hossam maghraby

شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

hossam maghraby

شبكة المعلومات الجامعية

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

hossam maghraby

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

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

يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

hossam maghraby

شبكة المعلومات الجامعية

بعض الوثائق الأصلية تالفة

hossam maghraby

شبكة المعلومات الجامعية

بالرسالة صفحات لم ترد بالأصل

BREEDING STUDIES OF SOME ECONOMIC CHARACTERS ON SUNFLOWER (*Helianthus annuus* L.)

By

Mohamed Abd El-Azeem Salih
B.Sc. (Agric.) Ain Shams Univ. 1967
M.Sc. (Agric.) Zagazig Univ. 1987

Thesis
Submitted in Partial Fulfillment of the Requirements for the Degree of
DOCTOR OF PHILOSOPHY
IN
AGRONOMY

Department of Agronomy and Agricultural Mechanization
Faculty of Agriculture at Moshtohor
Zagazig University (Benha Branch)

2000

BREEDING STUDIES OF SOME ECONOMIC CHARACTERS ON SUNFLOWER
(*Helianthus annuus* L.)

By

Mohamed Abd El-Azeem Salih
B.Sc. (Agric.) Ain Shams Univ. 1967
M.Sc. (Agric.) Zagazig Univ. 1987

Thesis

Submitted in Partial Fulfillment of the Requirements for the Degree of

DOCTOR OF PHILOSOPHY
IN
AGRONOMY

Department of Agronomy and Agricultural Mechanization
Faculty of Agriculture at Moshtohor
Zagazig University (Benha Branch)

2000

Approved By

Prof. Dr. ....S. E. Shaftak........

Prof. Dr. ...a. abdurras.......................

Prof. Dr. A. A. El-Hosary.................

Prof. Dr. ....G. Y. Hammam.........

Date: Committee in Charge

سبحانك لا علم لنا إلا ما علمتنا انك انت العليم الحكيم

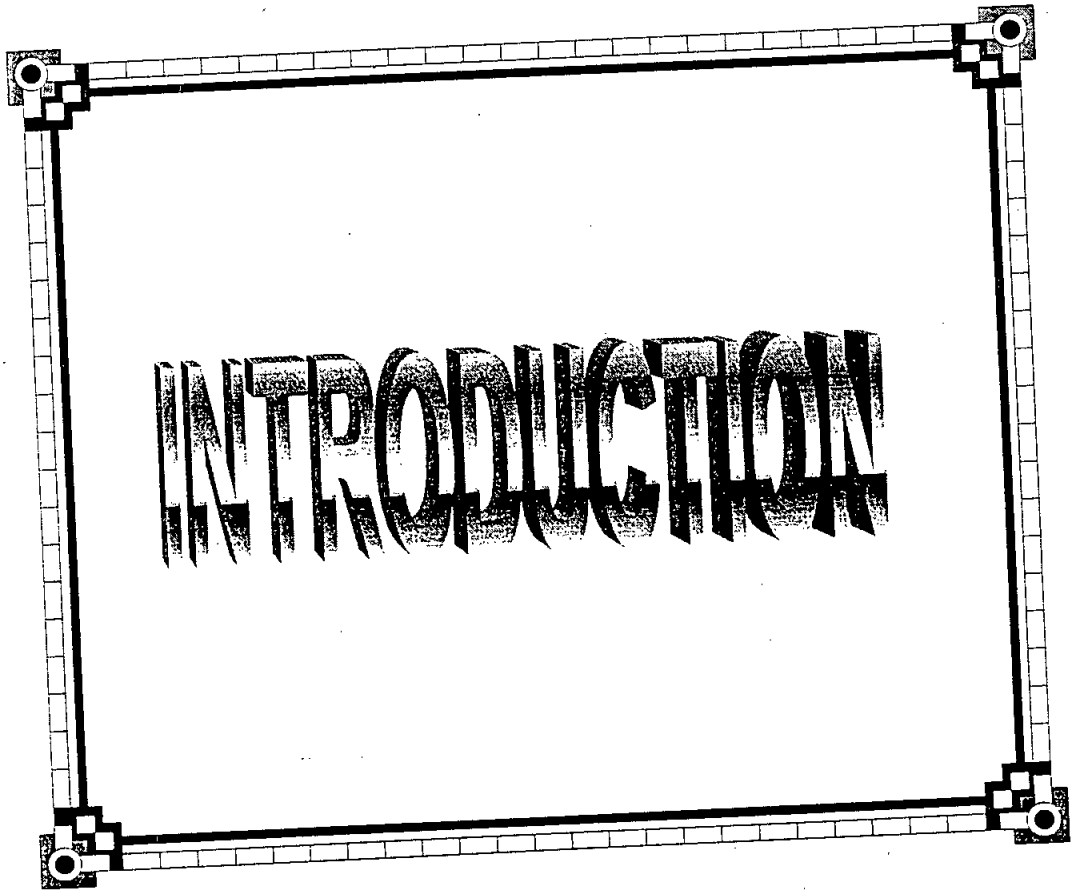
البقرة – اية ٣٢

ACKNOWLEDGMENT

It gives me immence pleasure to express my deep sense of gratitude to Prof. Dr. S.E. Shafshak, and Prof. Dr. A.A. El-Hosary, Agronomy Dep., Faculty of Agriculture at Moshtohor, members of supervision committee for suggesting the problem and valuable guidance throughout the course of these investigations. Their inspiring help, constructive criticism and sustained interest were a source of constant encouragement to me. I am also indebted to them for going very critically throughout the manuscript.

Many thanks are also due to Prof. Dr. S.A.M. Attia, Head of Oil Crops Research Section, Prof. Dr. Maaty Keshta member of the supervision committee and Dr. M.E. Abou-Ghazala for helping me to solve the problems which I faced throughout the study.

CONTENTS


INTRODUCTION

INTRODUCTION

The cultivated sunflower (*Helianthus annuus* L.) is one of the most important oil crops in the world. It was introduced into Europe in the 16th century and then spread widely all over the world. It became the main source of edible oil in most countries like Russian Federal Republic, Argentina, Rumania, Turkey, France and Italy due to its wide rage of adaptability in addition to high percent of excellent edible oil in the seed (45-55%).

The cultivated form was re-introduced to North America about 1880 (**Heiser, 1951**) and all cultivars now grown in America are their direct introduction from Europe or have European cultivars in their pedigree (**Eric and Dorrel, 1975**).

Sunflower is now the fifth oil seed crop in the world after soybean, rape seed, cotton and peanut, although it is the fourth liquid oil produced and consumed in the world. The total world production of oil seeds in 1999[1] reached (in million metric tons): 157.19 for soybean, 36.61 for rape, 32.71 for cotton, 28.88 for peanut and 25.72 for sunflower. The crushed seeds were[1] (in million metric tons in 1999): 130.46, 32.77, 24.65, 22.79 and 14.53 for soybean, rape, cotton, sunflower and peanut, respectively. Argentina is the largest single producer of sunflower seed with an annual production of 6750 000 t (22.5% of the total annual production in 1999[2].

[1] Counselar and Attache Reports, Official Statistics, USDA. Estimates July 1991
[2] FAO, OBS, Vol. 12 (3/4), 1999.

In Egypt, due to the severe shortage of edible oil, sunflower received a great attention. The area devoted to sunflower is increasing gradually and reached 34798 fed. in 1998[3] with an average yield of 973 kg/fed. (2317 kg/ha) and total production of 33872 t. The area is concentrated in Assiut, El-Fayoum, Bani-Suef, El-Behera and El-Minia governorates where about 92.8% of sunflower seeds were produced.

Sunflower seed contains a high proportion of polyunsaturated fatty acids, where oil contains a high percentage of Linoleic acid reaching a level of 52-62% from the total fatty acids content, this high percentage of Linoleic acid reduces the cholesterol content in human blood and the remainder after oil extraction contains a high percentage of protein ranging from 13 to 19%. So sunflower cake could be considered as a good feed for cattle and poultry also the green leaves of sunflower could be utilized as a forage crop due to their high content of protein. Furthermore, sunflower oil may be used as a fuel energy source, the sunflower inflorescence contains 18% pectin and is considered as an important material used in many industrial processes.

The amino acid composition of sunflower protein such that the meal could be valuable ingredient in food materials (**Earle *et al.*, 1969**). These amino acids are lysine, tryptophan, methionine and cystine, the contents of the majority amino acids in the protein of sunflower and soybean meals are approximately the same.

Due to the rapid increase in population in Egypt, there is a growing demand for vegetable oils. At present, Egypt imports about 4/5 of its

[3] Ministry of Agric., Ann. Statis. Data, Sec. Part, Summer and Nile Crops, Dec. 1998.

annual requirements of edible vegetable oils. These imports draw a heavy bill on the foreign currency reserves of the country.

A possible remedy to the present gap between the domestic production of and demand for edible oil could be the use of new sunflower genotypes imported from different countries of the world. After being grown under local climatic conditions these genotypes should be evaluated for further introduction.

The possible use of cytoplasmic male sterile and fertility restorer system gives an excellent chance to utilize hybrid vigor in commercial production of sunflower. So, the materials used in this study included 6 cytoplasmic male sterile lines (CMS) and 5 restorer lines of diverse origins. The CMS lines were crossed to the restorer lines to give 30 hybrids, which were evaluated at three densities in two locations in order to:

1- Estimate the heterosis as a best criterion for producing hybrids.
2- Determine the importance of genotype x spacing between plants.
3- Estimate the general and specific combining ability (GCA and SCA) and their interaction by spacing between plants.
4- Identify the breeding potentialities of superior parental sunflower inbred lines to be used in sunflower breeding programs.

REVIEW OF LITERATURE