**PYRENOID AND CHLOROPLAST ULTRASTRUCTURE: A NOVEL INSIGHT INTO THE CHARACTERIZATION OF *Trebouxia* DIVERSITY**

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The green algal genus *Trebouxia* Puymaly is among the most widespread phycobionts, associating with a broad range of lichen-forming fungi. To date, around 30 *Trebouxia* spp. have been described based on the combination of morphological traits and genetic diversity. However, due to the limited number of morphological characters and the general lack of *Trebouxia* strains isolated in culture, a clear characterization of the species base of morphological and ultrastructural traits still remain challenging in this lichen-forming microalgae. In this work we used transmission electron microscopy (TEM) and laser scanning confocal microscopy (LSCM) to characterize the morphology and ultrastructure of *Trebouxia* chloroplasts and pyrenoids, respectively, of 19 *Trebouxia* strains, grown in cultures directly on solid agar medium or on cellulose-acetate discs laid over the agar medium. Our results evidenced that *Trebouxia* pyrenoid and chloroplast diversity is higher than it was previously reported in literature. In addition, the studied algae maintain similar ultrastructure and morphology when grown either on agar medium or acetate discs. Analysing the ultrastructural and morphological traits of the pyrenoid and chloroplast in the light of the most updated *Trebouxia* phylogeny, we were able to reappraise and clarify the classification of the pyrenoids and chloroplasts within this genus. This work is intended to be the stepping-stone for future research when isolated *Trebouxia* species are identified by means of microscopy and molecular characters.

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