Seminar Jeudi AMAP

Santiago is currently a postdoctoral researcher at the School of Forestry and Environmental Studies of Yale University. Working on physiological plant ecology, he is interested in the functional responses of vegetation to drought stress using experimental and modelling approaches.

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11h00 – 12h00

Salle 201, Bâtiment PS2, CIRAD-UMR AMAP,
Boulevard de la Lironde

Understanding the effect of plant-water relations on the distribution and survival of species using a nanometers-to-landscape approach

presented by

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ABSTRACT

Increasing frequency and severity of drought events are triggering the dieback of plant communities across the world. Understanding how vegetation responds to water deficit is therefore a major goal in current ecological research. Using a functional approach, we have found that, amongst other commonly measured traits, the drought-induced dysfunction of the xylem hydraulic system is a major driver of the distribution of tropical species. Consequently, xylem embolism vulnerability is significantly related to environmental variables across the landscape. However, to understand the fate of plant communities under climate change, it is important to study the levels of dehydration that impact major physiological processes at the organ level.

In a second part of this presentation, I will show a sequence of leaf functional damage over increasing dehydration. Our findings suggest that stomatal and leaf hydraulic declines are impacted early during dehydration. Damage to the photochemical apparatus, which functional decline is commonly used as a marker of drought stress, seems to occur only under extreme dehydration. By analysing a large set of anatomical features, we have found that the thickness of the membrane covering the lateral pits of the xylem conduits is correlated with the drought tolerance of the hydraulic apparatus. This finding highlights the influence of a nanometrical anatomical feature on the drought resistance of plant species with different anatomical organizations. In order to further understand how anatomical structure influence the hydraulic function of the plant, I am currently using cutting-edge imaging techniques such as x-ray microtomography. We will discuss how this technique can help us to understand the hydraulic function of the plant *in vivo*, and how this knowledge can be used to predict the survival of plant communities under global climate change.

KEY WORDS

Drought; Ecophysiology; Leaf physiology; Plant hydraulics; Microtomography; Xylem anatomy.

Invited and animated by:	Dr. Claire FORTUNEL (UMR AMAP)
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