ABSTRACT BOOK I

Oral Presentations

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essential step in sclerenchyma formation. Knock-out or knock-down OSH15 in twi1 could rescue the twisted leaf phenotype. These studies identified a key factor controlling cell pattern formation in rice leaves.

**T4-09-03**

Water supply and demand remain coordinated during breakdown of the global scaling relationship between leaf size and major vein density

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Vein networks that disobey the global scaling of major vein density with leaf size shed light on functional constraints of vein network formation in dicotyledons. Based on vein traits of 55 species of pantropical Ochnaceae, stomata and climatic niche data, and a dated molecular phylogeny, we unveiled major structural shifts in vein networks through deep time, relationships between leaf size, vein and stomatal traits. Our study shows that the breakdown of the vein-leaf size scaling is associated with vein networks that exhibit densely spaced 2° veins and reduced minor veins, and that this character combination evolved multiple times independently in Ochnaceae. In spite of the major shifts in vein architecture in this venation type, the coordination of vein and stomatal densities remains similar to that in species with normally spaced 2° veins and abundant minor veins.

**T4-09-04**

Daily dynamics of xylem sap properties and plant hydraulic traits in hybrid aspen

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Plants have to cope with very different environmental conditions, which vary circadianally in most habitats, shaping daily patterns in physiological processes including long-distance water transport and xylem sap properties. Some of them are poorly documented in natural conditions; especially there is a lack of nighttime measurements. The daily dynamics of physico-chemical properties of xylem sap and their co-variation with xylem traits was investigated in hybrid aspen (*Populus tremula* L. × *P. tremuloides* Michx) in field conditions. K⁺ concentration ([K⁺]), electrical conductivity (Sₑ), osmolality (Osm) and pH of the xylem sap, as well as branch hydraulic traits including whole-branch (Kᵦ), leaf blade (Kₑ) and petiole hydraulic conductances (Kₛ) and bare branch hydraulic conductance (Kᵦ), were measured in the field over 24-h cycles. The study aimed also to clarify which environmental drivers influencing the daily dynamics of these parameters. All studied xylem sap properties and hydraulic characteristics including Kᵦ, Kₑ and Kₛ presented clear daily dynamics. Air temperature (Tᵦ) and photosynthetic photon flux density (PPFD), but also water vapour pressure deficit (VPD) and relative humidity (RH), had significant impacts on Kᵦ, Kₑ, Kₛ [K⁺], and Sₑ. In the same time Osm varied only with light intensity (PPFD), while Kₑ was influenced by atmospheric evaporative demand expressed as Tᵦ, VPD or RH. Xylem sap pH depended inversely on soil water potential (Ψₛ), and during daylight, also on VPD. Although soil water content was close to saturation during the study period, Ψₛ influenced also [K⁺] and Sₑ. The enhancement of branch hydraulic conductance in the morning was associated with the upregulation of potassium ion concentration in xylem sap. The present study presents evidence of coupling between circadian patterns of xylem sap properties and plant hydraulic conductance providing adequate water supply to foliage under environmental conditions characterised by diurnal variation. A combination of different atmospheric variables generating AED rather than irradiance predominantly controls the circadian patterns of tree’s hydraulic conductance and xylem sap ionic content in field conditions. The ionic content of xylem sap also affects plant hydraulic traits, but atmospheric variables mask this effect: the direct impact of environmental conditions on branch hydraulic efficiency outweighs that of xylem sap properties.

**T4-09-05**

Global analysis of the evolution of leaf venation networks in angiosperms

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Understanding the mechanistic implications of functional trait variation and how this variation evolved through time is key to understanding species adaptation to their environments and how they will respond to global environmental changes. Leaf vein traits are proving especially important to understanding plant performance, environmental adaptation including drought tolerance and even the paleohistory of ecosystems. We quantified leaf morphological and venation characteristics for >5,000 angiosperm species distributed worldwide based on the cleared leaf collections of D. Axelrod and J. Wolfe, to describe the evolution of vein densities and vein architecture types across biomes including their relationship with life form, climate and evolutionary diversification.

**T4-09-06**

The forgotten side of leaf veins: Phloem hydraulic architecture of Poplar and Ginkgo

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Over the last decade, research in leaf vasculature has unveiled fundamental form-function properties that govern leaf hydraulics, consequently affecting traits such as drought tolerance and maximum rates for gas exchange among others. Most research deal-