

## Water retention pathways in bryophytes: A characterization and quantification study in native vegetation of the Azores

MÁRCIA C.M. COELHO, F. PEREIRA, C. AH-PENG & R. GABRIEL



Coelho, M.C.M., F. Pereira, C. Ah-Peng & R. Gabriel 2016. Water retention pathways in bryophytes: A characterization and quantification study in native vegetation of the Azores. Pp. 436 in: R. Gabriel, R.B. Elias, I.R. Amorim & P.A.V. Borges (Eds). Conference program and abstracts of the 2nd International Conference on Island Evolution, Ecology and Conservation: Island Biology 2016, 18-22 July 2016, Angra do Heroísmo, Azores, Portugal. *Arquipelago*. Life and Marine Sciences. Supplement 9.

Key words: *Location*: Terceira Island, Azores; *Taxa*: Division Bryophyta, Division Marchantiophyta; *Other*: AWC - Absolute Water Content, external water, apoplast water, symplast water, liverworts, mosses.

*Márcia C.M. Coelho (e-mail: marciacmcoelho@gmail.com), Fernando Pereira and Rosalina Gabriel, cE3c/ABG – Centre for Ecology, Evolution and Environmental Changes/Azorean Biodiversity Group & University of the Azores, 9700-042 Angra do Heroísmo, Azores, Portugal; Claudine Ah-Peng, Université de La Réunion, UMR PVBMT, Pôle de Protection des Plantes, Pôle Forêt, Saint-Pierre, Ile de La Réunion, France.*

Bryophytes are poikilohydric plants, meaning that the cellular water content fluctuates with external water availability. They can absorb and conduct water internally (endohydric) and/or externally (ectohydric). The aims of this work are: i) to characterize and quantify the ability of 14 bryophytes, typical of the Azorean native vegetation (six liverworts, eight mosses), to retain water through those pathways; ii) analyse which pathway is dominant among the studied species and iii) assess if there are differences among different life forms – leafy liverworts, acrocarpic, cladocarpic and pleurocarpic mosses. Twelve replicates of each species were collected in Terceira Island in order to obtain the absolute water content (AWC). In the lab, the samples were fully hydrated for at least 12 hours, squeezed and dried, allowing the quantification of saturated, free of external water and dry weights. External and internal water were correlated ( $r=0,82$ ). All species showed a higher (>50%) ability to retain water externally over internally, showing predominantly a ectohydric behaviour. The species with the lowest external water retention ability were *Isoetecium prolixum* and *Polytrichum commune*, which was expected in the latter, since it has a well-developed internal conducting system, with specialized hydroids. As expected, the highest AWC value was achieved by the cladocarpic moss, *Sphagnum subnitens*, which is able to retain 53 grams of water per gram of dry weight, probably due to its morphological structure. Different life forms present significant differences ( $p<0,05$ ) in their ability to retain water externally and internally. Nevertheless, and in accordance with literature, all species may be considered as preferentially ectohydric, so these bryophytes typically maintain their internal water content constant by absorbing water from the external capillary spaces, as needed. Bryophytes clearly behave as terrestrial sponges and besides their own water needs, the retention of additional external water will undoubtedly confer an overall positive effect on the ecosystem functioning.