

## S08P10

### **Cloning and functional analysis of stress-responsive genes in *Poncirus trifoliata***

Liu J.H., Wang J., Huang X.S. and Sun P.P.

Huazhong Agricultural University, College of Horticulture and Forestry Science, China. [liujihong@mail.hzau.edu.cn](mailto:liujihong@mail.hzau.edu.cn)

*Poncirus* is a widely used rootstock for citrus because it has several desirable attributes, such as cold hardiness and Citrus Tristeza Virus tolerance. However, it is not drought and salt tolerant. On the other hand, most of citrus commercial cultivars are not cold tolerant. Therefore, it is necessary to obtain novel germplasms of either rootstock or scion cultivars with enhanced stress tolerance. As a complementation to the traditional breeding, genetic transformation has been proven as an effective approach to generate plants with enhanced stress tolerance. To make this new approach applicable to citrus cultivar improvement, it is obligatory to clone and functionally characterize genes involved in stress response. During the last years we have made efforts to isolate several functional or regulatory genes involved in stress response from trifoliolate orange, including *PtADC*, *PtrABF* and *PtrMAPK*. Function of the genes in stress tolerance was characterized using *Arabidopsis* or tobacco transformation. For example, overexpression of *PtADC* in *Arabidopsis* led to enhanced tolerance to osmotic stress, drought and cold stress. Interestingly, transgenic plants exhibited longer roots and smaller stomatal density. Transformation of *PtrABF* and *PtrMAPK* in tobacco resulted in elevated drought tolerance, accompanied by the induction of stress-responsive genes and enhanced antioxidant system for ROS scavenging. These genes hold great potential for genetic transformation in citrus or trifoliolate orange.

## S08P11

### **Characterization of water deficit tolerance of *Poncirus trifoliata* genotypes as related diversity**

Ben Yahmed J.<sup>1</sup>, Costantino G.<sup>2</sup>, Ben Mimoun M.<sup>3</sup>, Talon M.<sup>4</sup>, Ollitrault P.<sup>1</sup>, Morillon R.<sup>1</sup> and Luro F.<sup>2</sup>

<sup>1</sup>Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD), Amélioration des Plantes à Multiplication Végétative, France; <sup>2</sup>Institut National des Recherches Agronomiques (INRA), France; <sup>3</sup>Institut National Agronomique de Tunisie (INAT), Arboriculture Fruitière, Tunisie; and <sup>4</sup>Centro de Genómica, Instituto Valenciano de Investigaciones Agrarias (IVIA), Spain. [jihene.benyahmed@gmail.com](mailto:jihene.benyahmed@gmail.com)

Rootstock provides better adaptation to biotic and abiotic constraints. *Poncirus* and its hybrids are widely used since they are tolerant to Citrus Tristeza Virus. However, when grafted, most of them are considered to be sensitive to salinity and water deficit. Diversity does exist within the *Poncirus trifoliata* specie but little is known regarding the behaviour variability of genotypes to abiotic constraints. The citrus diversity of 72 *P. trifoliata* genotypes was investigated using SSR markers. Two mayor genetic groups were clearly identified. Five genotypes, belonging to each genetic group, were then selected to investigate their properties of tolerance to water deficit. Water deficit was applied by withdrawing irrigation for 4 weeks. Physiological parameters such leaf stomatal conductance and quantum yield of PSII electron transport, soil water potential, leaf osmotic pressure and transpiration were estimated. Among genotypes, we observed that some genotypes such as 'Rubidoux' were clearly more tolerant to water deficit than others such as 'Pomeroy'. Interestingly, the genotypes that were sensitive belonged to one genetic group and the tolerant ones belonged to the other group. Therefore, it sounds that among the *Poncirus* genus, it is possible to select genotypes as parent in breeding programs, which are more tolerant to water deficit.

## S08P12

### **Screening nine citrumelo rootstocks for tolerance to drought conditions**

Fadli A.<sup>1</sup>, Beniken L.<sup>2</sup>, Omari F.E.<sup>2</sup>, Benkirane R.<sup>1</sup> and Benyahia H.<sup>2</sup>

<sup>1</sup>Ibn Tofail University (IUT), Department of Plant Science, Kenitra, Morocco; and <sup>2</sup>Kenitra Regional Center for Agricultural Research (CRRAK), Department of Plant Breeding and Phylogenetic Ressources Conservation, Kenitra, Morocco. [a.fadli.uit@gmail.com](mailto:a.fadli.uit@gmail.com)

Two months old citrumelo rootstocks groups seedlings were grown in 0.5 L plastic pots in a greenhouse at El Menzeh (CRRAK Kenitra), INRA Morocco, under three moisture regimes (100%, 75% and 50% Hfc) to investigate the effects of water stress on their morphological and physiological characteristics such as plant height, number of leaves per plant, fresh matter accumulation, transpiration ratio, chlorophyll content (SPAD), soluble solids and proline content, respectively. A split plot design with ten citrus rootstocks × three treatments and