

Marker-assisted selection for tolerance to aluminum toxicity and increased phosphorus acquisition efficiency in grain sorghum breeding lines

Marcos de Oliveira Pinto⁽¹⁾; Thaís Fernanda Silva⁽²⁾; Crislene Vieira dos Santos⁽²⁾; Cícero Bezerra de Menezes⁽³⁾; Robert Eugene Schaffert⁽³⁾; Jurandir Vieira Magalhães⁽³⁾.

⁽¹⁾ Analista de pesquisa e desenvolvimento; Embrapa Milho e Sorgo (CNPMS); Sete Lagoas, MG; ⁽²⁾ Graduanda em Engenharia Agrônômica; Universidade Federal de São João Del-Rei; Sete Lagoas, MG; ⁽³⁾ Pesquisador; Embrapa Milho e Sorgo (CNPMS); Sete Lagoas-MG;

Keywords: *AltSb*, *Pstol1* and *Sorghum bicolor*

Soils in tropical regions of Brazil are generally characterized by low pH, high aluminum saturation, low levels of P and high P fixation. These characteristics limit agricultural production in these regions. Embrapa Maize and Sorghum has identified and characterized genes in sorghum for tolerance to Al toxicity and more efficiency in phosphorus acquisition, *Alt_{SB}* and *SbPstol1*, respectively. The objectives of this study was to fine tune and validate marker assisted selection for tolerance to Al toxicity and increased phosphorus acquisition in grain sorghum restorer lines at Embrapa sorghum molecular breeding program for tropical regions. A total of 436 F_{2:5} progenies derived from crosses between two elite aluminum tolerance sources, such as SC549, SC566-14 and six elite breeding lines, but not tolerant to Al toxicity and adapted to low P soils were used in this study. These progenies were visually selected in previous generations for good agronomic characteristics. The plants were genotyped with 4 SNPs associated with tolerance to aluminum (*Alt_{SB}_5519*, *Alt_{SB}_6083*, *Alt_{SB}_6083_CA*, *Alt_{SB}_8423*) and 4 SNPs associated with increased phosphorus acquisition (*SbPstol1*) (*Sb03g031680_1541pb*, *Sb03g006765_1998pb*, *Sb03g006765_2067pb* and *Sb03g006765_2141pb*). Seventy-seven progenies were identified with favorable alleles for aluminum tolerance (*Alt_{SB}*) and increased phosphorus acquisition efficiency (*Pstol1*). These lines will be phenotyped in an Al toxicity site and a low P phosphorus site at Embrapa to validate increased tolerance to Al toxicity and increased P acquisition efficiency.

Financial support: FAPEMIG, Embrapa Milho and Sorgo, and Generation Challenge Programme