شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

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

يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

To be Kept away from Dust in Dry Cool place of 15-25- c and relative humidity 20-40%

بعض الوثائـــــــق الاصليـــــة تالفـــة

بالرسالة صفحات لم ترد بالاصل

TANTA UNIVERSITY
FACULTY OF AGRICULTURE
KAFR EL-SHEIKH
Agronomy of Department

STUDIES ON CORN BREEDING

By

Fouad Shehata Abou-Zied Ahmed

B. Sc. Agric. Tanta University, 1979

Thesis

Submitted in Partial fulfillment of the requirements for the degree

OF

AGRICULTURAL SCIENCE

In

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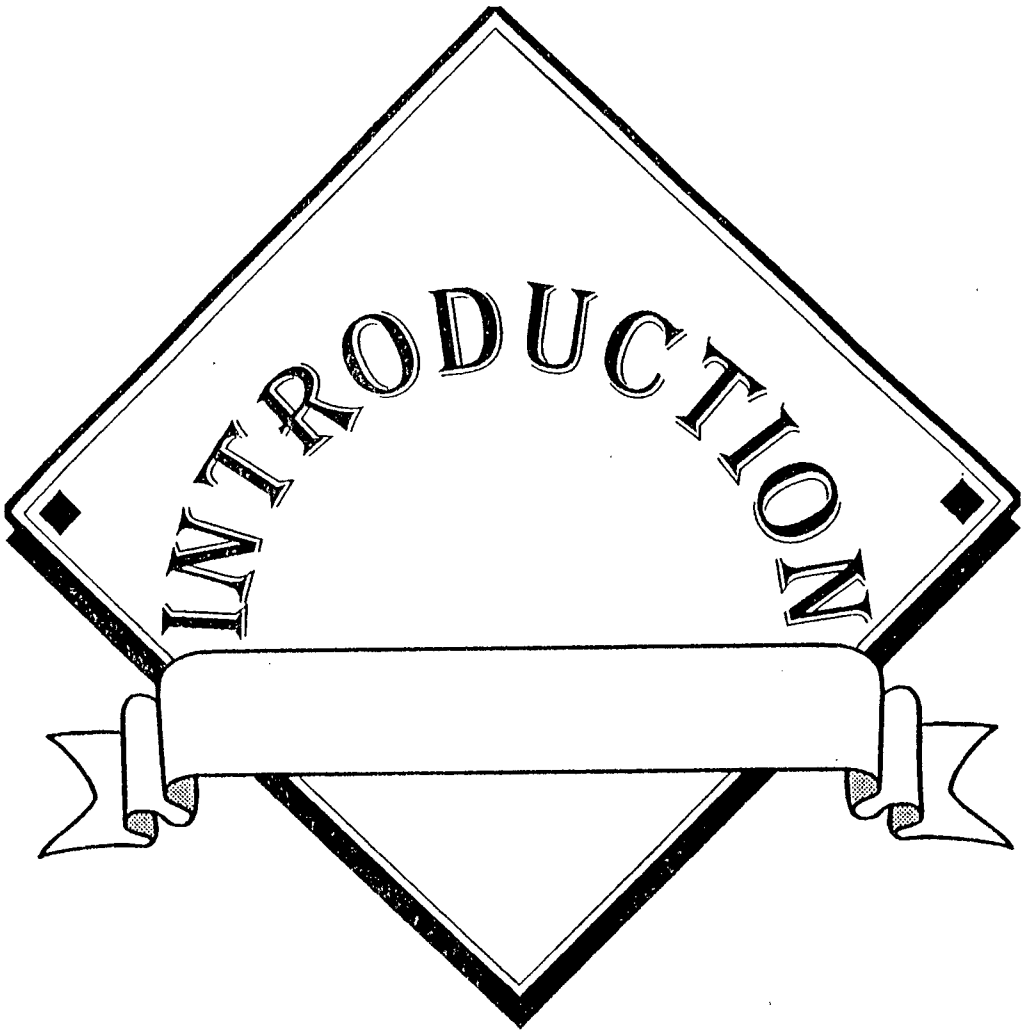
INTRODUCTION

INTRODUCTION

Maize (*Zea mays* L.) is one of the most important cereal crops in Egypt and in the world. Maize in the world ranks the third surpassed only by wheat and rice. It is a great importance for both human and animal feeding. Therefore, efforts are focused on increasing productivity of this crop by growing high yielding new hybrids under the most favourable cultural practices.

The growth and yield of maize depend on many factors. The major factors are plant population density, genotypes and nitrogen fertilization. Plant density and nitrogen fertilization could be the most important factors for raising maize production. The optimum level of both factors varied widely according to soil fertility, water supply, day length and planting patterns, **Duncan (1972)**. However, there are some differences among formers concerning these factors.

Nitrogen fertilization is among the most important cultural practices, which control maize production (**Mandour 1977 and Balkò and Russel 1980**). Provision for an adequate supply of nitrogen throughout the growing season is necessary and is one of the important functions of soil management. The effect of nitrogen fertilization up to 140 kgs/fed. appeared obviously for almost traits where as grain yield per unit area (Ard./fad.), grain yield gms per plant, ear length, no. of kernels/row, weight of 100 kernels and plant height increased as well as the nitrogen levels increased from 60 up to 140 kgs/fad. (**Younis *et al.* 1990, and Esmail and El-Sheikh 1994**).

Concerning the effect of plant density on maize yield and its components. **Galal *et al.* (1979), Sayfikar (1983) and Younis *et al.* (1989)** reported that high grain yield/fad. obtained with increasing plant density but in high densities provided less ear length (**Moursi *et al.*, 1970 and Alessi and Power 1974**), ear diameter, rows number per ear (**Rutger and Crowder 1967**), grains number/ear (**Ewies 1980**), However high plant density increased ears number/fad. (**El-Tabbakh and Salem 1979**) as well as grain yield/fad.

In Egypt maize growers can select maize cultivars such as single cross, three way cross and double cross hybrids which may increased maize production compared to open-pollinated varieties. It is well known that maize varieties differ in growth characters.

Developing and releasing high yielding and more stable maize (*Zea mays* L.) hybrids is among the main objectives of the Egyptian Maize Research program. Many high yielding single and three-way cross hybrids were developed and released during the recent few years. The hybrids produce high grain yield under different environmental conditions. Estimate of the genotypic stability of new hybrids was needed in any successful breeding program. In this respect, **Freedman and Perkins (1971)** stated that the basic cause of the differences between genotypes in their yield stability is the wide occurrence of genotype × environment interaction (G×E interaction).

Comostock and Moll (1963); Allard and Bradshaw (1964); Baker (1969); El-Nagouly *et al.*,(1980); Loffler *et al.* (1986), Westcott (1986) and Nassar and Huhn (1987) mentioned that the genotype × environment interaction could be partitioned into predictable and unpredictable variates. The predictable ones is due mainly to the more permanent factors, while the unpredictable variates as caused by different environmental stress factors like fluctuations in soil fertility and weather conditions, insect infestation, disease infection ..... etc.

Stability in performance is one of the most desirable properties of a genotype to be released as a variety for wide cultivation, where the new cultivar should have stable performance and broad adaptation over a range of environments, in addition to high yield potential (Allard and Bradshaw, 1964).

Yates and Cochran (1938) proposed a method of partitioning the genotype × environment interaction by calculating a regression of the yields of a given genotype in different environments on the respective means of all genotypes. This procedure, as elaborated by Eberhart and Rusell (1966) has been widly used to estimate phenotypic stability. Eberhart and Russell's method provides two statistical measures to characterize an entry: (I) the coefficient of regression (bi), an indicator of whether the genotype is better adapted to environments which are above average (bi>1) or to poorer environments (bi<1) , and (ii) the mean square for deviations from regression, a measure of the reliability of the linear response. They defined an ideal cultivar as one having a regression

coefficient of unity (bi=1) and a minimmum deviation from regression ($S^2di=0$).

Genotypic stability analysis was proposed by Tai (1971), using a model that measures the linear response of genotypes to environmental effects (αi) and the deviation from the linear repose (λi). He defined perfectly stability cultivar as one that has (αi, λi) = -1, 1). A cultivar of average stability has (αi, λi) = 0, 1). Tai's approach is similar to that Eberhart and Russell's one in attempting to determine the linear response of a cultivar to environmental effects, but Tai's model differs in the estimation of statistics determining stability. Eberhart and Russell's method (1966) has been used extensively in crop breeding programs, but that proposed by Tai (1971) has seldom been used.

The objectives of the present investigation could be summarize in the following aspects:

1- Evaluation of twelve hybrids corn (*Zea mays* L.) under three plant densities combined with three nitrogen levels.

2- The estimation of linear regression equation for grain yield under D×N interaction.

3- The determination the nature of genotype × environment interaction.

4- The estimation of the phenotypic and genotypic stability parameters to identify the stable maize genotypes for grain yield under different environments.