

DIALLEL CROSS ANALYSIS FOR EARLINESS AND DISEASE RESISTANCE  
IN FIELD BEAN (Vicia faba L.)

By

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ABSTRACT

To estimate the type and relative amount of genetic variance components and their interaction with the environment in field bean, the following traits were studied; flowering date, maturity date, maturity period, number of branches per plant, plant height, resistance to chocolate leaf spot and rust diseases. A half diallel F<sub>2</sub> set of crosses involving five parental lines were evaluated under spaced and dense planting in two separate experiments. Each of which was grown in a randomized complete block design with three replicates. Data were recorded on the base of the individual plant for all traits, and then genetically analysed by the procedures recorded by Griffing (1956) and Jinks (1954).

Significant densities mean squares were obtained for all the traits under study. Mean squares for genotypes as well as its components reached the level of significance for most traits.

Significant general combining ability (GCA) variance was obtained for all traits. Also, significant specific combining ability (SCA) variance was found for all cases except for the number of branches per plant in the two sides planting, and the rust disease percentage in one side planting. The magnitudes of the ratios of GCA/SCA revealed that the additive and additive x additive types of gene action were the more important expression for all traits. Interaction of GCA x densities mean squares were significant for the characters of flowering date, fruiting period, plant height and percentage of chocolate leaf spot disease. However, significant mean squares due to SCA x densities interaction were obtained for all traits except that of the number of branches per plant and percentage of rust disease infection.

The parental line N.A. 112 was the best combiner for maturity date and fruiting period. While, the parental line Equadols seemed to be a good combiner for resistance to chocolate spot and rust disease as well as plant height. The most desirable inter-and intra-allelic interactions were presented in two F<sub>2</sub>'s crosses. The first (Equadols x Giza 2) for earliness, number of branches per plant, and resistance to rust disease. The second (N.A. 112 x Romi) for the resistance to chocolate leaf spot disease.

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