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PHENOTYPES AND GENES ASSOCIATED WITH ROOT TRAITS UNDERLYING PHOSPHORUS ACQUISITION EFFICIENCY IN MAIZE

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Embrapa Maize and Sorghum; Embrapa Maize and Sorghum; Embrapa Maize and Sorghum; Embrapa Maize and Sorghum; Embrapa Maize and Sorghum; Embrapa Maize and Sorghum; Embrapa Maize and Sorghum; Embrapa Maize and Sorghum;

Phosphorus (P) is an essential nutrient to plants and is acquired as inorganic phosphate from the rhizosphere solution. P is one of the least available nutrients particularly in highly weathered, tropical soils, limiting substantially plant growth. An interesting approach to circumvent P deficiency in tropical areas is to explore the genetic diversity available in plants to breed cultivars more efficient in P acquisition. It has been shown that root traits, such as root length and volume, are important to determine if a genotype is P efficient. This study aimed to study root traits that could be involved with P acquisition efficiency and to identify candidate genes with an expression profile consistent with a possible role in root morphology. Field phenotyping results under low and high P conditions enabled us to define two contrasting genotypes for P acquisition efficiency that were used for root traits studies. We standardized the nutrient solution conditions in order to find the best phenotyping parameters for root early screening. Root traits presented overall a high heritability and a low coefficient variation. Also, out of 24 root traits analyzed, 10 presented a correlation above 0.9. These results together with PCA allowed us identify four root traits which adequately represent the variation observed among genotypes. The information described in this study is important for designing early selection strategies for P efficiency in maize, which are needed to support advanced molecular and physiological studies. Supported by Embrapa, Fapemig, McKnight Foundation and Generation Challenge Program (GCP).