GROWTH, FLOWERING AND FRUITING OF SOME NEWLY ORANGE CULTIVARS BUDDED ON SOUR ORANGE AND VOLKAMER LEMON ROOTSTOCKS UNDER SHARQIA GOVERNORATE CONDITIONS

By

MOHAMED ABD EL-HAMED NASSER

B.Sc. Agric. Sc. (Horticulture), Ain Shams University, 2005

M.Sc. Agric. Sc. (Pomology), Ain Shams University, 2010

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This thesis for Ph. D. degree has been approved by:

Dr. Ahmed Tawfik Salem……....

Prof. Emeritus of Pomology, Faculty of Agriculture, Cairo University

Dr. Nazmy Abd El-Hamid abd El-Ghany.....

Prof. of Pomology, Faculty of Agriculture, Ain Shams University

Dr. Assem Desouki Shaltout…….....

Prof. Emeritus of Pomology, Faculty of Agriculture, Ain Shams University

Dr. Alaa El-Din Zaki Bondok.....

Prof. Emeritus of Pomology, Faculty of Agriculture, Ain Shams University

Date of Examination: 15 / 9 / 2015

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Under the supervision of:

Dr. Alaa El–Din Zaki Bondok

Prof. Emeritus of Pomology, Department of Horticulture, Faculty of Agriculture, Ain Shams University (Principal Supervisor)

Dr. Assem Desouki Shaltout

Prof. Emeritus of Pomology, Department of Horticulture, Faculty of Agriculture, Ain Shams University

Dr. Noha Ahmed Ibrahim Mansour

Lecturer of Pomology, Department of Horticulture, Faculty of Agriculture, Ain Shams University

ABSTRACT

Mohamed Abd El-Hamed Nasser: Growth, Flowering and Fruiting of some Newly Orange Cultivars Budded on Sour Orange and Volkamer Lemon Rootstocks Under El Sharqia Governorate Conditions. Unpublished Ph. D. Thesis, Department of Horticulture, Faculty of Agriculture, Ain Shams University, 2015.

A field experiment was carried out in a private orchard at Wady El-mollak, El Sharqia Governorate, Egypt during the two successive seasons of (2012 and 2013) to evaluate growth, flowering and fruiting of some newly introduced Navel and Valencia orange cultivars. The present study involved two experiments, the first one comprises ten newly introduced Navel orange cultivars (New Hall, Navelina, Navelate, Lane Late, Cara Cara, Spring, Fisher, Parent, Fukumoto and Leng) budded on two commercial rootstocks "Sour orange" (*Citrus aurantium* L.) and "Volkamer lemon" (*Citrus Volkameriana* L.). On the other hand, the second experiment comprises five Valencia orange cultivars (Frost, Olinda, Delta, Campbell and 26) budded on Sour orange and Volkamer lemon rootstocks. Both experiments were laid out in factorial experiment in a randomized complete block design.

Regarding Navel orange, results showed that Lane Late cultivar gave the highest values of vegetative growth as compared with other cultivars. Navelate, Lane Late, New Hall and Navelina gave the highest values of fruit set and the lowest values of fruit drop and enzyme activity (Poly galactourenase and Pectine methyl esterase) in fruit peduncles. Whereas, New Hall gave the highest values of fruit weight and yield/tree followed by Navelina and Lane Late but New Hall gave large fruit size which not accepted in export and local market. Meanwhile, New Hall and Navelina cultivars gave the highest values of TSS, T.S.S/acid ratio and the lowest values of acidity. On the other hand, "Cara Cara" "Spring" and

“Leng” gave significant lower values of N content than other Navel orange cultivar. Navelate and Lane Late gave the highest values of P, K and Ca. The significant highest values of C/N ratio were obtained by New Hall, Navelate, Spring, and Fukumoto in two seasons. While, the significant highest values of gibberellic acid and auxins content were obtained by New Hall, Lane Late and Fukumoto cultivars through the two studied seasons and Navelina in the second season. On the other hand, Lane Late cultivar gave the lowest significant values for abscissic acid content followed closely by Fukumoto and New Hall. Regarding the effect of rootstocks, Volkamer Lemon (VL) rootstock gave the significant highest values of vegetative growth, flowering, fruit set, fruit drop, Poly galactourenase activity in fruit peduncles, yield parameters, peel thickness, macro & micronutrients content (N, P, K, Ca, Mg, Fe, Zn, and Mn), gibberellic acid & auxins content with the lowest significant values for abscissic acid content as compared with sour orange (SO) rootstock. On the other hand, Sour orange gave the significant highest values of juice volume, TSS, TSS/acid ratio, total carbohydrates and C/N ratio. Regarding the interaction between cultivars and rootstocks, Lane Late and New Hall cultivars on Volkamer Lemon gave the highest values of vegetative growth, flowering, fruit set percentages and lower values of fruit drop as compared with other interaction. The lowest significant values for enzyme activity obtained from Navelate on SO in the two seasons. New Hall budded on both rootstocks gave the highest values of yield followed by Lane Late on Volkamer Lemon. The highest values of TSS, TSS/acid ratio were obtained when New Hall and Navelina budded on sour orange followed closely by the same cultivars on Volkamer Lemon rootstock and the trend was reversed for acidity. The highest values of N, P, Ca, Mg, Fe and Mn were obtained when Lane Late budded on Volkamer Lemon rootstock**.** All Navel orange cultivars budded on Volkamer Lemon rootstock gave lower C/N ratio than other budded on Sour orange rootstock. Concerning the highest significant values of gibberellic acid were obtained when (New Hall, Lane Late and

Fukumoto) budded on each rootstock and Navelina budded on VL. The relationship between meteorological condition (temperature and humidity) with fruit drop showed that, the relationship between temperature and fruit drop of Navel orange cultivars were direct moderate correlation. While, the relationship between humidity and fruit drop were indirect moderate correlation.

In spite of Volkamer Lemon rootstock gave higher values of yield/tree than sour orange but with low fruit quality especially for peel thickness, TSS and TSS/acid ratio. Finally, New Hall gave the highest values of fruit weight and yield/tree followed by Navelina and Lane Late but New Hall especially on VL gave large fruit size which not accepted in export and local market. So, it could be recommended by budded Navelina and Lane Late cultivars on SO rootstock for suitable yield with high fruit quality.

Valencia orange cultivars results showed that, each cultivar had the best compatibility with VL and SO rootstocks but 26 and Campbell cultivars gave the significant higher values of vegetative growth, macronutrients (P, K, Ca and Mg), micronutrients (Fe and Zn), gibberellic acid and auxins leaf content than other cultivars. On the other hand, the lowest values of flowering were obtained by Frost. Whereas, all cultivars except Frost gave the highest values of fruit weight and yield per tree. The significant highest values of fruit drop and enzyme activity were obtained by Frost. Generally 26, Delta, Campbell and Olinda cultivars gave the highest values of yield/tree with the highest values of fruit physical properties. TSS and acidity were not affected significantly by Valencia orange cultivars, rootstocks and their interaction, while Frost gave the significant lowest values of vitamin C. Regarding the rootstocks, VL rootstock gave the highest significant values of vegetative growth, fruit drop, yield/tree, Vitamin C, enzyme activity, macronutrients, micronutrients, C/N ratio, gibberellic acid and auxins content with the lowest significant values for abscissic acid content compared with SO rootstock. Concerning the interaction, the significant highest values of

vegetative growth were obtained when 26 and Campbell budded on VL rootstock. 26, Delta and Olinda on VL rootstock gave the highest values of yield/tree with the highest values of fruit physical properties. While Campbell on VL gave the highest values of yield with lowest values of fruit physical properties. Generally the highest values of N, P, Ca, Mg, Fe and Mn were obtained when 26, Delta and Campbell budded on VL rootstock. Olinda and 26 cultivars gave the significant highest values of total carbohydrates and C/N ratio. The highest significant values of gibberellic acid and auxins were obtained by 26 and Campbell on VL. On the other hand, the lowest significant values for abscissic acid content were obtained by 26 on VL in the first season and Frost on VL in the second season. Concerning the relationship between meteorological condition (temperature and humidity) with fruit drop it was found that, the relationship between temperature and fruit drop of Valencia orange cultivars were direct strong correlation. While, the relationship between humidity and fruit drop were indirect strong correlation.

In spite of VL rootstock gave higher values of yield/tree and fruit quality especially for physical properties and Vitamin C than sour orange. Finally it could be concluded that, 26 gave the highest values of vegetative growth and yield per tree with the highest values of fruit physical properties followed closely by Delta and Olinda Valencia orange cultivars on VL rootstock.

Key words:

Vegetative growth, Fruit quality**,** mineral content, newly Navel orange cultivars, newly Valencia orange cultivars, Sour orange , Volkamer Lemon- yield

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