SALT TOLERANCE AND POLYPHYLY IN THE CYANOBACTERIUM

CHROOCOCCIDIOPSIS (PLEUROCAPSALES)

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Abstract: Chroococcidiopsis Geitler (Geitler 1933) is a genus of cyanobacteria
containing desiccation and radiation resistant species. Members of the genus live in
habitats ranging from hot and cold deserts to fresh and saltwater environments.
Morphology and cell division pattern have historically been used to define the genus. To
better understand the genetic and phenotypic diversity of the genus, 15 species were
selected that had been previously isolated from different locations, including salt and
freshwater environments. Four markers were sequenced from these 15 species, the 16S
rRNA, rbcL, desC1 and gltX genes. Phylogenetic trees were generated which identified
two distinct clades, a salt-tolerant clade and a freshwater clade. This study demonstrates
that the genus is polyphyletic based on saltwater and freshwater phenotypes. To
understand the resistance to salt in more details, species were grown on a range of sea salt
concentrations which demonstrated that the freshwater species were salt-intolerant whilst
the saltwater species required salt for growth. This study shows an increased resolution
of the phylogeny of Chroococcidiopsis and provides further evidence that the genus is
polyphyletic and should be reclassified to improve clarity in the literature.