



Tobacco transformation with rice *Phosphorus Starvation Tolerance 1* gene and its sorghum and maize homologs

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Low phosphorus (P) availability in soil is a major constraint for crop production in tropical regions. Phosphorus-Starvation Tolerance1 (OsPstol1) is a protein kinase that enhances root surface, P acquisition and grain yield in rice under P deficiency. Sorghum homologs of OsPstol1 were identified by association mapping in two sorghum association panels phenotyped for P uptake, root system morphology and architecture in hydroponics and grain yield and biomass accumulation under low-P conditions, in Brazil and/or in Mali. Maize and sorghum candidate genes co-localized with quantitative trait loci for traits underlying root morphology and dry weight accumulation under low P via Quantitative Trait Loci mapping. In order to validate the function of these genes, rice OsPstol1 (control) and its maize (*ZmPSTOL3.06*, *ZmPSTOL8.02* and *ZmPSTOL8.05_1*) and sorghum (*Sb07g002840*, *Sb03g031690* and *Sb03g006765*) homologs were cloned downstream of ubiquitin promoter in pMCG1005 vector, using *bar* gene as a selective marker. Tobacco *Petit havana* plants were genetically transformed via *Agrobacterium tumefaciens* EHA101 strain and regenerated from selected callus in shooting and rooting medium supplemented with 100 mg/ml of Tioxin and 1 mg/L of Phosphinothricin. Multiplex PCR with gene specific (~700 bp) and *bar* (~400 bp) primers confirmed the presence of *Pstol1* genes in tobacco plants. Currently putative transgenic tobacco plants harboring the seven different genetic cassettes are in the greenhouse and are going to be used for molecular and functional analysis of *Pstol1* homologs regarding the enhancement of root surface, P acquisition and grain yield under low P conditions.

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