

A novel understanding of peristome hygroscopic movements in mosses revealed by histological investigation

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The peristome is located at the extremity of the sporophyte capsule and is considered as the most complex and conservative morphological structure in mosses. In the Arthroodontous mosses, defined by a peristome with one or two rings of articulated teeth made of remnants of thickened cell walls, this structure plays a key role in spore dispersal. Surrounding the opening of the capsule, the peristome teeth control spore release with hygroscopic movements in order to disperse the spores at the most appropriate time. The teeth respond to diverse humidity conditions and this mechanism results in opening and closing movements. These hygroscopic movements are due to the nature and architecture of the peristome. To better understand them, a thorough histological investigation of the arthroodontous peristome was carried out across a large sampling of representative species in the Arthroodontous mosses. Longitudinal serially sectioned slices of the mature and developing peristome revealed the presence or absence of a hydrophobic layer in between the outer and inner faces of the peristome. To complement the anatomical dataset, we led a series of physiological tests to ascertain the function of this layer. Altogether, our combined histological and physiological data led to a novel understanding of the hygroscopic movements of peristomes.