

The Vice-chancellor of Ghent University has the honour of inviting you to attend the public defense of the doctoral dissertation of

Farzaneh RAZAVI (MSc.)

Title of the doctoral dissertation:

Molecular and Physiological Responses to Drought Stress in Fragaria *Moleculaire en Fysiologische Reacties op Droogtestress bij Aarbei*

The public defence will take place on 3 December 2012 at 4pm in the Academieraadzaal (Hall of the Academic Board), room A 0.030 Faculty of Bioscience Engineering, Coupure links 653, 9000 Ghent.

There will be a contiguous reception to which you are heartily invited. Please confirm your attendance before 27.11.2012 to: farzaneh.razavihosseinabadi@ugent.be OR farzanehrazavi2003@yahoo.com

Promoters

Prof. dr. ir. Marie Christine VAN LABEKE
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Dr. ir. Jan DE RIEK
Institute for Agriculture and Fisheries Research, Unit Plant, Melle (ILVO), Belgium

Board of Examiners

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University of Florida,
Gainesville, USA

Prof. dr. ir. Katy STEPPE
Faculty of Bioscience Engineering,
Ghent University, Belgium

Prof. dr. ir. Wannes KEULEMANS
Faculty of Bioscience Engineering,
Catholic University of Leuven,
Belgium

Abstract of the doctoral research

Drought stress and its effects on crop productivity in horticultural systems are receiving increasing interest. Strawberry cultivation relies on irrigation and is sensitive to even a short period of water deficit. The main objectives of this study were to identify and characterize the plant defense mechanisms to drought stress in *Fragaria* and to classify available genotypes based on their drought tolerance capacity. Chlorophyll fluorescence proved to be a useful non-destructive technique to detect drought stress in strawberry. The osmotic adjustment by sugars and polyamines as well as anti-oxidative response was involved in plant response to drought stress. Candidate genes that might be involved in plant response to water deficit were cloned and isolated from *Fragaria*. EST markers were developed from these candidate genes and applied together with AFLP markers for a marker-trait association analysis for drought tolerance in *Fragaria*. EST markers associated to drought tolerance in *Fragaria* were identified. The differential expression level of *Fragaria* homologous sequences (candidate genes) was also analyzed in a selected set of four *Fragaria* genotypes under different stages of water deficit. Overall, results confirmed the involvement of carbohydrate metabolism in osmotic adjustment, of antioxidant ROS scavenging defense system and of ABA-dependent and -independent signalling pathways in *Fragaria* adaptive response to water deficit. Finally, a gene silencing (RNAi)/over expression approach was applied for further functional analysis under drought stress.

Brief Curriculum Vitae

Farzaneh RAZAVI was born in Isfahan (Iran) on the 6th of July 1973. In 1999 she obtained the 3 years Master degree in Crop Physiology and Breeding, in Tarbiat Modarres University (TMU) with great distinction. From 1999 to 2004 she worked as a member of the scientific board and academic staff in the Department of Plant Biotechnology and Physiology, (SPII, IRAN). In this period she managed and completed different research projects on crop breeding. From 2004 to 2006 she was granted a scholarship from the Iranian Ministry of Science to continue her education in a pre-doctoral program at KULeuven, Belgium and was involved in research about QTL analysis of ascorbic acid content in *Malus* sp. End of 2006 she started her PhD at the Department of Plant Production, Ghent University and ILVO-Plant with a grant of the Iranian Ministry of Science followed by a BOF scholarship from Ghent University. She presented her results at different international conferences and published in A1/ISI international journals.