PERFORMANCE OF FABA BEAN GENOTYPES TO *OROBANCHE* INFESTATION AND ENVIRONMENTAL CONDITIONS

By

VINCENT GILBERT QUARSHIE

B.Sc. Agric. Sci. (Crop Science), College of Basic and Applied Sciences, University of Ghana., 2017

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APPROVAL SHEET

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APPROVAL COMMITTEE

Dr. EZZALDIN OMAR ABUSTEIT ……..…….
Professor of Agronomy, Fac. Agric., Cairo University

Dr. MAGDI TAWFIK ABDELHAMID…...……..……..…
Researcher Professor at National Research Center

Dr. SAMIR RABIE ABO HEGAZY……..
Associate Professor of Agronomy, Fac. Agric., Cairo University

Dr. DARWISH SALEH DARWISH ……...…
Professor of Agronomy, Fac. Agric., Cairo University

Date: 7/12/2020

SUPERVISION SHEET

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SUPERVISION COMMITTEE

Dr. DARWISH SALEH DARWISH
Professor of Agronomy, Fac. Agric., Cairo University

Dr. SAMIR RABIE ABO HEGAZY
Associate Professor of Agronomy, Fac. Agric., Cairo University

Dr. IBRAHIM HASSAN YACOUB
Lecturer of Agronomy, Fac. Agric., Cairo University

Name of Candidate: Vincent Gilbert Quarshie **Degree:** M.Sc.

Title of Thesis: Performance of Faba Bean Genotypes to *Orobanche* Infestation under Environmental Conditions.

Supervisors: Prof. Darwish Saleh Darwish
Assoc. Prof. Samir Rabie Abo Hegazy
Dr. Ibrahim HassanYacoub

Department: Agronomy **Approval:7/12/2020**

ABSTRACT

Ten field experiments were conducted under naturally broomrape infested soils at the Experimental and Research Station, Faculty of Agriculture Cairo University, Giza, Egypt during 2018/2019 and 2019/2020 winter seasons. The main objectives are to elucidate the performance and phenotypic as well as genotypic variations of recent Egyptian faba bean varieties in reaction to *Orobanche* infestation under variable environmental conditions as sowing dates. The searching for the proper faba bean genotype/s that resist/tolerate *Orobanche* under wide range of environmental conditions is aimed also. The utilization of recommended dosage, i.e. 160 g of a.i/ha herbicidal treatment of Glyphosate (48%) of N-phosphono methyl glycine used in two splits each added with 480 L water starting as foliar application starting at 25% flowering of faba bean plants compared to untreated plots was targeted to explore their validity under different environments .

During each season, five trials were carried out, i.e. at five planting dates starting in October, 28th 2018 and October, 17th 2019 in 1st and 2nd season, respectively.

Ten faba bean genotypes were used in each trial: Cairo 4, Cairo 5, Cairo 25, Cairo 30 and Cairo 49 obtained from (Agronomy Department, Faculty of Agriculture; Cairo University), Misr 3, Giza 429, Giza 843 and Nubaria 3 from Food Legumes Section (Field Crops Research Institute, ARC) and Mariot 2 from Desert Research Center (Egyptian Ministry of Agriculture and Land Reclamation).

It could be concluded that the environmental conditions beared from different sowing dates has manipulated the performance of faba beans yield and attributes as well as the broomrape reactions.

Based on ranking of performance by the use of centroid method especially for the SYR genotypes such as C.5, C.25, C.49, M.3 and G.429 are generally adaptable. It might be perceived that, these genotypes have the potential of performing better irrespective of the environmental condition or seasons. The performance of these varieties might not be affected across different seasons particularly for seed yield (SYR) in spite of recorded variable broomrape infestation levels.

Key words: Faba bean (*Vicia faba* L.), *Orobanche crenata*, GDD, Environmental conditions, Selection. Stability analysis.

DEDICATION

This thesis manuscript is dedicated to my beloved families, my Father Mr. Philip Dotsey Quarshie, my Mother Mrs. Comfort Sefakor Nutor, my Brothers Victor Kofi Quarshie, Victus Clement Quarshie and my Sisters Joyce Esinam Quarshie, Lydia Enyonam Quarshie and Grace Enya Quarshie for their immense love and unlimited encouragement during the period of my graduate studies.

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