ESTIMATION OF GENETIC PARAMETERS FOR AGRONOMIC TRAITS IN DIALLEL CROSSES OF BREAD WHEAT UNDER DIFFERENT SOWING DATES

By

SAMI SHEIKHMOUS OTHMAN
B.Sc. Agric. Sc. (Agronomy), Aleppo University, Syria, 2004

A thesis submitted in partial fulfillment
of
the requirements for the degree of

MASTER OF SCIENCE

in
Agricultural Science
(Agronomy)

Department of Agronomy
Faculty of Agriculture
Ain Shams University

2010

Approval Sheet

ESTIMATION OF GENETIC PARAMETERS FOR AGRONOMIC TRAITS IN DIALLEL CROSSES OF BREAD WHEAT UNDER DIFFERENT SOWING DATES

By

SAMI SHEIKHMOUS OTHMAN
B.Sc. Agric. Sc. (Agronomy), Aleppo University, Syria, 2004

This thesis for M. Sc. degree has been approved by:

Prof. Dr. Mazhar Mohamed Fawzy Abdalla……..
Prof. Emeritus of Agronomy, Faculty of Agriculture,
Cairo University

Prof. Dr. Ali Mohammed Esmail …….
Prof. Emeritus of Agronomy, Faculty of Agriculture,
Ain Shams University

Prof. Dr. Hamed Abd El-Raoof Khalil……..
Prof. Emeritus of Agronomy, Faculty of Agriculture,
Ain Shams University

Prof. Dr. Ahmed Abd El-Sadik Mohamed Abd El-Dayem……
Prof. Emeritus of Agronomy, Faculty of Agriculture,
Ain Shams University

Date of Examination: 15 / 7 / 2010

ESTIMATION OF GENETIC PARAMETERS FOR AGRONOMIC TRAITS IN DIALLEL CROSSES OF BREAD WHEAT UNDER DIFFERENT SOWING DATES

By

SAMI SHEIKHMOUS OTHMAN
B.Sc. Agric. Sc. (Agronomy), Aleppo University, Syria, 2004

Under the supervision of:

Prof. Dr. Ahmed Abd El-Sadik Mohamed Abd El-Dayem
Prof. Emeritus of Agronomy, Department of Agronomy, Faculty of Agriculture, Ain Shams University (Principal Supervisor)

Prof. Dr. Hamed Abd El-Raoof Khalil
Prof. Emeritus of Agronomy, Department of Agronomy, Faculty of Agriculture, Ain Shams University

Dr. Samir Hassan Saleh Khalil
Assistant Prof. of Agronomy, Department of Agronomy, Faculty of Agriculture, Ain Shams University

تقدير المعالم الوراثية للصفات المحصولية في هجن تبادلية من قمح الخبز تحت مواعيد زراعة مختلفة

رسالة مقدمة من

سامي شيخموس عثمان
بكالوريوس علوم زراعية (محاصيل) ، جامعة حلب ، سوريا ، 2004

للحصول على
درجة الماجستير في العلوم الزراعية
(محاصيل)

قسم المحاصيل
كلية الزراعة
جامعة عين شمس

2010

صفحة الموافقة على الرسالة

تقدير المعالم الوراثية للصفات المحصولية في هجن تبادلية من قمح الخبز تحت مواعيد زراعة مختلفة

رسالة مقدمة من

سامي شيخموس عثمان
بكالوريوس علوم زراعية (محاصيل) ، جامعة حلب ، سوريا ، 2004

للحصول على
درجة الماجستير في العلوم الزراعية
(محاصيل)

وقد تمت مناقشة الرسالة والموافقة عليها

اللجنة:

أ.د. مظهر محمد فوزي عبدالله .....
أستاذ المحاصيل المتفرغ ، كلية الزراعة ، جامعة القاهرة

أ.د. على محمد اسماعيل .....
أستاذ المحاصيل المتفرغ ، كلية الزراعة ، جامعة عين شمس

أ.د. حامد عبدالرؤوف خليل.....
أستاذ المحاصيل المتفرغ ، كلية الزراعة ، جامعة عين شمس

أ.د. أحمد عبد الصادق محمد عبد الدايم .....
أستاذ المحاصيل المتفرغ ، كلية الزراعة ، جامعة عين شمس

تاريخ المناقشة: 15 / 7 / 2010

جامعة عين شمس
كلية الزراعة

رسالة الماجستير

اسم الطالب : سامي شيخموس عثمان
عنوان الرسالة : تقدير المعالم الوراثية للصفات المحصولية في هجن تبادلية من قمح الخبز تحت مواعيد زراعة مختلفة
اسم الدرجة : ماجستير في العلوم الزراعية (محاصيل)

لجنة الإشراف :

أ.د. أحمد عبد الصادق محمد عبد الدايم
أستاذ المحاصيل المتفرغ ، قسم المحاصيل ، كلية الزراعة ، جامعة عين شمس
(المشرف الرئيسي)

أ.د. حامد عبدالرؤوف خليل
أستاذ المحاصيل المتفرغ ، قسم المحاصيل ، كلية الزراعة ، جامعة عين شمس

د. سمير حسن صالح خليل
مدرس المحاصيل ، قسم المحاصيل ، كلية الزراعة ، جامعة عين شمس

تاريخ البحث 11/ 2 / 2008

الدراسات العليا

ختم الإجازة **أجيزت الرسالة بتاريخ**
15 / 7 / 2010

موافقة مجلس الكلية **موافقة مجلس الجامعة**
/ / 2010 / / 2010

ABSTRACT

Sami Sheikhmous Othman: Estimation of Genetic Parameters for Agronomic Traits in Diallel Crosses of Bread Wheat under Different Sowing Dates. Unpublished M. Sc. Thesis, Department of Agronomy, Faculty of Agriculture, Ain Shams University, 2010.

This investigation aimed to study performance, heretosis, combining ability, heritability, interrelationships among traits and path coefficient analysis for grain yield and its attributes in bread wheat (*Triticum aestivum,* L.) as affected by sowing dates. Six parents included three local cvs. namely; Giza 168 (P1) ,Sakha 94 (P2) and Gemmeiza 10 (P6) and three Syrian cvs. namely; Cham 8 (P3), Bohouth 6 (P4) and Cham 4 (P5) were used in this study .The parents were crossed in all possible combinations, excluding reciprocals in 2007/2008 season , and a total of 15 F_1 hybrids were obtained. In 2008/ 2009 season, the six parents along with their 15 F_1' s were evaluated for the studied traits at three sowing dates, i.e. 23rd of Oct. (the early sowing), 16th of Nov.(the recommended sowing) and 13th of Dec. (the late sowing). A field experiment was devoted for each sowing date at the Experimental Farm for Faculty of Agriculture, Ain Shams University at Shalakan , Kalubia Governorate.

The results revealed that mean squares due to sowing dates, genotypes and genotypes x sowing dates interaction were significant for most of the studied traits. Delaying sowing date to Dec. caused substantial reduction in all studied traits except heading and anthesis dates and grain filling rate which increased by delaying sowing date . However, the two local cvs. Giza 168 and Sakha 94 appeared to be more suitable for growing on the early sowing than other cvs. . Also the crosses; P1 x P2, P1 x P3 and P2 x P3 were superior in grain yield

per plant and in most of its components under different sowing dates. These genotypes were also earlier in maturity than other genotypes.

Values of heterosis relative to better parents were greatly differed at different sowing dates and few crosses exhibited significant useful heterosis in all traits studied. The positive useful heterosis values ranged from 6.14 % in the cross P3 x P4 for plant height on the late sowing to 52.75% in the cross P4 x P6 for no. of spikes/plant on the recommended sowing. However, negative useful heterosis values ranged from -8.07 % in the cross P2 × P3 for grain filling period on the recommended to -1.21% in the cross P2× P4 for maturity date on the recommended sowing also.

General and specific combining ability mean squares indicated the importance of both additive and non-additive gene effects in the inheritance of the traits studied with few exceptions. However, the additive effect was more important than the non-additive effects in the inheritance of no. of spikelets /spike, no. of kernels/spike, 1000-kernel weight and harvest index while, the non-additive effects were more important than the additive effects in the inheritance of grain filling period and flag leaf area.

High and moderate values of narrow sense heritability were obtained for some traits ranging from 54.36 % for spike length at the recommended sowing date to 92.23 % for no. of spikelets / spike over the three sowing dates. Moderate and low narrow sense heritability values were obtained for some traits.

The results of path coefficient analysis showed that number of kernels/ spike and 1000-kernel weight at different environments proved to be the major grain yield contributors. Thus the breeders should take into consideration these two traits as selection criteria for wheat yield improvement under these environments**.**

Key words: Bread wheat,, *Triticum aestivum* , Sowing date, Heterosis, Combining ability, Heritability, Phenotypic correlation coefficient, Path coefficient analysis.

ACKNOWLEDGMENT

Firstly, **I** wish to express my great and sincere gratitude to **ALlAH** who give me the prosperity and ability to achieve this work

Great thanks to my home country, **Syria** which gave me opportunity to complete my post-graduate education. Also thanks are forwarded to my second country **Egypt** which received me, offered all available facilities and abilities and funded this study.

The author wishes to express his great appreciation, sincere thanks, and deepest grateful to their supervisor **Prof. Dr. Hamed Abd El-Raoof khalil and Prof. Dr. Ahmed Abd EL-Sadik Mohamed**, Emeritus Professors of Plant Breeding, Agronomy Department, Faculty of Agriculture, Ain Shams University, for suggesting the problem, drawing the plan of the work, valuable help, advise, kind guidance and continuous encouragement during the courses and the preparation of the manuscript.

My sincere thanks and appreciation to **Dr. Samir Hassan Saleh** assistant Professor of Plant Breeding, Agronomy Department, Faculty of Agriculture, Ain Shams University for his faithful encouragement valuable guidance and help guidance in statistical analysis of data.

The searcher would like to express his great appreciations to all staff members of Agronomy Department, Faculty of Agriculture, Ain Shams University, for their encouragement and valuable help during the courses of this work

I am particularly grateful to **my family** and **my wife** for their help and continuous encouragement during my study period.

CONTENTS

LIST OF TABLES