

# بسم الله الرحمن الرحيم



HOSSAM MAGHRABY



# شبكة المعلومات الجامعية التوثيق الالكتروني والميكرو فيلم



HOSSAM MAGHRABY



# جامعة عين شمس

## التوثيق الإلكتروني والميكروفيلم

### قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها  
على هذه الأقراص المدمجة قد أعدت دون أية تغيرات



## يجب أن

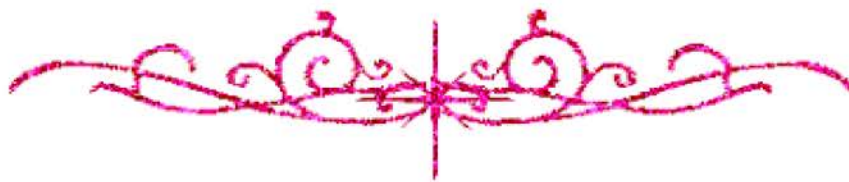
تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



HOSSAM MAGHRABY



# بعض الوثائق الأصلية تالفة



HOSSAM MAGHRABY





بالرسالة صفحات

لم ترد بالأصل



HOSSAM MAGHRABY

**EFFECT OF SOME MACRO AND MICRO  
NUTRIENTS ON GROWTH AND YIELD OF  
EGYPTIAN COTTON (*Gossypium barbadense* L.)**

B10501

BY

Faisal Abo El-Kassem Khalaf Allah Sabik

B. Sc. (Agronomy), Ain Shams Univ., 1970

M. Sc. (Agronomy), El-Azhar Univ., 1989

THESIS

Submitted in Partial Fulfillment of  
the Requirements for the Degree of  
Doctor of Philosophy

in

AGRONOMY

Faculty of Agriculture at Assiutah,  
Zagazig University (B.Sc. Branch)



1997

Approved by:

Prof. Dr.

*A. M. Bakh*

Prof. Dr.

*A. H. El-Agamy*

Prof. Dr.

*H. R. A. El-Deen*

Prof. Dr.

*M. Mohamed Kasem*

Committee in Charge

Date: / / 1997

Deposited in the Faculty Library

Date: / / 1997

Librarian



سبحانه

لا علم لنا إلا ما علمتنا إنك أنت العليم الحكيم

- صدق الله العظيم -

سورة البقرة (آية ٢٢)

**TO :**

**MY MOTHER ...**

**MY WIFE ...**

**MY SONS ...**

**MOHAMED,HATEM,ESSAM AND DIAA**



## CONTENTS

|                                         |           |
|-----------------------------------------|-----------|
| INTRODUCTION                            | Page<br>1 |
| REVIEW OF LITERATURE                    | 3         |
| MATERIALS AND METHODS                   | 29        |
| RESULTS AND DISCUSSION                  | 35        |
| I. Effect of nitrogen fertilization     | 35        |
| A- Cotton growth                        | 35        |
| 1- Plant height (cm)                    | 35        |
| 2- Number of leaves/ plant              | 37        |
| 3- Leaf area/ plant                     | 37        |
| 4- Number of vegetative branches/ plant | 37        |
| 5- Number of flowers/ plant             | 38        |
| B- Yield and yield components           | 38        |
| 1- Number of fruiting branches/ plant   | 38        |
| 2- Total number of bolls/ plant         | 40        |
| 3- Boll weight (gm)                     | 40        |
| 4- Fruit set percentage                 | 41        |
| 5- Shedding percentage                  | 41        |
| 6- Seed index                           | 42        |
| 7- Lint percentage                      | 42        |
| 8- Seed cotton yield/ fed.              | 42        |
| 9- Lint yield/ fed.                     | 44        |
| C- Cotton seed chemical analysis        | 45        |
| 1- Protein percentage                   | 45        |
| 2- Oil percentage                       | 45        |
| D- Fiber properties                     | 47        |
| II- Effect of phosphorus fertilization  | 47        |
| A- Cotton growth                        | 47        |
| 1- Plant height (cm)                    | 50        |
| 2- Number of leaves/ plant              | 50        |
| 3- Leaf area/ plant                     | 50        |
| 4- Number of vegetative branches/ plant | 51        |
| 5- Number of flowers/ plant             | 51        |
| B- Yield and yield components           | 51        |
| 1- Number of fruiting branches/ plant   | 51        |
| 2- Total number of bolls/ plant         | 53        |
| 3- Boll weight (gm)                     | 53        |
| 4- Fruit set percentage                 | 54        |
| 5- Shedding percentage                  | 54        |
| 6- Seed index                           | 54        |
| 7- Lint percentage                      | 55        |
| 8- Seed cotton yield/ fed.              | 55        |
| 9- Lint yield/ fed.                     | 55        |
| C- Seed chemical analysis               | 57        |
| 1- Protein percentage                   | 57        |
| 2- Oil percentage                       | 57        |

|                                             |      |
|---------------------------------------------|------|
|                                             | Page |
| D- Fiber properties                         | 59   |
| III- Effect of micronutrients fertilization | 59   |
| A- Cotton growth                            | 59   |
| 1- Plant height (cm)                        | 59   |
| 2- Number of leaves/ plant                  | 62   |
| 3- Leaf area/ plant                         | 62   |
| 4- Number of vegetative branches/ plant     | 62   |
| 5- Number of flowers/ plant                 | 63   |
| B- Yield and yield components               | 64   |
| 1- Number of fruiting branches/ plant       | 64   |
| 2- Total number of bolls/ plant             | 64   |
| 3- Boll weight (gm)                         | 66   |
| 4- Fruit set percentage                     | 67   |
| 5- Shedding percentage                      | 67   |
| 6- Seed index                               | 68   |
| 7- Lint percentage                          | 68   |
| 8- Seed cotton yield/ fed.                  | 68   |
| 9- Lint yield/ fed.                         | 70   |
| C- Cotton seed chemical analysis            | 71   |
| 1- Protein percentage                       | 71   |
| 2- Oil percentage                           | 71   |
| D- Fiber properties                         | 73   |
| IV- Effect of the interaction               | 75   |
| 1- Nitrogen and phosphorus                  | 75   |
| 2- Nitrogen and microelements               | 93   |
| 3- Phosphorus and micronutrients            | 114  |
| 4- Second order interaction                 | 127  |
| SUMMARY                                     | 135  |
| LITERATURE CITED                            | 147  |
| APPENDIX                                    | 172  |
| ARABIC SUMMARY                              |      |

## ACKNOWLEDGMENT

The writer expresses his sincere appreciation and gratitude to Dr. A.M. Badr, Professor of Agronomy, Fac. of Agric. Moshtohor, Zagazig Univ., Dr. G.A. Sary Professor and head of Agronomy Department, Fac. of Agric. Moshtohor, Zagazig Univ., Dr. H.R. A. El-Deepah Professor of Agronomy Fac. of Agric. Moshtohor, Zagazig Univ., for their supervision, advice and helpful criticism throughout this study and during the preparation of this manuscript.

The writer expresses his sincere appreciation to the memory of late Prof. Dr. Mohamed Shehata Soliman Salem for his supervision and valuable guidance before his death.

Sincere thanks are also due to Dr. H. Kabeel Researcher of Agric. Res. Center for his sincere help and advice throughout the preparation of this manuscript.

Thanks are also due to staff members of the farm of Fac. of Agric. Moshtohor, Zagazig Univ. Thanks are also due to the staff members of Ginning, Fiber and Spinning Res. Sec., Cotton Res. Sec. Cotton Res. Inst. for their sincere help and service.

I wish to extend my sincere appreciation to the chairman Prof. N. El- Mowailhy of Soil and Water Res. Instit.



# INTRODUCTION

## INTRODUCTION

There is a general agreement that cotton is considered for a long time one of the most important commercial crops which plays a prominent role in the economy and the social affairs of Egypt. In the last years, the total area cultivated with cotton has decreased. On the other hand, the inside marketing needs large quantities of crude cotton to face the increasing demands of spinning and textile industry, consequently any attempt which plays an important role to improving and increasing productivity per feddan to compensate for the decrease in acreage has become a main objective for the researchers to achieve.

According to the latest statistics of the Egyptian Ministry of Agriculture, the total acreage of cotton was 721443 \* feddan in 1994. Undoubtedly, under Egyptian agriculture system, several factors affect the productivity of cotton. One of the important factors which plays a good role in this respect is fertilization with macro- and micro- nutrients. Micro elements have been found to be deficient in most Egyptian soils, especially after the construction of the High Dam (El-Fouly, 1987). Therefore, the dose, the concentration, the date and the methods of application of these nutrients may lead to substantial effects as regard to physiological, morphological, functional and cytological aspects of cotton plant which may change vegetative and reproductive stages. The present investigation aimed to study the effect of some macro- and

---

\*Statistical Book Year, A.R.E., 1994

micro- nutrients on some vegetative growth characters, yield , yield components as well as fiber properties and some chemical characters of seed of cutliver Giza 85 as well (MOBARAK). Therefore, the aims of this study are specifically as follows:

- 1- To study the effects of nitrogen fertilizer at three levels on growth, yield and fiber properties of Giza 85 cultivar.
- 2- To study the effects of phosphorus at two rates on growth, yield and fiber properties of Giza 85 cultivar.
- 3- To study the effects of foliar application of Fe and Zn on the previous characters.
- 4- To study the interactions between these macro- and micro- nutreints on the previous characters.

# **REVIEW OF LITERATURE**