数据资源：林业专题资讯

打印 下载 A+ A- 分享

Leaves as bottlenecks: The contribution of tree leaves to hydraulic resistance within the soil?plant?atmosphere continuum

编号	040038502
推送时间	20230306
研究领域	森林培育
年份	2022
类型	期刊
语种	英语
标题	Leaves as bottlenecks: The contribution of tree leaves to hydraulic resistance within the soil?plant?atmosphere continuum
来源期刊	Plant，Cell & Environment
期	第385期
发表时间	20221223
关键词	drought responsehy; drodynamic modelling; leaf hydraulic conductivity; plant hydraulicsplant water relations; whole-tree hydraulic conductance;
摘要	Within vascular plants, the partitioning of hydraulic resistance along the soil-to-leaf continuum affects transpiration and its response to environmental conditions. In trees, the fractional contribution of leaf hydraulic resistance (Rleaf) to total soil-to-leaf hydraulic resistance (Rtotal), or fRleaf (=Rleaf/Rtotal), is thought to be large, but this has not been tested comprehensively. We compiled a multibiome data set of fRleaf using new and previously published measurements of pressure differences within trees in situ. Across 80 samples, fRleaf averaged 0.51 (95% confidence interval [CI]?=?0.46?0.57) and it declined with tree height. We also used the allometric relationship between field-based measurements of soil-to-leaf hydraulic conductance and laboratory-based measurements of leaf hydraulic conductance to compute the average fRleaf for 19 tree samples, which was 0.40 (95% CI?=?0.29?0.56). The in situ technique produces a more accurate descriptor of fRleaf because it accounts for dynamic leaf hydraulic conductance. Both approaches demonstrate the outsized role of leaves in controlling tree hydrodynamics. A larger fRleaf may help stems from loss of hydraulic conductance. Thus, the decline in fRleaf with tree height would contribute to greater drought vulnerability in taller trees and potentially to their observed disproportionate drought mortality.
服务人员	孙小满
服务院士	尹伟伦
PDF文件	浏览全文