

Plant irrigation automated control in the SITIS Platform

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Plant irrigation in greenhouse experiments executed by persons results in problems like: exposition to severe climatic conditions (high air temperature and relative humidity), low accuracy in the applied water amount and in recorded data, irrigations being executed after normal period and at the weekend [1]. The technical team of Embrapa Rice and Beans developed a system named SITIS Platform of Plant Phenotyping for Drought Tolerance for automating the planning and execution of plant irrigations in the greenhouse. The SITIS has two integrated modules: 1) SitisWeb - responsible by the planning of the irrigations in all soil columns with an human-machine interface, based on Java EE technology and PostgreSQL; 2) SitisEmbbded - responsible by irrigation in each soil column from the rules planned and by returning with the results to the SitisWeb, based on embedded technology, Java SE, SQLite, connected to a digital scale with capacity of up 100 kg and accuracy of 10 g and with a solenoid valve connected to an hydraulic system. The valve doesn't have flow control of water and has two states: open and close. The irrigation algorithm was projected to perform many partial water applications with a cycle of opening and closing of the valve associated to monitoring of the weight of the soil columns because there isn't uniformity water pressure in each column. The tests showed that irrigations are executed accurately regardless of water pressure. Thus, the solution of irrigation control developed fully meets the identified problems.

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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. Poster. Brasília, DF: Embrapa, 2010.