

127, 17 27, 17 (20) 77, 17 (20









جامعة عين شمس

التوثيق الالكتروني والميكروفيلم



نقسم بللله العظيم أن المادة التي تم توثيقها وتسجيلها علي هذه الأفلام قد اعدت دون آية تغيرات



يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

في درجة حرارة من 15-20 مئوية ورطوبة نسبية من 20-40 %

To be kept away from dust in dry cool place of 15 – 25c and relative humidity 20-40 %



ثبكة المعلومات الجامعية





Information Netw. " Shams Children Sha شبكة المعلومات الجامعية @ ASUNET بالرسالة صفحات لم ترد بالأص

SUGAR BEET YIELD AND QUALITY AS AFFECTED BY THE APPLIED LEVELS AND TIME OF PHOSPHORUS AND POTASSIUM IN CALCAREOUS SOIL

BY

Kamal Mohamed Agami Attia

B. Sc. Agriculture 1981

Faculty of Agriculture Alexandria Univ

Thesis

Submitted in partial Fulfillment of the Requirements for the Degree of

MASTER OF AGRICULTURAL SCIENCES IN AGRONOMY

Faculty of Agriculture at Moshtohor

(Benha Branch)

ZAGAZIG UNIVERSITY

2000

Approved by	prof. Dr H. R. A. El-Deepah
	prof. Dr. G. M. Shams El-Din
	prof. Dr. H.M. El Naggar
,	prof. Dr Tawakul Ryk
•	

Baran

Committee in charge

Date: / / 2000

ACKNOWLEDGEMENT

I feel deeply indebted to the soul of late **Prof. Dr. A. M. Badr,** who did not preclude any effort to make this work successful. May **Allah** reward him the best for what he has done, Amin

I wish to express my deepest gratitude and sincere appreciation to **Prof. Dr. H. R. A. El- Deepah,** Professor of Agronomy, Agronomy and Agricultural Engineering Department, Faculty of Agriculture at Moshtohor, Zagazig University for his useful criticism, directing and supervising the present investigation and for revising the manuscript. The achievement of present work was mainly based on his efforts which deserve my thanks and indebtedness.

Sincere thanks are due to **Prof. Dr. G. M. Shams El-Din,**Professor of Agronomy, Agronomy and Agricultural Engineering
Department, Faculty of Agriculture at Moshtohor, Zagazig University,
for his valuable assistance and interest in the progress of this work.

My thanks are also due to **Prof. Dr. I. H. M. El- Geddawy** Professor of Agronomy and Head of Agronomy Department, Sugar Crops Research Institute, Agricultural Research Center (ARC), for his supervision, encouragement, generous cooperation, valuable advice and for providing the materials needed for the present study

Sincere thanks are due to my colleagues at Sugar Crops
Research Department, Nubaria Agricultural Research Station, for
their great help during the course of this study

Finally, the author owe much indebted to **Prof. Dr. A. I. Allam,** Director of Sugar Crops Research Institute, Agriculture Research Center (ARC), for all facilities supported by Institute director ship during the present study.

CONTENTS

	Page
ACKNOWLEDGEMENT	•
INTRODUCTION	. 1
REVIEW OF LITERATURE	3
I- Effect of phosphorus fertilizer	. 3
II- Effect of potassium fertilizer	9
III- Effect of application time of fertilizer	. 20
IV- Effect of interaction between phosphorus, potassium and	
application time of fertilizer	. 21
MATERIALS AND METHODS	. 23
RESULTS AND DISCUSSION	29
I- EFFECT OF PHOSPHORUS FERTILIZER	. 29
a- Growth characters	29
1- Number of leaves/ plant	29
2- Root length	31
3- Root diameter	31
4- Fresh and dry weight of leaves/ plant	
5- Fresh and dry weight of root/ plant	32
6- Total fresh and dry weight of plant	33
b- Leaf characters	33
c- Yield and yield components	35
1- Root length	35
2- Root diameter	37
3- Fresh weight of root/ plant	37

4	4- Root yield/ fad	38
,	5- Top yield/ fad	39
. (6- Biological yield/ fad	40
•	7- Sugar yield/ fad	40
d-	Technological quality	41
	1- Total soluble solids percentage	41
;	2- Sucrose percentage	43
,	3- Sugar purity percentage	43
-	EFFECT OF POTASSIUM FERTILIZER	44
a-	- Growth characters	44
	1- Number of leaves/ plant	46
	2- Root length	46
. •	3- Root diameter	47
•	4- Fresh and dry weight of leaves/ plant	47
	5- Fresh and dry weight of root/ plant	48
(6- Total fresh and dry weight/ plant	48
b-	Leaf characters	49
C- `	Yield and yield components	51
	1- Root length	51
	2- Root diameter	53
;	3- Fresh weight of root/ plant	53
	4- Root yield/ fad	54
,	5- Top yield/ fad	55
(6- Biological yield/ fad	56
	7- Sugar yield/ fad	57
C - '	Technological quality	. 58

	1- Total soluble solids percentage	58
	2- Sucrose percentage	58
	3- Sugar purity percentage	60
111	EFFECT OF APPLICATION TIME OF FERTILIZER	60
a-	Growth characters	60
	1- Number of leaves/ plant	62
	2- Root length	62
	3- Root diameter	62
-	4- Fresh and dry weight of leaves/ plant	63
	5- Fresh and dry weight of root/ plant	63
	6- Total fresh and dry weight/ plant	64
b-	Leaf characters	64
C-	Yield and yield components	66
	1- Root length	66
	2- Root diameter	66
	3- Fresh weight of root/ plant	68
	4- Root yield/ fad	68
	5- Top yield/ fad	. 69
	6- Biological yield/ fad	69
	7- Sugar yield/ fad	. 70
d-	Technological quality	70
ΙV	- EFFECT OF INTERACTION	70
1-	Effect of the interaction between phosphorus and potassium	
	fertilizer	76
a-	Growth characters	76
b.	· Leaf characters	. 79

INTRODUCTION

INTRODUCTION

Sugar beet (<u>Beta vulgaris</u> L.) is considered one of the important sugar crops in the world. It is cultivated successfully in a wide range of climates (It is grown at latitudes between 30° and 60° N).

Sugar production all over the world depends on two main crops namely, sugar cane and sugar beet, where the percentage of recovered sugar out of cane and beet amounts to around 60% and 40% of total world production of sugar, respectively

In Egypt, growing sugar beet on a large scale began in 1982. The area under cultivation increased from 17,000 faddan in 1982 to 130,000 faddan in 1999 *

Sugar beet is a crop of short duration, more tolerant to salinity of soil and requires less water to produce the same amount of sugar as compared with sugar cane. Therefore, it is preferable to increase the area of sugar beet in Egypt.

Most area of sugar beet is cultivated in northern localities of Egypt at Kafr El- Sheikh and planning has been carried out to cultivate the crop in the northern cost near Alexandria at Noubaria region. There are some studies to establish new sugar factories in the west Noubaria area, due to the recent expansion of sugar beet cultivation in the new sandy and calcareous soils.

^{*} The Agricultural Magazine. March 2000 - Year 42- No. 496 Page 74 (in Arabic).

The use of fertilizers is a factor of great importance among the different cultural practices in sugar beet production. In general, it is well known that potassium (K) acts to balance the effect of nitrogen and enhances the cold endurance of crops and slow down the efflux of photosynthesis products from leaves to roots. In addition there is a close correlation between potassium content and growth rate in plants.

Phosphorus is one of the major essential plant nutrient needed for sugar beet production. The crop has a high phosphorus requirement and is considered as a limiting factor for obtaining high yield.

This Investigation was carried out to study the response of sugar beet to different levels and application time of K and P fertilization and interaction between them

REVIEW OF LITERATURE