Interaction between water stress and rootstock on postharvest quality in persimmon

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- Persimmon (*Diospyros kaki*) is an important crop in the Mediterranean region. Spain is the second largest global producer worldwide and 'Rojo Brillante' the dominant cultivar.
- In semi-arid conditions, it is commonly grafted onto *D. lotus* and *D. virginiana*, which differ in their tolerance to abiotic stresses.
- Given increasing water scarcity, improved understanding of potential fruit quality differences under stress in both rootstocks is essential for the grower´s decisions but also for the agrifood chain.

Objective: Evaluation of the response of *D. kaki* grafted onto both rootstocks to irrigation withholding, to assess their harvest and postharvest fruit quality under a simulated drought period (stress).

Materials and methods

Diospyros caqui cv. 'Rojo Brillante' on D. lotus and D. virginiana **rootstocks**
CEBAS-CSIC Experimental Station, Murcia

Preharvest: well irrigated (control, ct) and irrigation withholding (stress, st)

Harvest (October 20th, *D. lotus*, November 7th, *D.virginiana*)

Deastringency (24 h, 92% CO_2 at 19ºC)

Storage (5 or 6 d, at 15ºC & 75-82% RH

Fruit quality evaluation

- Weight loss
- Hardness
- Color
- Respiration rate
- Ethylene production
- Total soluble solids
- Juice yield
- Sensory analysis (consumers)

Results

- In *D. lotus*, the main effects of stress were lower fruit hardness (Fig.1) and color coordinate values (Fig. 2), along with higher juice yield (+7%), weight losses (Fig. 1) and respiration rate (Fig. 3) compared to control fruit.
- In *D. virginiana*, stressed fruit showed higher ethylene production (Fig. 3), and also higher juice yield at harvest and after deastringency (+5%), but not during storage.

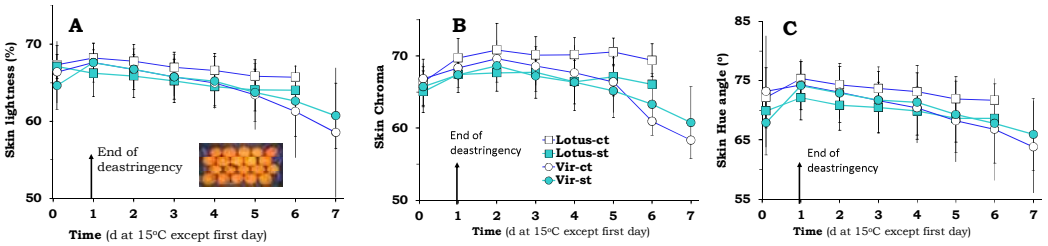

Fig. 2. Fruit skin color changes (trichromatic coordinates, illuminant C) over time at different storage conditions obtained in individual persimmon fruit (means ± SD, n=5-6) from harvest and during storage at 15ºC after deastringency. Fruit were harvested from two rootstock (*D. lotus* or *D. virginiana*, Vir) with or without preharvest stress (-st or -ct, respectively). **A. Skin Lightness. B. Skin Chroma. C. Skin Hue angle.** Arrows indicate the end of deastringency.

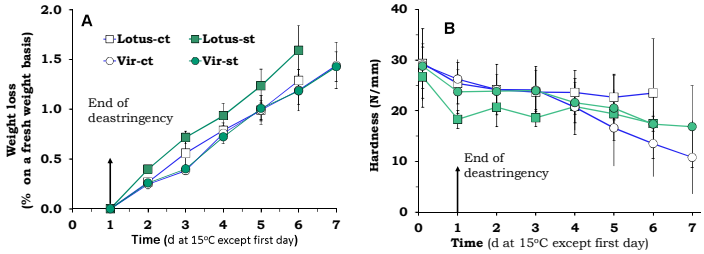

Fig. 1. A. Weight loss in individual persimmon deastringented fruit during storage at 15ºC o two rootstock (*D. lotus* or *D. virginiana, Vir*) with or without preharvest stress -st or ct ,respectively- (means ± SD, n=5). Arrow indicates the end of deastringency. **B. Whole fruit hardness.**

- After 3 or 6 d of storage, consumers were unable to distinguish between the control and stressed fruits in different consumer double-triangle tests.
- No differences in astringency, odors, or off-flavors were found in paired tests in fruits of both rootstock (data not shown).

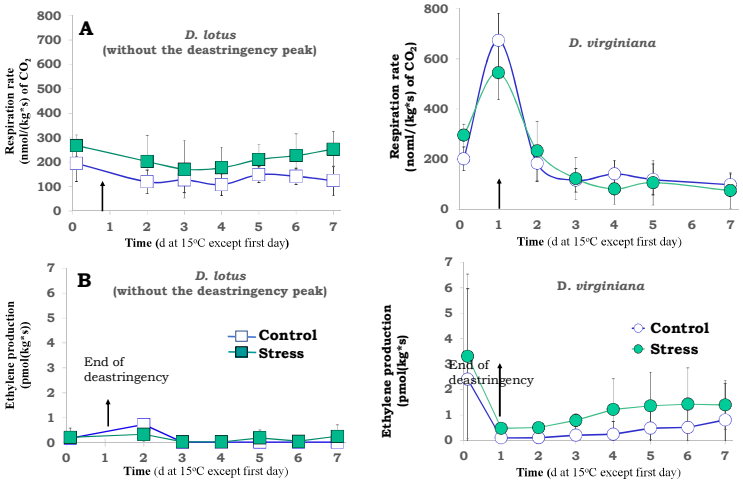

Fig. 3. Physiological behavior in of individual persimmon deastringented fruit during storage at 15ºC on two rootstock (*D. lotus* or *D. virginiana*) with or without preharvest stress (means ± SD, n=5). **A. Respiration rate B. Ethylene production**. Arrow indicates the end of deastringency.

Conclusions

Persimmon cv. 'Rojo Brillante' grafted onto *D. virginiana* constitutes a better option for maintaining fruit quality when grown in poor soils and with water supply limitations. Only in *D. lotus* rootstock the preharvest stress had a significant impact on fruit quality.

Acknowledgements. This research was part of the projects: (i) **SP-IRRICROP (PID2023-147690OB-I00)** funded by Spanish State Research Agency MCIU/AEI/10.13039/501100011033/FEDER-UE, (ii) **BRILLASENS** (22605/PI/24) and (iii) (23029/GERM/25), funded by Seneca Foundation- Region of Murcia: FSRM/10.13039/100007801. To Frutas Esther S.A. (Abarán, Murcia) for fruit deastringency.