

**BREEDING STUDIES ON LEAF BLIGHT
DISEASE IN CORN (*Zea mays* L.)**

By

IBRAHIM ADLY ABOU- HUSSEN
B.Sc. Agric. Sci.(Agronomy), Fac. Agric., Alazhr Univ., 2005

THESIS

Submitted in Partial Fulfillment of the
Requirements for the Degree of

MASTER

In

**Agricultural Sciences
(Agronomy)**

**Department of Agronomy
Faculty of Agriculture
Cairo University
EGYPT**

2010

APPROVAL SHEET

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Head Research of Agronomy, Field Crop. Res. Inst., ARC

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Date: 13 / 1 / 2010

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Title of Thesis: Breeding studies on leaf blight disease in corn (*Zea mays* L.)

Supervisors: Dr. Fawzy Fathy Saad

Dr. Mohamed Abd El-Maboud Abd El-Shafy

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Department: Agronomy

Approval: 13 / 1/ 2010

ABSTRACT

The objectives of this investigation were to study the mode of inheritance of maize resistance to heterostrophus leaf blight (HLB) disease caused by *Cochliobolus heterostrophus*, estimate heterosis and combining ability of the studied material for maize HLB resistance as well as other traits and identify the resistant maize genotypes to the HLB disease that show good agronomic and yield traits. In 2006 season, 44 inbred lines were grown and artificially infected by HLB fungus at the disease nursery of Nubaria, Sakha Res. Stns. and Seven inbreds were selected as parents for diallel crosses, according to their reaction to this disease. In 2007 season, all possible F_1 crosses (including reciprocals) were made at Giza Res. Stns. among inbreds. In late summer of 2008 season, the seven parental lines as well as 21 F_1 and 21 reciprocal crosses were grown in two field experiments at Sakha and Nubaria Res. Stns. The first one was under artificial infection conditions and the second under protected conditions from the disease in RCB design.

The percentage of infected plants with HLB disease was estimated in the 1st experiment. Some agronomic and yield traits were determined in the 2nd experiment. Results showed that both general (GCA) and specific (SCA) combining ability mean squares were highly significant for all studied traits, indicating that both additive and non-additive gene action were involved in the inheritance of these traits. However, non-additive variance played the major role in the inheritance of all studied traits except resistance to HLB disease, days to 50% silking and no. rows/ear where the GCA was more important than SCA variance. Narrow sense heritability estimates (h^2_n) for HLB disease resistance were 68.54 and 69.14 % at Sakha and Nubaria, respectively. Results indicated that no complications of linkage were existed between genes of the HLB resistance and grain yield.

Key words: Corn, *Cochliobolus heterostrophus*, heterostrophus leaf blight, Disease resistance, Combining ability, Heterosis, Gene action and Inheritance.

DEDICATION

I dedicate this work to whom my heartfelt thanks; MY FATHER, MY MOTHER, SISTER AND BROTHER for their patience, help and all the support they lovely offered.

ACKNOWLEDGEMENT

*Thanks to Allah, the most Merciful and the most Beneficial. My words fail to express my utmost gratitude and appreciation to my respectable **Dr. Fawzy Fathy Saad** Professor of Agronomy Fac. Agric., Cairo Univ., Chairman of the supervision committee for valuable guidance, Special thanks are also due to **Dr. Emad Abd El-Gawad Ismail** Assistant prof. of Agronomy Fac. Agric., Cairo Univ. for his effective supervision and for his constructive criticism throughout the preparation of this manuscript. and **Dr. Mohamed Abd El-Maboud Abd El-Shafy**, Asist Prof. of Agronomy, Fac. Agric., Cairo Univ. for great help, valuable guidance, continuous encouragement, sincere concern and accurate supervision through all stages of the M. Sc. work. Scincere thanks and grateful appreciation are extended to **Dr. Tamer Abd El-Fattah Abdallah**, Senior Researcher, Maize Res. Prog., ARC, for his valuable guidance, inspiring help, devoted efforts and sincere concern in supervising this study and during the preparation of this manuscript. Grateful appreciation and indebtedness are extended to **Dr. Hamdy Youssef El-Sherbieny**, Head of Research of Agronomy FCRI., ARC. for his great help, devoted efforts, continues encouragement, sincere concern and providing all the facilities for field work and during preparation of this thesis. Special deep appreciation is given to **Mr. Adly Ibrahim** National Maize Program for his sincere cooperation, and assistance in field work and moral support since the first day of this work.*

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