Accepted Manuscript

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PII: S2352-4073(17)30022-7
DOI: doi: 10.1016/j.plgene.2017.05.005
Reference: PLGENE 99

To appear in: *Plant Gene*

Received date: 10 April 2017
Revised date: 12 May 2017
Accepted date: 13 May 2017

Please cite this article as: Mark A. Buchheim, Tobias Müller, Matthias Wolf , 18S rDNA sequence-structure phylogeny of the Chlorophyceae with special emphasis on the Sphaeropleales, *Plant Gene* (2017), doi: 10.1016/j.plgene.2017.05.005

18S rDNA sequence-structure phylogeny of the Chlorophyceae with special emphasis on the Sphaeropleales

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Abstract: Using THESES db, the algae 18S rDNA sequence-structure database for inferring phylogenies, we reconstructed the phylogeny of a comprehensive sampling of sphaeroplealean green algae evaluated in the context of chlorophycean diversity. A review of the most recent assessments of chlorophycean phylogeny using sequence-only analyses further illustrates the contrast with results obtained from chlorophycean 18S rDNA sequence-structure analysis to the current literature on chlorophycean phylogenomics. With only the phylogenetic position of *Golenkinia* and the *Cylindrocapsa*-clade as exceptions, a maximum likelihood tree of 18S rDNA sequence-structure data is robustly supported and is almost fully congruent with the tree topology obtained by the most recent phylogenomic approaches. Remarkably, even a quick and easy neighbor-joining analysis yields accurate results and enables one to reconstruct and discuss the big picture for all three hundred sphaeroplealean 18S rDNA sequence-structure pairs currently available. These results are testament to the ease, utility and power of a sequence-structure approach to analyzing 18S rDNA data.

Keywords: algae; Chlorophyta; RNA; secondary structure; phylogeny.