

Malaga to Seville: Varied Plant Science Research and Exploring the Plant Biological Spectrum

Premkumar, Albert

Visiting Guest Scientist, Plant Biotechnology Dept., Instituto de Recursos Naturales y Agrobiología (IRNAS), Spanish National Research Council (CSIC), Sevilla, Spain.

Five core topics of plant science research will be covered in the presentation.

Ex vitro acclimatization: In a study at Malaga University, we examined the effects of different sucrose concentrations on the physiological traits of micropropagated juvenile avocado plants. Preconditioning with varied sucrose levels led to significant changes in physiological parameters during acclimatization. In a separate investigation, we analysed levels of Rubisco subunits in various tree saplings grown *in vitro* and *ex vitro*. Our findings revealed species-specific influences of *in vitro* conditions on Rubisco subunits.

Chitin signaling: We developed a high-throughput screening system for *Arabidopsis* mutants, allowing rapid evaluation of thousands of plants in just a few weeks. Additionally, we identified a key receptor-like kinase called CERK1 involved in chitin elicitor signaling in *Arabidopsis*.

Hypoxia signaling: Hypoxia disrupts plant metabolism and stunts growth. Phospholipase D (PLD) is implicated in stress signaling. *Arabidopsis* has 12 PLD isoforms. We studied their role in hypoxia using wild-type and mutant *Arabidopsis*.

Silicon's alleviating roles: We investigated how silicon affects chloride accumulation in wheat plants. Silicon is known to alleviate stress in plants. We studied two wheat cultivars with different salt sensitivities, observing chloride levels with and without potassium silicate. Our findings show that silicon treatment reduces chloride buildup in leaf cells, improving salt tolerance

Cl⁻ and NO₃⁻ interactions: Nitrate and chloride play crucial roles in plant nutrition and physiology, affecting nutrient uptake, ion balance, and stress tolerance. Investigating their interactions is vital for improving agricultural practices and enhancing plant productivity. At CSIC-IRNAS in Seville, we are studying the roles of nitrate transporters in chloride uptake and chloride transporters in nitrate uptake using *Arabidopsis* knock mutants.