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Drought influences the foliar water uptake capacity of temperate tree species

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Climate change-induced drought events are predicted to become more common, resulting in a limited water availability at root-level. This has already led to an observed increase in worldwide drought-induced tree dieback. One of the possible mechanisms allowing trees to bypass a limited soil water availability is foliar water uptake (FWU).

FWU has been identified as a commonly used mechanism by trees originating from a range of biomes, but so far this plant trait has been understudied in species originating from temperate regions. By performing an FWU-capacity experiment, this plant trait was examined during drought for nine tree species occurring in temperate regions. The magnitude of FWU was species-specific but allowed a subdivision in three distinctly different groups with respect to their FWU-capacity as a function of drought at the root-level: Group 1 was unresponsive to drought, whereas Group 2 increased, and Group 3 decreased its FWU-capacity as drought intensified. These results indicate that FWU can partly ameliorate the detrimental effects of drought for some key tree species from the temperate regions. The observed differences in FWU-capacity as a function of drought might be the result of a different FWU pathway, highlighting the need for more research on this pathway.