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Moss hair water transport ZHAO PAN, Brigham Young University, NAN WU, Key Laboratory of Biogeography and Bioresource in Arid Land, Chinese Academy of Sciences, RANDY HURD, SCOTT THOMSON, WILLIAM PITT, TADD TRUSCOTT, Brigham Young University — We present an investigation of water transportation on a moss (*Syntrichia caninervis*) indigenous to temperate deserts. The moss typically appears to be in a dry, brown state, but is rehydrated by water during the wet season, making the desert green. Small hairs (500-2000 μm in length, and 40 μm in diameter, d) growing out from the tip of the moss leaves transport water back to the leaves. Through high speed observations and mathematical modeling it appears that this transportation is driven by two different mechanisms. 1) Droplet transport is achieved in three ways: i) A large ($10\,d$) droplet attached between two intersecting fibers will move toward the bases of the leaves by the changing angle between the two hairs. ii) The shape of the moss hair is conical, thicker at the base, producing a gradient that moves fluid ($5\,d$) toward the leaf similar to cactus spines. iii) We also observe that in some cases a Plateau-Rayleigh instability trigger a series of droplets moving toward the base. 2) Micro-grooves on the moss hair transport a film of water along the moss hair when larger droplets are not available. These various water transportation strategies combine to help the moss to survive in the desert and provide valuable insight.

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