



**Faculty of Science  
Department of Botany**

# **Morphological Studies on the Family Crassulaceae**

**A Thesis**

Submitted in Partial Fulfillment for the Degree of Master of Science in  
Botany (Taxonomy of Flowering Plants)

**By**

**Mohamed Abd-Elfattah Salim**

B.Sc. (Botany, 2004)

**Presented to**

Department of Botany  
Faculty of Science  
Ain Shams University

**(2010)**



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## **Supervisors**

**Prof. Dr. Karima A. Hamed**

(Taxonomy of Flowering Plants)

Department of Botany, Faculty of Science, Ain Shams University

**Dr. Eman A. K. Karakish**

Assi. Prof. (Taxonomy of Flowering Plants)

Department of Botany, Faculty of Science, Ain Shams University

**Dr. Usama I. El-Magly**

Lecturer (Taxonomy of Flowering Plants)

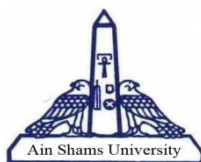
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**Department of Botany**

## **Approval Sheet**

**Name of Student:** Mohamed Abd-Elfattah Salim

**Title of Thesis:** Morphological Studies on the Family Crassulaceae

**Degree:** M.Sc.

This thesis has been approved by:

**Prof. Dr. Mohamed Abd El-fattah Zaki**

Prof. of Plant Taxonomy and Flora, Department of Botany,  
Faculty of Science, Cairo University.

**Prof. Dr. Elsaïda Mohamed Gamal El-deen**

Prof. of Plant Taxonomy and Flora, Department of Botany,  
Faculty of Science, Suez Canal University.

**Prof. Dr. Karima A. Hamed**

Prof. of Plant Taxonomy, Department of Botany, Faculty of  
Science, Ain Shams University.

**Date**

/ /2010

**Committee in Charge**

# **Declaration**

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

*Mohamed Abd-Elfattah Salim*

## Abstract

The morphological characters (vegetative and floral) of the available 22 taxa of Crassulaceae were investigated. The results were discussed in the light of some of the previous works. The floral morphological characters, especially the anatomical, proved to be more significant. Based on both the number and source of whorls of vascular traces which supply the floral parts, the studied taxa could be grouped under four groups and nine subgroups. The nectary scales are referred to as of foliar nature. The interrelationships among the taxa under investigation were discussed. A core position was suggested for the genus *Kalanchoe*.

Key words: Crassulaceae (morphology-floral morphology-anatomy interrelationships).

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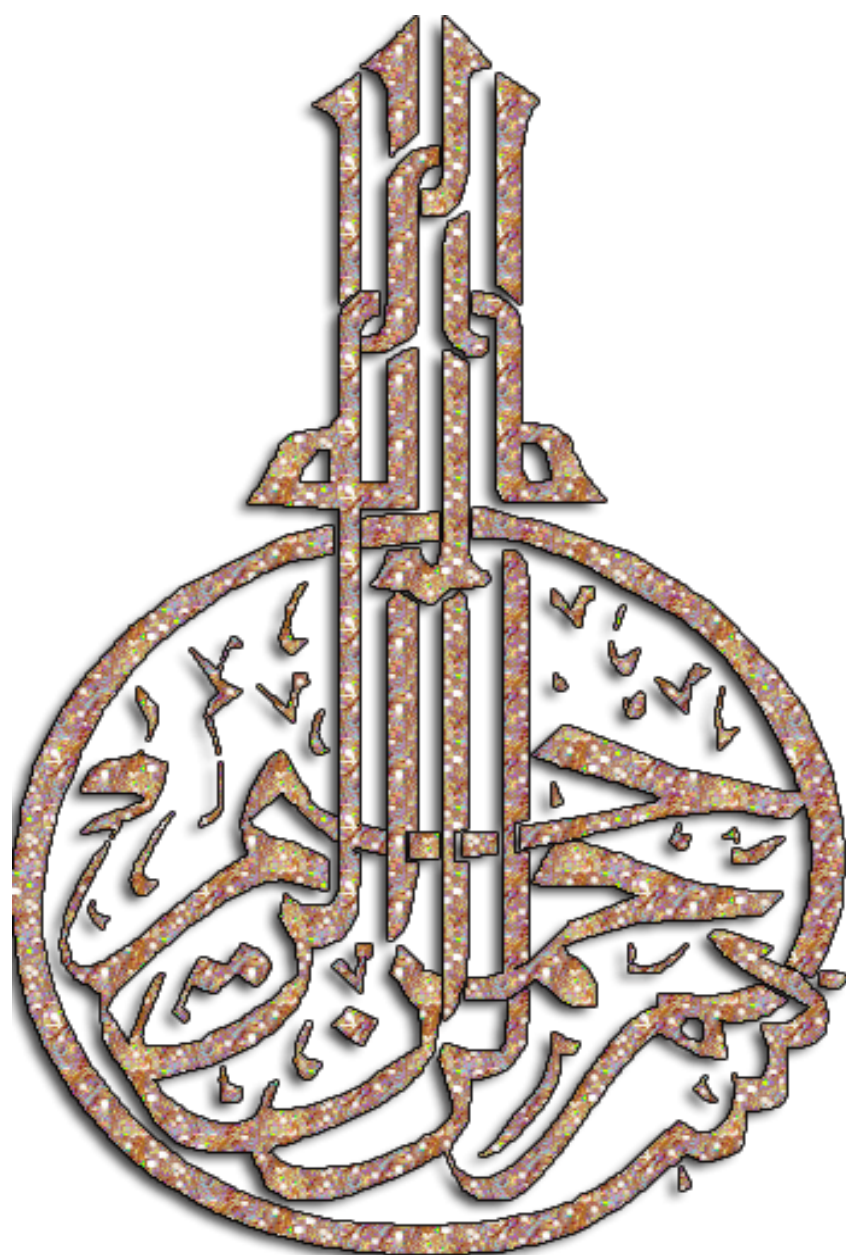
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*Mohamed Abd-Elfattah Salim*







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## Preface

Crassulaceae have been reported as including 35 genera and 1500 species by **Berger (1930)**, 25 genera and 900 species by **Bailey (1949)**, 30 genera and 1300 species by **Rendle (1952)** and 25 genera and 900 species by **Cronquist (1981)**. According to **Heywood (1978)**, the Crassulaceae is a cosmopolitan family, mainly in warm regions but its chief development in South Africa.

As regards the wild taxa in Egypt, **Montasir & Hassib (1956)** recorded two monotypic genera; *Tillaea tricopoda* Fenzl. and *Umbilicus pendulinus* DC. The latter species comprises two varieties. **Täckholm (1974)** recognized six species belonging to three genera; *Crassula alata* Berger, *Sedum sempervivum* Raymond-Hamet, *Umbilicus botryoides* Hochst. ex A. Rich., *U. horizontalis* (Guss.) DC., *U. intermedius* Boiss and *U. rupestris* (Salisb.) Dandy. **Boulos (1999)** recorded three genera comprising five species; *Crassula alata* (Viv.) A. Berger, *Rosularia lineate* (Boiss.) A. Berger, *Umbilicus botryoides* Hochst. ex A. Rich., *U. rupestris* (Salisb.) Dandy, *U. horizontalis* (Guss.) DC. The latter species includes two varieties; *U. horizontalis* var. *horizontalis* and *U. horizontalis* var. *intermedius* (Boiss.) D. F. Chamb.