

Combination of Rootstocks and Scions to Increase the Fruit Quality in Watermelon

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Introduction

Mexico is the most important watermelon exporter [*Citrullus lanatus* (Thunb) Matsum & Nakai] thanks to the high quality product, but the productive potential of Mexico is being affected by the incidence of soil-borne diseases. Grafted plants have been a useful tool in the control of soil-borne diseases, but there is a lot of inconsistencies on the fruit quality effect, the scion variety directly affects the quality of the fruit in grafted plants, but rootstock effects can drastically alter these characteristics. Lycopene concentration, soluble solid content and firmness are some fruit quality parameters that could be affected by the scion/rootstock interaction in watermelon (Davis *et al.*, 2008).

Objective

The purpose of this study was to evaluate fruit variability based on some specific qualities (firmness, total soluble solid and lycopene concentration) caused by the combination of two watermelons cultivars, non grafted and grafted onto four *Cucurbita* rootstocks.

Materials & Methods

The experiments were carried out in the State of Colima, Southeast Mexico in an open field condition, under commercial system production. The field was arranged in randomized complete blocks with five treatment and three repetitions. The triploids watermelon cultivars used as scion were "Mielheart" and "Ocelott". Each scion cultivar was grafted onto four commercial rootstocks, using the approach method (Lee, 1994). The rootstocks used were "Super Shintoza" (*Cucurbita moschata*), "53004" (*Cucurbita maxima*), "RS841" and "TZ-148" (*Cucurbita maxima* x *Cucurbita moschata*), and non grafted cultivars were used as control (Figure 1). Experiments for each scion cultivar were independent.

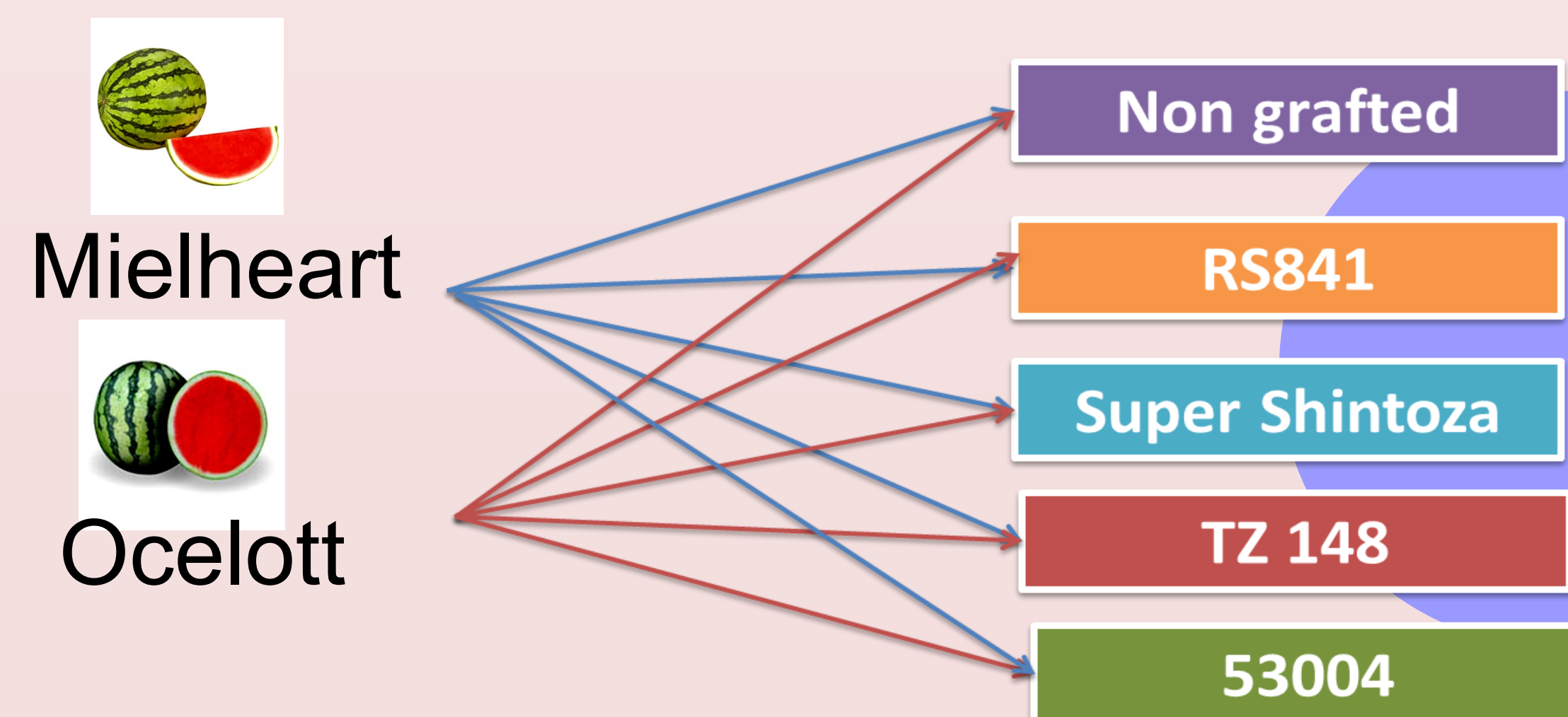


Figure 1. The combination of scions and rootstocks. Two triploid watermelon cultivars (Mielheart and Ocelott) grown non grafted and grafted onto four commercial rootstocks (RS841, TZ-148, Super Shintoza and 53004).



In order to measure the quality attributes, four fruit pieces of each plot were used to determine the total soluble solid and firmness, expressed in °Brix and kg respectively. (Ricárdez-Salinas., 2010). Lycopene content was extracted and quantified using the method of Reduced Volume Lycopene Assay described by Fish *et al.* (2002).

Results

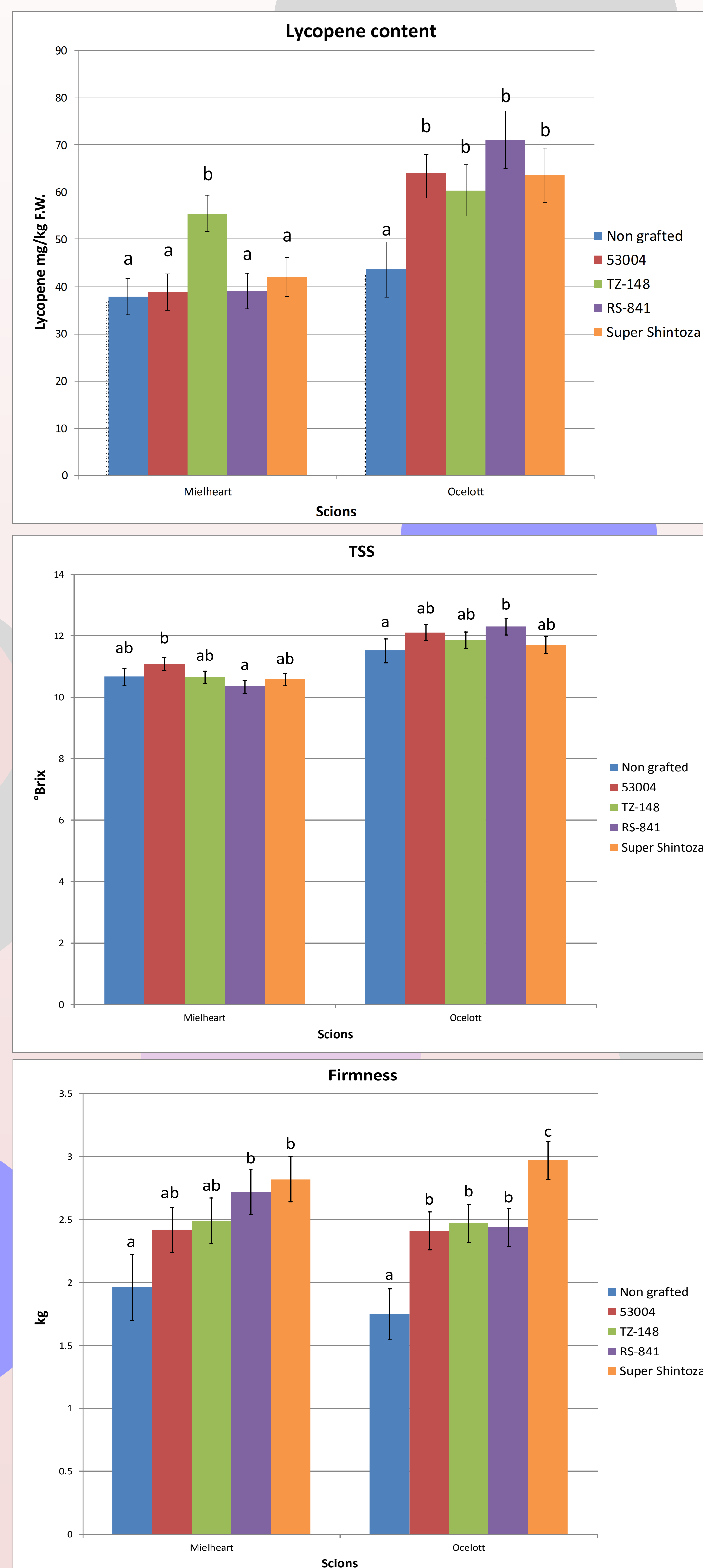


Figure 2. Lycopene content, Total Soluble Solid (TSS) and firmness of two watermelon cultivars (Mielheart and Ocelott) non grafted and grafted onto four commercial rootstock. Bars with no letter in common differ significantly at P< 0.05 (Fisher's LSD test).

Cultivar "Mielheart" was affected by the rootstock/scion combination in lycopene content, "TZ-148" (*C. maxima* x *C. moschata*) it exhibited the highest concentration of lycopene, with difference respect to non grafted and grafted onto another rootstocks.

"Ocelott" cultivar had the lowest concentration of lycopene on non grafted treatment, showing significant difference from grafted treatments. Grafted plants increase lycopene content between 38% and 63% in cultivar "Ocelott".

Total soluble solid showed difference between two grafted treatments in "Mielheart" cultivar. "RS841" had the lowest total soluble solid content (10.34) with difference respect to "53004" (11.08).

Nevertheless "Ocelott" grafted onto "RS841", showed the highest level of concentration of total soluble solids, with difference on non grafted "Ocelott". There was no difference observed between the rest of the treatments.

"Mielheart" grafted onto "RS841" and "Super Shintoza" had significant effect on fruit firmness with respect to non grafted treatment.

Graft had significant effect on firmness in "Ocelott" cultivar. All grafted treatment showed significant difference respect to non grafted treatment. "Super Shintoza" had the highest firmness value in both cultivars.



Conclusions

In some quality parameters, the cultivars (Mielheart and Ocelott) obtained different results as being grafted onto the same type of rootstocks. "Ocelott" enhances lycopene content when grafted with such rootstocks. In general, the use of grafted plants increase the fruit firmness.

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