STUDIES ON SELF INCOMPATIBILITY PHENOMENON IN SOME MANGO CULTIVARS

By

MAHMOUD FATHI MAHMOUD MAKLAD

B.Sc. Agric.Sc. (Horticulture), Ain Shams University, 1999

M.Sc. Agric.Sc. (Pomology), Ain Shams University, 2005

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

Dr. Ahmed Abdel Salam Mahmoud ----------

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

Dr. Assem Dessouki Shaltout ----------

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

Dr. Mohamed Abdel-Salam Rashed ----------

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

Dr. Ibrahim Mohamed Dessoukey ----------

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

Date of Examination: 18 / 7 / 2012

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Under the supervision of:

Dr. Ibrahim Mohamed Dessoukey

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

Dr. Mohamed Abdel-Salam Rashed

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

Dr. Amr Mohamed Egeez

Researcher of protein and nucleic acid chemistry, Agricultural Genetic Engineering Research Institute, Agricultural Research Center

دراسات على ظاهرة عدم التوافق الذاتى فى بعض أصناف المانجو

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ABSTRACT

Mahmoud Fathi Mahmoud Maklad: Studies on Self Incompatibility Phenomenon in Some Mango Cultivars. Unpublished Ph.D. Thesis, Department of Horticulture, Faculty of Agriculture, Ain Shams University, 2012.

Five mango cultivars (Alphonse, Ewais, Hindi khassa, Keitt and Zebda) were used in this study during two successive seasons i.e. 2009 and 2010 at the Horticulture Research Station in El-Kanater El-Kheireia Kalubia Governorate, Laboratory of Molecular Genetics, Department of Genetics, Faculty of Agriculture, Ain Shams University, Shoubra El-Kheima, Cairo, Egypt and Department of protein and nucleic acid chemistry, Agricultural Genetic Engineering Research Institute, ARC Giza, Egypt, were examined for their self and cross-compatibility. At the same time, the fluorescence microscope was used to determine the growth of pollen tube in the style tissue after pollination. RAPD-PCR (polymerase chain reaction randomly amplified polymorphic DNA) analysis was performed to assess the genetic variation in cross-compatibility between them.

The obtained results showed that**,** Hindi khassa cv. was the earliest in beginning of blooming date while, Keitt and Zebda cv.s. were the latest in blooming date in the two seasons of study. Zebda cv. had the least length of panicle (13.00 to 13.10 cm) compared to the other four cultivars. The highest sex ratio (more perfect flowers) was found in Keitt cv. followed by the other cultivars under study in the two seasons. Microscopic examination for Alphonse, Ewais and Hindi khassa cultivars after self pollination revealed various degrees of self incompatibility characteristics in most of selfing pollen tubes such as short tubes which were unable to penetrate the style. Additionally, many deposits of calluses were appeared at a long of the pollen tubes after self pollination. The germination of Keitt and Zebda pollen grains on Hindi khassa and Keitt stigmatic surface, respectively were higher than other combinations and such pollen tubes reached to the base of the style in 4 days after

pollination, this is an indication of high cross compatible between each two cultivars. Moreover, the percentage of pistils with pollen tubes reaching stylar base was the highest when Keitt cultivar was used as a pollinizer to Zebda (19.04 %) and was (16.66 %) when Alphonse was used as a pollinizer for Keitt, while, Ewais gave the lowest percentage of pistils with pollen tubes reaching the base of the style 7 days after self pollination. In general, selfing of either cultivar induced lower number of pollen tubes at style bases compared to crossing to other cultivars. The highest initial number of fruits per panicle was observed when Keitt cv. was crossed by Zebda pollen grains meanwhile the lowest initial number of fruits per panicle value was noticed when Ewais cv. was selfed i.e. open followed by cross pollination gave the highest initial number of fruits per panicle in all cultivars under study than after self pollination.

For PCR-RAPD analysis, 10 arbitrary (12-mer) and 12 arbitrary (10-mer) primers were used (Operon Technologies Inc., Alameda, CA). A total of 91 and 161 polymorphic bands were detected for 10 primers (12-mer) and 12 primers (10-mer) RAPD analysis, respectively.

Dendrogram tree generated across RAPD analysis demonstrated that the highest similarity was scored between Alphonse and Ewais (77.1 %), while the lowest was scored between Keitt and Hindi khassa cultivars (28.1 %)

Some RAPD markers may be linked to some flowering characteristics such as beginning of blooming (C11-1952), length of panicle (B3-270), sex ratio (C6-810) and compatibility characteristics such as best pollinizer for each cultivar i.e. (Primers A11-1589, A21-579, A9-2582, A0-3249 and A2-1264)

Key words: Mango – blooming date – sex ratio – compatibility – cross pollination – pollen tube growth – RAPD- PCR – DNA markers.

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