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شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم



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شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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بالرسالة صفحات لم ترد بالأصل



**STUDIES FOR IMPROVING YIELD
POTENTIAL OF SOME SESAME
GENOTYPES**

BY

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ABSTRACT

The present study was carried out to improve the yield potential of some sesame genotypes through application the suitable agronomic practices and use of suitable plant breeding approaches in the crop improvement. The first part of the study aimed to investigate the response of different sesame genotypes to nitrogen fertilization and plant population density in terms of hill spacing in order to maximize seed yield/unit area. In this respect, a spilt – spilt plot design was used where N levels of 30, 45 and 60 Kg N/fad. were applied in the main plots, while sesame genotypes (Mutant48, EUL90 and Giza32) were arranged in the sub plots and hill spacing of 10, 15 and 20cm were distributed in the sub-sub plots. Combined data over two seasons for growth characters and its components showed significant effect for N levels, genotypes and hill spacing as well as their first and second order interactions on most of these characters. In general, combined analysis revealed that highest seed yield per faddan (926.2 Kg) was obtained from Mutant48 when it grown at 15cm hill spacing and received 60 Kg N/fad. , however, the economic yield (909.7 Kg) could be obtained from Mutant48 at 20cm hill spacing with 2 plants/hill and adding 45Kg N/fad. For EUL90, greatest seed yield /fad. (808.5 Kg) was recorded when it grown at 15cm between hills and 60Kg N/fad. However, the commercial cultivar Giza32 produced highest seed yield (738.0Kg/fad.) when it sown at hill spacing of 10cm and 60Kg N/fad.

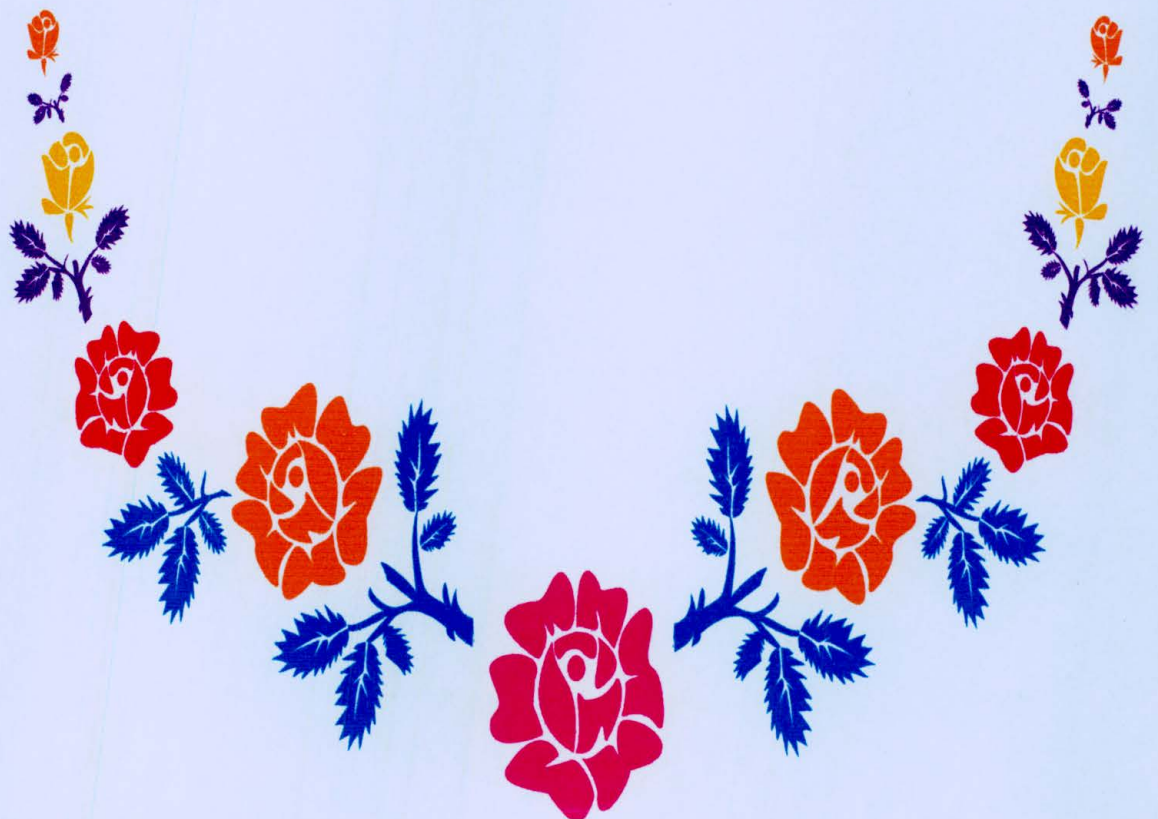
The second part of this study was conducted aiming to generate a new forms of sesame with high yield potential through hybridization and selection. Therefore, a half diallel set of crosses including six parental genotypes were used to investigate heterosis and combining ability in the F₁ generation as well as the nature of gene action controlling seed yield and its contributing characters in both F₁ and F₂ generations. Results showed that the maximum significant true heterosis in desirable direction (47.4%) was recorded for capsules/plant, followed by seed yield/plant (39.2%), fruiting zone length (17.4%) and 1000-seed weight (10.2%). Analysis of variance for combining ability indicated that general (GCA) and specific (SCA) combining ability variances were highly significant for all investigated traits, revealing the presence of both additive and non-additive gene effects involved in the expression of these traits. General and specific combining ability effects were frequently significant among parents and crosses for the studied traits. Superior parents and crosses were identified for particular characters. Non of the parents appeared to be good general combiner for all traits together. The performance of the crosses was compared on the basis of mean yield, desirable heterosis, SCA effects of hybrids and GCA effects of parents. According to these parameters, four crosses were classified as the best and could be utilized either for development of hybrid sesame or for recovering superior lines in further segregation populations. Estimates of genetic parameters and their ratios indicated that an indirect selection for stem height to first capsule, fruiting zone length, branches and capsules per plant would be help to isolate high yielded genotypes in the segregating populations due to the substantial contribution of additive gene effects and high estimates of narrow sense heritability for such traits in the F₂ generations. However, the predominant of non-additive gene effects and low estimates of narrow sense heritability for capsules/plant and seed yield/plant in the F₁ generation, suggesting the possibility exploiting dominance gene effects for improving such traits through heterosis breeding if the male sterile line of sesame become available.



TO

MY MOTHER

Dr. SEHAM EL KHIAT



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Firstly, Thanks to God

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INTRODUCTION

INTRODUCTION

Sesame (*Sesamum indicum* L.) is an important oilseed crop in the tropics and subtropics, however 99% of its cultivated area are in the developing countries where usually grown by the small holders (Production Year Book, FAO, 1999). Sesame crop has an important advantages because it could be grown under fairly high temperature, low water supply and low levels of other inputs (Weiss, 1983 and Ashri, 1989).

In Egypt, sesame is consider a food crop rather than oilseed crop because most of its seeds consumed directly, without oil extraction, in different purposes such as bakery products, tehena, halawa ...etc.

The cultivated area of sesame in Egypt increased markedly during the last few years. It increased from 30 733 faddan in 1986 to 67000 faddan in 1999 (118 %), thus the total seed production increased from 14 885 ton in 1986 to 33000 ton (121.7%) in 1999. However, the productivity per unit area was not increased markedly, it increased from 477 to 497 kg seed/faddan only (4.2%) in the same period (Central Administration of Agricultural Economy, Ministry of Agriculture, Egypt). However, the local production from sesame seed did not satisfy the national requirements, thus about 35000 ton of sesame seed was imported in 1998. (Trade Year book, FAO, 1998).

It is clear that the increase in sesame production during the last years was mainly due to the increase in its growing area in Egypt. This means that intensive research work is needed to increase the productivity of sesame to reduce the imported sesame seeds in the near future aiming to reach to the self-sufficiency later on.