GENETICAL STUDIES ON SOME MORPHOLOGICAL AND PHYSIOLOGICAL CHARACTERS IN COWPEA (*Vigna unguiculata* L.)

BY

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B.Sc. Agric. (Horticulture), Fac. of Agric., Assiut Univ., 1991

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ABSTRACT

Ahmed Helmy Hussein. Studies on Genetical Studies on Some Morphological and Physiological Characters of Cowpea**. Unpublished Master of Agriculture Science, Ain Shams University, Faculty of Agriculture, Horticultural Department 1998.**

This study was carried out from 1995 to 1997 at the Experimental Farm of the Vegetable Research Department (Dokki) and Experimental Farm at Barrage Horticultural Experiment Station. Four cowpea cultivars and their F1 hybrids and F2 population. Data were recorded on: plant height, date flowering, number of branches/plant, pod length, number of seeds per pod, pod filling, pods weight/plant, number of pods/plant, yield of dry seeds/plant and and 100 seed weight protein content in seeds. Results cleared significant variance for all characters except protein percentage. However, genetic variance for Griffing cleared highly significant for general and specific combining ability for all characters except number of branches it was controlled by additive genes system while the specific combining ability was negative significant for this character. In addition the cross Dokki 331 x (8) IT 84S-2240 showed a high performance for all characters except number of pods/cluster and pod length.

Key words: Cowpea, Half-diallel, pods characters, heterosis, general and specific combining ability.

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1. INTRODUCTION

Cowpea (*Vigna unguiculata* (L.) Walp.) is one of the important vegetable crops in Egypt as well as many other tropical and subtropical countries in the world. Also, it is considered as one of the important sources of protein.

Cowpea is used for both green pods as well as dry seeds. Acreage cultivated with cowpea for green pods consumption in 1997 is 25632feddan* with total production of 65867 tons. As for dry seeds, the acreage was 10730 feddan and its production was about 12476 tons.

Yielding ability of the various cultivars cultivated in Egypt is somewhat low. Moreover, the various cultivars usually differ in their morphological and physiological characters.

The improvement of both quantitative and qualitative characters of cowpea such as earliness, dry seed yield and green pods. Yield depends on the presence of genetic variability that allows the breeders to select new lines and varieties. Contrasting differences in the available characteristics of cowpea varieties and lines are found. Also, hybridization is one of sources of inducing variabilities.

Therefore, the objective of this work was to study the genetic behaviour of some economic characters in cowpea using diallel crossing system. Such as study many help in developing an accurate and appropriate breeding program for improving yield and quality of cowpea. Moreover, determination of the correlation existed among the various characters facilitates improving these characters through hybridization and selection.

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2. REVIEW OF LITERATURE

2.1. Vegetative growth

2.1.1 Plant height

The evaluation of parents and the intervarietal crosses for F1 and F2 generation of cowpea cultivars, with regards to plant height, have been studied by many investigators.

Gad El-Hak *et al.* (1988) found that plant height ranged from 40 to 130 cm in the different cowpea cultivars.

Jindal and Gupta (1984); Tamilselnam and Das (1994); Damarany (1994a) and Sawant (1994) found a positive correlation between plant height and seed yield. Heterosis in relation to the better parent for plant height was also reported by **Thiyagarajan (1989); Roquib and Patanik (1990)** and **Sawant (1994)**. They showed that the heterosis in the F1 hybrids ranged from 164.4 to 87.6% with a general mean 119% in F1 hybrids for plant height.

Tamilselvam and Das (1994) mentioned that plant height was positively correlated with days to 50% flowering, number of clusters/plant, pod length and 100-seed weight.

Apte *et al.* (1987) reported that the genetic gain percentage was high for plant heights as a selected criteria.

2.1.2 Number of branches/plant

Chikkadyavaiah (1985) showed that the seed yield of cowpea was positively correlated with number of branches per plant.

Apte *et al.* (1987) found that in 50 cowpea genotypes, percentage of genetic gain was high for number of branches per plant.

Senanayake and Wijerathne (1988) reported that the seed yield was negatively correlated with the number of primary branches (r = -0.88). On the contrary, **Pundir *et al.* (1992) Altinbas and Sepetoglu (1993)** and **Damarany (1994a)** reported that the seed yield was positively correlated with number of branches per plant.

Tiwari *et al.* (1993) found a highly significant specific combining ability for branches per plant.