شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

HANAA ALY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

HANAA ALY

شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

HANAA ALY

ASSESSMENT OF BIODIVERSITY AMONG SOME SESAME GENOTYPES ON THE MOLECULAR LEVEL

By

NOURHAN ATEF ISMAIL ABOELNAGA
B.Sc. Agric. Sc. (Genetics), Fac. of Agric., Ain Shams University, 2016

A Thesis Submitted in Partial Fulfillment
Of
The Requirement for the Degree of

MASTER OF SCIENCE
in
Agricultural Sciences
(Genetics)

Department of Genetics
Faculty of Agriculture
Ain Shams University

2021

ASSESSMENT OF BIODIVERSITY AMONG SOME SESAME GENOTYPES ON THE MOLECULAR LEVEL

By

NOURHAN ATEF ISMAIL ABOELNAGA
B.Sc. Agric. Sci. (Genetics), Fac. of Agric., Ain Shams University, 2016

Under the supervision of:

Dr. Ahmed Fahmy Houssien Abodoma
Prof. of Genetics, Department of Genetics, Faculty of Agriculture, Ain Shams University (Principal Supervisor).

Dr. Lamyaa Mostafa Kamal
Associate Prof. in Genetics, Department of Genetics, Faculty of Agriculture, Ain Shams University.

Dr. Clara Reda Azzam
Head Researches of Biotechnology, Field Crops Research Institute, Agricultural Research Center.

ABSTRACT

Nourhan Atef Ismail. Assessment of Biodiversity among some sesame Genotypes on the molecular level. Unpublished M.Sc. Thesis, Department of Genetics, Faculty of Agriculture, Ain-Shams University, 2021.

Biodiversity among thirty sesame (*Sesamum indicum* L.) genotypes that were obtained from various regions of Egypt and two local cultivars were assessed agronomically using different yield-related traits. Significant variations were observed in oil contents and morphometric traits such as plant height, shoot fresh weight, number of pods, pods weight and oil contents. The variation between the highest and the lowest genotypes in plant height ranged from 220 cm in cultivar Shandaweel 3 to 100 cm in genotype Qena5-85. Shoot fresh weight ranged from 802.2 to 99.5 g in Asyut-71 and Aswan1-82 genotypes, respectively. Pods weight varied from 202.6 to 32.2 g in Qena2-69 and Behera-81, respectively. No. of pods ranged from 75.7 to 10.3 in Sohag1-70 and Al Wadi Al Jadeed1-83, respectively, while oil content varied from 60% in Qena2-69 to 40.53% in Qena1-68. Using yield-related characteristics, the genotypes were grouped into two main clusters with high variation among them. Fifteen out of the 32 genotypes were chosen and subjected to ISSRs and SRAP PCR analyses to detect the level of genetic diversity in relation to geographical origins using 11 ISSR and 7 SRAP primers. ISSR primers generated 46 amplified bands. Four out of these primers were resulted in 6 unique markers among the 15 sesame genotypes. Molecular characterization revealed a polymorphism percentage of 47.82% for ISSR fragments, while SRAP primers exhibited a total of 23 bands and two out of these primers revealed 4 unique genotype specific marker polymorphism that calculated as 52.17%. The cluster analysis showed a high genetic diversity among the sesame genotypes and their diversities were consistent with their source pedigrees. The results of principal component analysis (PCA) were closely aligned with those of the cluster analysis. Considering the relatedness of

genotypes, geographical origin and their yield-related characteristics were reflected as the similarity of ISSRs and SRAP patterns.

Keywords: *Sesamum indicum* L., Biodiversity, Genetic diversity, ISSRs, SRAP, PCA

ACKNOWLEDGEMENT

First and foremost, glory and gratitude to God, the Almighty, for His showers of blessings to successfully complete the study during my research work.

I would like to express my sincere and genuine appreciation to my research supervisor; **Prof. Dr. Ahmed Houssien Abodoma,** Professor and Head of the Dept. of Genetics, Ain Shams University, for providing me the opportunity to perform research and provide invaluable support in this research. I was influenced greatly by his dynamism, imagination, honesty and inspiration. I want to thank him, too, for his friendship, his empathy and his wonderful sense of humor, and writing the manuscript.

Deep thanks and appreciation to **Prof. Dr. Clara R. Azzam,** Professor and Head of Cell Research Department, Field Crops Research Institute, Agricultural Research Center. She has taught me the methodology to carry out the research and to present the research works as clearly as possible. Working and learning under her supervision was a real pleasure and honor. I am extremely grateful for what she has offered me. I am extending my heartfelt thanks to her husband, family for their acceptance and patience during the discussion I had with her on research work and thesis preparation

I cannot express enough thanks to **Dr. Lamyaa Mostafa Kamal Sayed** Associate Prof. in the Genetics Dept., Ain Shams University for her continued support and encouragement and for the useful comments, remarks and engagement throughout the experimental and thesis works have contributed to the success of this research. Her office was always open whenever I ran into a trouble spot or had a question about my research or writing. She consistently allowed this paper to be my own work, but steered me in the right the direction whenever he thought I needed it.

I am extremely grateful to my parents for their devotion, prayers, care and their sacrifices for educating and preparing me for my future. I also thank my sister and brothers for their encouragement and valuable prayers.

Finally, my thanks go to all the people who have supported me to complete the research work directly or indirectly.

CONTENTS

LIST OF TABLES