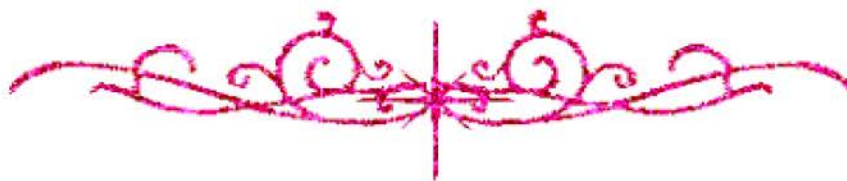


# بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ





# شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



# جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

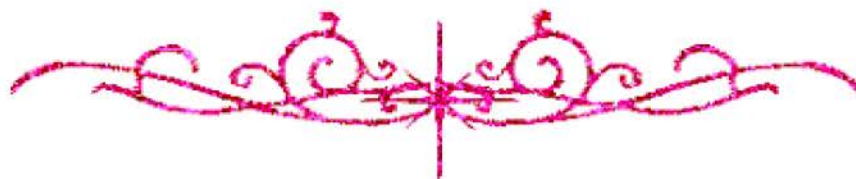
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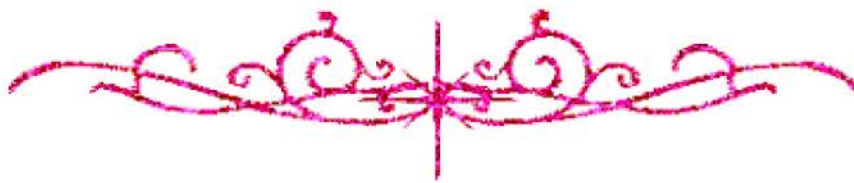
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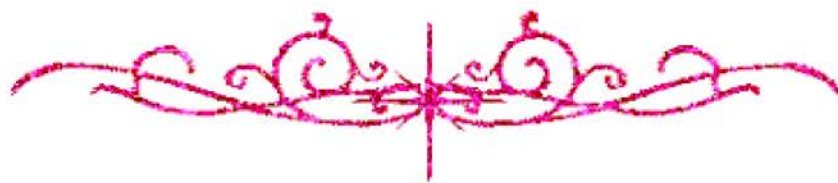


# بعض الوثائق الأصلية تالفة





# بالرسالة صفحات لم ترد بالأصل



B12791

**SYSTEMATICAL STUDIES OF THE  
SPECIES OF *SCROPHULARIACEAE*  
IN EGYPT**

**A THESIS**

Submitted For the Degree of Ph.D.  
In Botany (Taxonomy & Flora)

Presented By

**Eman Mahmoud Kamal Khalil Shams**  
(M.Sc. Botany, Cairo University)

**Botany Department  
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Cairo University**

**2000**

## Approval Sheet For Submission

Title of Ph.D. Thesis: **Systematical studies of the species of  
*Scrophulariaceae* in Egypt.**

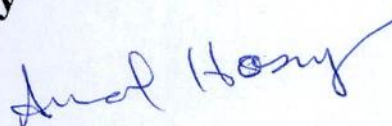
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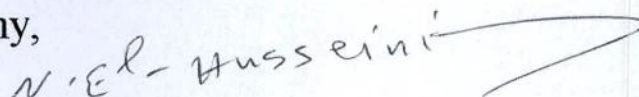
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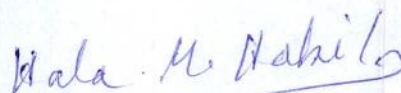
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## ABSTRACT

**Name:** Eman Mahmoud Kamal Khalil Shamsou

**Title of the thesis:** Systematical studies of the species of *Scrophulariaceae* in Egypt.

**Degree:** Ph.D., Faculty of Science, Cairo University, 2000.

The native Egyptian taxa of the family *Scrophulariaceae* were systematically revised. This revision revealed the presence of 16 genera, comprising 51 species; of these, *Anarrhinum forskahlii* var. *forskahlii*, *Kickxia gracilis*, *K. pseudoscoparia*, *Scrophularia sinaica* var. *sinaica*, *S. sinaica* var. *ampliantha* *Veronica scardica*, *V. cymbalaria* and *V. rubrifolia* subsp. *respectatissima* are new records to the flora of Egypt.

Five principal types of trichomes were recognized: unicellular, multicellular uniseriate, glandular, branched and stinging-like. Subtypes and forms of these principal types can also be recognized.

Seven pollen morphotypes were recorded, based on the type and the number of aperture as well as the exine sculpture. These morphotypes are: *Anticharis* type, *Striga* type, *Veronica* type, *Bacopa* type, *Peplidium* type, *Kickxia* type and *Scrophularia* type.

Comparative studies of the seed characters included seed shape, size and position of hilum. According to the characters of the outer epidermal cells, and those of seed coat surface; four sculpture patterns are distinguished; reticulate, tuberculate, scalariform and ridged patterns.

**Key words:** *Scrophulariaceae*, trichome types, pollen morphotypes, seed coat patterns.

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This thesis has not been submitted for  
a degree at this or any other university  
and is the original work of the writer.

*Eman Shamsa*

**To  
My Parents  
My Husband  
and  
My lovely daughter**

to whose encouragement and  
kind care this work owes so much.

*Eman Shamsa*

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*Eman shamso*

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## **INTRODUCTION AND AIM OF THE WORK**

## INTRODUCTION AND AIM OF THE WORK

*Scrophulariaceae* is a large family comprising about 292 genera and nearly 3000 species of Cosmopolitan distribution, mainly in North Temperate region; consisting mainly of herbs and a few shrubs and lianas. *Paulownia* is the sole tree genus, some of the herbaceous genera are semiparasitic (Richardson, 1978).

The members of the family are generally recognized by their typically bilateral symmetric tubular flowers ( $\pm$ actinomorphic in *Verbascum*), and their many seeded capsular fruits.

Richardson (op. cit.) discussed the major characters of the family, the reduction combined the floral parts; and placed the family under order *Scrophulariales*.

Most of the larger genera (*Pedicularis*, *Penstemon*, *Verbascum*, *Veronica*, *Linaria*, etc.) are northern hemisphere taxa, while *Hebe* and *Calceolaria* are southern genera from Australasia and South Africa (Lawrance, 1951 & Richardson, 1978).

Hutchinson (1969), included *Scrophulariaceae* with the families *Salpiglossidaceae*, *Acanthaceae*, *Gesneriaceae*, *Orobanchaceae*, *Lentibulariaceae* and *Columelliaceae* in his order *Personales*.

The family is of varied aspect, distinguished from the closely allied *Solanaceae* by the nonplicate usually zygomorphic corolla, the collateral vascular strands and the frequent reduction of the posterior stamen; from *Gesneriaceae* and *Orobanchaceae* by the usually bilocular ovary and axile placentation. It is distinguished from *Pedaliaceae* and *Bignoniaceae* by the presence of endosperm; from *Plantaginaceae* by insect pollination and from *Labiatae* and *Verbanaceae* by few to numerous ovules. *Acanthaceae* which has often a similar habit, is distinguished through the inflorescence, bracts and explosive capsules.