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Poster: Environmental Stress and Adaptation to Stress: Drought

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Abs # P13026: Phenotypic, physiological, and molecular studies on the desiccation tolerant moss *Pseudocrossidium replicatum*

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Mosses from the central highlands of Mexico were evaluated for desiccation tolerance according to the Austin Protocol. The specie *Pseudocrossidium replicatum* (Taylor) R.H. Zander showed total photosynthesis recovery when rehydrated after total desiccation. We developed an in vitro culture system for *P. replicatum*. Using this system, we observed that its spores are able to germinate when exposed to very high concentrations of osmotic agents and NaCl. Furthermore, the resulting protonema exhibited growth under such stressing conditions even for several weeks. Also, we found that ABA sensitivity during spore germination is significantly lower than Arabidopsis seed germination. Protonema responses to abiotic stress were tested on pure lines obtained from one spore. Protonemal tissues from these strains were exposed for different time periods (days) to several concentrations of osmotic agents, NaCl, and freezing. The phenotypes observed at extreme conditions correlate with a slow decrease of Fv/Fm. Surprisingly, few days after transferring the stressed tissues to control conditions, they were able to recover growth and normal photosynthesis rates. Interestingly, tissues from *P. replicatum* can recover growth and Fv/Fm even after 1 week of exposition to -80°C. Currently, we are developing a protocol for genetic transformation for this specie. Finally, as an attempt to identify *P. replicatum* dehydration and ABA responsive genes, strategies as the FOX gene hunting system, RNA-seq, and subtractive hybridization of a cDNA library are under way. Our results indicate that the moss *P. replicatum* is tolerant to severe abiotic stress and can be used as a bryophyte model system to study abiotic stress tolerance and as a genetic source with biotechnological potential.

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