

PHYSIOLOGICAL STUDIES ON MANGO

By

ALI ASHOUR SHAABAN SAYED

B.Sc. Agric. Sci. (Plant pathology), Fac. Agric., Fayoum Univ., 2009

A THESIS

**Submitted in Partial Fulfillment of
The Requirements for the Degree of
MASTER OF SCIENCE**

IN

**Agricultural Sciences
(Plant physiology)
Agric. Botany Department
Faculty of Agriculture
Fayoum University
EGYPT
2015**

ABSTRACT

Low temperature is a major environmental stress for many crops worldwide. The relationship between low temperature stress and the response of some different mango cultivars was monitored on some physiological and biochemical events that occur following cold exposure of mango trees leaves. These changes were studied under *in vitro* conditions (field, air ambient temperature) and *in vivo* conditions (laboratory, controlled temperatures). However, mango trees were tested to evaluate the ability of mango cultivars to acquire cold injury during exposure to low temperature. To verify this objective, 12 popular commonly

mango cultivars (30 years old) which grown in a private orchard in Fayoum Governorate, Egypt were selected. The selected cultivars were: Alphonso, Balady, Bullock's Heart, Helmand, Hindy Besennara, Mabrouka, Mestekawy, Nabeeh, Ewais, Spates, Taimour and Zebda. This study was carried out during the period of years; 2012 and 2013. **The following trends were stated:**

1. Field conditions: The detected physiological and biochemical changes were significantly differed among the tested cultivars and sampling times. In this respect, leaf pigments (Chl. a, b, total, carotenoids and anthocyanins), F_v/F_m ratio, relative water content, membrane stability index and vitality of leaves were estimated in fresh leaves (except, anthocyanin in dry leaves). A similar trend was observed by electrolytes leakage (%), Na^+ , K^+ , inorganic phosphate (P_i), Ca^{+2} , total soluble sugars (TSS) and total free amino acids (TFAA) concentrations were detected in leachate of fresh leaves. In dry leaves, Na^+ , K^+ , total phosphate (P), Ca^{+2} , N, TSS, TFAA, protein and proline content recorded significant differences as affected by the cultivar and sampling times. However, according to the results of field study, the ordering of cultivars (as descending) in their tolerance to the conditions of this study was: 1. Helmand, 2. Spates, 3. Balady, 4. Taimour, 5. Bullock's Heart, 6. Mestekawy, 7. Ewais, 8. Zebda, 9. Alphonso, 10. Nabeeh, 11. Mabrouka and 12. Hindy Besennara. **2. Laboratory conditions:** The same trend in the mentioned characters under controlled temperature (storage of mango leaves at 5°C and 10°C) was observed, the ordering of the tested cultivars was: **1. Storage at 5°C:** 1. Ewais, 2. Spates, 3. Mestekawy, 4. Mabrouka, 5. Zebda, 6. Nabeeh, 7. Alphonso, 8. Balady, 9. Bullock's Heart, 10. Helmand, 11. Hindy Besennara and 12. Taimour. **2. Storage at 10°C:** 1. Balady, 2. Alphonso, 3. Taimour, 4. Ewais, 5. Bullock's Heart, 6. Spates, 7. Helmand, 8. Hindy Besennara, 9. Mabrouka, 10. Mestekawy, 11. Nabeeh and 12. Zebda.

Key words: Mango (*Mangifera indica* L.), cultivars, cold tolerance, biochemical changes.