GENETICAL STUDIES ON SOME HEXAPLOID WHEAT VARIETIES AND THEIR HYBRIDS

By

JOSEPH ELIA NASSEEF

B.Sc. Agric. Sci. (Agronomy), Fac. Agric., Assiut Univ., ٢٠٠٥
Completing the Genetics Department Requirements, Fac. Agric., Ain Shams Univ., ٢٠٠٨

THESIS

Submitted in Partial Fulfillment of the Requirements for the Degree of

MASTER OF SCIENCE

In

Agricultural Sciences

(Genetics)

Department of Genetics
Faculty of Agriculture
Cairo University
EGYPT

٢٠١٢

APPROVAL SHEET

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SUPERVISION SHEET

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Title of Thesis: Genetical Studies on Some Hexaploid Wheat Varieties and Their Hybrids.
Supervisors: Dr. Mona Hashem Ahmed Hussein
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Dr. Aida Alfonse Rizkalla
Department: Genetics **Approval:** ٢٧/٠٦/٢٠١٢

ABSTRACT

Combining ability and heterosis were studied in a ٧x٧ diallel set of bread wheat. Analysis of variance revealed that mean squares due to genotypes, parents and F_1 crosses, were highly significant for all studied characters. The mean square due to parents vs. crosses, as an indication to the average heterosis, found to be highly significant for all studied traits. Also, the mean squares due to both general (GCA) and specific (SCA) combining abilities were highly significant for all studied characters. Significant and highly significant desirable heterosis relative to the better parent was recorded in all studied characters. The maximum useful heterosis (٧٨.٠٥%) was observed in grain yield/plant for cross (P_4xP_7). Many hybrids showed desirable significant or highly significant specific combinig ability effects for all studied traits, except days to ٥٠% heading and plant height. The relashionship among the seven parental genotypes was investigated using ١٠ RAPD primers. The highest similarity index was found between P_5 and P_6, while the lowest similarity index was found between P_2 and P_6. Among the studied parents, five out of seven parents were characterized by ١٣ negative and ٢ positive unique markers. According to the presence or absence of bands in each hybrid, the RAPD markers were classified into seven types of markers included in three categories. The bands common in the two parents and their hybrid (Type ١), bands common in hybrid and its female parent (Type ٣) or its male parent (Type ٤), these three types of markers are belonging to category ١. The bands from parents not found in hybrid and included in markers type ٢, ٥ and ٦ (category ٢). The third category are non-parental bands expressed uniquely in hybrid and included in marker type ٧. Results showed that the percentages of each category differed among the studied hybrids. Non-significant correlations were observed between genetic distance with each of heterosis and specific combining ability for grain yield / plant, as well as between heterosis and specific combining ability.
Keywords: Bread wheat, hybrids ,combining ability ,heterosis, DNA, unique marker, RAPD, similarity index.

DEDICATION

I dedicate this work to my mother, father, brothers and my friends for all the support they lovely offered during my Master studies.

Also, I dedicate this work to Prof. Dr. Aida Alfonse Rezkalla and to my love.

ACKNOWLEDGEMENTs

Unlimited thanks for ***Jesus,*** *on his uncountable and infinite graces, guided me to complete this work.*

I would like to express my sincere gratitude, special thanks and appreciation to ***Dr. Mona H. A. Hussein,*** *Professor of Genetics and* ***Dr. Basita A. Hussein,*** *Lecturer of Genetics, Cairo university, member of supervision committee for kind guidance, valuable advices, continuous encouragement, sincere concern and accurate supervision throughout all stages of my M. Sc. Work and during the preparation of this manuscript.*

Sincere thanks and grateful appreciations are extended to ***Dr. Aida A. Rizkalla,*** *Associate professor of genetics and member of the supervision committee for her valuable guidance, inspiring help, infinite efforts and sincere concern*

Also I would like to express my sincere gratitude, special thanks and appreciation to ***Dr. Abd-El-Rahman M. F. Al-Ansary*** *Associate professor of genetics, National Research Center and member of the supervision committee and* ***Dr. Elham A. Abbas*** *professor of genetics, National Research Center for their inspiring help, devoted efforts during the preparation of this thesis.*

Also I would like to express my special thanks to ***Dr. Mohamed A. El-Morshedy*** *for kindly providing the genotypes used in this work.*

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