EXPRESSION OF GENES INVOLVED IN DROUGHT RESPONSE IN *PRUNUS* ROOTSTOCKS

B. Bielsa[1], C. Leida[2], M.J. Rubio-Cabetas[1]

(1) Unidad de Hortofruticultura. CITA – Gobierno de Aragón, Avda. de Montañana 930, 50059 Zaragoza, mjrubioc@aragon.es

(2) Fondazione Edmund Mach (FEM) Research and Innovation Centre Molecular Biology of Fruit Crops Via E. Mach, 1-38010 San Michele a/A (TN), Italy

Climate change conditions accentuate drought since 10% reduction of precipitation corresponds to 25% of soil water loss. Therefore, adapted rootstocks are imperative to water stress conditions. We have studied the expression patterns of four genes coding for proteins related to ABA pathway and abiotic stress.

Plant Material

Three *Prunus* hybrid rootstocks, almond x peach hybrid (*P. amygdalus* x *P. persica*) 'Garnem', their progenies 'P.2175' x 'Garnem'-3 tri-hybrid (*P. cerasifera* x [*P. amygdalus* x *P. persica*]) and 'P.2175' x 'Garnem'-9 tri-hybrid were investigated.

Experiment

Drought conditions (35% water soil content) with a subsequent re-watering period were tested for plants in pot during one month.

Physiological and Molecular Analysis

- Physiological Analysis
  - Stomatal Conductance
  - Leaf Water Potential (LWP)
  - Epinasty
- Shoot Ash Content Analysis
- Expression Patterns
  - Dehydrin (*ppa005514m*)
  - LEA protein (*ppa008651m*)
  - A20/AN1 zinc finger (*ppa012373m*)
  - bZIP transcription factor (*ppa013046m*)

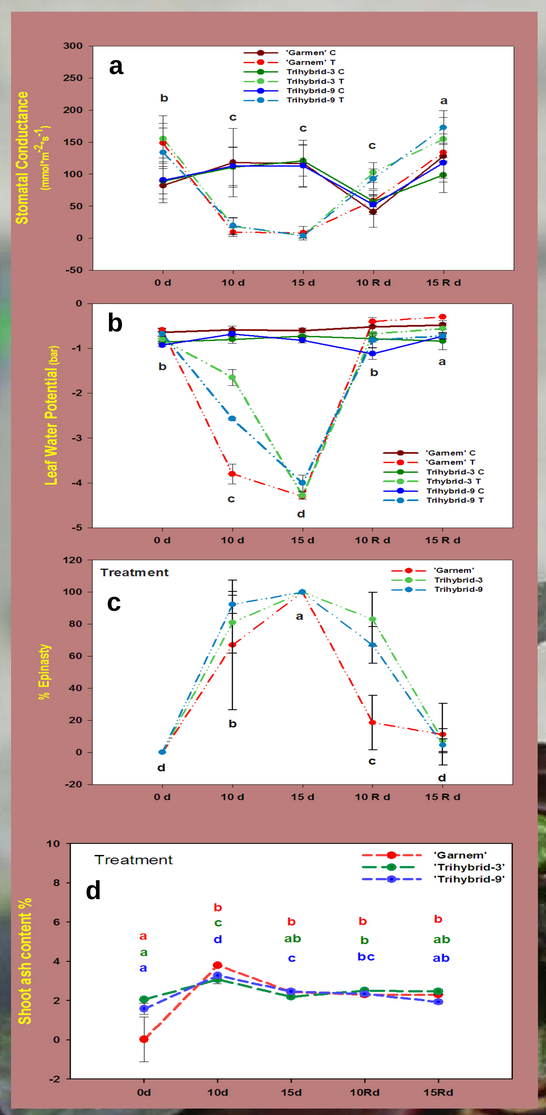

Fig 1. Physiological parameters during drought and re-watering periods (C: Control; T: Treatment). For each genotype, mean values followed by the same letter are not significantly different at P≤0.05 within treatments.

Results and Discussion

At 10 days of stress 'Garnem' showed the lowest value of Stomatal Conductance (Fig 1 a) and LWP (Fig 1 b). This decrease was faster in 'Garnem' than in the two tri-hybrids, showing the lowest value at 15 days of treatment. The low value of 'Garnem' correlates with the highest shoot ash content (Fig 1 d) at 10 days, which could indicate that 'Garnem' has worse Water Use Efficiency (WUE) than the tri-hybrids.

During the re-watering period, all genotypes recovered the basal levels for all the measured parameters. Although 'Garnem' leaves re-sprouted (Fig 1 c) before than in the tri-hybrids, Stomatal Conductance it is still lower than in their tri-hybrids.

Garnem' showed the lowest gene expression in the 4 studied genes, with not significant differences among days (Fig 2 A1-H1). Meanwhile the tri-hybrids showed the highest expression values at 15 days (Fig 2 A2-H2 A and A3-H3). In the two hybrids bZIP and A20/AN1 zinc finger TF genes showed the highest expression in root tissue (Fig 2 B2-D2 y Fig 2 B3-D3, while LEA and Dehydrin presented similar values in root (Fig 2 F2-F3 y Fig 2 H2-H3) and in phloem tissue (Fig 2 E2-E3 y Fig 2 G2-G3). The minor differences observed in TFs expression during the drought stress would explain their role as regulatory genes more in the stress induction than in the late response where LEA protein and Dehydrin could be involved.

Results have indicated that, under drought conditions, tri-hybrids have a better adaptative response that 'Garnem' genotype. This assumption is explained by both physiological and molecular parameters.

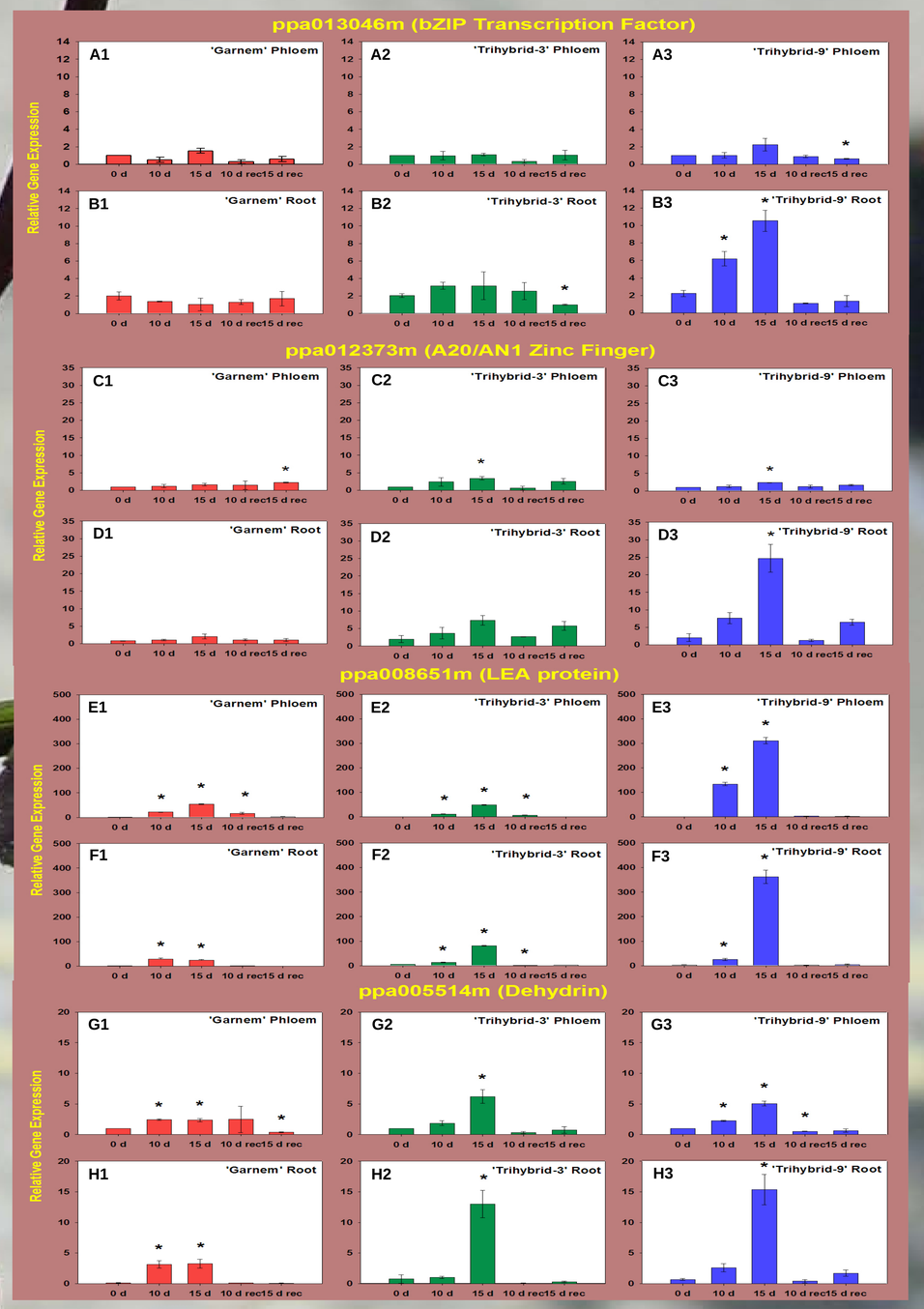

Fig 2. Gene expression patterns. Values followed by an asterisk are significantly different (P≤0.05) according to t-Student test.

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