



شبكة المعلومات الجامعية

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ





شبكة المعلومات الجامعية



شبكة المعلومات الجامعية

التوثيق الالكتروني والميكرو فيلم

جامعة عين شمس

التوثيق الالكتروني والميكرو فيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد اعدت دون أية 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 %



شبكة المعلومات الجامعية



بعض الوثائق الأصلية تالفة



شبكة المعلومات الجامعية



بالرسالة صفحات
لم ترد بالأصل

**EFFECT OF SOME TILLAGE PRACTICES AND
PLANT SPACING ON SUGAR CANE
PRODUCTIVITY IN SOHAG**

By



GAMAL SAAD EL-SAYED

B. Sc. Agric. (General), AL-Azhar University(1980)

M. Sc. Agric. (Agronomy), Fac. Agric., Moshtohor, Zagazig University, (1996)

THESIS

**Submitted in Partial Fulfillment of the Requirements for the
Degree of**

DOCTOR OF PHILOSOPHY

in

AGRONOMY

**Agronomy Department
Faculty of Agriculture at Moshtohor
Zagazig University
(Banha Branch)**

2000

APPROVED BY:

Prof. Dr. *S. E. Shafarak*

Prof. Dr. *Sayed M. Abdel-Aal*

Prof. Dr. *A. S. El-Dieb*

Dr. *Saleh Allam*

COMMITTEE IN CHARGE

Date ²⁷/₈ / 2000

B7128

SUMMARY

Experiments were conducted in Sohag in a clay soil to study the effects of ploughing intensity (2, 3 and 4 times), row spacing (100 and 125 cm) and hoeing (twice and thrice) on yield and quality of sugar cane, during 1997/98 and 1998/99 seasons.

The results showed that:

- 1- Ploughing intensity markedly affected stalk height, N content in leaf and in stalk, K% in stalk, Brix %, sucrose %, purity % and millable cane number.
- 2- Cane yield increased by 7.2-16.5 % and 13.4-24.9 % due to increasing ploughing intensity from 2 to 3 and 4, respectively. The corresponding increases in sugar yield were 6.0-29.3 and 22.2-48.4 %, respectively.
- 3- Row spacing affected stalk height and diameter, total soluble solids % in leaf and juice, Na, K and sucrose % in juice.
- 4- Planting at 100 cm increased cane yield by 6.5-6.1 % compared with 125 cm, sugar yield increased by 7.1-3.4 %.
- 5- Hoeing did not markedly affected most of the studied characters.
- 6- The highest cane yield was 60- 66.2 t/fed. and sugar yield reached 7.6- 8.2 t/fed. which were recorded by 4 ploughing + 100 cm + 3 hoeings.
- 7- 3 hoeings reduced total dry weight of weeds by 26-51 % compared with 3 hoeings.

ACKNOWLEDGEMENT

ACKNOWLEDGEMENT

I wish to express my deepest gratitude and sincere appreciation to Dr. S. E. Shafshak. Professor of Agronomy, Faculty of Agriculture, at Moshtohor, Zagazig University and to Dr. S. A. H. Allam, Assistant Professor of Agronomy, Faculty of Agriculture, at Moshtohor, Zagazig University for suggesting the problem of study and for their valuable scientific supervision, advice, continuous help and constructive criticism throughout the course of this study and during the preparation of the manuscript.

Thanks are also due to Professor Dr. I. H. El- Geddawy Head of Agronomy Division of Sugar Crops Research Institute, Agricultural Research Center for his supervision, suggesting the problem, valuable guidance, helpful ideas and constructive criticism throughout the period of the present study.

Deep gratitude is due to Dr. M. K. Ali, Assistant Professor at Shandaweel Research Station for his help during the present investigation.

I like to express many thanks to all staff members of Sugar Crops Research Institute for their help, encouragement and providing all the needed facilities.

CONTENTS

	Page
INTRODUCTION	1
REVIEW OF LITERATURE	3
I. Effect of ploughing intensity on growth, juice quality and yield and its attributes of sugar cane.....	3
II. Effect of row spacing on growth, juice quality and yield and its attributes of sugar cane.....	6
III. Effect of row spacing on growth, juice quality and yield and its attributes of sugar cane.....	16
MATERIALS AND METHODS	21
RESULTS AND DISCUSSION	27
I. Effect of ploughing, row spacing, hoeing and their interactions on growth characters of sugar cane.....	27.
1. Germination percentage.....	27
2. Number of stalks/m ²	29
3. Stalk diameter.....	34
4. Stalk height.....	37
II. Effect of ploughing, row spacing, hoeing and their interactions on weed density in sugar cane.....	42
1. Fresh weight of total weeds (g/m ²).	42
2. Dry weight of total weeds(g/m ²)	46
III. Effect of ploughing, row spacing, hoeing and their interactions on chemical composition in leaf and juice at different growth stages.....	50
1. Nitrogen percentage in leaf at different growth stages.....	50
2. Potassium percentage in leaf at different growth stages.....	54
3. Sodium percentage in leaf at different growth stages.....	58
4. Nitrogen percentage in stalk at harvest.....	62

5. Sodium percentage in stalk at harvest.....	63
6. Potassium percentage in stalk at harvest.....	64
7. Fiber percentage in stalk at harvest.....	67
8. Total soluble solids percentage (TSS%) in juice at different growth stages.....	68
9. Brix percentage in juice at harvest	73
10. Sucrose percentage in juice at harvest.....	76
11. Reducing sugar percentage (R.S.%) in juice at harvest.....	77
12. Purity percentage in juice at harvest.....	78
13. Sugar recovery percentage (S.R.%).....	81

IV. Effect of ploughing, row spacing, hoeing and their interactions on yield and yield components of sugar cane.....	82
1. Number of millable cane.....	82
2. Cane yield (tons/fed).....	85
3. Sugar yield (tons/fed).....	88

SUMMARY	92
----------------------	----

LITERATURE CITED	104
-------------------------------	-----

ARABIC SUMMARY

INTERODUCTION

INTRODUCTION

Sugar cane is grown on a wide range of soils with different texture from light sand to heavy clay. It is also tolerant to wide variations of acidity and alkalinity. Meanwhile, it is well known that sugar cane is a robust, tillering and perennial crop characterized with its high demand and strong ability of depleting nutrients.

Sugar cane is considered the main sugar crop in Egypt where the total amount of sugar produced from cane and beet reached 1.325 million tons, out of which 325.000 tons are produced from sugar beet. However, there is a difficulty to extend the area under sugar cane cultivation as an attempt to narrow the gap between the produced and consumed sugar averaged yearly by 0.6 million tons. Sugar cane growers renew its plantation after 5-6 seasons.

Because of the limited area suitable for sugar cane, many growers have been accustomed to replant their cane in a monoculture system. This condition negatively affected not only soil fertility but also physical and chemical soil properties. Consequently growth, yield and quality of the end product were seriously affected.

From the point of botanical view, sugar cane internodes are very short in the basal part and the suitable hoeing broadly improves plant growth and the final millable cane at harvest would be increased.

Soil deep loosening techniques can improve soil structure and increase the soil aeration and water permeability of soil. It can also substantially increase crop yields.

Row spacing plays an important role in the amount of solar radiation intercepted and water transpired by crop canopy which in turn affect the

photosynthesis processes and ultimately the dry matter produced and sugar extracted by sugar cane plant. Moreover, planting density may affect cane diameter, length and weight of individual plants which contribute to cane yield.

Thus, the aim of the present investigation is to get some information of the requirements of tillage practices of sugar cane namely, ploughing and hoeing intensities of plant cane. Also, row spacing has been also considered. It is hoped that such information may help in getting some recommendations for sugar cane growers in Sohag Governorate.

REVIEW
OF
LITERATURE