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Phosphorus use efficiency by cotton measured through 32P isotope technique

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Deficiency of phosphorus (P) is the major limitation to agricultural production in the Brazilian Savannah (Cerrado), which is naturally poor in this nutrient. Most of the P applied by fertilizer in Cerrado soils are converted into low solubility forms and can not be easily absorbed by plants. This occurs for characteristics of adsorption, conditioned by the predominance of low pH and aluminum and iron oxides in the clay fraction. The development of genotypes and cultivars with greater capacity to grow up in soils with low P availability ('phosphorus efficiency') is interesting to improve the agriculture in these areas in a sustainable way. Cotton (Gossypium spp.) is the main product for the fibers used nationally and globally in the textile chain. This study aim was to evaluate the efficiency of absorption and utilization of P by cotton cultivars/genotypes grown in Cerrado soil by the isotopic dilution technique. The soil classified as Ultisols, was labeled with the radioisotope 32P.The experiment was conducted in a greenhouse in a completely randomized design factorial 2 x 17. Factors were considered two levels of P (insufficient = 20 mg kg-1 and sufficient = 120 mg kg-1) and 17 genetic materials of cotton recommended for Cerrado region. Phosphorus levels influenced significantly the shoots dry matter production, the P content and accumulation, the 32P specific activity, the L value and L value less seed cotton P by cultivars and genotypes. The hierarchical clustering analysis used to verify the similarities between the cultivars and genotypes of cotton, classified them into internally homogeneous groups and heterogeneous between different groups. Cultivars FMT 523, FM 910 and CNPA GO 2043 were the most responsive to phosphate fertilizer in sufficient level of P, while the genotype Barbadense 01 and cultivars FM 966LL, IPR Jataí, BRS Aroeira and BRS Buriti were most efficient absorbing P in soils with insufficient level.