTGG

[a] Primers used for cloning of *rnpB* genes. Sequences matching the *rnpB* genes are underlined. The T7 promoter sequence is in italics. [b] Oligonucleotides used for mutagenesis. The changed nucleotide is underlined.

Supplementary References

1. Baum, M.; Schön, A. Localization and expression of the closely linked cyanelle genes for RNase P RNA and two transfer RNAs. *FEBS Lett.* **1996**, *382*, 60–64.
2. De la Cruz, J.; Vioque, A. A structural and functional study of plastid RNAs homologous to catalytic bacterial RNase P RNA. *Gene* **2003**, *321*, 47–56.
3. Lai, L.B.; Bernal-Bayard, P.; Mohannath, G.; Lai, S.M.; Gopalan, V.; Vioque, A. A functional RNase P protein subunit of bacterial origin in some eukaryotes. *Mol. Genet. Genomics* **2011**, *286*, 359–369.
4. Marquez, S.M.; Harris, J.K.; Kelley, S.T.; Brown, J.W.; Dawson, S.C.; Roberts, E.C.; Pace, N.R. Structural implications of novel diversity in eucaryal RNase P RNA. *RNA* **2005**, *11*, 739–751.
5. Reyes-Prieto, A.; Yoon, H.S.; Moustafa, A.; Yang, E.C.; Andersen, R.A.; Boo, S.M.; Nakayama, T.; Ishida, K.; Bhattacharya, D. Differential gene retention in plastids of common recent origin. *Mol. Biol. Evol.* **2010**, *27*, 1530–1537.

6. Nowack, E.C.; Melkonian, M.; Glockner, G. Chromatophore genome sequence of *Paulinella* sheds light on acquisition of photosynthesis by eukaryotes. *Curr. Biol.* **2008**, *18*, 410–418.
7. Stirewalt, V.L.; Michalowski, C.B.; Löffelhardt, W.; Bohnert, H.J.; Bryant, D.A. Nucleotide sequence of the cyanelle genome from *Cyanophora paradoxa*. *Plant Mol. Biol. Rep.* **1995**, *13*, 327–332.
8. Cordier, A.; Schön, A. Cyanelle RNase P: RNA structure analysis and holoenzyme properties of an organellar ribonucleoprotein enzyme. *J. Mol. Biol.* **1999**, *289*, 9–20.
9. Li, D.; Willkomm, D.K.; Schön, A.; Hartmann, R.K. RNase P of the *Cyanophora paradoxa* cyanelle: A plastid ribozyme. *Biochimie* **2007**, *89*, 1528–1538.
10. Pascual, A.; Vioque, A. Functional reconstitution of RNase P activity from a plastid RNA subunit and a cyanobacterial protein subunit. *FEBS Lett.* **1999**, *442*, 7–10.
11. Janouskovec, J.; Liu, S.L.; Martone, P.T.; Carre, W.; Leblanc, C.; Collen, J.; Keeling, P.J. Evolution of red algal plastid genomes: Ancient architectures, introns, horizontal gene transfer, and taxonomic utility of plastid markers. *PLoS One* **2013**, *8*, e59001.
12. Ohta, N.; Matsuzaki, M.; Misumi, O.; Miyagishima, S.Y.; Nozaki, H.; Tanaka, K.; Shin, I.T.; Kohara, Y.; Kuroiwa, T. Complete sequence and analysis of the plastid genome of the unicellular red alga *Cyanidioschyzon Merolae*. *DNA Res.* **2003**, *10*, 67–77.
13. Glockner, G.; Rosenthal, A.; Valentin, K. The structure and gene repertoire of an ancient red algal plastid genome. *J. Mol. Evol.* **2000**, *51*, 382–390.
14. Seif, E.R.; Forget, L.; Martin, N.C.; Lang, B.F. Mitochondrial RNase P RNAs in ascomycete fungi: Lineage-specific variations in RNA secondary structure. *RNA* **2003**, *9*, 1073–1083.
15. Campbell, M.A.; Presting, G.G.; Bennett, M.S.; Sherwood, A.R. Highly conserved organellar genomes in the Gracilariales as inferred using new data from the Hawaiian invasive red alga *Gracilaria salicornia* (Rhodophyta). *Phycologia* **2014**, *53*, 109–116.
16. Hagopian, J.C.; Reis, M.; Kitajima, J.P.; Bhattacharya, D.; de Oliveira, M.C. Comparative analysis of the complete plastid genome sequence of the red alga *Gracilaria tenuistipitata* var. *liui* provides insights into the evolution of rhodoplasts and their relationship to other plastids. *J. Mol. Evol.* **2004**, *59*, 464–477.
17. DePriest, M.S.; Bhattacharya, D.; Lopez-Bautista, J.M. The plastid genome of the red macroalga *Grateloupia taiwanensis* (Halymeniaceae). *PLoS One* **2013**, *8*, e68246.
18. Reith, M.; Munholland, J. Complete nucleotide sequence of the *Porphyra purpurea* chloroplast genome. *Plant Mol. Biol. Rep.* **1995**, *13*, 333–335.
19. Hughey, J.R.; Gabrielson, P.W.; Rohmer, L.; Tortolani, J.; Silva, M.; Miller, K.A.; Young, J.D.; Martell, C.; Ruediger, E. Minimally destructive sampling of type specimens of *Pyropi*a (Bangiales, Rhodophyta) recovers complete plastid and mitochondrial genomes. *Sci. Rep.* **2014**, *4*, 5113.
20. Smith, D.R.; Hua, J.; Lee, R.W.; Keeling, P.J. Relative rates of evolution among the three genetic compartments of the red alga *Porphyra* differ from those of green plants and do not correlate with genome architecture. *Mol. Phylogenet. Evol.* **2012**, *65*, 339–344.
21. Tajima, N.; Sato, S.; Maruyama, F.; Kurokawa, K.; Ohta, H.; Tabata, S.; Sekine, K.; Moriyama, T.; Sato, N. Analysis of the complete plastid genome of the unicellular red alga *Porphyridium purpureum*. *J. Plant Res.* **2014**, *127*, 389–397.

22. Wang, L.; Mao, Y.; Kong, F.; Li, G.; Ma, F.; Zhang, B.; Sun, P.; Bi, G.; Zhang, F.; Xue, H.; *et al*. Complete sequence and analysis of plastid genomes of two economically important red algae: *Pyropia haitanensis* and *Pyropia yezoensis*. *PLoS One* **2013**, *8*, e65902.
23. Worden, A.Z.; Lee, J.H.; Mock, T.; Rouze, P.; Simmons, M.P.; Aerts, A.L.; Allen, A.E.; Cuvelier, M.L.; Derelle, E.; Everett, M.V.; *et al*. Green evolution and dynamic adaptations revealed by genomes of the marine picoeukaryotes *Micromonas*. *Science* **2009**, *324*, 268–272.
24. Turmel, M.; Gagnon, M.C.; O'Kelly, C.J.; Otis, C.; Lemieux, C. The chloroplast genomes of the green algae *Pyramimonas*, *Monomastix*, and *Pycnococcus* shed new light on the evolutionary history of prasinophytes and the origin of the secondary chloroplasts of euglenids. *Mol. Biol. Evol.* **2009**, *26*, 631–648.
25. Turmel, M.; Otis, C.; Lemieux, C. The complete chloroplast DNA sequence of the green alga *Nephroselmis olivacea*: Insights into the architecture of ancestral chloroplast genomes. *Proc. Natl. Acad. Sci. USA* **1999**, *96*, 10248–10253.
26. Robbens, S.; Derelle, E.; Ferraz, C.; Wuyts, J.; Moreau, H.; Van de Peer, Y. The complete chloroplast and mitochondrial DNA sequence of *Ostreococcus tauri*: Organelle genomes of the smallest eukaryote are examples of compaction. *Mol. Biol. Evol.* **2007**, *24*, 956–968.