دور العناصر الوراثية المتنقلة الرجعية في التنوع الجينومي في كائنات مختلفة

رسالة مقدمة من

مروة محمود شحاته أحمد

بكالوريوس علوم زراعية (وراثة)، جامعة عين شمس، 2007

للحصول على
درجة الماجستير في العلوم الزراعية
(وراثة)

قسم الوراثة
كلية الزراعة
جامعة عين شمس

2014

صفحة الموافقة على الرسالة

دور العناصر الوراثية المتنقلة الرجعية في التنوع الجينومي في كائنات مختلفة

رسالة مقدمة من

مروة محمود شحاته أحمد

بكالوريوس علوم زراعية (وراثة)، جامعة عين شمس، 2007

للحصول على
درجة الماجستير في العلوم الزراعية
(وراثة)

وقد تمت مناقشة الرسالة والموافقة عليها:

اللجنة:

د. أحمد عبد السلام محمود .....
أستاذ الوراثة المتفرغ، كلية الزراعة، جامعة الزقازيق

د. سمير عبد العزيز إبراهيم .....
أستاذ الوراثة المتفرغ، كلية الزراعة، جامعة عين شمس

د. فاطمة محمد إبراهيم بدوي .....
أستاذ الوراثة المتفرغ، كلية الزراعة، جامعة عين شمس

د. إيمان محمود فهمى .....
أستاذ الوراثة المتفرغ، كلية الزراعة، جامعة عين شمس

تاريخ المناقشة 28 / 8 /2014

جامعة عين شمس
كلية الزراعة

رسالة ماجستير

اسم الطالبة : مروة محمود شحاته أحمد
عنوان الرسالة : دور العناصر الوراثية المتنقلة الرجعية في التنوع الجينومي في كائنات مختلفة

اسم الدرجة : ماجستير في العلوم الزراعية (وراثة)

لجنة الإشراف

د. إيمان محمود فهمى
أستاذ الوراثة المتفرغ، قسم الوراثة، كلية الزراعة، جامعة عين شمس (المشرف الرئيسي)

د. فاطمة محمد إبراهيم بدوي
أستاذ الوراثة المتفرغ، قسم الوراثة، كلية الزراعة، جامعة عين شمس

د. لمياء مصطفى كمال سيد
مدرس الوراثة، قسم الوراثة، كلية الزراعة، جامعة عين شمس

تاريخ التسجيل 2008/10/13

الدراسات العليا

ختم الإجازة **أجيزت الرسالة بتاريخ**
2014 / 8 / 28

موافقة مجلس الكلية **موافقة مجلس الجامعة**
/ / 2014 / / 2014

ROLE OF RETROTRANSPOSONS IN GENOMIC DIVERSITY IN DIFFERENT ORGANISMS

By

MARWA MAHMOUD SHEHATA AHMED
B.Sc. Agric. Sc. (Genetics), Ain Shams University, 2007

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

MASTER OF SCIENCE
in
Agricultural Science
(Genetics)

Department of Genetics
Faculty of Agriculture
Ain Shams University

2014

Approval Sheet

ROLE OF RETROTRANSPOSONS IN GENOMIC DIVERSITY IN DIFFERENT ORGANISMS

By

MARWA MAHMOUD SHEHATA AHMED

B.Sc. Agric. Sc. (Genetics), Ain Shams University, 2007

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

Dr. Ahmed Abdel-Salam Mahmoud ……..……

Prof. Emeritus of Genetics, Faculty of Agriculture, Zagazig University

Dr. Samir Abdel-Aziz Ibraheem ……..……

Prof. Emeritus of Genetics, Faculty of Agriculture, Ain Shams University

Dr. Fatma Mohammad Ibraheem Badawy ……..……

Prof. Emeritus of Genetics, Faculty of Agriculture, Ain Shams University

Dr. Eman Mahmoud Fahmy ……..……

Prof. Emeritus of Genetics, Faculty of Agriculture, Ain Shams University

Date of examination: 28 / 8 / 2014

ROLE OF RETROTRANSPOSONS IN GENOMIC DIVERSITY IN DIFFERENT ORGANISMS

By

MARWA MAHMOUD SHEHATA AHMED

B.Sc. Agric. Sc. (Genetics), Ain Shams University, 2007

Under the supervision of:

Dr. Eman Mahmoud Fahmy

Prof. Emeritus of Genetics, Department of Genetics, Faculty of Agriculture, Ain Shams University (Principal Supervisor).

Dr. Fatma Mohammad Ibraheem Badawy

Prof. Emeritus of Genetics, Department of Genetics, Faculty of Agriculture, Ain Shams University

Dr. Lamyaa Mostafa Kamal Sayed

Assistant Prof. of Genetics, Department of Genetics, Faculty of Agriculture, Ain Shams University

ABSTRACT

Marwa Mahmoud Shehata Ahmed: Role of Retrotransposons in Genomic Diversity in Different Organisms. Unpublished MSc. Thesis, Department of Genetics, Faculty of Agriculture, Ain Shams University, 2014.

Five molecular genetic techniques (RAPD, ISSR, IRAP, REMAP and RRAP) were used to study the genetic diversity in yeast and barley. Five yeast strains and six barley cultivars were used. Two retrotransposon-based primers (ScM1 and ScM2) were designed. In yeast strains, RAPD technique showed highly polymorphism. RAPD primers differed in their amplified loci (number of bands) from eight loci to 31 different bands. ISSR primers showed highly polymorphism. ISSR primers amplified similar loci numbers. IRAP primers showed moderately polymorphism. REMAP primers showed moderately to highly polymorphism percentages. The number of bands in the REMAP technique was relatively high. RRAP primers showed moderately to highly polymorphism percentages. RRAP combinations showed similar number of bands. In barley cultivars, RAPD primers showed variable polymorphism percentages. RAPD primers were different in their amplified loci or generated bands. ISSR primers showed moderatly polymorphism. The number of bands was similar among the IRAP primers. REMAP technique revealed moderate polymorphism. REMAP combinations showed similar numbers of bands. RRAP technique revealed low to moderately polymorphism. Number of bands among the RRAP technique was almost similar. RAPD technique represented the highest polymorphism percentages per primer among the other four techniques. ISSR primers represented polymorphism percentages more than IRAP primers in yeast but IRAP primers were more polymorphic than those of ISSR in barley. Both REMAP and RRAP combinations showed similar results either in yeast or barley. Retrotransposon-based techniques showed more number of bands more than those of non-retrotransposon-based techniques.

Key words: Retrotransposon, LTR, IRAP, REMAP, RRAP, RAPD, ISSRs, Yeast, *Saccharomyces cerevisiae*, Barley, *Hordeum vulgare* and Genomic diversity.

ACKNOWLEDGMENT

Thanks for **my God Allah, the great and almighty** on his uncountable and infinite graces, guided me to the Islam and learned me things that I didn't know.

I wish to express my sincere appreciation and deep gratitude to **Prof Dr. Eman Mahmoud Fahmy**, Prof. of Genetics, Genetics Dept., Ain Shams University for her kind supervision; suggesting the scientific problem, fruitful help, energetic guidance, conclusive instructions throughout the course of this investigation and in reviewing the manuscript.

Great and deep thanks is offered to **Prof Dr. Fatma Mohammad Ibrahim Badawy**, Prof. of Genetics, Genetics Dept., Fac. of Agric., Ain Shams Univ. for her kind supervision; the facilities she offered to me during the preparation of this work, her valuable advices and writing and reviewing the manuscript.

Sincere appreciation is due to **Dr. Lamyaa Mostafa-Kamal Sayed,** Assistant Prof. of Genetics, Genetics Dept., Fac. of Agric., Ain Shams Univ. for her supervision, useful suggestions and reviewing the manuscript.

Great thanks are offered to **Prof. Dr. Fatthy M. Abdel-Tawab**, Prof. of Genetics, Genetics Dept., Fac. of Agric., Ain Shams Univ. for his supervision in the first period of this study, suggesting the scientific problem and facilities he offered to me during this work. Great thanks to **Dr. Sabah Mahmoud Hassan** Associate Prof. of Genetics, Genetics Dept., Fac. of Agric., Ain Shams Univ. for her supervision before her travel to Saudi Arabia.

Great thanks to **Prof. Dr. Mohamed A. Rashed,** Prof. of Genetics, Genetics Dept., Fac. of Agric., Ain Shams Univ. and his laboratory staff for the facilities they offered to finish this work.

Great and deep thanks to **Dr. Nouh E. Ahmed,** Assistant Prof. of Genetics, Genetics Dept., Fac. of Agric., Ain Shams Univ. for helping me in the design of yeast primers, for his useful and benefit discussions, helping me during this study and learning me a lot of things. Deep thanks to **Dr. Hala Badr Khalil** Assistant Prof. of Genetics, Genetics Dept., Fac. of Agric., Ain Shams Univ. for her useful discussions. Great thanks to **Dr. Mohamed Adel** Assistant Prof. of Food Science, Food Science Dept., Fac. of Agric., Ain Shams Univ. for supply me one of the yeast strains. Great thanks to my friend **Mona Mohamed Moghazee,** Assistant Lecturer of Genetics, Genetics Dept., Fac. of Agric., Ain Shams Univ. for helping me in yeast DNA extraction.

Finally, many thanks to my colleagues; the **staff members of Molecular and Biochemical Genetics Lab.,** Genetics Dept., Fac. of Agric., Ain Shams Univ. for their great help and encouragement.

I am indebted as a gift to **my parents and my family** specially **my sister Amira** for their continuous encouragement, helping me and praying for me.

CONTENTS

LIST OF TABLES