

## Phosphorus and sucrose effect on maize root

de Sousa, S.M., Parentoni, S.N., Guimarães, C.T., Magalhães, J.V.,  
Vasconcelos, M.J.V. Embrapa Milho e Sorgo, Sete Lagoas, Brazil.

Phosphorus is one of the most limiting nutrients for crops in the world and the least efficiently used by plants. To increase the absorption capacity of Pi, plants need to adapt the biochemistry, physiology and morphology of their root system. Previously, we evaluated maize genotypes for their Pi uptake and use efficiency by verifying grain yield under contrasting levels of phosphorus. In this study, two contrasting genotypes were used to perform a detailed morphological characterization of the root system. We have standardized the growth conditions in nutrient solution and the parameters to be assessed. To test the hypothesis that Pi and sucrose availability have significance on root growth, we tested three different sucrose concentrations in low and high Pi conditions on two maize contrasting lines. We showed that sucrose influenced maize development, modifying not only genetic and biochemical profiles, but also root morphology. Plants grown on sucrose showed a smaller number of fine roots that had higher sugar content, and genes involved on these processes were also affected. The shoots from sucrose grown plants presented higher Pi and lower K and Ca content. We showed with this study that low Pi and no sucrose at 12 days after treatment are the most feasible conditions to distinguish maize contrasting genotypes for Pi use efficiency.

*Zea mays*, gene expression, morphology, physiology

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