بسم الله الرحمن الرحيم

∞∞∞∞

تم رفع هذه الرسالة بواسطة /صفاء محمود عبد الشافى

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

ملاحظات: لايوجد

ESTABLISHMENT OF DNA BARCODE FOR THE IDENTIFICATION OF SOME ENDEMIC PLANT SPECIES

By

SHAIMAA AHMED ALI ABDELHADY
B.Sc.Agric. Sci. (Genetics), Fac. of Agric, Ain Shams University, 2008
M.Sc.Agric.Sci.(Genetics), Fac. of Agric, Ain Shams University, 2014

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

DOCTOR OF PHILOSOPHY
in
Agricultural Sciences
(Genetics)

Department of Genetics
Faculty of Agriculture
Ain Shams University

2022

Approval Sheet

ESTABLISHMENT OF DNA BARCODE FOR THE IDENTIFICATION OF SOME ENDEMIC PLANT SPECIES

By

SHAIMAA AHMED ALI ABDELHADY

B.Sc.Agric. Sci. (Genetics), Fac. of Agric, Ain Shams University, 2008
M.Sc.Agric.Sci.(Genetics), Fac. of Agric, Ain Shams University, 2014

This thesis for Ph.D. degree has been approved by:

Dr. Houssam El-Din Fathy El-Wakeel **…….**
Prof. Emeritus of Agriculture Botany, Faculty of Agriculture, (Saba Basha) Alexandria University.

Dr. Alia Ahmed El-Seoudy **…….**
Prof. Emeritus of Genetics, Faculty of Agriculture, Ain Shams University.

Dr. Khaled Abdelaziz Soliman **…….**
Prof. Emeritus of Genetics, Faculty of Agriculture, Ain Shams University.

Date of Examination: 12 / 12 / 2021

ESTABLISHMENT OF DNA BARCODE FOR THE IDENTIFICATION OF SOME ENDEMIC PLANT SPECIES

By

SHAIMAA AHMED ALI ABDELHADY
B.Sc.Agric. Sci. (Genetics), Fac. of Agric, Ain Shams University, 2008
M.Sc.Agric.Sci.(Genetics), Fac. of Agric, Ain Shams University, 2014

Under the supervision of:

Dr. Aly Z.E. Abdelsalam
Prof. Emeritus of Genetics, Department of Genetics, Faculty of Agriculture, Ain Shams University (Late)

Dr. Khaled Abdelaziz Soliman
Prof. Emeritus of Genetics, Department of Genetics, Faculty of Agriculture, Ain Shams University.

ABSTRACT

Shaimaa Ahmed Ali Abdelhady: Establishment of DNA Barcode for The Identification of Some Endemic Plant Species. Unpublished PhD. Thesis, Department of Genetics, Faculty of Agriculture, Ain Shams University, 2021.

Global warming, which is caused by anthropogenic activity, is a major threat to biodiversity in arid and semi-arid areas. Egypt is expected to undergo acute rainfall decrease and temperature boost in the next few decades, leading to geographical allocation of many plant species. Endemic plants of pleiotropic economic importance are strongly affected in the context of climate change prospects which gradually will result in losing our genetic resources plant wealth. Few studies were carried on the Egyptian Brassicaceae family which has economical and medicinal importance because of the presence of many active compounds that are included, in the pharmaceutical and cosmetic components like glucosinolates that play an important role against several pests like weeds, insects, and nematodes. In addition, it contains a large amount of antioxidant which inhibit the growth of microbes and can be used to treat rheumatic diseases. The identification of such family still kind depend and mostly rely on the morphological characters. To globally sustain the genetic pattern of this Egyptian plant family wealth, it was essential to characterize them basing on their authenticated genetic background. Here we present a phylogenetic analysis of 16 species of Egyptian Brassicaceae family using two plastid coding genes; Ribulose-1,5- bisphosphate carboxylase oxygenase (*rbcL-a*) and maturase K (*matK*). The maximum likelihood method of the two markers for our samples was concordant with the Brassicaceae's references-sequences, which exist on plastid are considered highly conserved biomarkers. In this study, we have generated a robust phylogeny tree based on molecular level that validates the Egyptian plant species and reliably differentiate them not only depending on the morphological identification. This study is considered the first phase

of Egyptian Brassicaceae family species authentication to be followed by biochemical studies serving the pharmacological and medicinal fields. DNA barcode is an effective technique in identifying species.

Keywords: *rbcL-a*; *matK*; DNA Barcoding and phylogenetic analysis.

ACKNOWLEDGEMENT

I wish to express my deep gratitude and sincere appreciation to **Prof. Dr. Aly Z.E. Abdelsalam**, Professor of Genetics, Genetics Dept., Faculty of Agriculture, Ain Shams University for continuous supervision, kind encouragement, precious advices during the progress of thesis work. After helping to initiate this study, Dr. Abdelsalam passed away in March of 2020.

Gratefulness and thanks are not enough to express my deep gratitude, and sincere appreciation to **Prof. Dr. Khaled Abdelaziz Soliman**, Professor of Genetics, Genetics Dept., Faculty of Agriculture, Ain Shams University for his continuous supervision, tremendous help, kind encouragement, sincere guide criticism, facilities offered and valuable guid while writing and revising this thesis.

Great appreciation is also expressed to **Dr. Asmaa M. Abushady,** Associate Prof. of Genetics, Fac. of Agric. Ain Shams Univ. for her continuous supervision, kind encouragement, sincere help and criticism, precious advices and for revising this thesis during this study.

Great appreciation is also expressed to **Dr. Abdoallah A. Sharaf,** Associate Prof. of Genetics, Fac. of Agric. Ain Shams Univ. for his continuous supervision, sincere help and criticism, precious guiding in data analyses.

I would also like to express my deepest thanks and everlasting gratitude to **Prof. Abd El-Halim Abd El-Mogali Mohamed** for his valuable help for sample authentication according to morphological characters.

Finally, I am indebted to my family for their great help and patience during this work, especially **mother, father** for continuous encouragement and praying for me.

CONTENTS