

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

By

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A thesis submitted in partial fulfillment

of

the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

Agricultural Science

(Pomology)

Department of Horticulture

Faculty of Agriculture

Ain Shams University

2015

Approval Sheet

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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 Unpublished Ph.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 galactouronase 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 galactouronase 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

ACKNOWLEDGEMENT

Praiseworthy and gratitude to “ALLAH” for helping me, willing and patience to carry out this work.

I wish to express my great appreciation and gratitude to **Prof. Dr. Alaa El-Din Zaki Bondok** Prof. Emeritus of Pomology, Department of Horticulture, Faculty of Agriculture, Ain Shams University for valuable help and his continuous supervision during the progress of the study, the preparation and reviewing the manuscript and for his support during the course of this work.

Sincere appreciation is expressed to **Prof. Dr. Assem Desouki Shaltout**, Prof. Emeritus of Pomology, Department of Horticulture, Faculty of Agriculture, Ain Shams University for his suggesting the problem, drawing the plan of the work, supporting me through availability (the private orchard and the plant material), valuable help and his continuous supervision during the progress of the study and the preparation, guidance and for his support during the course of this work.

Deep gratitude and thanks are offered to **Dr. Noha Ahmed Ibrahim Mansour** Lecturer of Pomology, Department of Horticulture, Faculty of Agriculture, Ain Shams University for her supervision, valuable suggestion, the great efforts in writing and reviewing the manuscript.

I would like to express my great appreciations to all my colleagues for their encouragement and valuable help during the course of this work.

I am particularly grateful to my family for help and continuous encouragement during my study period.

CONTENTS

	Page
LIST OF TABLES	IV
LIST OF FIGURES	VIII
1. INTRODUCTION	1
2. REVIEW OF LITERATURE	4
2.1. Commercial characters of the tested Orange cultivars	4
2.2. General characteristics of the tested rootstocks	8
2.3. Effect of rootstocks on some scion characteristics	9
2.3.1. Vegetative growth.	9
1. Tree vigor	9
2. Shoot number	13
3. Shoot length	13
4. Leaf area	14
5. Compatibility Percentage	14
2. Flowering%, fruit set%, fruit drop%, yield and fruit quality	15
2.3.2.1. Flowering%	15
2.3.2.2. Fruit set% and fruit drop%	15
2.3.2.3. Yield	16
2.3.2.4. Fruit quality	16
2.3.3. Chemical analysis:	17
2.3.3.1. Leaf mineral content of scion.	17
2.3.3.2. C/N ratio of scion shoots.	18
2.3.4. Enzyme activity.	18
2.3.5. Endogenous hormones content in cultivars leaves.	19

3. MATERIALS AND METHODS	21
3.1. Vegetative growth.	22
3.2. Flowering%, fruit set%, fruit drop%, yield and fruit quality.	23
3.2.1. Flowering%.	23
3.2.2. Fruit set%.	23
3.2.3. Fruit drop%.	23
3.2.4. Yield	24
3.2.5. Fruit quality	24
3.2.5.1 Fruit physical properties	24
3.2.5.2 Fruit chemical properties	25
3.2.5.2.1 Ascorbic acid (Vitamin C) content:	25
3.2.5.2.2 Total soluble solids percentage (TSS %)	25
3.2.5.2.3 Total acidity percentage	25
3.2.5.2.4 Total soluble solids / acid ratio.	25
3.3. Chemical analysis:	25
3.3.1 Leaf mineral content	25
3.3.2. Total carbohydrates	26
3.3.3. C/N ratio	26
3.4. Enzyme activity:	26
3.5. Endogenous hormones content in cultivars leaves.	26
3.6. Statistical analysis	27
4. RESULTS AND DISCUSSION	28
4.1. The first experiment: Newly Navel orange cultivars.	28
4.1.1. Vegetative growth.	28
4.1.1.1. Scion height, canopy diameter and canopy volume.	28
4.1.1.2. Shoot number and shoot length.	31
4.1.1.3. Leaf area and total chlorophyll content.	33
4.1.1.4. Trunk circumference and compatibility%.	35
4.1.2. Flowering%, fruit set%, fruit drop%, yield and fruit quality.	37

4.1.2.1. Flowering % and fruit set%.	37
4.1.2.2. Fruit drop%.	40
4.1.2.3. Yield.	47
4.1.2.4. Fruit quality.	50
4.1.2.4.1. Fruit physical properties.	50
4.1.2.4.2. Fruit chemical properties.	56
4.1.3. Chemical analysis.	62
4.1.3.1. Effect on leaf macronutrients content.	62
4.1.3.2. Effect on leaf micronutrients content.	66
4.1.3.3. Effect on C/N ratio.	69
4.1.4. Enzyme activity.	71
4.1.5. Endogenous hormones content in cultivars leaves.	73
4.2. The second experiment: Valencia orange cultivars.	77
4.2.1. Vegetative growth.	77
4.2.1.1. Scion height, canopy diameter and canopy volume.	77
4.2.1.2. shoot number and shoot length.	80
4.2.1.3. Leaf area and total chlorophyll content.	81
4.2.1.4. Trunk circumference and compatibility%.	83
4.2.2. Flowering%, fruit set%, fruit drop%, yield and fruit quality.	86
4.2.2.1. Flowering % and fruit set %:	86
4.2.2.2. Fruit drop%.	89
4.2.2.3. Yield.	94
4.2.2.4. Fruit quality.	97
4.2.2.4.1. Fruit physical properties	97
4.2.2.4.2. Fruit chemical properties	101
4.2.3. Chemical analysis.	106
4.2.3.1. Effect on leaf macronutrients content.	106
4.2.3.2. Effect on leaf micronutrients content.	109
4.2.3.3. Effect on C/N ratio.	112
4.2.4. Enzyme activity	113

4.2.5. Endogenous hormones content in cultivars leaves	115
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5. SUMMARY AND CONCLUSION	119
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6. REFERENCES	131
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ARABIC SUMMARY

LIST OF TABLES

No.		Page
1.	Some physical properties of the experimental soil.	21
2.	Chemical properties of the experimental soil.	22
3.	Effect of some Navel orange cultivars and two rootstocks on scion height, canopy diameter and canopy volume during the 2012 and 2013 seasons.	30
4.	Effect of some Navel orange cultivars and two rootstocks on shoot number and shoot length during the 2012 and 2013 seasons.	32
5.	Effect of some Navel orange cultivars and two rootstocks on leaf area and total chlorophyll content (SPAD) during the 2012 and 2013 seasons.	34
6.	Effect of some Navel orange cultivars and two rootstocks on trunk circumference (cm) and compatibility% during the 2012 and 2013 seasons.	36
7.	Effect of some Navel orange cultivars and two rootstocks on flowering%, leafy inflorescences, woody inflorescences and fruit set% during the 2012 and 2013 seasons	39
8.	Effect of some Navel orange cultivars budded on two rootstocks, intervals date and their interaction on fruit drop % during the 2012 and 2013 seasons.	42
9.	Effect of some Navel orange cultivars and two rootstocks on fruit number, fruit weight and yield per tree during the 2012 and 2013 seasons	49

10.	Effect of some Navel orange cultivars and two rootstocks on fruit length, fruit diameter and fruit shape during the 2012 and 2013 seasons	53
11.	Effect of some Navel orange cultivars and two rootstocks on fruit firmness, peel thickness and juice volume during the 2012 and 2013 seasons	54
12.	Effect of some new Navel orange cultivars budded on two rootstocks on vitamin C, TSS and acidity during the 2012 and 2013 seasons	59
13.	Collected data for some characteristics of interaction between Navel orange cultivars and two rootstocks	60
14.	Effect of some Navel orange cultivars budded on two rootstocks and harvesting date on TSS/acid ratio during the 2012 and 2013 seasons	61
15.	Effect of some Navel orange cultivars and two rootstocks on leaf macronutrient content (N, P, K, Ca and Mg) during the 2012 and 2013 seasons	65
16.	Effect of some Navel orange cultivars and two rootstocks on leaf micronutrient content (Fe, Zn and Mn) during the 2012 and 2013 seasons	68
17.	Effect of some Navel orange cultivars and two rootstocks on shoots carbohydrate%, nitrogen% and C/N ratio during the 2012 and 2013 seasons	71
18.	Effect of some Navel orange cultivars and two rootstocks on Poly galactourenase and Pectine methyl esterase enzyme activity in fruit peduncles during the 2012 and 2013 seasons	72
19.	Effect of some Navel orange cultivars and two rootstocks on Leaf endogenous hormones (gibberellic acid, auxins and abscissic acid) during the 2012 and 2013 seasons	75
20.	Effect of some Valencia orange cultivars and two	79

rootstocks on scion height, canopy diameter and canopy volume during the 2012 and 2013 seasons	
21. Effect of some Valencia orange cultivars and two rootstocks on Shoot number and shoot length during the 2012 and 2013 seasons	81
22. Effect of some Valencia orange cultivars and two rootstocks on leaf area and total chlorophyll content during the 2012 and 2013 seasons	84
23. Effect of some Valencia orange cultivars and two rootstocks on trunk circumference and Compatibility% during the 2012 and 2013 seasons	85
24. Effect of some Valencia orange cultivars and two rootstocks on flowering%, leafy inflorescences% , woody inflorescences% and fruit set% during the 2012 and 2013 seasons	88
25. Effect of some Valencia orange cultivars budded on two rootstocks, intervals date and their interaction on fruit drop% during the 2012 and 2013 seasons	90
26. Effect of some Valencia orange cultivars and two rootstocks on fruit number, fruit weight and yield per tree during the 2012 and 2013 seasons	96
27. Effect of some Valencia orange cultivars and two rootstocks on fruit length, fruit diameter and fruit shape during the 2012 and 2013 seasons	99
28. Effect of some Valencia orange cultivars and two rootstocks on fruit firmness, peel thickness and juice volume during the 2012 and 2013 seasons	99
29. Effect of some Valencia orange cultivars budded on two rootstocks on vitamin C, TSS and acidity during the 2012 and 2013 seasons	103
30. Collected data for some characteristics of interaction between Valencia orange cultivars and two	104