PHYSIOLOGICAL EVALUTION OF SOME CITRUS ROOTSTOCKS FOR VALENCIA ORANGE AND CHINESE TANGARINE YOUNG TREES UNDER SALINE CONDITIONS

By

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B.Sc. Agric. Sc. (Horticulture), El-Monofiya University, 2004

M.Sc. Enviro. Sc. (Pomology), El-Sadat City University, 2009

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ABSTRACT

Islam Frahat Zaky Hassan: Physiological evaluation of some citrus rootstocks for Valencia orange and Chinese tangerine young trees under saline conditions .Unpublished Ph. D. Thesis, Department of Horticulture, Faculty of Agriculture, Ain Shams University, 2018.

In this work two field experiments were carried out during a three successive seasons of 2015/2016 , 2016/2017 and 2017/2018 to evaluate the physiological response of foliar application of some antioxidants (salicylic and ascorbic acids) on Valencia orange and Chinese tangerine young trees grown under irrigation with saline water. The two Citrus varieties, Valencia orange (V. O) *Citrus sinensis.L. osbeck* and Chinese (Ponkan) mandarin (*Citrus reticulate*) were budded on three citrus rootstocks namely sour orange (*Citrus aurantum, mion*) ,Volkamer lemon (V. L) (*Citrus volkameriana*, Tem) and X639 hybrid between (*Citrus reticulate* × *Ponicurus trifoliata*).

As for Valencia orange, results showed that Volkamer lemon rootstock gave the highest values of most studied characters of vegetative growth (height increment percentage, stem diameter increment percentage, number of leaves increment percentage and leaf area cm^2).As compared with other studied rootstocks with exception that with exception that salicylic acid was effective also on stem diameter and leaves number increment. In addition, the results revealed that, higher growth parameters were recorded by the interaction between Volkamer lemon rootstock and ascorbic acid at concentration of 800 ppm. As for physiological and biochemical constitutes (relative water content , proline content , protein content , total antioxidant capacity , carbohydrates content , chlorophyll a, chlorophyll b and carotenoids.) Volkamer lemon rootstock achieved the higher values most of the previous characters in combination with ascorbic acid and salicylic acid at 600 to 800 ppm with exception that X639 rootstock which achieved the higher carbohydrates and proline content, while Volkamer lemon achieved the least values. On

the other hand Valencia orange budded on Volkamer lemon rootstock recorded the higher chemical content (macro elements: nitrogen, phosphorus, potassium ,calcium and micro elements ; zinc and magnesium) in combination with ascorbic acid and salicylic acid at 600 to 800 ppm , with exception that Sour orange accumulated the higher Magnesium content, on the other hand Volkamer lemon rootstock accumulated under saline conditions higher content of micro elements iron, zinc and manganese, the values increased gradually by treatment of antioxidants from 0 to 800 ppm concentrations. salicylic acid was more effective in concentration than ascorbic acid . As for endogenous hormones content Volkamer lemon rootstock achieved the higher hormonal content (indole acetic IAA acid and Gibberlinne GA) and the lower abscisc acid ABA, on the other hand both salicylic and ascorbic acids at 800 ppm in combination with Volkamer lemon rootstock reduce the harmful effects of salinity stress on Leaf anatomical structure compared with the control.

As for Chinese tangerine Results showed that, Volkamer lemon rootstock surpassed Sour orange and X639 rootstocks under saline conditions, the highest incremental percentage young tree height, stem diameter, number of leaves per shoot and leaf area were registered by Chinese tangerine scion budded on Volkamer lemon rootstock. Among selected antioxidants, ascorbic acid at the concentrations of 800 ppm recorded the highest significant values for vegetative growth parameters and surpassed salicylic acid. As for physiological and biochemical constitutes (relative water content , proline content , protein content , total antioxidant capacity, carbohydrates content , chlorophyll a, chlorophyll b and carotenoids.) Volkamer lemon rootstock achieved the higher values most of the those characters in combination with ascorbic acid and salicylic acid at 600 to 800 ppm with exception that X639 rootstock which achieved the higher carbohydrates and proline content, while Volkamer lemon achieved the least values.

Also Chinese mandarin scion budded on Volkamer lemon accumulated the higher concentrations of nitrogen (N), phosphorus (P), magnesium (Mg), and chloride (Cl^-) and the lowest concentration of sodium (Na^+). Chinese mandarin scion budded on sour orange rootstock accumulated the highest concentrations of potassium (K) while Chinese tangerine scion budded on X639 accumulated the highest concentrations of sodium (Na). In addition, the results revealed that, higher growth parameters were recorded by the interaction between Volkamer lemon rootstock and ascorbic acid at concentration of 800 ppm.The studied rootstocks exhibited insignificant differences in Fe concentration, while Volkamer lemon rootstock exhibited the higher zn and mn concentration under saline conditions .Volkamer lemon rootstock recorded the higher content of zn and mn when interacted with 800 ppm of salicylic acid for zn content and 800 ppm of ascorbic acid for Mn content .In this respect Sour orange registered the higher Fe concentration by 600 ppm of salicylic acid. As for endogenous hormones content Volkamer lemon rootstock achieved the higher hormonal content (indole acetic IAA acid and Gibberlinne GA) and the lower abscisc acid ABA, on the other hand the same rootstock reduce the harmful effects of salinity of the anatomical structure of leaves. .

Key words: Rootstocks, antioxidants, saline conditions.

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