The Nature and Distribution of Vegetative Desiccation Tolerance in Bryophytes.

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Vegetative desiccation-tolerance, defined as the ability of vegetative structures to recover from the air-dry state, is a widely distributed phenotype in bryophytes. Vegetative desiccation-tolerance is common in mosses, and rare in liverworts & hornworts. Desiccation tolerant bryophyte species can survive equilibration with extremely dry air (i.e. 0-30% RH or less than -162 MPa), and have been identified within 7 classes of bryophytes, the Andreaeopsida, Bryopsida, Polytrichopsida & Tetraphidopsida (mosses), Marchantiopsida & Jungermanniopsida (liverworts) and the Anthocerotopsida (hornworts). We are currently generating a comprehensive checklist of bryophyte species with documented vegetative desiccation-tolerance. We will expand the treatise that vegetative desiccation tolerance in the bryophytes reflects the primitive mechanism that originated in vegetative tissues of land plants by: 1) discussing the distribution of vegetative desiccation-tolerance in bryophytes, 2) comparing and contrasting vegetative desiccation-tolerance amongst bryophytes, and 3) providing specific examples of physiological, molecular and biochemical mechanisms that we think are key components of the phenotype.