SITIS – Plant Phenotyping Platform

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Plant phenotyping in greenhouse requires high physical effort for management and data collection [1, 2]. To minimize this effort, SITIS Platform of Plant Phenotyping for Drought Tolerance was projected and built by Embrapa Rice and Beans to automate the management and data collections in greenhouse and consists of 384 columns of soil (diameter: 25 cm; height: 100 cm) placed on an digital scale with individualized monitoring of the water supply. SITIS is composed by two integrated modules: 1) SITIS Web – responsible by the planning and supervision of the environment variables, irrigation during the experiment and recording the results. The monitored variables are: soil moisture until it reached five depth layers (20, 40, 60, 80 and 100 cm), evapotranspiration and climatic conditions: temperature, relative air humidity and solar radiation; 2) SITIS Embedded – responsible for the monitoring and actions of water supply, it uses an embedded system connected to an digital scale with capacity of up 100 kg and accuracy of 10 g, capacitive sensors of soil moisture, solenoid valve connected to an hydraulic system and sensors of air temperature, air relative humidity and solar radiation. This automated SITIS platform will allow reducing the human effort and will improve the quality of the data collected.

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References:
[1] GUIMARAES, C.M., NARCISO, M.G., TORRE NETO, A., et al. *Plataforma de fenotipagem para tolerância à deficiência hídrica*. In: SIMPÓSIO SOBRE INOVAÇÃO E CRIATIVIDADE CIENTÍFICA NA EMBRAPA, 2., 2010, Brasília, DF. Posteres. Brasília, DF: Embrapa, 2010.
[2] Novas rotas para o melhoramento de plantas. *Revista XXI Ciência para a vida Embrapa: Semeando água*, Brasília, DF, n. 08, p. 36-47, set./dez. 2014.