CSCS-/RCB–Colloquium (Part II)

Thursday, March 5th, 2026, at 2.30 p.m.
H53

Dr. Sylvia M.S. Tinôco

Embrapa Maize and Sorghum

(Sete Lagoas, Brazil)

"Plant-soil-microorganism interactions: enhancing phosphorus acquisition of maize and sorghum in tropical soils"

Marginal soil fertility, soil acidity, aluminum toxicity, and low nutrient levels, especially phosphorus (P), are major limiting factors to cereal production in highly weathered tropical soils. Cereals receive almost half of the world's phosphate fertilizer applications. Therefore, plant P-use efficiency (PUE) should be increased, aiming a more sustainable agriculture. One alternative is to use less soluble P-sources associated that are more efficient in PUE. In addition, the symbiosis between P with plant genotypes solubilizing bacteria and/or arbuscular mycorrhizal fungi and plants can contribute to increase the acquisition of this nutrient and promote the growth of cultivated plants. A receptor-like cytoplasmic kinase gene named PHOSPHORUS-STARVATION TOLERANCE 1 (PSTOL1) is the first gene candidate to P-efficiency (tolerance to low soil P) identified. Among others the Tinoco lab has identified and characterized the homologous genes in maize and sorghum. In parallel, they showed that the most productive maize and sorghum genotypes have higher root angle and area, increasing foraging on the soil surface and P-acquisition. Moreover, they found that the crop type, genotype and fertilizer type are the main factors affecting grain yield, root system, genetic diversity and abundance of microorganisms. Thus, the combined use of less reactive P-sources, which could be more soluble over time by the physicochemical processes and soil microbiota activity, together with more efficient genotypes might reduce the amount of soluble phosphate fertilizers applied annually to crops.

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