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Kinetic of water consume is an informative and useful trait for high through phenotyping for drought response and GWAS analysis in soybean

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Drought is one of the most constraint environmental stress factor which limit crop productivity and soybean is not the exception. Efforts for introducing, in crop breeding program, traits associated with drought tolerance have been slow and frustrating. The multigenic character of drought tolerance is part of this barrier avoiding the speed up of breeding for drought tolerance. Most of high through phenotyping platforms base on the diagnostic of changes in the plant physiology using a complex system of analysis. In the aim to find a simple and informative methods for evaluating response to drought stress genotype dependent, our group carried out the phenotyping of the response to drought of 200 soybean genotypes under semi-controlled conditions. Photosynthetic activity, stomata conductance, leaf water potential, canopy thermography and foliar area were analyzed. Also, kinetic of water consume was registered daily after drought was imposed. Resulting curve of water consume was disassembled into components and mathematical constants revealed. Two constants that include the variable time and the maximum consume showed good association with physiological behavior of genotypes in response to soil water content. In base of these constants a GWAS was performed in the collection of 200 genotypes resulting in significant SNPs in chromosomes 3, 10 and 16. We propose that this simple method of classification could contribute to the analysis of drought response of soybean genotypes. Deeper analysis of contrasting genotypes in this parameter would help the improvement of the knowledge of physiological basis of drought tolerance in soybean.