

Genetic Variability in Sorghum for P Efficiency and Responsiveness

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Thirty six sorghum lines were evaluated for P efficiency and responsiveness at the National Maize and Sorghum Research Center of EMBRAPA/CNPMS during the 1995/96 growing season at Sete Lagoas, MG, Brazil. The experiment was conducted on a Dark Red Latosol under savanna vegetation soil at 5 and 18 ppm P (Mehlich-1 extractor). The soil was limed to raise the pH to a range between 5.5 and 6.0. Triple superphosphate was broadcast and incorporated to reach the desired P levels as determined by an incubation curve. N and K were applied based on the soil analysis. The 36 lines included 12 traditional lines representing both tolerance and susceptibility to Al toxicity and 24 lines derived from crosses between elite B-lines and a source of tolerance to Al toxicity, SC 283-14 E (IS7173C). Twelve lines were susceptible to toxic levels of Al and 24 lines were tolerant. Toxic levels of Al did not occur in the plow layer but were present in the subsoil. Genotypes with above average grain production at the low P level were classified as P-efficient and genotypes with above average relative response to P were classified as responsive to P. Average grain yield ranged from 1.76 to 3.52 t/ha at low P with a mean of 2.63 t/ha

and from 1.84 to 5.39 t/ha at high P with a mean of 3.68 t/ha. The relative response to applied P ranged from less than zero to 93% with an average of 41%. The 36 entries were classified into four groups, efficient and responsive to P (ER), nonefficient and responsive to P (NR), efficient and not responsive to P (EN), and nonefficient and not responsive to P (NN). Tolerance and susceptibility to Al toxicity was not directly related to P efficiency and P responsiveness. The standard for tolerance to Al toxicity, SC 283-14 E, was near average for P efficiency (2.70 t/ha at low P) and not responsive to additional P (12%), whereas the standard for susceptibility to Al toxicity, the commercial male sterile line BR 007B, was near average for P efficiency (2.60 t/ha at low P) and highly responsive to additional P (93%). The Al-tolerant line of a P-non efficient near-isogenic pair for Al toxicity was more responsive to P (70%), whereas the Al susceptible line of the pair was less responsive to P (33%). Two Al tolerant near-isogenic recombinant lines from the cross between BR 007 and SC 283-14 E were near average for P efficiency and highly responsive to P (60 and 90%).

Identification and Characterization of the Ma_5 and Ma_6 Maturity Loci in Sorghum.

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The genetics of maturity in sorghum have been well documented for many years, and it has become a model for research concerning the factors that affect maturity or photoperiodic response in tropical cereals. Since Quinby¹ (1974) first identified and characterized the Ma_1 , Ma_2 , Ma_3 , and Ma_4 loci in sorghum, maturity in sorghum has been defined by the alleles at those loci and their interaction. Recently, an extremely photoperiod-sensitive hy-

brid was discovered from the cross of 90T190 and RTx430. When planted in early April, hybrids from this cross are extremely photoperiod-sensitive and they will not flower until mid-October (up to 180 days in Central Texas). This "ultralate" phenotype is not caused by known combination of alleles at the four Ma loci currently characterized. The objective of this research was to determine the genetic inheritance of this ultralate (photoperiod-sensitive)