PERFORMANCE OF PARENTS, F_1 AND F_2 FOR TOLERANCE TO *OROBANCHE* AND *BOTRYTIS* IN FABA BEAN AND MOLECULAR CHARACTERIZATION OF HOST AND PARASITE

By

Heba Amin Mohamed Ali Saleh
B.Sc. Agric. Sci. (Agronomy), Fac. Agric., Zagazig Univ., 2007
M.Sc. Agric. Sci. (Agronomy) Fac. Agric., CairoUniv., 2015

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Supervisors: Dr. Mazhar Mohamed Fawzy Abdalla
Dr. Magdy Mohamed Shafik.
Dr. Mahmoud Ibrahim Abdel-Mohsen

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ABSTRACT

This study was conducted during 2015/2016, 2016/2017 and 2017/2018 seasons. The faba bean, *Viciafaba* genotypes: Nubaria 1 (P_1 - *Major*), Giza 843 (P_2 – *Equina*), Sakha 4 (P_3 – *Equina*), Camilina (P_4 – *Minor*), Misr 1 (P_5 – *Equina*) and Cairo 33 (P_6 – *Equina*) were crossed in a diallel system excluding reciprocals, to widen genetic base, to estimate heterosis, GCA, SCA, correlation coefficient and to provide materials for selecting good combinations from segregating generations. The six parents, 15 F_1's and 15 F_2's were employed in the study and planted in open naturally *Orobanche*-infested field. Also, artificial inoculation with *Botrytis fabae* was done. Characters studied were: flowering date, plant height, branches per plant, pods per plant, seeds per plant, seed yield per plant, 100-seed weight, tolerance criteria for *Orobanche* and disease resistance parameters. Variability was observed among genotypes (parents and crosses). There was significance in tolerance characters of *Orobanche*. The seed yield components showed F_2 to be higher than F_1 due to remaining heterosis and transgressive segregants. This indicates that F_1 and F_2 may be grown commercially to reduce cost of hybrid seed production.

There was positive significance of resistance to chocolate spot disease (**gain**) in all studied resistance characters. Moreover, there were positive significant correlation between yield characters and all plant growth traits, while, all studied plant growth and yield characters were affected negatively by chocolate spot disease.

There were similarity between faba bean host and *Orobanche* parasite and this may indicate some kind of complementary genes system controlling interaction of the host and the parasite. Moreover, there were similarity and high relationship between all tested *Orobanche* plants indicating that every *Orobanche* plant has its unique genotype which was partially similar to other plants in the same plot.

Key words: *Vicia faba*, Faba beans,*Orobanche crenata***,** *Botrytis fabae*, Hybrids, GCA, SCA, Heterosis, Inbreeding effects, Correlations, ISSR Markers - Genetic Polymorphism - Genetic variability and similarity.