RESPONSE OF KEITT MANGO TREES TO DIFFERENT NITROGEN AND POTASSIUM FERTILIZATION LEVELS UNDER SHADING AND NON SHADING CONDITIONS

By

OLA ABD EL SATAR ABD EL HALIEM EMAM
B.Sc.Agric. Sc. (Horticulture), Ain Shams University, 2001
M.Sc. Agric. Sc. (Vegetable Crops), Cairo University, 2008

A Thesis Submitted in Partial Fulfillment
Of
The Requirements for the Degree of

DOCTOR OF PHILOSOPHY
in

Agricultural Sciences (Pomology)

Department of Horticulture
Faculty of Agriculture Ain
Shams University

2018

Approval Sheet

RESPONSE OF KEITT MANGO TREES TO DIFFERENT NITROGEN AND POTASSIUM FERTILIZATION LEVELS UNDER SHADING AND NON SHADING CONDITIONS

By

OLA ABD EL SATAR ABD EL HALIEM EMAM

B.Sc .Agric. Sc. (Horticulture), Ain Shams University, 2001
M.Sc. Agric. Sc. (Vegetable Crops), Cairo University, 2008

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

Dr. Ahmed Ahmed Rezk El-sayed Atawia ..……..……..
Prof. of Pomology, Faculty of Agriculture, Banha University

Dr. Ahmed Abdel Fattah Mahmoud El Gazzar ……
Prof. of Pomology, Faculty of Agriculture, Ain Shams University

Dr. Ahmed Abd El-Hamid Ahmed Awad ……..……
Associate professor of Pomology, Faculty of Agriculture, Ain Shams University

Dr. Hassan Mohamed Fadel El-Wakeel ..……
Prof. Emeritus of Pomology, Faculty of Agriculture, Ain Shams University

Date of Examination: 24 / 2 / 2018

RESPONSE OF KEITT MANGO TREES TO DIFFERENT NITROGEN AND POTASSIUM FERTILIZATION LEVELS UNDER SHADING AND NON SHADING CONDITIONS

By

OLA ABD EL SATAR ABD EL HALIEM EMAM

B.Sc .Agric. Sc. (Horticulture), Ain Shams University, 2001
M.Sc. Agric. Sc. (Vegetable Crops), Cairo University, 2008

Under the supervision of:

Dr. Hassan Mohamed Fadel El-Wakeel

Prof. Emeritus of Pomology, Department of Horticulture, Faculty of Agriculture, Ain Shams University (principals supervisor)

Dr. Ahmed Abd El-Hamid

Associate Professor of Pomology, Department of Horticulture, Faculty of Agriculture, Ain Shams University

Dr. Abd El- Monem Ahmed Esmail

Chief Researcher, Central Laboratory of Agricultural Climate, Agricultural Research Center

ABSTRACT

Ola Abd El-Satar Abd El Haliem: Response of Keitt Mango Trees to different Nitrogen and Potassium Fertilization Levels Under Shading and non-Shading Conditions Unpublished Ph.D. Thesis, Department of Horticulture, Faculty of Agriculture, Ain Shams University, 2018.

This study was carried out during three successive seasons of 2010/2011, 2011/2012 and 2012/2013 to investigate the effect of nitrogen and potassium fertilization treatments and shading on yield, and fruit quality of three-years-old mango (*Mangifica indica* L.*)* cv. Keitt grafted on sucary seedling rootstock planted at 2.5×2.5 meters apart grown in sandy soil under drip irrigation system with wells water .This experiment included nine levels of fertilization: T1= N 80+ K_2O 80 Kg/Fed., T2= N 80+ K_2O 100 Kg/Fed., T3= N 100+ K_2O 80 Kg/Fed., T4= N 100+ K_2O 100 Kg/Fed., T5= N 120+ K_2O 80 Kg/Fed., T6= N 120+ K_2O 100 Kg/Fed.,T7= N 150+ K_2O 80 Kg/Fed., T8= N 150+ K_2O 100 Kg/Fed. and control (T9) = N 133+ K_2O 90 Kg/Fed.. The results cleared that Keitt mango trees supplied with 150 kg/feddan of nitrogen + 100 kg/feddan of potassium under shading condition significantly exhibited the highest yield (kg)/tree, number of fruit/tree, fruit weight, total sugars content and reducing sugars. Moreover, the best fruit pulp color was achieved with 80 kg/feddan of nitrogen + 80 kg/feddan of potassium under open field condition in the three studied seasons. The highest significant value of acidity and TSS were achieved by 120 kg/feddan of nitrogen + 100 kg/feddan of potassium under shading condition in the first and the third seasons. Whereas, the control treatment attained a maximum ascorbic acid content in the three growing seasons. The nitrogen, potassium, iron, zinc, calcium, magnesium, manganese, copper and cobalt in leaves were evidenced with by the treatment 150 kg/feddan of nitrogen+100 kg/feddan of potassium under shading condititon manifested the highest values through three tested seasons. Nevertheless, the highest phosphorus percentage in leaves of keitt mango trees was found by 150 kg/feddan of

nitrogen + 100 kg/feddan of potassium treatment under open field condition in first and third seasons. whilst, In second season, 150 kg/feddan of nitrogen + 80 kg/feddan of potassium treatment under shading condition.

The application of 150 kg/feddan of nitrogen + 100 kg/feddan of potassium treatments under shading condition gave highest N, P, Fe, Zn, S and Mg in mango fruits pulp, except, Ca and Mn in second and third seasons, respectively, whereas, 150 kg/feddan of nitrogen + 100 kg/feddan of potassium with open field condition gave highest percent in second season.

Keywords: Fertilization, Mango cv. Keitt, Nitrogen, Potassium, Shading-yield

ACKNOWLEDGMENT

Above all else, I might want to Praise and thank profound to "ALLAH" who gave me assist and persistence to complete this work.

I like sincerely wishes to extend his deepest sense of gratitude to **Prof. Dr. Hassan El-Wakeel** Professor Emeritus of Pomology, Faculty. of Agric. Ain Shams University for his supervision, worthy advice, encourage me, orientation for expert and help during the course of this study and during preparing and reviewing the manuscript.

I am also indebted and expressing my genuine thanks and deep gratitude to **Dr. Ahmed Abd El- Hamid** Associate professor of Pomology, Faculty. of Agric. Ain Shams University for his kind supervision, valuable assistance, and preparing this manuscript.

I wish like to gratitude to **Prof. Dr. Abdel Moneim Ahmed Ismail** Central Laboratory for Agriculture Climate, Agricultural Research Center, for his supervision, great support and continued help during the preparation of this work.

I like honored to express heartfelt thanks and appreciation to his **Dr. Mohammed Abd El- Muhsen Salem** Associate professor, Aridland Agriculture Dept., Faculty of food and Agriculture, UAE Univ., Al-Alin, United Arab Emirates, for his supervision, for providing all kinds of moral support, valuable assistance and constructive suggestions during period of research work.

Many thanks are due to **Ministry of climate change and environment, Laboratory Department, Sharjah central laboratory**

Thanks are also the **staff members** of Climate modification Department research, Central Laboratory for Agricultural Climate for their encouragement and help during the course of this work.

CONTENTS

LIST OF TABLES