بسم الله الرحمن الرحيم

شبكة المعلومـــــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

﴿ قـــسـم ﴾

نقسم بالله 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 %

بعض الوثائق الأصلية تالفة

بالرسالة صفحات

لم ترد بالأصـــل

Studies on P, K, and Zn in New Valley Soils

By

Safy Helmy Matta

B.Sc. Agric. (Soils & Water), Assiut University (1992)

THESIS

Submitted in Partial Fulfillment of the
Requirements for the Degree of

MASTER OF SCIENCE

In

Soil Science

Department of Soils and Water
Faculty of Agriculture
Assiut University

2000

Supervised by:

Prof. Dr. M.H. Nafady

Dr. M.A. El-Desoky

Examined by:

Prof. Dr. M.H. Nafady

Prof. Dr. M.A. Maatouk

Prof. Dr. M.K. Rushdi

Dr. M.A. El-Desoky

٥٠٨٥

APPROVAL SHEET

Title : **Studies On P, K, and Zn in New Valley Soils.**

By
Safy Helmy Matta

Approved by :

M. H. Nagdy

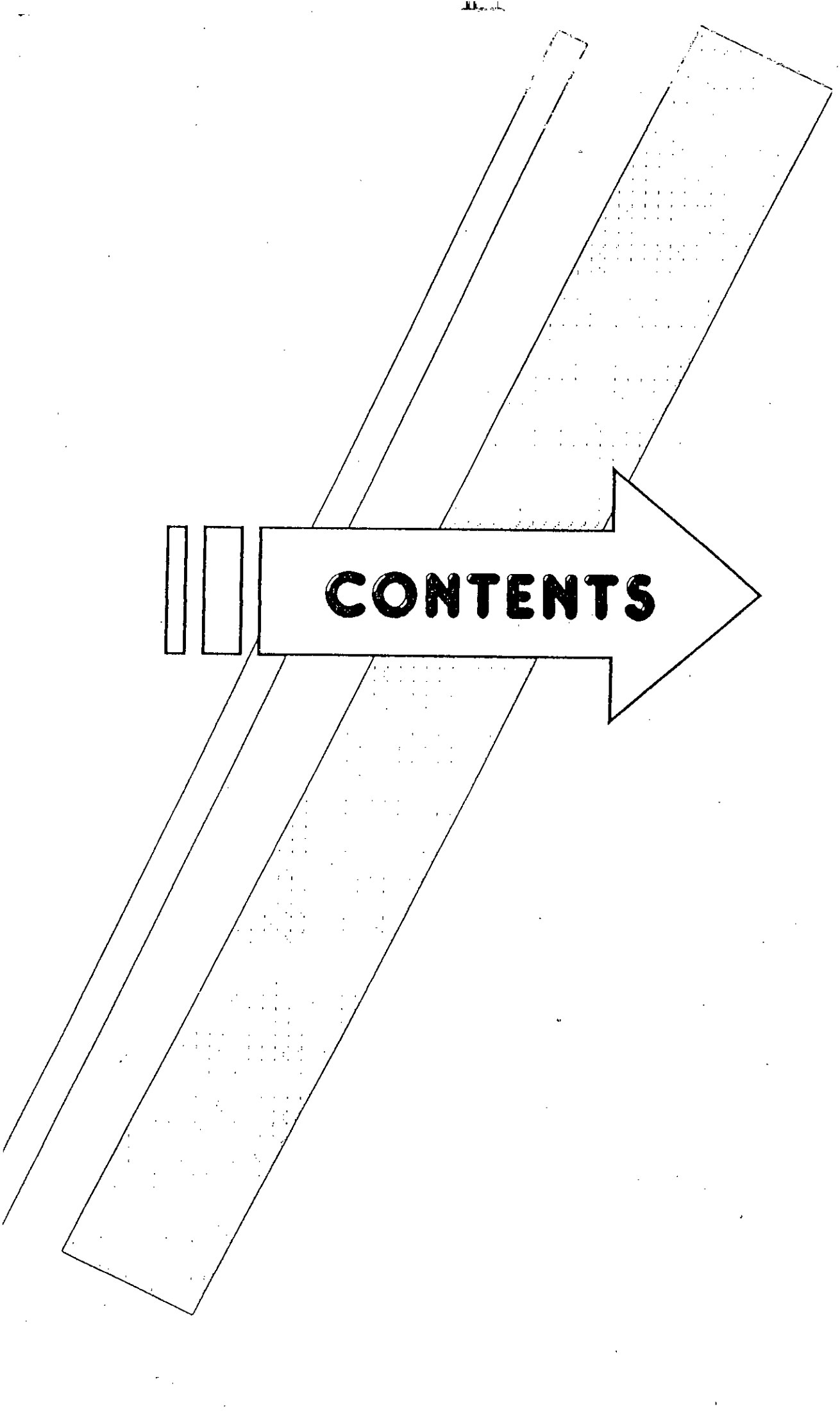
M. K. Rushdi

M. A. Mastouk

Mohamed El Dars

(Committee in charge)

Date: 7 / 2 /2000


CONTENTS

ACKNOWLEDGEMENT

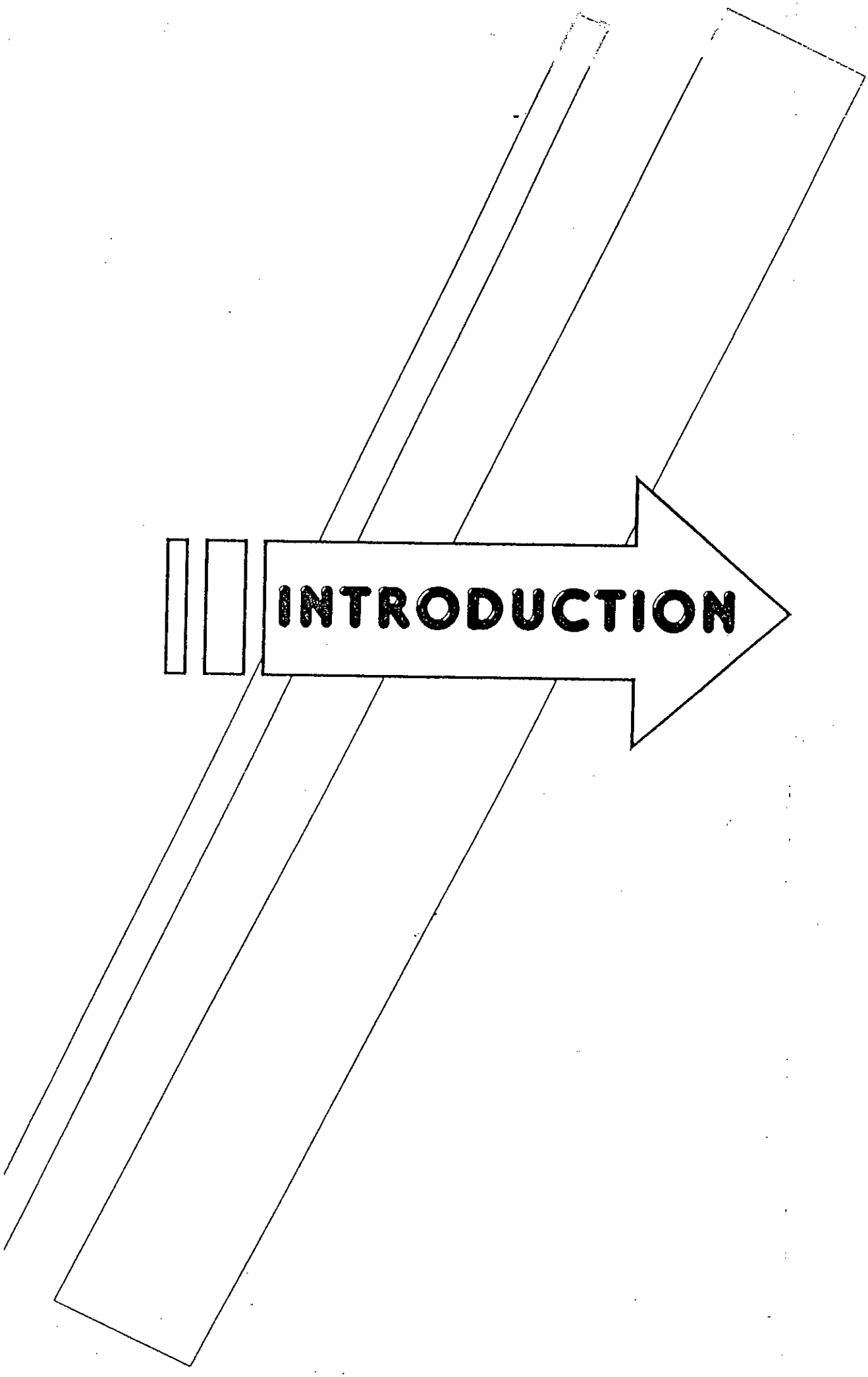
The author wishes to express his sincere gratitude and appreciation to ***Prof. Dr. M.H. Nafady***, Department of Soils and Water, College of Agriculture, University of Assiut, for suggesting this research problem, his sincere supervision, immensely continued help, continuous encouragement, and his continued assistance in writing and preparing the thesis.

Many thanks and gratefulness go out to ***Dr. M.A. El-Desoky***, Associate Professor of Soil Science, Department of Soils and Water, College of Agriculture, University of Assiut, for his supervision on this work, helpful assistance, and continuous guidance as well as his help in preparing this thesis.

Merciful prayers go out to the soul of Deceased ***Dr. M.I. Abo Zeid***, Late Associate professor of Soil Science, Department of Soils and Water, College of Agriculture, University of Assiut, for his participation in supervision, valuable help and assistance during the laboratory work.

Thanks are also extended to all Faculty members of the Department of Soils and Water, College of Agriculture, University of Assiut.

Finally, I would like to thank and appreciate ***my family*** for their encouragement during this work.


INTRODUCTION

INTRODUCTION

New Valley is considered as one important region, where about two-third the Egyptian area is located. Egyptian government depends upon this region in land expansion to increase the cultivated area and agricultural production. A multidirectional policy now, is carried out to make use of the land, water, and human resources of this area. A new community is stablished on this region, especially south part of New Valley governorate (Toshka) to lessen the human pressure on the Nile Valley which became very crowded with people.

One of the main problems of the soils of this area is its low content of plant nutrients that are essential for growth, (especially P, K and Zn). Plants grown on few sites of this area showed deficiency symptoms for phosphorus, potassium and zinc. The use of fertilizers that contain these nutrients is important for solving these problems.

The present study is a trial to evaluate the responses of plants grown on soils of El-Kharga and El-Dakhla, New Valley, to P, K and Zn fertilizers.

II

REVIEW OF LITERATURE

REVIEW OF LITERATURE

1 - Phosphorus

1.1- Phosphorus content and forms in soils:

The soils vary in their contents of total phosphorus (P) as the results of differences in weathering intensity and composition of parent material (**Stevenson, 1986**). Total phosphorus in most mineral soils varies from 0.02 to 0.05% (**Barber, 1984**). In Egyptian soils, phosphorus ranges between 0.05 and 0.15% P in basin soils and between 0.04 to 0.12% in irrigated soils (**Shawarbi and Moustafa, 1959**). **Rushdi (1976)** found that the total soil P ranged between 520 and 1000 ppm with an average of 786 ppm.

Soil P exists in three main groups: (1) soil solution, (2) inorganic, and (3) organic.

(a) Soil solution phosphorus:

This refers to the amount of phosphorus in the soil that can be taken up by plants and considered as available (**Ali, 1996**). Soil test using water and $NaHCO_3$ extracts are most reliable and satisfactory for determining available phosphorus in the soil of Egypt (**Omar, 1964**).

Tomar and Tekchand (1992) found that the available P increased with pH but decreased with organic C. In an acid Alfisol, Lime application increased available P (**Sood and Bhardwaj, 1992**). Extractable P increased markedly with increasing rates of P application up to 200 ppm in three soil types (**Ahmed, 1985**). Sodium biocarbonate extractable phosphorus increased with increasing pH of extractant, temperature, time of extraction, and soil solution ratio (**Maclean, 1965**).

Grant and Bailey (1989) found that phosphorus availability was greater with broadcast than with banded fertilizer additions. **Ibrahim *et al.* (1984)** reported that the mean values of available P were 7, 14 and 19 mg/g for calcareous, sandy, and alluvial soil in Egyptian soils. **El-Sherbieny *et al.* (1998)** showed that the values of available phosphorus in the untreated soil irrigated with sewage effluents ranged from 26.4 to 61.0 with a general average of 44.9 mg $P_2O_5.kg^{-1}$, (the range in the calcareous soil, under normal irrigation was 15.8 to 10.5 with a general average of 13.1 mg $P_2O_5.kg^{-1}$).

(b) Inorganic phosphorus compounds:

Most the inorganic phosphorus compounds that present in soils are calcium phosphates [Ca-P], aluminum phosphates [Al-P], and iron phosphates [Fe-P] (**Khalil, 1989**). Inorganic phosphorus content in soils ranged from 10 to 90% of the total P (**Stevenson, 1986**). **Sood and Bhordwaj (1992)** found that liming increased AL-P, Ca-P, Fe-P content. The inorganic P comprise 84.2 to 96% of the total P (**Aljouaid *et al.* 1991**).

In Egyptian soils, **Amer and Abou-El-Roos (1975)** found that the inorganic P ranged from 48 to 78% of the total P. **Ibrahim *et al.* (1984)** showed that the values of inorganic P were 96.8, 20.3 and 20.4 mg P/100g in alluvial, sandy and calcareous soils, respectively.