



Faculty of Science  
Botany Department

# **Physiological Strategies for Improving Defense Mechanisms of Maize Plant (*Zea mays* L.)**

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**Ain Shams University, Faculty of Science,  
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(2012)**



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**Thesis submitted for partial fulfillment of Master  
degree of Science in Botany (Physiology)**

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(2008)**

**Ain Shams University  
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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

( قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا  
إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ  
الْحَكِيمُ )

صدق الله العظيم  
سورة البقرة - الآية 32

This thesis has not been previously submitted for any degree at this or any other University.

The references in the text will show specifically the extent to which I have availed myself of the work of other authors.

**Abdelaziz Atef Abdelaziz Ramadan**

*To my lovely parents*

*And sisters*



*Abdelaziz Ramadan*



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**Arabic abstract and summary (right side of the thesis)**



## List of Abbreviations

<b>12-OPDA</b>	: 12-oxophytodienoic acid
<b>13HPL</b>	: Fatty acid 13-hydroperoxide lyase
<b>13HPOT</b>	: Linolenic acid 13-hydroperoxide
<b>ABA</b>	: Absciscic acid
<b>ACC</b>	: 1-aminocyclopropane-1-carboxylic acid
<b>Act1</b>	: Actin1 (housekeeping gene)
<b>ADH</b>	: Alcohol dehydrogenase
<b>AOS</b>	: Allene oxide synthase
<b>CHAT</b>	: Acetyl CoA-( Z )-3-hexen-1-ol acetyl transferase
<b>COI1</b>	: CORONATINE INSENSITIVE 1
<b>CR</b>	: Control volatile-receiver plants
<b>Cys-PI</b>	: Cystatin-like protease inhibitor
<b>DMADP</b>	: Dimethylallyl diphosphate
<b>DMNT</b>	: (E)-4,8-dimethyl-1,3,7-nonatriene

## Abbreviations

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<b>ET</b>	: Ethylene
<b>FACs</b>	: Fatty acid amino acid conjugates
<b>FDP</b>	: Farnesyl diphosphate
<b>GDP</b>	: Geranyl diphosphate
<b>GGDP</b>	: Geranylgeranyl diphosphate
<b>GLVs</b>	: Green leaf volatiles
<b>HAMPs</b>	: Herbivore associated molecular patterns
<b>Hex-</b>	: hexenols
<b>Hex-Ac</b>	: (Z)-3-hexen-1-yl acetate
<b>Hex-Ac</b>	: hexenyl acetate
<b>Hex-al</b>	: hexenals
<b>HIPVs</b>	: Herbivore induced plant volatiles
<b>HR</b>	: HIPV-receiver plants
<b>IDP</b>	: isopentenyl diphosphate
<b>IM</b>	: Inner membrane
<b>JA</b>	: Jasmonic acid
<b>JACs</b>	: Jasmonic acid amino acid conjugates

## Abbreviations

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<b>JA-Ile</b>	: Jasmonoyl isoleucine
<b>JAR1</b>	: JASMONATE RESISTANT 1
<b>JAZ</b>	: Jasmonate ZIM domain protein
<b>JMT</b>	: Jasmonic acid carboxyl methyltransferase
<b>LOX</b>	: Lipoxygenase
<b>LP</b>	: Lipase
<b>MeJA</b>	: Methyl jasmonic acid
<b>MEP pathway</b>	: 2-C-methyl-D-erythritol 4-phosphate pathway
<b>MVA pathway</b>	: Mevalonic acid pathway
<b>OM</b>	: Outer membranes
<b>OPR</b>	: 12-oxophytodienoic acid reductase
<b>OR</b>	: ( <i>E</i> )- $\beta$ -ocimene-receiver plants
<b>PIs</b>	: proteinase inhibitors
<b>PIOS</b>	: <i>Phaseolus lunatus</i> Ocimene synthase
<b>PPO</b>	: polyphenoloxidase
<b>SA</b>	: Salicylic acid
<b>SAR</b>	: Systemic acquired resistance