EFFECT OF PLANT DENSITY AND CALCIUM NUTRITION ON GROWTH AND YIELD OF SOME FABA BEAN VARIETIES UNDER SALINE CONDITIONS

By

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THESIS

Submitted in Partial Fulfillment of the Requirements for the Degree of

DOCTOR OF PHILOSOPHY

In

Agricultural Sciences

(Agronomy)

Department of Agronomy
Faculty of Agriculture
Cairo University
EGYPT

2016

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ABSTRACT

The alleviation of adverse salinity effects to increase faba bean (*Vicia faba* L.) productivity is an important agronomic practice. Two field experiments were conducted in the Desert Experimental Station of the Faculty of Agriculture, Cairo University in Wadi El-Natroon, El-Beheira Governorate, Egypt, during two winter seasons of 2013/14 and 2014/15 to investigate the effect of three levels of calcium nutrition (0, 1 and 2g Ca/liter) on three faba bean varieties (Sakha-1, Sakha-2 and Nubaria-2) under two plant densities (26 and 54 plants/m^2). A split-spilt plot design with four replications was used. The main plots consisted of three calcium levels, sub-plots were allocated to three varieties, while sub-sub plots were devoted to two plant densities (26 and 54 plant/m^2). The obtained results revealed that calcium application as foliar spray significantly increased number of branches and pods/plant, weight of seeds/plant, seed index, seed yield/feddan and harvest index. In general, sakha-1 cultivar recorded the highest seed yield/feddan. The plant density of 54 plants/m^2 recorded the highest seed yield/feddan and harvest index. The interaction between calcium nutrition and varieties had a significant effect on weight of seeds/plant, seed index and harvest index in both seasons. The highest seed yield/ feddan was obtained from calcium application at 2 g/liter combined with Sakha-1 and 54 plants/m^2.

Key words: *Vicia faba*, salinity, calcium, density, variety, Egypt

DEDICATION

*I dedicate this work to whom my heart felt thanks; to **my parents** for all the support they lovely offered along the period of my post graduation, as well as to **my wife** and my sons **Youssef**, **Nadia** and **Saif** for their patience and help.*

ACKNOWLEDGEMENT

*I wish to express my sincere thanks, deepest gratitude and appreciation to **Dr. Nabil Ali Khalil** Professor of Agronomy, Faculty of Agriculture, Cairo University for his supervision, Suggesting the problem, continued assistance and guidance throughout the course of study, as well as, for critical review and constructive suggestions which resulted in a great improvement of the quality of the thesis.*

*Also, I feel deeply grateful to **Dr. WAGEIH ABD EL-AZEEM EL-MURSHEDY** Professor of Agronomy, Faculty of Agriculture, Cairo University for valuable advice, help and kind support during this work.*

*Sincere thanks to **Dr. Eman Abd Al-latif Mohammed** Associate Professor of Agronomy, Faculty of Agriculture, Cairo University for sharing in supervision.*

*I feel grateful to **Dr. El-Metwally Abd Allah El-Metwally** Professor of Agronomy, Faculty of Agriculture, Cairo University for his continued support and guidance during the experimentation stage in Wadi El-Natroon station, as well, for valuable help, suggestions, reviewing of the manuscript of this thesis and discussion*

*Grateful appreciation is also extended to all **my colleagues** of Agronomy Department, Faculty of Agriculture, Cairo University for kind support.*

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INTRODUCTION

Faba bean (*Vicia faba* L.) has a long tradition of cultivation in the old world agriculture, being among the most ancient plants in cultivation. In Egypt, it is considered the first pulse crop concerning the cultivated area. Moreover, it is a soil enriching and, nitrogen-fixing legume adapted to a diversity of soils and climatic conditions (Duke, 1981).

The whole dried seeds of faba bean contain (per 100 g) 344 calories, 10.1% moisture, 1.3 g fat, 59.4 g total carbohydrate, 6.8 g fiber, 3.0 g ash, 104 mg Ca, 301 mg P, 6.7 mg Fe, 8 mg Na, 1123 mg K, 130 mg β-carotene equivalent, 0.38 mg thiamine, 0.24 mg riboflavin, 2.1 mg niacin, and 162 mg tryptophan. Also, the fatty acid composition of broad bean oil has been reported as 88.6% unsaturated (Duke, 1981). The amino acid content except for methionine is reasonably well balanced (Bond *et al.*, 1985). Faba bean is one of the promising pulse crops which can play an important role in increasing legume production in Egypt. According to FAO statistics in 2014, the cultivated area and production of faba bean decreased in the last four years in Egypt from 77149 to 46200 hectare and from 233523 to 157639 ton, respectively. In addition, Egypt imports about 64% (455831 ton) of its annual requirements of faba bean (FAO, 2014).

Faba bean seeds are used in form of green or dry as human diet and vines as animal feed. The bulk of faba bean production in Egypt is harvested as dry seed and is used as a human food in the popular dishes and in other preparations.